

Propane Biosparge Pilot Test Summary
RACER Trust Plant 2 – Lansing, Michigan

ATTACHMENTS



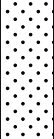
Propane Biosparge Pilot Test Summary
RACER Trust Plant 2 – Lansing, Michigan

BORING LOGS

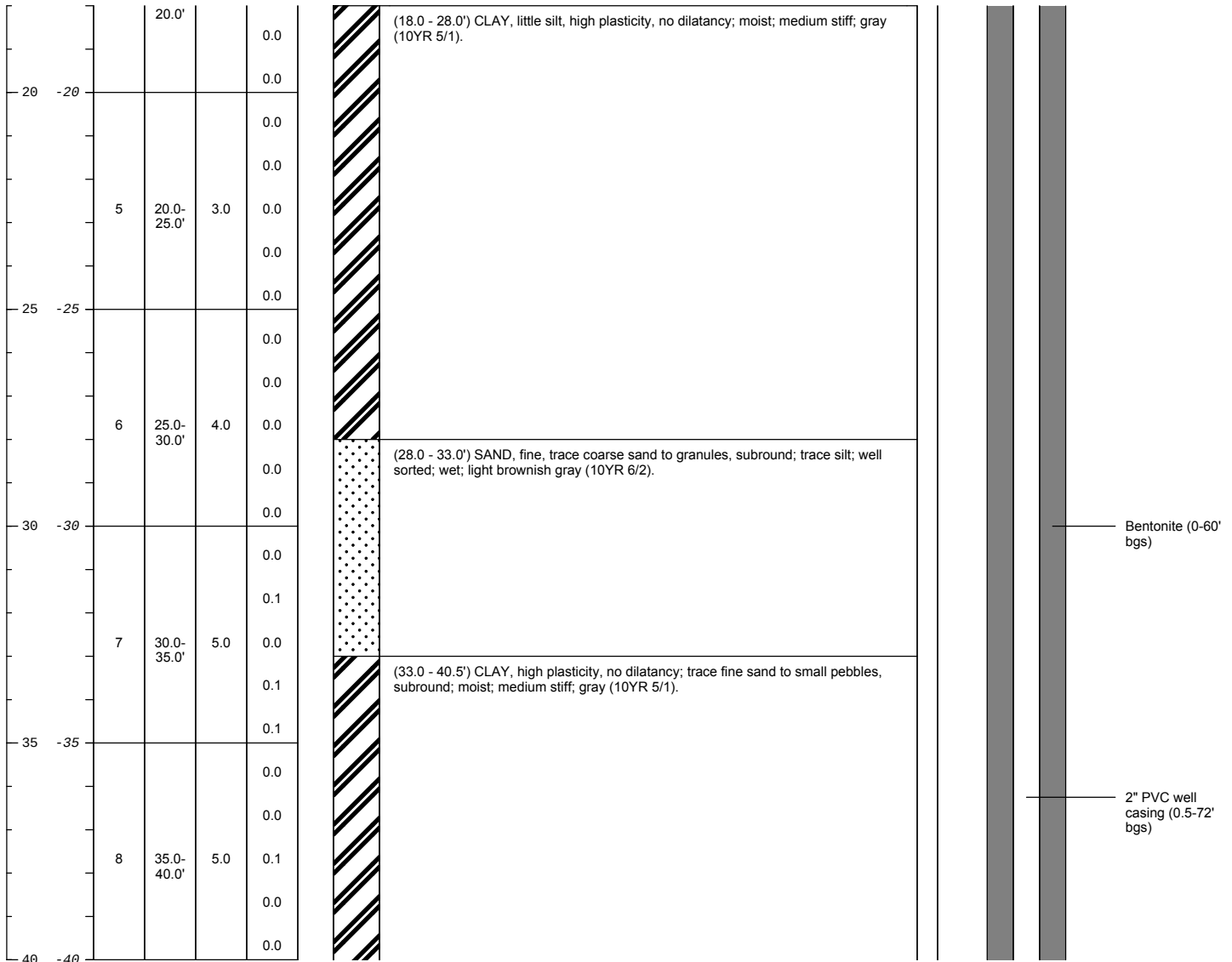


Date Start: 06/02/2016 Date Finish: 06/03/2016 Drilling Company: Cascade Driller's Name: D. Gordon Drilling Method: Rotosonic Sampling Method: Continuous Rig Type: Rotosonic Water Level Start (ft. bgs.): NA Water Level Finish (ft. btoc.): NA	Northing: NA Easting: NA Casing Elevation: NA Borehole Depth (ft. bgs.): 78.5 Surface Elevation: NA Descriptions By: A. Westhuis	Well/Boring ID: AS-16-01 Client: RACER Location: RACER Lansing Plant 2 Weather Conditions: 80 F, Sunny

DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction

0	0									
		1	0.0-5.0'	5.0	0.0			(0.0 - 0.5') CONCRETE		
					0.0			(0.5 - 3.5') SAND, fine to medium, trace granules, subround; trace silt; dry; brown (10YR 5/3).		
					0.0					
					0.0			(3.5 - 8.0') CONCRETE		
5	-5	2	5.0-10.0'	5.0	0.0					
					0.0			(8.0 - 9.0') SAND, fine to medium, trace granules to medium pebbles, subround; trace silt; well sorted; moist; yellowish brown (10YR 5/6).		
					0.0			(9.0 - 12.0') Organic material and SILT, dark brown (10YR 3/3).		
10	-10				0.0					
					0.0					
		3	10.0-15.0'	4.0	0.0			(12.0 - 18.0') CLAY, little silt, high plasticity, no dilatancy; moist; soft; gray (10YR 5/1).		
					0.0					
15	-15				0.0					
					0.0					
		4	15.0-	4.0	0.0					

	Remarks: bgs = below ground surface No odor or staining observed

[illegible]

	Remarks: bgs = below ground surface No odor or staining observed

Date Start: 06/02/2016 Date Finish: 06/03/2016 Drilling Company: Cascade Driller's Name: D. Gordon Drilling Method: Rotosonic Sampling Method: Continuous Rig Type: Rotosonic Water Level Start (ft. bgs.): NA Water Level Finish (ft. btoc.): NA	Northing: NA Easting: NA Casing Elevation: NA Borehole Depth (ft. bgs.): 78.5 Surface Elevation: NA Descriptions By: A. Westhuis	Well/Boring ID: AS-16-01 Client: RACER Location: RACER Lansing Plant 2 Weather Conditions: 80 F, Sunny

DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction

40	-40	9	40.0-45.0'	5.0	0.0			(40.5 - 45.0') SAND, fine, trace granules, subround; trace to little silt; well sorted; dry to moist; grayish brown (10YR 5/2).		
45	-45	10	45.0-50.0'	5.0	0.0			(45.0 - 48.0') CLAY and SILT, low plasticity, no dilatancy; little fine sand, trace granules to large pebbles, subround; moist; stiff; gray (10YR 5/1).		
50	-50	11	50.0-55.0'	5.0	0.0			(48.0 - 50.0') SAND, very fine, subround; and SILT; well sorted; dry to moist; grayish brown (10YR 5/2).		
55	-55	12	55.0-60.0'	5.0	0.0			(50.0 - 63.0') SILT, trace to little clay, non-plastic, no dilatancy; little to some fine sand, trace granules to large pebbles, subround; dry; stiff to very stiff; very dark gray (10YR 3/1).		
60	-60				0.1			NOTE: Trace fragments of interbedded sandstone and shale starting at 58.0' bgs.		

	Remarks: bgs = below ground surface No odor or staining observed

Date Start: 06/02/2016 Date Finish: 06/03/2016 Drilling Company: Cascade Driller's Name: D. Gordon Drilling Method: Rotosonic Sampling Method: Continuous Rig Type: Rotosonic Water Level Start (ft. bgs.): NA Water Level Finish (ft. btoc.): NA	Northing: NA Easting: NA Casing Elevation: NA Borehole Depth (ft. bgs.): 78.5 Surface Elevation: NA Descriptions By: A. Westhuis	Well/Boring ID: AS-16-01 Client: RACER Location: RACER Lansing Plant 2 Weather Conditions: 80 F, Sunny

DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction

65	-65	13	60.0-65.0'	5.0	0.0			(63.0 - 65.0') SANDSTONE and SHALE, weathered, very fine, light gray (10YR 7/1).		Neat Cement (60-70' bgs)
					0.0					
					0.0					
70	-70	14	65.0-67.0'	2.0	0.0			(65.0 - 70.0') SHALE, non-plastic, no dilatancy; little to some very fine to fine sand, subround; little sandstone and shale fragments, subangular; very stiff; dark gray (10YR 4/1).		Choker Sand (70-71' bgs)
					0.0					
					0.1					
75	-75	15	67.0-74.0'	5.0	0.0			(70.0 - 72.0') SANDSTONE, weathered, very fine, light gray (10YR 7/1).		Filter Pack (71-78.5' bgs) 2" PVC, 10 slot well screen (72-77' bgs)
					0.1			(72.0 - 78.5') SANDSTONE and SHALE, weathered.		
					0.1					
		16	74.0-78.5'	4.0	0.0					
					0.0					
					0.0					

	Remarks: bgs = below ground surface No odor or staining observed

ARCADIS

Well Construction Log - Stick up

(Unconsolidated)

Project RACER Trust Plant 2 Well AS-16-01

Town/City Lansing, MI

County Ingham State MI

Permit No. _____

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed

☐ Estimated

Installation Date(s) 6/2/16

Drilling Method Sonic

Drilling Contractor Cascade Drilling

Drilling Fluid Water

Development Technique(s) and Date(s)

Fluid Loss During Drilling = 150 ~~none~~ gallons

Water Removed During Development _____ gallons

Static Depth to Water _____ feet below M.P.

Pumping Depth to Water _____ feet below M.P.

Pumping Duration _____ hours

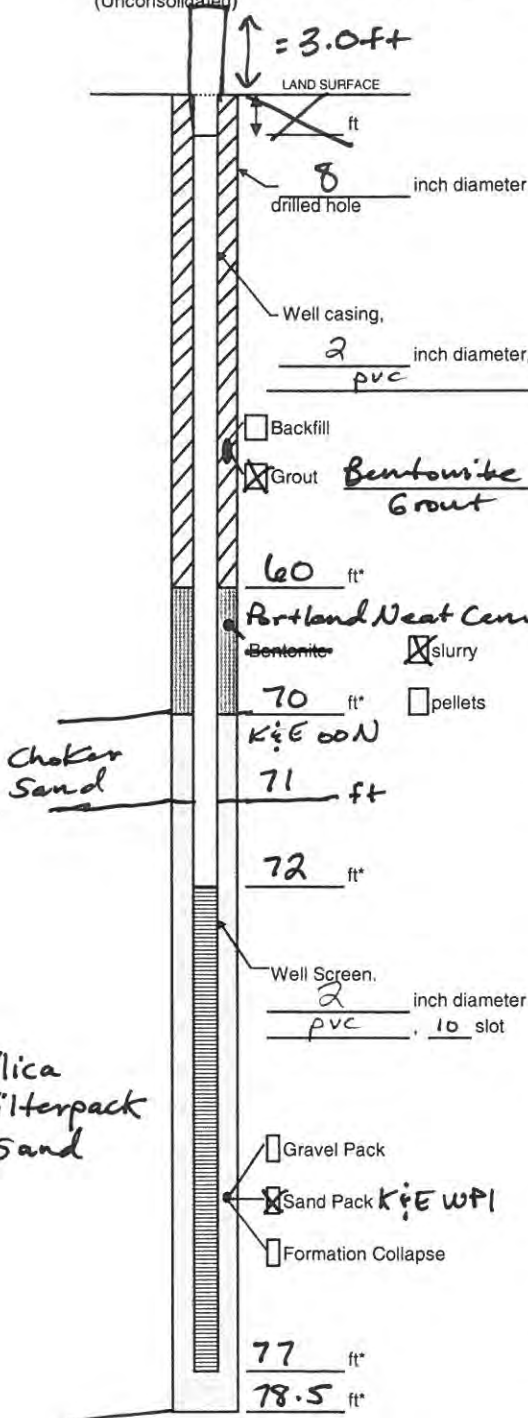
Yield _____ gpm Date _____

Specific Capacity _____ gpm/ft

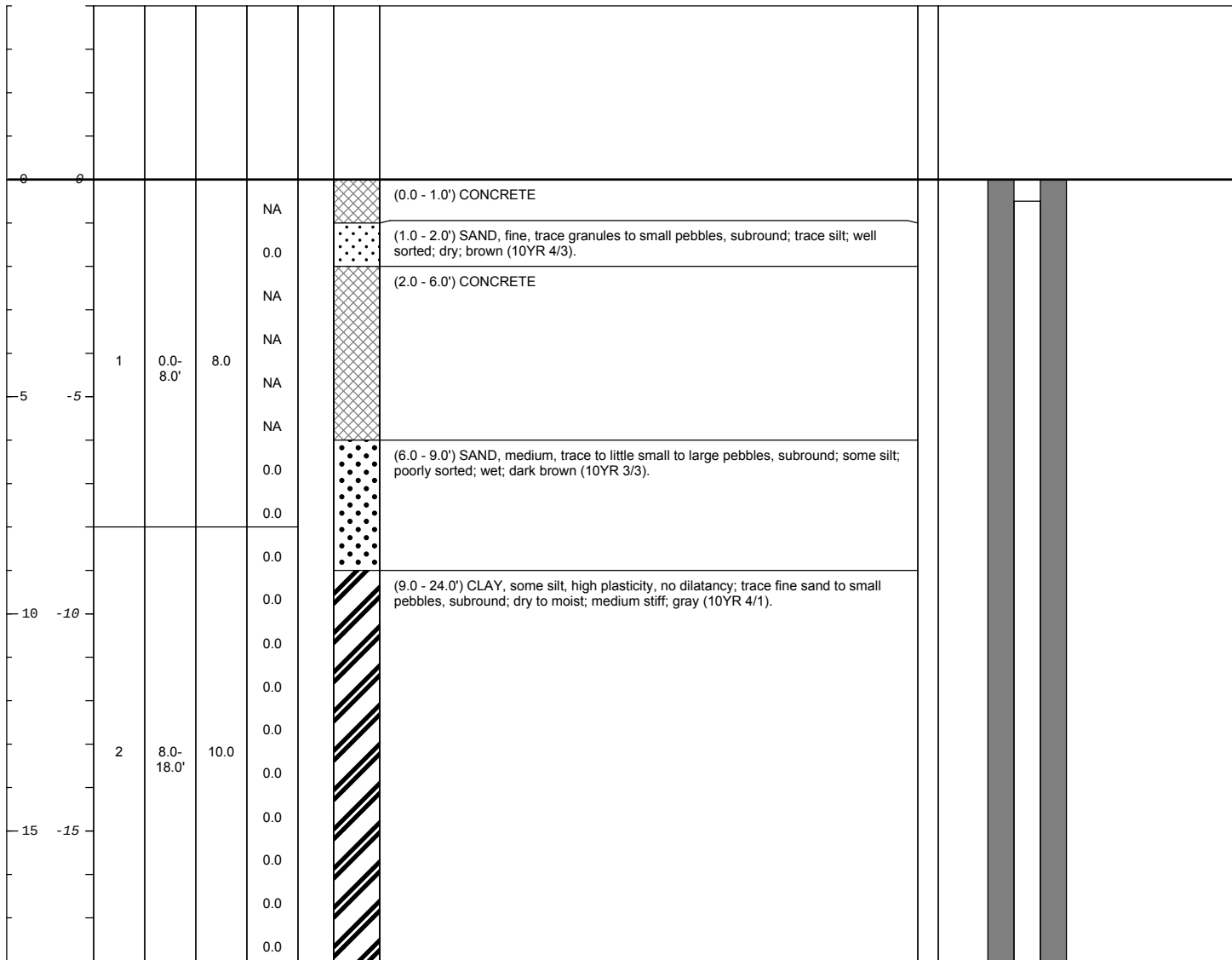
Well Purpose Air Sparge Well

Remarks _____

Prepared by A. Westhuis



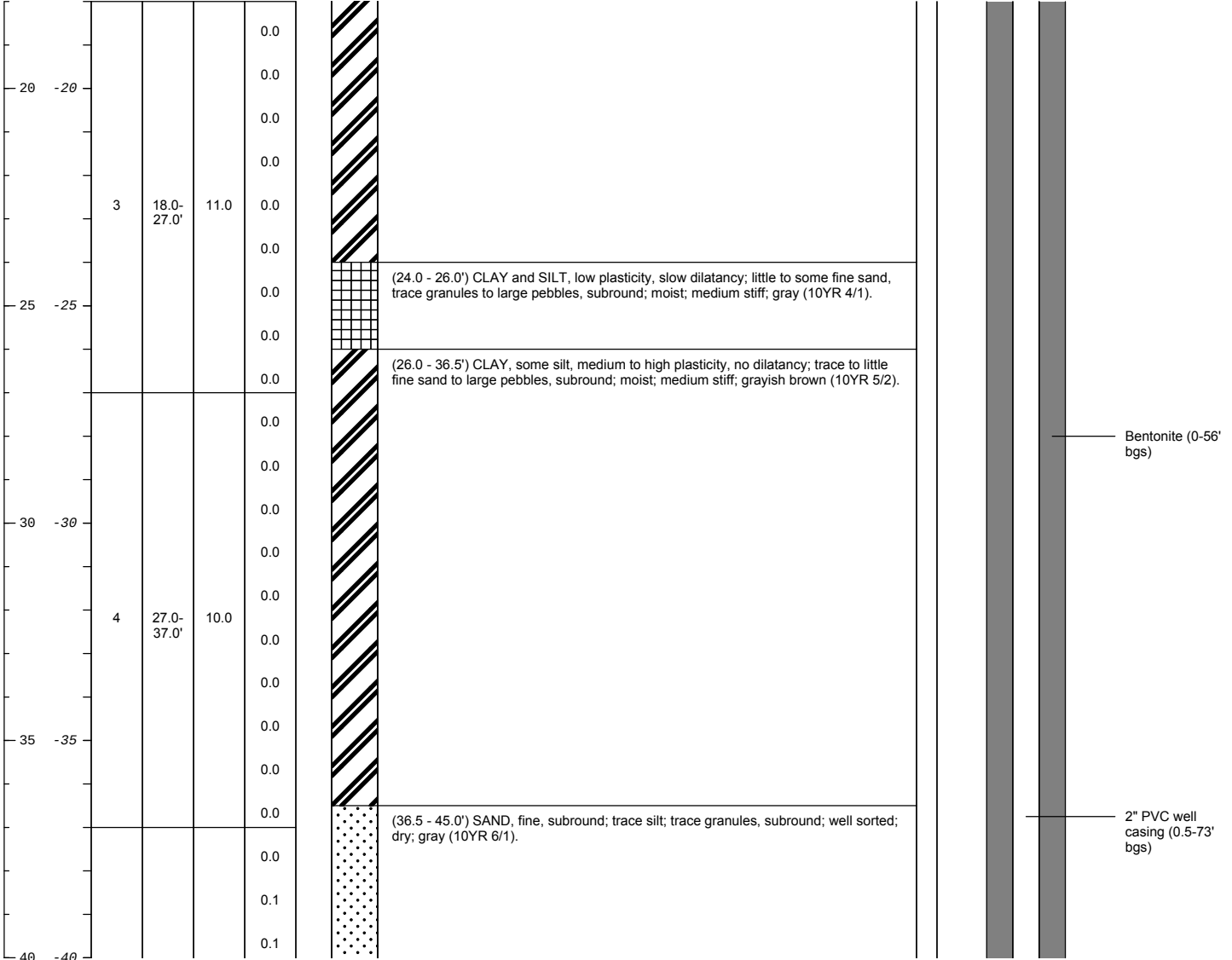
DEPTH (feet bgs.)
ELEVATION
Sample Run Number
Sample/Int/Type
Recovery (feet)
PID Headspace (ppm)
Analytical Sample
Geologic Column
Stratigraphic Description
Water Level (ft. bgs.)
Well/Boring Construction



	Remarks: bgs = below ground surface No odor or staining observed

Date Start: 08/16/2016 Date Finish: 08/17/2016 Drilling Company: Cascade Driller's Name: M. Bond Drilling Method: Rotosonic Sampling Method: Continuous Rig Type: Rotosonic Water Level Start (ft. bgs.): NA Water Level Finish (ft. btoc.): NA	Northing: NA Easting: NA Casing Elevation: NA Borehole Depth (ft. bgs.): 79.0' bgs Surface Elevation: NA Descriptions By: A. Westhuis	Well/Boring ID: TW-16-01 Client: RACER Location: RACER Lansing Plant 2 Weather Conditions: 80 F, Cloudy, Light Rain

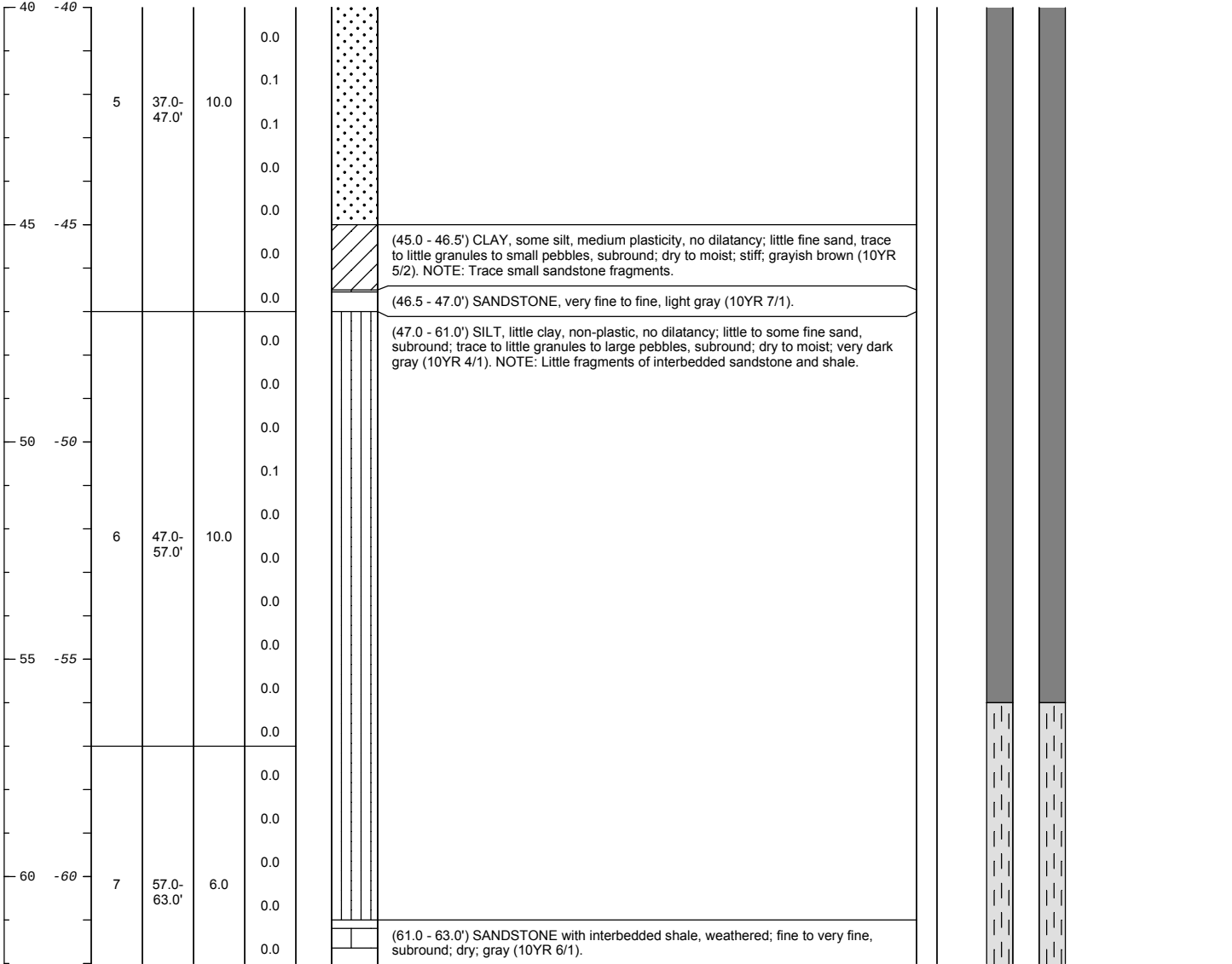
DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction



	Remarks: bgs = below ground surface No odor or staining observed

Date Start: 08/16/2016 Date Finish: 08/17/2016 Drilling Company: Cascade Driller's Name: M. Bond Drilling Method: Rotasonic Sampling Method: Continuous Rig Type: Rotasonic Water Level Start (ft. bgs.): NA Water Level Finish (ft. btoc.): NA	Northing: NA Easting: NA Casing Elevation: NA Borehole Depth (ft. bgs.): 79.0' bgs Surface Elevation: NA Descriptions By: A. Westhuis	Well/Boring ID: TW-16-01 Client: RACER Location: RACER Lansing Plant 2 Weather Conditions: 80 F, Cloudy, Light Rain

DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction



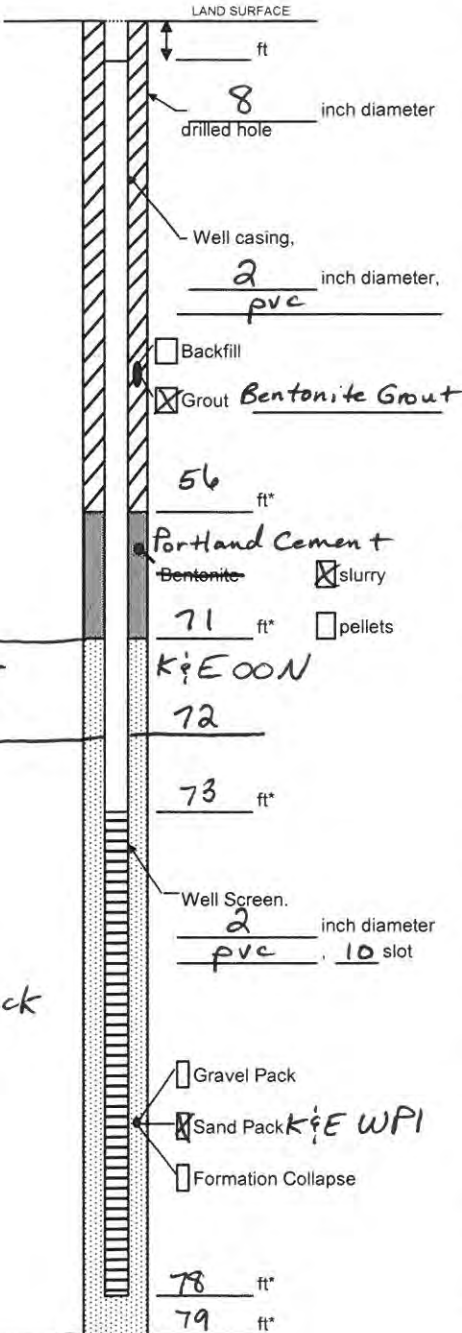
	Remarks: bgs = below ground surface No odor or staining observed

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	Remarks: bgs = below ground surface No odor or staining observed

Well Construction Log

(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project RACER Lansing Well TW-16-01

Town/City Lansing

County Ingham State MI

Permit No. _____

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed

☐ Estimated

Installation Date(s) 8/17/16

Drilling Method Sonic

Drilling Contractor Cascade Drilling

Drilling Fluid Water

Development Technique(s) and Date(s)

Fluid Loss During Drilling _____ gallons

Water Removed During Development _____ gallons

Static Depth to Water _____ feet below M.P.

Pumping Depth to Water _____ feet below M.P.

Pumping Duration _____ hours

Yield _____ gpm Date _____

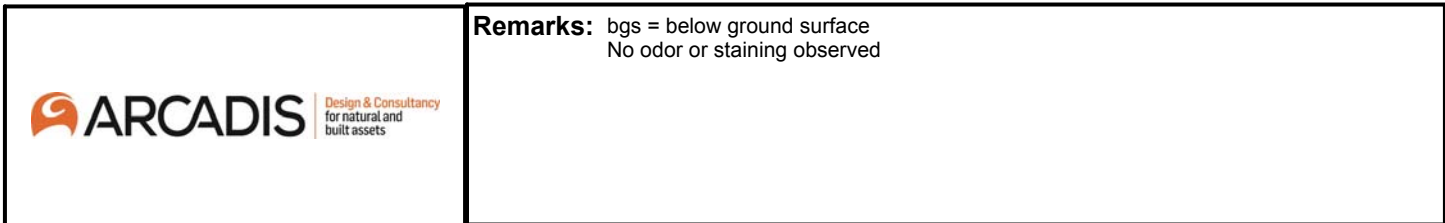
Specific Capacity _____ gpm/ft

Well Purpose Air Sparge Well

Remarks _____

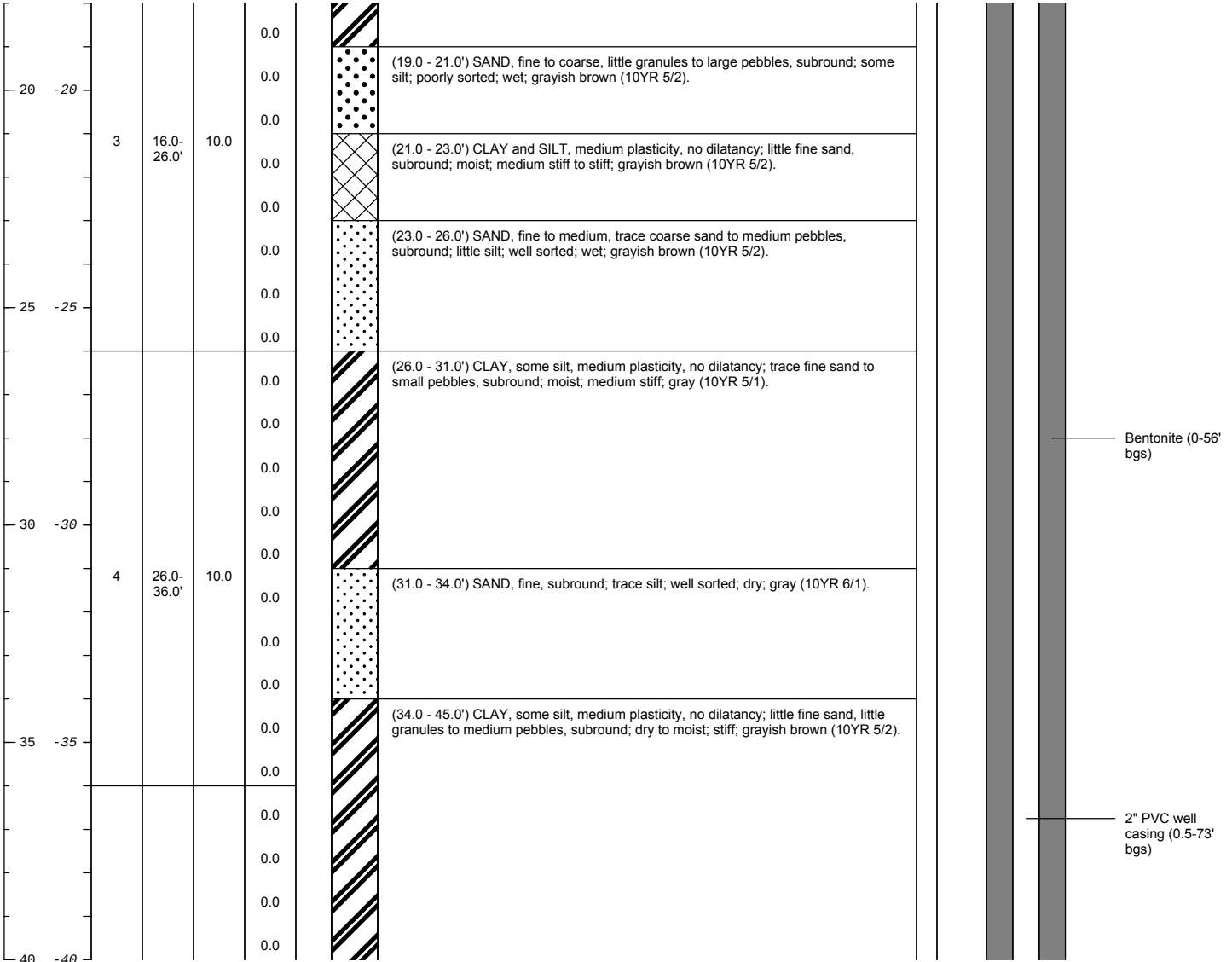
Prepared by A. Westhuis

DEPTH (feet bgs.)	Stratigraphic Description Water Level (ft. bgs.) Well/Boring Construction
ELEVATION	
Sample Run Number	
Sample/Int/Type	
Recovery (feet)	
PID Headspace (ppm)	
Analytical Sample	
Geologic Column	



Date Start: 08/15/2016 Date Finish: 08/16/2016 Drilling Company: Cascade Driller's Name: M. Bond Drilling Method: Rotosonic Sampling Method: Continuous Rig Type: Rotosonic Water Level Start (ft. bgs.): NA Water Level Finish (ft. btoc.): NA	Northing: NA Easting: NA Casing Elevation: NA Borehole Depth (ft. bgs.): 79.5' bgs Surface Elevation: NA Descriptions By: A. Westhuis	Well/Boring ID: AS-16-02 Client: RACER Location: RACER Lansing Plant 2 Weather Conditions: 80 F, Cloudy

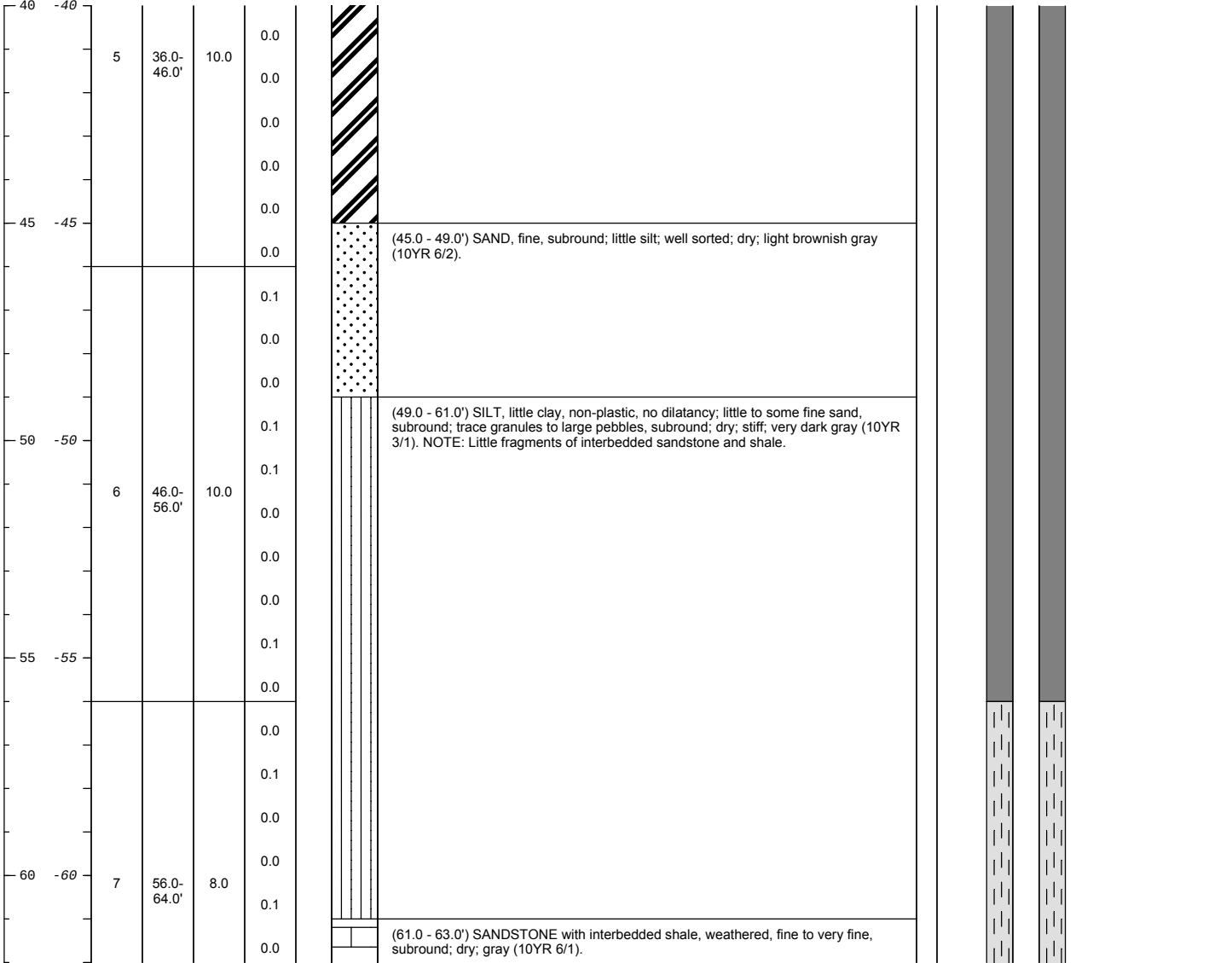
DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction



	Remarks: bgs = below ground surface No odor or staining observed

Date Start: 08/15/2016 Date Finish: 08/16/2016 Drilling Company: Cascade Driller's Name: M. Bond Drilling Method: Rotasonic Sampling Method: Continuous Rig Type: Rotasonic Water Level Start (ft. bgs.): NA Water Level Finish (ft. btoc.): NA	Northing: NA Easting: NA Casing Elevation: NA Borehole Depth (ft. bgs.): 79.5' bgs Surface Elevation: NA Descriptions By: A. Westhuis	Well/Boring ID: AS-16-02 Client: RACER Location: RACER Lansing Plant 2 Weather Conditions: 80 F, Cloudy

DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction



	Remarks: bgs = below ground surface No odor or staining observed

Date Start: 08/15/2016 Date Finish: 08/16/2016 Drilling Company: Cascade Driller's Name: M. Bond Drilling Method: Rotosonic Sampling Method: Continuous Rig Type: Rotosonic Water Level Start (ft. bgs.): NA Water Level Finish (ft. btoc.): NA	Northing: NA Easting: NA Casing Elevation: NA Borehole Depth (ft. bgs.): 79.5' bgs Surface Elevation: NA Descriptions By: A. Westhuis	Well/Boring ID: AS-16-02 Client: RACER Location: RACER Lansing Plant 2 Weather Conditions: 80 F, Cloudy

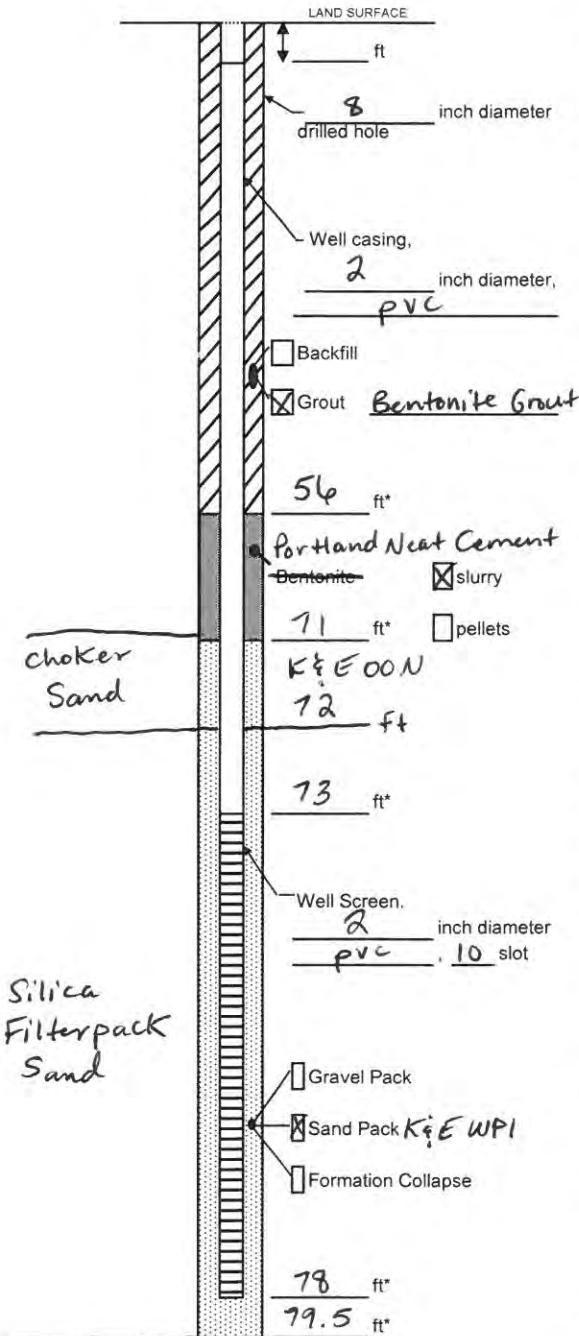
DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction

					0.0					
					0.1			(63.0 - 68.0') SANDSTONE, weathered, moist to wet, gray (10YR 6/1).		Neat Cement (56-71' bgs)
65	-65	8	64.0-66.0'	NA	0.0					
					0.0					
					0.1					
					0.0			(68.0 - 73.5') SHALE with interbedded sandstone, weathered, very fine; dry; gray (10YR 6/1) to dark gray (10YR 4/1).		
70	-70	9	66.0-73.0'	7.0	0.0					
					0.0					
					0.0					
					0.0					
					0.0					
					0.0					
75	-75	10	73.0-79.5.0'	6.5	0.0			(73.5 - 79.5') SANDSTONE with interbedded shale, weathered, moist to wet; gray (10YR 6/1). NOTE: Wet at 75.5' bgs.		Filter Pack (72-79.5' bgs)
					0.0					2" PVC, 10 slot well screen (73-78' bgs)
					0.0					
					0.0					
					0.0					
					0.0					
					0.0					

	Remarks: bgs = below ground surface No odor or staining observed

Well Construction Log

(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project RACER Lansing Well AS-16-02

Town/City Lansing

County Ingham State MI

Permit No. _____

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed

☐ Estimated

Installation Date(s) 8/16/16

Drilling Method Sonic

Drilling Contractor Cascade Drilling

Drilling Fluid Water

Development Technique(s) and Date(s)

Fluid Loss During Drilling ~150 gallons

Water Removed During Development _____ gallons

Static Depth to Water _____ feet below M.P.

Pumping Depth to Water _____ feet below M.P.

Pumping Duration _____ hours

Yield _____ gpm Date _____

Specific Capacity _____ gpm/ft

Well Purpose Air Sparge Well

Remarks _____

Prepared by A. Westhuis

Soil Boring Log

Sheet: 1 of 5

Project Name: RACER Lansing Date Started: 8/17/16 Logger: A. Westhuis
 Project Number: B0064479.2016.00102 Date Completed: 8/18/16 Editor: _____
 Project Location: Lansing, MI Weather Conditions: Sunny, =80°F

Depth (feet)	Sample ID & Time	Recovery (in.)	PID (ppm)	USCS Class.	Description	Construction Details
1			NA		(0.0 - 1.0 ft) Concrete.	
2			0.0		(1.0 - 2.0 ft) SAND, fine to coarse, little granules to med. pebbles, subround, some silt, poorly sorted, moist; brown (10YR 4/3)	
3			0.0		(2.0 - 6.0 ft) CLAY, some silt, high plasticity, no dilatancy; little fine sand, trace to little granules to large pebbles, subround; moist; stiff; gray (10YR 5/1).	
4		84"	0.0			
5			0.0			
6			0.0			
7	7'	✓	0.0		(6.0 - 8.0 ft) SAND, fine to med. trace granules to small pebbles, subround; trace silt; well sorted; moist to wet; light yellowish brown (10YR 6/4).	
8			0.0			
9			0.0		(8.0 - 17.0 ft) CLAY, some silt, med. to high plasticity, no dilatancy; trace fine sand, little granules to very large pebbles, subround; moist; stiff; gray (10YR 5/1).	
10			0.0		Note: Glacial Till.	
11		108"	0.0			
12			0.0			
13			0.0			
14			0.0			
15			0.0			
16			0.0			
17	17'	✓	0.0		(17.0 - 20.0 ft) SAND, med. to coarse, trace granules to small pebbles, subround; little silt; well sorted; wet; grayish brown (10YR 5/2).	
18			0.0			
19			0.0			
20			0.0			

Drilling Co.: Cascade Drilling
 Driller: Mike Bond
 Drilling Method: Hand Auger/Sonic
 Drilling Fluid: Water
 Remarks: _____

Sampling Method: Continuous
 Sampling Interval: 10 ft
 Water Level Start: _____
 Water Level Finish: _____
 Converted to Well: ☒ Yes ☐ No
 Surface Elev: NA
 North Coord: NA
 East Coord: NA

Soil Boring Log

Sheet: 2 of 5

Project Name: RACER Lansing Date Started: 8/17/16 Logger: A. Westhuis
 Project Number: B0064479.2016.00102 Date Completed: 8/18/16 Editor: _____
 Project Location: Lansing, MI Weather Conditions: Sunny, = 80°F

Depth (feet)	Sample ID & Time	Recovery (in.)	PID (ppm)	USCS Class.	Description	Construction Details
21			0.0		(20.0 - 26.0 ft) CLAY, some silt, med. to high plasticity, no dilatancy; trace fine sand to large pebbles, subround; moist, stiff, gray (10YR 5/1).	
22			0.0			
23		120"	0.0		Note: Glacial Till.	
24			0.0			
25			0.0			
26			0.0			
27	27'	✓	0.0		(26.0 - 28.0 ft) SAND, very fine to fine, subround; trace silt; well sorted; wet; light brownish gray (10YR 6/2).	
28			0.0			
29			0.0		(28.0 - 52.0 ft) CLAY, some silt, med. plasticity, no dilatancy; little fine sand, trace granules to very large pebbles, subround; dry to moist; stiff to very stiff; gray (10YR 5/1).	
30			0.0			
31			0.0			
32			0.0			
33		108"	0.0			
34			0.0			
35			0.0			
36			0.0			
37	37'	✓	0.0			
38			0.0			
39			0.0			
40			0.0			

Remarks: _____

Soil Boring Log

Sheet: 3 of 5

Project Name: RACER Lansing Date Started: 8/17/16 Logger: A. Westhuis
 Project Number: B0064479.2016.00102 Date Completed: 8/18/16 Editor: _____
 Project Location: Lansing, MI Weather Conditions: Sunny, =80°F

Depth (feet)	Sample ID & Time	Recovery (in.)	PID (ppm)	USCS Class.	Description	Construction Details
41			0.0			
42			0.0			
43		102"	0.0			
44			0.0			
44			0.0			
46			0.0			
47	47'	↓	0.0			
48			0.0			
49			0.0			
50			0.0			
51			0.0			
52		108"	0.0			
53			0.0		(52.0 - 54.0 ft) SILT, little clay, non-plastic, no dilatancy; well sorted; moist; soft; light gray (10xR 7/1).	
54			0.0			
55			0.0		(54.0 - 59.0 ft) SAND, very fine to fine; trace to little silt; well sorted; dry to moist; light gray (10xR 7/1).	
56			0.0			
57	57'	↓	0.0			
58			0.0			
59			0.1		(59.0 - 65.0 ft) CLAY and SILT, low plasticity to non-plastic trace to little very fine to fine sand, subround; trace granules to large pebbles, subround; moist; stiff; gray (10xR 5/1).	
60			0.0			

Remarks: Note: Large Sandstone fragments
starting at 60 ft.

Soil Boring Log

Sheet: 4 of 5

Project Name: RACER Lansing

Date Started: 8/17/16

Logger: A. Westhuis

Project Number: B0064479.2016.00102

Date Completed: 8/18/16

Editor:

Project Location: Lansing, MI

Weather Conditions: Sunny, = 80°F

Depth (feet)	Sample ID & Time	Recovery (in.)	PID (ppm)	USCS Class.	Description	Construction Details
61			0.0			
62			0.0			
63		120"	0.0			
64			0.0			
65			0.0		(65.0 - 69.0 ft) SANDSTONE very fine, light gray (10xR 7/1).	
66			0.0			
67	67'		0.0		Note: Wet at 67.0 ft	
68			0.0			
69			0.0			
70		60"	0.0		(69.0 - 70.0 ft) SANDSTONE and SHALE, weathered, very fine, gray (10xR 6/1). Note: Dry.	
71			0.0		(70.0 - 72.0 ft) SHALE, weathered, dark gray (10xR 4/1).	
72	72'		0.0		Note: Dry.	
73			0.0		(72.0 - 74.0 ft) SANDSTONE, very fine, weathered, light gray (10xR 7/1).	
74			0.0		Note: Dry	
75		60"	0.0		(74.0 - 75.0 ft) SANDSTONE and SHALE, weathered; gray (10xR 6/1).	
76			0.0		Note: Moist to wet. Large sandstone cores.	
77	77'		0.0		(75.0 - 84.0 ft) SANDSTONE, little interbedded shale.	
78			0.0			
79			0.0			
80			0.0			

Remarks:

Soil Boring Log

Sheet: 5 of 5

Project Name: RACER Lansing Date Started: 8/17/16 Logger: A. Westhuis
 Project Number: B0064479.2016.00102 Date Completed: 8/18/16 Editor: _____
 Project Location: Lansing, MI Weather Conditions: Sunny, = 80°F

Depth (feet)	Sample ID & Time	Recovery (in.)	PID (ppm)	USCS Class.	Description	Construction Details
81		↓	0.0			
82	82'	↓	0.0		~~EOB @ 82.0 ft bgs~~ ^{all}	
83		↓	0.0			
84	84'	↓	0.0		EOB @ 84.0 ft bgs	
85						
86						
87						
88						
89						
90						
91						
92						
93						
94						
95						
96						
97						
98						
99						
100						

Remarks: _____

Date Start: 08/18/2016 Date Finish: 08/18/2016 Drilling Company: Cascade Driller's Name: M. Bond Drilling Method: Rotosonic Sampling Method: Continuous Rig Type: Rotosonic Water Level Start (ft. bgs.): NA Water Level Finish (ft. btoc.): NA	Northing: NA Easting: NA Casing Elevation: NA Borehole Depth (ft. bgs.): 79.0' bgs Surface Elevation: NA Descriptions By: A. Westhuis	Well/Boring ID: SB-A5.2-NK140 Client: RACER Location: RACER Lansing Plant 2 Weather Conditions: 80 F, Partly Cloudy

DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction

0	0						X	(0.0 - 1.0') Crushed concrete and asphalt, some fine sand, subround; brown (10YR 4/3). NOTE: Fill.		
					0.0		X	(1.0 - 2.0') CONCRETE		
		1	0.0-7.0'	7.0	0.0			(2.0 - 6.0') SAND, very fine to fine, subround; little granules to medium pebbles, subround; and SILT, trace clay, non-plastic to low plasticity, no dilatancy; moist; medium stiff; brown (10YR 4/3).		
-5	-5				0.0					
					0.3					
					1.2					
					11.5			(6.0 - 9.0') CLAY, some silt, medium to low plasticity, no dilatancy; little to some fine sand, subround; trace granules to small pebbles, subround; moist to wet; medium stiff to soft; dark gray (10YR 4/1).		
					1.9					
					1.6					
-10	-10				1.1			(9.0 - 10.0') SAND, fine, subround; little to some silt; wet; well sorted; black (10YR 2/1). NOTE: Black (10YR 2/1) staining, moderate odor.		
					0.8			(10.0 - 13.0') SAND, fine to medium, some coarse sand, subround; trace granules to medium pebbles, subround; trace to little silt; poorly sorted; wet; light brownish gray (10YR 6/2).		
					0.2					
					0.0					
-15	-15	2	7.0-17.0'	9.0	0.0			(13.0 - 20.0') CLAY, some silt; medium to high plasticity, no dilatancy; little fine sand, trace granules to very large pebbles, subround; dry to moist; stiff to very stiff; brown (10YR 5/3). NOTE: Glacial till.		
					0.0					
					0.0					
					0.0					
					0.0					

	Remarks: bgs = below ground surface No odor or staining observed VAP samples collected from screened intervals 67.0-72.0' bgs and 74.0-79.0' bgs

Date Start: 08/18/2016 Date Finish: 08/18/2016 Drilling Company: Cascade Driller's Name: M. Bond Drilling Method: Rotosonic Sampling Method: Continuous Rig Type: Rotosonic Water Level Start (ft. bgs.): NA Water Level Finish (ft. btoc.): NA	Northing: NA Easting: NA Casing Elevation: NA Borehole Depth (ft. bgs.): 79.0' bgs Surface Elevation: NA Descriptions By: A. Westhuis	Well/Boring ID: SB-A5.2-NK140 Client: RACER Location: RACER Lansing Plant 2 Weather Conditions: 80 F, Partly Cloudy

DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction

20	-20				0.0					
					0.0			(20.0 - 22.0') SAND, medium, subangular; trace silt; well sorted; wet; grayish brown (10YR 5/2).		
					0.0			(22.0 - 31.0') CLAY, some silt, medium plasticity, no dilatancy; trace fine sand, trace granules to large pebbles, subround; dry to moist; stiff; grayish brown (10YR 5/2).		
25	-25	3	17.0-27.0'	9.0	0.0					
					0.0					
					0.0					
					0.0					
					0.0					
30	-30				0.0					
					0.0			(31.0 - 33.0') SAND, very fine to fine, subround; and SILT, non-plastic, slow dilatancy; well sorted; wet; pale brown (10YR 6/3).		
					0.0			(33.0 - 51.0') CLAY, some silt, low plasticity, no dilatancy; trace fine sand, little granules to very large pebbles, subround; dry; very stiff; grayish brown (10YR 5/2).		
35	-35	4	27.0-37.0'	10.0	0.0					
					0.0					
					0.0					
					0.0					
					0.0					
					0.0					
					0.0					
					0.0					
40	-40				0.0					

	Remarks: bgs = below ground surface No odor or staining observed VAP samples collected from screened intervals 67.0-72.0' bgs and 74.0-79.0' bgs

Date Start: 08/18/2016 Date Finish: 08/18/2016 Drilling Company: Cascade Driller's Name: M. Bond Drilling Method: Rotosonic Sampling Method: Continuous Rig Type: Rotosonic Water Level Start (ft. bgs.): NA Water Level Finish (ft. btoc.): NA	Northing: NA Easting: NA Casing Elevation: NA Borehole Depth (ft. bgs.): 79.0' bgs Surface Elevation: NA Descriptions By: A. Westhuis	Well/Boring ID: SB-A5.2-NK140 Client: RACER Location: RACER Lansing Plant 2 Weather Conditions: 80 F, Partly Cloudy

DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction

40	-40				0.0					
		5	37.0-47.0'	NA	0.0					
45	-45				0.0					
					0.0					
					0.0					
50	-50				0.0					
					0.0					
					0.0					
		6	47.0-57.0'	10.0	0.0			(51.0 - 56.5') SAND, very fine to fine, subround; trace silt; well sorted; dry; light gray (10YR 7/1).		
55	-55				0.0					
					0.0					
					0.0			(56.5 - 59.0') CLAY, some silt, low to medium plasticity, no dilatancy; dry to moist; medium stiff; gray (10YR 5/1).		
					0.0					
					0.0			(59.0 - 66.0') SANDSTONE, little interbedded shale, weathered; dry; light gray (10YR 7/1).		
60	-60				0.0					
		7	57.0-65.0'	8.0	0.0					

	Remarks: bgs = below ground surface No odor or staining observed VAP samples collected from screened intervals 67.0-72.0' bgs and 74.0-79.0' bgs

Date Start: 08/18/2016 Date Finish: 08/18/2016 Drilling Company: Cascade Driller's Name: M. Bond Drilling Method: Rotosonic Sampling Method: Continuous Rig Type: Rotosonic Water Level Start (ft. bgs.): NA Water Level Finish (ft. btoc.): NA	Northing: NA Easting: NA Casing Elevation: NA Borehole Depth (ft. bgs.): 79.0' bgs Surface Elevation: NA Descriptions By: A. Westhuis	Well/Boring ID: SB-A5.2-NK140 Client: RACER Location: RACER Lansing Plant 2 Weather Conditions: 80 F, Partly Cloudy

DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction

65	-65	8	65.0-67.0'	2.0	0.0			(66.0 - 69.0') SANDSTONE, trace interbedded shale; weathered; wet; light gray (10YR 7/1).		
70	-70	9	67.0-72.0'	5.0	0.0	X		(69.0 - 79.0') SANDSTONE and SHALE, weathered; gray (10YR 5/1).		
75	-75	10	72.0-76.0'	4.0	0.0					
		11	76.0-	3.0	0.0	X		End of boring at 79.0' bgs.		

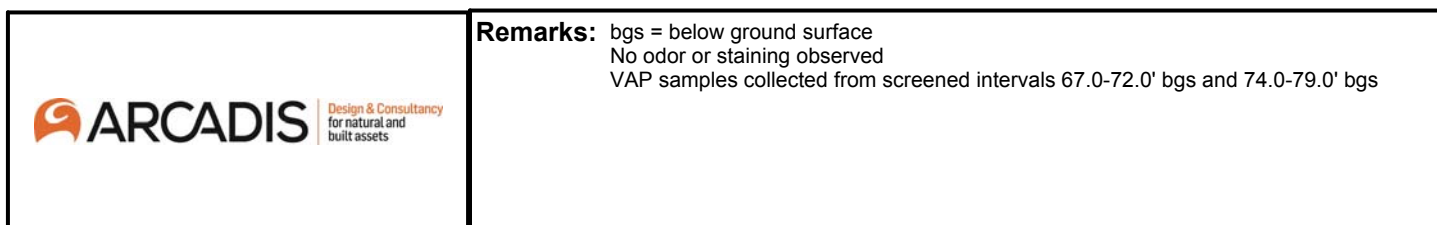
	Remarks: bgs = below ground surface No odor or staining observed VAP samples collected from screened intervals 67.0-72.0' bgs and 74.0-79.0' bgs

Date Start: 08/18/2016 Date Finish: 08/19/2016 Drilling Company: Cascade Driller's Name: M. Bond Drilling Method: Rotosonic Sampling Method: Continuous Rig Type: Rotosonic Water Level Start (ft. bgs.): NA Water Level Finish (ft. btoc.): NA	Northing: NA Easting: NA Casing Elevation: NA Borehole Depth (ft. bgs.): 79.0' bgs Surface Elevation: NA Descriptions By: A. Westhuis	Well/Boring ID: SB-A5.2-ND132 Client: RACER Location: RACER Lansing Plant 2 Weather Conditions: 80 F, Sunny

DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction

20	-20				0.0					
					0.0					
					0.0					
					0.0			(21.0 - 23.0') SAND, fine to medium, subround; trace silt; well sorted; wet; pale brown (10YR 6/3).		
		3	17.0-27.0'	10.0	0.0			(23.0 - 48.0') CLAY, some silt, medium to high plasticity, no dilatancy; little fine sand, subround; trace to little granules to large pebbles, subround; moist; stiff; grayish brown (10YR 5/2). NOTE: Glacial till.		
25	-25				0.0					
					0.0					
					0.0					
					0.0					
					0.0					
30	-30				0.0					
					0.0					
					0.0					
					0.0					
		4	27.0-37.0'	10.0	0.0					
35	-35				0.0					
					0.0					
					0.0					
					0.0					
					0.0					
					0.0					
					0.0					
					0.0					
40	-40				0.0					

	Remarks: bgs = below ground surface No odor or staining observed VAP samples collected from screened intervals 67.0-72.0' bgs and 74.0-79.0' bgs

[illegible]

DEPTH (feet bgs.)	ELEVATION
Sample Run Number	
Sample/Int/Type	
Recovery (feet)	
PID Headspace (ppm)	
Analytical Sample	
Geologic Column	
Stratigraphic Description	
Water Level (ft. bgs.)	
Well/Boring Construction	

	Remarks: bgs = below ground surface No odor or staining observed VAP samples collected from screened intervals 67.0-72.0' bgs and 74.0-79.0' bgs

Propane Biosparge Pilot Test Summary
RACER Trust Plant 2 – Lansing, Michigan

LABORATORY REPORTS





Analytical Laboratory Report

Report ID: S75897.01(01)

Generated on 09/16/2016

Report to

Attention: Gwen Kubacki
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 248-994-2240 FAX: 248-994-2241

Email: gwen.kubacki@arcadis.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
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Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)

Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S75897.01-S75897.02

Project: B0064479.2016.00501 RACER Lansing

Collected Date: 09/07/2016

Submitted Date/Time: 09/08/2016 08:00

Sampled by: Christine Gregg

P.O. #: B0064479.2016.00501

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A handwritten signature in black ink, reading "Maya Murshak".

Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods



Analytical Laboratory Report

Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
E300.0	EPA Method 300.0 Revision 2.1
N/A	Not Applicable
SM2320B	Standard Method 2320 B 20th Edition
SM4500-N(org)/NH	Standard Method 4500 N(org)B / NH3D 20th Edition
SM4500-PE	Standard Method 4500 P E 20th Edition
SM5310C	Standard Method 5310C 20th Edition
SW3015A	SW 846 Method 3015A Revision 1 February 2007
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs



Analytical Laboratory Report

Sample Summary (2 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S75897.01	AS-16-01_090716	Groundwater	09/07/16 12:40
S75897.02	AS-16-02_090716	Groundwater	09/07/16 15:35



Analytical Laboratory Report

Lab Sample ID: S75897.01
Sample Tag: AS-16-01_090716
Collected Date/Time: 09/07/2016 12:40
Matrix: Groundwater
COC Reference: 100828

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	9.0	IR
1	125ml Plastic	HNO3	Yes	9.0	IR
1	250ml Plastic	H2SO4	Yes	9.0	IR
3	40ml Glass	H2SO4	Yes	9.0	IR
1	125ml Plastic	None	Yes	9.0	IR
1	250ml Plastic	None	Yes	9.0	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
Metal Digestion	Completed			SW3015A	09/12/16 09:15	JRH		
Metal Digestion	Completed			SW3015A	09/12/16 09:15	JRH		
pH check for VOCs*	<2	STD Units		N/A	09/16/16 12:30	JML		
Inorganics								
Alkalinity as CaCO3	406	mg/L	2	SM2320B	09/12/16 13:45	JKB		
Fluoride (Undistilled)	Not detected	mg/L	0.5	E300.0	09/08/16 11:14	JDP	16984-48-8	
Nitrate-N	Not detected	mg/L	0.5	E300.0	09/08/16 11:14	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	09/08/16 11:14	JDP	14797-65-0	
TOC	10.8	mg/L	1	SM5310C	09/09/16 16:11	JKB		
Total Kjeldahl Nitrogen	0.6	mg/L	0.1	SM4500-N(org)/NH	09/14/16 16:52	MJC		
Total Phosphorus	0.05	mg/L	0.01	SM4500-PE	09/09/16 17:46	MJC	7723-14-0	
Metals								
Iron, Dissolved	Not detected	mg/L	0.02	E200.8	09/12/16 15:07	JRH	7439-89-6	
Iron	3.92	mg/L	0.02	E200.8	09/12/16 15:04	JRH	7439-89-6	
Manganese, Dissolved	0.142	mg/L	0.005	E200.8	09/12/16 15:07	JRH	7439-96-5	
Manganese	0.141	mg/L	0.005	E200.8	09/12/16 15:04	JRH	7439-96-5	
Organics - Volatiles								
1,4-Dioxane*	590	ug/L	30	SW8260B - SIM	09/15/16 18:18	JGH	123-91-1	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S75897.02
Sample Tag: AS-16-02_090716
Collected Date/Time: 09/07/2016 15:35
Matrix: Groundwater
COC Reference: 100828

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	9.0	IR
1	125ml Plastic	HNO3	Yes	9.0	IR
1	250ml Plastic	H2SO4	Yes	9.0	IR
3	40ml Glass	H2SO4	Yes	9.0	IR
1	125ml Plastic	None	Yes	9.0	IR
1	250ml Plastic	None	Yes	9.0	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
Metal Digestion	Completed			SW3015A	09/12/16 09:15	JRH		
Metal Digestion	Completed			SW3015A	09/12/16 09:15	JRH		
pH check for VOCs*	<2	STD Units		N/A	09/16/16 12:30	JML		
Inorganics								
Alkalinity as CaCO3	394	mg/L	2	SM2320B	09/12/16 13:50	JKB		
Fluoride (Undistilled)	Not detected	mg/L	0.5	E300.0	09/08/16 11:27	JDP	16984-48-8	
Nitrate-N	Not detected	mg/L	0.5	E300.0	09/08/16 11:27	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	09/08/16 11:27	JDP	14797-65-0	
TOC	7.2	mg/L	1	SM5310C	09/09/16 16:32	JKB		
Total Kjeldahl Nitrogen	1.6	mg/L	0.2	SM4500-N(org)/NH	09/14/16 17:09	MJC		
Total Phosphorus	0.19	mg/L	0.05	SM4500-PE	09/09/16 18:01	MJC	7723-14-0	
Metals								
Iron, Dissolved	Not detected	mg/L	0.02	E200.8	09/12/16 14:56	JRH	7439-89-6	
Iron	32.1	mg/L	0.02	E200.8	09/12/16 14:59	JRH	7439-89-6	
Manganese, Dissolved	0.117	mg/L	0.005	E200.8	09/12/16 14:56	JRH	7439-96-5	
Manganese	0.827	mg/L	0.005	E200.8	09/12/16 14:59	JRH	7439-96-5	
Organics - Volatiles								
1,4-Dioxane*	69	ug/L	3	SW8260B - SIM	09/15/16 16:45	JGH	123-91-1	

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME			
Gwendolyn Kubacki			
COMPANY			
Arcadi's			
ADDRESS			
28550 Cabot Drive Suite 500			
CITY		STATE	ZIP CODE
Novi		MI	48377
PHONE NO.		FAX NO.	P.O. NO.
248-994-2249			
E-MAIL ADDRESS		QUOTE NO.	
Gwen.Kubacki@Arcadis.com			

CONTACT NAME		☐ SAME	
COMPANY			
ADDRESS			
CITY		STATE	ZIP CODE
PHONE NO.	E-MAIL ADDRESS		

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME: B0064479.2016.00501 RACER Landing SAMPLER(S) - PLEASE PRINT/SIGN NAME: Christine Gregg CWRS

TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER _____

DELIVERABLES REQUIRED ☐ STD ☐ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER _____

MATRIX CODE:	GW=GROUNDWATER	WW=WASTEWATER	S=SOIL	L=LIQUID	SD=SOLID
	SL=SLUDGE	DW=DRINKING WATER	O=OIL	WP=WPIE	A=AIR
					W=WASTE

Containers & Preservatives

[illegible][illegible]

Certifications

☐ OHIO VAP ☐ Drinking Water

☐ DoD ☐ NPDES

Project Locations

☐ Detroit ☐ New York

☐ Other _____

Special Instructions

* Proj # B001,448(1), 2016, 0050

RELINQUISHED BY: Christine Gregg (Arcadis) Sampler
SIGNATURE/ORGANIZATION

RECEIVED BY: _____
SIGNATURE/ORGANIZATION: Meint Loeck

RELINQUISHED BY: Meik Poon
SIGNATURE/ORGANIZATION: Meik Poon

SIGNATURE/ORGANIZATION: Monte Drop box
RECEIVED BY: CE
SIGNATURE/ORGANIZATION: _____

SIGNATURE/ORGANIZATION  PLEASE NOTE: SIGNING ACKNOWLEDGES RECEIPT OF INFORMATION

RELINQUISHED BY:			
SIGNATURE/ORGANIZATION		DATE	TIME

RECEIVED BY:			
SIGNATURE/ORGANIZATION		DATE	TIME

SEAL NO.	SEAL INTACT	INITIALS	NOTES:	TEMP. ON ARRIVAL

YES ☐		NO ☐	
SEAL NO.	SEAL INTACT	INITIALS	

9.0

YES ☐ NO ☐

0 MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



Analytical Laboratory Report

Supplemental Report

Report ID: S75934.01(02)

Generated on 10/03/2016

Replaces report S75934.01(01) generated on 09/21/2016

Report to

Attention: Gwen Kubacki
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 248-994-2240 FAX: 248-994-2241

Email: gwen.kubacki@arcadis.com

Additional Contacts: Christine Gregg

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)

Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S75934.01-S75934.04

Project: B0064479.2016.00501

Collected Date: 09/08/2016

Submitted Date/Time: 09/09/2016 08:00

Sampled by: Christine Gregg

P.O. #: B0064479.2016.00501

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Sample Summary (Page 5)

Maya Murshak
Technical Director



Analytical Laboratory Report

Supplemental Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Report Narrative

VOCs added per client request



Analytical Laboratory Report

Supplemental Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods



Analytical Laboratory Report

Supplemental Report

Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
E300.0	EPA Method 300.0 Revision 2.1
N/A	Not Applicable
SM2320B	Standard Method 2320 B 20th Edition
SM4500-N(org)/NH	Standard Method 4500 N(org)B / NH3D 20th Edition
SM4500-PE	Standard Method 4500 P E 20th Edition
SM5310C	Standard Method 5310C 20th Edition
SW3015A	SW 846 Method 3015A Revision 1 February 2007
SW5030C/8260C	SW 846 Method 8260C Revision 3 August 2006 / 5030C Revision 3 May 2003
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs



Analytical Laboratory Report

Supplemental Report

Sample Summary (4 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S75934.01	TW-14-02_090816	Groundwater	09/08/16 09:00
S75934.02	PW-14-01_090816	Groundwater	09/08/16 10:35
S75934.03	TW-16-01_090816	Groundwater	09/08/16 13:10
S75934.04	TW-14-01_090816	Groundwater	09/08/16 16:35



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S75934.01
Sample Tag: TW-14-02_090816
Collected Date/Time: 09/08/2016 09:00
Matrix: Groundwater
COC Reference: 75682

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.4	IR
1	125ml Plastic	HNO3	Yes	5.4	IR
1	250ml Plastic	H2SO4	Yes	5.4	IR
3	40ml Glass	H2SO4	Yes	5.4	IR
1	125ml Plastic	None	Yes	5.4	IR
1	250ml Plastic	None	Yes	5.4	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags

Extraction / Prep.

Metal Digestion	Completed			SW3015A	09/12/16 09:15	JRH		
Metal Digestion	Completed			SW3015A	09/12/16 09:15	JRH		
pH check for VOCs*	<2	STD Units		N/A	09/16/16 12:30	JML		

Inorganics

Alkalinity as CaCO3	444	mg/L	2	SM2320B	09/12/16 13:55	JKB		
Fluoride (Undistilled)	Not detected	mg/L	0.5	E300.0	09/09/16 09:57	JDP	16984-48-8	
Nitrate-N	Not detected	mg/L	0.5	E300.0	09/09/16 09:57	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	09/09/16 09:57	JDP	14797-65-0	
TOC	8.5	mg/L	1	SM5310C	09/14/16 13:23	JKB		
Total Kjeldahl Nitrogen	1.1	mg/L	0.1	SM4500-N(org)/NH	09/14/16 17:33	MJC		
Total Phosphorus	0.09	mg/L	0.01	SM4500-PE	09/15/16 14:56	MJC	7723-14-0	

Metals

Iron, Dissolved	0.06	mg/L	0.02	E200.8	09/12/16 15:23	JRH	7439-89-6	
Iron	7.14	mg/L	0.02	E200.8	09/12/16 15:20	JRH	7439-89-6	
Manganese, Dissolved	0.083	mg/L	0.005	E200.8	09/12/16 15:23	JRH	7439-96-5	
Manganese	0.081	mg/L	0.005	E200.8	09/12/16 15:20	JRH	7439-96-5	

Organics - Volatiles

1,4-Dioxane*	3,000	ug/L	300	SW8260B - SIM	09/20/16 15:15	JGH	123-91-1	Y

Volatile Organics - DEQ List

Diethyl ether*	Not detected	ug/L	10	SW5030C/8260C	09/30/16 13:00	JGH	60-29-7	H
Acetone	Not detected	ug/L	50	SW5030C/8260C	09/30/16 13:00	JGH	67-64-1	H
Methyl iodide*	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	74-88-4	H
Carbon disulfide	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:00	JGH	75-15-0	H
tert-Methyl butyl ether (MTBE)	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:00	JGH	1634-04-4	H
Acrylonitrile	Not detected	ug/L	2	SW5030C/8260C	09/30/16 13:00	JGH	107-13-1	H
2-Butanone (MEK)	Not detected	ug/L	25	SW5030C/8260C	09/30/16 13:00	JGH	78-93-3	H
Dichlorodifluoromethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:00	JGH	75-71-8	H
Chloromethane*	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:00	JGH	74-87-3	H
Vinyl chloride	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	75-01-4	H
Bromomethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:00	JGH	74-83-9	H
Chloroethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:00	JGH	75-00-3	H
Trichlorofluoromethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	75-69-4	H

Y-Elevated reporting limit due to high target concentration

H-Sample submitted and run outside of holding time



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S75934.01 (continued)

Sample Tag: TW-14-02_090816

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Organics - Volatiles (continued)								
Volatile Organics - DEQ List (continued)								
1,1-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	75-35-4	H
Methylene chloride	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:00	JGH	75-09-2	H
trans-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	156-60-5	H
1,1-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	75-34-3	H
cis-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	156-59-2	H
Tetrahydrofuran*	Not detected	ug/L	90	SW5030C/8260C	09/30/16 13:00	JGH	109-99-9	H
Chloroform	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	67-66-3	H
Bromochloromethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	74-97-5	H
1,1,1-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	71-55-6	H
4-Methyl-2-pentanone (MIBK)	Not detected	ug/L	50	SW5030C/8260C	09/30/16 13:00	JGH	108-10-1	H
2-Hexanone	Not detected	ug/L	50	SW5030C/8260C	09/30/16 13:00	JGH	591-78-6	H
Carbon tetrachloride	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	56-23-5	H
Benzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	71-43-2	H
1,2-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	107-06-2	H
Trichloroethene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	79-01-6	H
1,2-Dichloropropane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	78-87-5	H
Bromodichloromethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	75-27-4	H
Dibromomethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:00	JGH	74-95-3	H
cis-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	10061-01-5	H
Toluene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	108-88-3	H
trans-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	10061-02-6	H
1,1,2-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	79-00-5	H
Tetrachloroethene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	127-18-4	H
trans-1,4-Dichloro-2-butene*	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	110-57-6	H
Dibromochloromethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:00	JGH	124-48-1	H
1,2-Dibromoethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	106-93-4	H
Chlorobenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	108-90-7	H
1,1,1,2-Tetrachloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	630-20-6	H
Ethylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	100-41-4	H
p,m-Xylene*	Not detected	ug/L	2	SW5030C/8260C	09/30/16 13:00	JGH		H
o-Xylene*	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	95-47-6	H
Styrene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	100-42-5	H
Isopropylbenzene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:00	JGH	98-82-8	H
Bromoform	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	75-25-2	H
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	79-34-5	H
1,2,3-Trichloropropane*	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	96-18-4	H
n-Propylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	103-65-1	H
Bromobenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	108-86-1	H
1,3,5-Trimethylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	108-67-8	H
tert-Butylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	98-06-6	H
1,2,4-Trimethylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	95-63-6	H
sec-Butylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	135-98-8	H
p-Isopropyltoluene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:00	JGH	99-87-6	H
1,3-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	541-73-1	H
1,4-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	106-46-7	H
1,2-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	95-50-1	H
1,2,3-Trimethylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	526-73-8	H
n-Butylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:00	JGH	104-51-8	H

H-Sample submitted and run outside of holding time



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S75934.01 (continued)

Sample Tag: TW-14-02_090816

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Organics - Volatiles (continued)								
Volatile Organics - DEQ List (continued)								
Hexachloroethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:00	JGH	67-72-1	H
1,2-Dibromo-3-chloropropane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:00	JGH	96-12-8	H
1,2,4-Trichlorobenzene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:00	JGH	120-82-1	H
1,2,3-Trichlorobenzene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:00	JGH	87-61-6	H
Naphthalene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:00	JGH	91-20-3	H
2-Methylnaphthalene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:00	JGH	91-57-6	H

H-Sample submitted and run outside of holding time



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S75934.02
Sample Tag: PW-14-01_090816
Collected Date/Time: 09/08/2016 10:35
Matrix: Groundwater
COC Reference: 75682

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.4	IR
1	125ml Plastic	HNO3	Yes	5.4	IR
1	250ml Plastic	H2SO4	Yes	5.4	IR
3	40ml Glass	H2SO4	Yes	5.4	IR
1	125ml Plastic	None	Yes	5.4	IR
1	250ml Plastic	None	Yes	5.4	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags

Extraction / Prep.

Metal Digestion	Completed			SW3015A	09/12/16 09:15	JRH		
Metal Digestion	Completed			SW3015A	09/12/16 09:15	JRH		
pH check for VOCs*	<2	STD Units		N/A	09/16/16 12:30	JML		

Inorganics

Alkalinity as CaCO3	504	mg/L	2	SM2320B	09/12/16 14:00	JKB		
Fluoride (Undistilled)	Not detected	mg/L	0.5	E300.0	09/09/16 10:10	JDP	16984-48-8	
Nitrate-N	Not detected	mg/L	0.5	E300.0	09/09/16 10:10	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	09/09/16 10:10	JDP	14797-65-0	
TOC	8.0	mg/L	1	SM5310C	09/14/16 14:06	JKB		
Total Kjeldahl Nitrogen	0.7	mg/L	0.1	SM4500-N(org)/NH	09/14/16 17:47	MJC		
Total Phosphorus	0.05	mg/L	0.01	SM4500-PE	09/15/16 15:08	MJC	7723-14-0	

Metals

Iron, Dissolved	0.03	mg/L	0.02	E200.8	09/12/16 15:28	JRH	7439-89-6	
Iron	2.88	mg/L	0.02	E200.8	09/12/16 15:25	JRH	7439-89-6	
Manganese, Dissolved	0.088	mg/L	0.005	E200.8	09/12/16 15:28	JRH	7439-96-5	
Manganese	0.090	mg/L	0.005	E200.8	09/12/16 15:25	JRH	7439-96-5	

Organics - Volatiles

1,4-Dioxane*	560	ug/L	30	SW8260B - SIM	09/15/16 18:42	JGH	123-91-1	Y

Volatile Organics - DEQ List

Diethyl ether*	Not detected	ug/L	10	SW5030C/8260C	09/30/16 13:21	JGH	60-29-7	H
Acetone	Not detected	ug/L	50	SW5030C/8260C	09/30/16 13:21	JGH	67-64-1	H
Methyl iodide*	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	74-88-4	H
Carbon disulfide	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:21	JGH	75-15-0	H
tert-Methyl butyl ether (MTBE)	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:21	JGH	1634-04-4	H
Acrylonitrile	Not detected	ug/L	2	SW5030C/8260C	09/30/16 13:21	JGH	107-13-1	H
2-Butanone (MEK)	Not detected	ug/L	25	SW5030C/8260C	09/30/16 13:21	JGH	78-93-3	H
Dichlorodifluoromethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:21	JGH	75-71-8	H
Chloromethane*	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:21	JGH	74-87-3	H
Vinyl chloride	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	75-01-4	H
Bromomethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:21	JGH	74-83-9	H
Chloroethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:21	JGH	75-00-3	H
Trichlorofluoromethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	75-69-4	H

Y-Elevated reporting limit due to high target concentration

H-Sample submitted and run outside of holding time



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S75934.02 (continued)

Sample Tag: PW-14-01_090816

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Organics - Volatiles (continued)								
Volatile Organics - DEQ List (continued)								
1,1-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	75-35-4	H
Methylene chloride	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:21	JGH	75-09-2	H
trans-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	156-60-5	H
1,1-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	75-34-3	H
cis-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	156-59-2	H
Tetrahydrofuran*	Not detected	ug/L	90	SW5030C/8260C	09/30/16 13:21	JGH	109-99-9	H
Chloroform	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	67-66-3	H
Bromochloromethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	74-97-5	H
1,1,1-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	71-55-6	H
4-Methyl-2-pentanone (MIBK)	Not detected	ug/L	50	SW5030C/8260C	09/30/16 13:21	JGH	108-10-1	H
2-Hexanone	Not detected	ug/L	50	SW5030C/8260C	09/30/16 13:21	JGH	591-78-6	H
Carbon tetrachloride	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	56-23-5	H
Benzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	71-43-2	H
1,2-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	107-06-2	H
Trichloroethene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	79-01-6	H
1,2-Dichloropropane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	78-87-5	H
Bromodichloromethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	75-27-4	H
Dibromomethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:21	JGH	74-95-3	H
cis-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	10061-01-5	H
Toluene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	108-88-3	H
trans-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	10061-02-6	H
1,1,2-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	79-00-5	H
Tetrachloroethene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	127-18-4	H
trans-1,4-Dichloro-2-butene*	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	110-57-6	H
Dibromochloromethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:21	JGH	124-48-1	H
1,2-Dibromoethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	106-93-4	H
Chlorobenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	108-90-7	H
1,1,1,2-Tetrachloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	630-20-6	H
Ethylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	100-41-4	H
p,m-Xylene*	Not detected	ug/L	2	SW5030C/8260C	09/30/16 13:21	JGH		H
o-Xylene*	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	95-47-6	H
Styrene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	100-42-5	H
Isopropylbenzene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:21	JGH	98-82-8	H
Bromoform	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	75-25-2	H
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	79-34-5	H
1,2,3-Trichloropropane*	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	96-18-4	H
n-Propylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	103-65-1	H
Bromobenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	108-86-1	H
1,3,5-Trimethylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	108-67-8	H
tert-Butylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	98-06-6	H
1,2,4-Trimethylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	95-63-6	H
sec-Butylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	135-98-8	H
p-Isopropyltoluene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:21	JGH	99-87-6	H
1,3-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	541-73-1	H
1,4-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	106-46-7	H
1,2-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	95-50-1	H
1,2,3-Trimethylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	526-73-8	H
n-Butylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:21	JGH	104-51-8	H

H-Sample submitted and run outside of holding time



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S75934.02 (continued)

Sample Tag: PW-14-01_090816

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Organics - Volatiles (continued)								
Volatile Organics - DEQ List (continued)								
Hexachloroethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:21	JGH	67-72-1	H
1,2-Dibromo-3-chloropropane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:21	JGH	96-12-8	H
1,2,4-Trichlorobenzene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:21	JGH	120-82-1	H
1,2,3-Trichlorobenzene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:21	JGH	87-61-6	H
Naphthalene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:21	JGH	91-20-3	H
2-Methylnaphthalene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:21	JGH	91-57-6	H

H-Sample submitted and run outside of holding time



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S75934.03
Sample Tag: TW-16-01_090816
Collected Date/Time: 09/08/2016 13:10
Matrix: Groundwater
COC Reference: 75682

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.4	IR
1	125ml Plastic	HNO3	Yes	5.4	IR
1	250ml Plastic	H2SO4	Yes	5.4	IR
3	40ml Glass	H2SO4	Yes	5.4	IR
1	125ml Plastic	None	Yes	5.4	IR
1	250ml Plastic	None	Yes	5.4	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags

Extraction / Prep.

Metal Digestion	Completed			SW3015A	09/12/16 09:15	JRH		
Metal Digestion	Completed			SW3015A	09/12/16 09:15	JRH		
pH check for VOCs*	<2	STD Units		N/A	09/16/16 12:30	JML		

Inorganics

Alkalinity as CaCO3	454	mg/L	2	SM2320B	09/12/16 14:05	JKB		
Fluoride (Undistilled)	Not detected	mg/L	0.5	E300.0	09/09/16 10:23	JDP	16984-48-8	
Nitrate-N	Not detected	mg/L	0.5	E300.0	09/09/16 10:23	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	09/09/16 10:23	JDP	14797-65-0	
TOC	7.9	mg/L	1	SM5310C	09/14/16 14:28	JKB		
Total Kjeldahl Nitrogen	0.6	mg/L	0.1	SM4500-N(org)/NH	09/14/16 18:01	MJC		
Total Phosphorus	0.04	mg/L	0.01	SM4500-PE	09/15/16 15:19	MJC	7723-14-0	

Metals

Iron, Dissolved	0.02	mg/L	0.02	E200.8	09/12/16 15:33	JRH	7439-89-6	
Iron	2.46	mg/L	0.02	E200.8	09/12/16 15:30	JRH	7439-89-6	
Manganese, Dissolved	0.069	mg/L	0.005	E200.8	09/12/16 15:33	JRH	7439-96-5	
Manganese	0.100	mg/L	0.005	E200.8	09/12/16 15:30	JRH	7439-96-5	

Organics - Volatiles

1,4-Dioxane*	230	ug/L	30	SW8260B - SIM	09/20/16 14:55	JGH	123-91-1	Y

Volatile Organics - DEQ List

Diethyl ether*	Not detected	ug/L	10	SW5030C/8260C	09/30/16 13:42	JGH	60-29-7	H
Acetone	Not detected	ug/L	50	SW5030C/8260C	09/30/16 13:42	JGH	67-64-1	H
Methyl iodide*	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	74-88-4	H
Carbon disulfide	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:42	JGH	75-15-0	H
tert-Methyl butyl ether (MTBE)	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:42	JGH	1634-04-4	H
Acrylonitrile	Not detected	ug/L	2	SW5030C/8260C	09/30/16 13:42	JGH	107-13-1	H
2-Butanone (MEK)	Not detected	ug/L	25	SW5030C/8260C	09/30/16 13:42	JGH	78-93-3	H
Dichlorodifluoromethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:42	JGH	75-71-8	H
Chloromethane*	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:42	JGH	74-87-3	H
Vinyl chloride	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	75-01-4	H
Bromomethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:42	JGH	74-83-9	H
Chloroethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:42	JGH	75-00-3	H
Trichlorofluoromethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	75-69-4	H

Y-Elevated reporting limit due to high target concentration

H-Sample submitted and run outside of holding time



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S75934.03 (continued)

Sample Tag: TW-16-01_090816

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Organics - Volatiles (continued)								
Volatile Organics - DEQ List (continued)								
1,1-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	75-35-4	H
Methylene chloride	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:42	JGH	75-09-2	H
trans-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	156-60-5	H
1,1-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	75-34-3	H
cis-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	156-59-2	H
Tetrahydrofuran*	Not detected	ug/L	90	SW5030C/8260C	09/30/16 13:42	JGH	109-99-9	H
Chloroform	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	67-66-3	H
Bromochloromethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	74-97-5	H
1,1,1-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	71-55-6	H
4-Methyl-2-pentanone (MIBK)	Not detected	ug/L	50	SW5030C/8260C	09/30/16 13:42	JGH	108-10-1	H
2-Hexanone	Not detected	ug/L	50	SW5030C/8260C	09/30/16 13:42	JGH	591-78-6	H
Carbon tetrachloride	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	56-23-5	H
Benzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	71-43-2	H
1,2-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	107-06-2	H
Trichloroethene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	79-01-6	H
1,2-Dichloropropane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	78-87-5	H
Bromodichloromethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	75-27-4	H
Dibromomethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:42	JGH	74-95-3	H
cis-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	10061-01-5	H
Toluene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	108-88-3	H
trans-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	10061-02-6	H
1,1,2-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	79-00-5	H
Tetrachloroethene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	127-18-4	H
trans-1,4-Dichloro-2-butene*	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	110-57-6	H
Dibromochloromethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:42	JGH	124-48-1	H
1,2-Dibromoethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	106-93-4	H
Chlorobenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	108-90-7	H
1,1,1,2-Tetrachloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	630-20-6	H
Ethylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	100-41-4	H
p,m-Xylene*	Not detected	ug/L	2	SW5030C/8260C	09/30/16 13:42	JGH		H
o-Xylene*	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	95-47-6	H
Styrene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	100-42-5	H
Isopropylbenzene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:42	JGH	98-82-8	H
Bromoform	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	75-25-2	H
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	79-34-5	H
1,2,3-Trichloropropane*	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	96-18-4	H
n-Propylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	103-65-1	H
Bromobenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	108-86-1	H
1,3,5-Trimethylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	108-67-8	H
tert-Butylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	98-06-6	H
1,2,4-Trimethylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	95-63-6	H
sec-Butylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	135-98-8	H
p-Isopropyltoluene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:42	JGH	99-87-6	H
1,3-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	541-73-1	H
1,4-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	106-46-7	H
1,2-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	95-50-1	H
1,2,3-Trimethylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	526-73-8	H
n-Butylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 13:42	JGH	104-51-8	H

H-Sample submitted and run outside of holding time



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S75934.03 (continued)

Sample Tag: TW-16-01_090816

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Organics - Volatiles (continued)								
Volatile Organics - DEQ List (continued)								
Hexachloroethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:42	JGH	67-72-1	H
1,2-Dibromo-3-chloropropane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:42	JGH	96-12-8	H
1,2,4-Trichlorobenzene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:42	JGH	120-82-1	H
1,2,3-Trichlorobenzene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:42	JGH	87-61-6	H
Naphthalene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:42	JGH	91-20-3	H
2-Methylnaphthalene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 13:42	JGH	91-57-6	H

H-Sample submitted and run outside of holding time



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S75934.04
Sample Tag: TW-14-01_090816
Collected Date/Time: 09/08/2016 16:35
Matrix: Groundwater
COC Reference: 75682

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.4	IR
1	125ml Plastic	HNO3	Yes	5.4	IR
1	250ml Plastic	H2SO4	Yes	5.4	IR
3	40ml Glass	H2SO4	Yes	5.4	IR
1	125ml Plastic	None	Yes	5.4	IR
1	250ml Plastic	None	Yes	5.4	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags

Extraction / Prep.

Metal Digestion	Completed			SW3015A	09/12/16 09:15	JRH		
Metal Digestion	Completed			SW3015A	09/12/16 09:15	JRH		
pH check for VOCs*	<2	STD Units		N/A	09/16/16 12:30	JML		

Inorganics

Alkalinity as CaCO3	404	mg/L	2	SM2320B	09/12/16 14:10	JKB		
Fluoride (Undistilled)	Not detected	mg/L	0.5	E300.0	09/09/16 10:36	JDP	16984-48-8	
Nitrate-N	Not detected	mg/L	0.5	E300.0	09/09/16 10:36	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	09/09/16 10:36	JDP	14797-65-0	
TOC	5.1	mg/L	1	SM5310C	09/14/16 14:49	JKB		
Total Kjeldahl Nitrogen	1.1	mg/L	0.1	SM4500-N(org)/NH	09/14/16 18:22	MJC		
Total Phosphorus	0.35	mg/L	0.05	SM4500-PE	09/15/16 15:28	MJC	7723-14-0	

Metals

Iron, Dissolved	0.08	mg/L	0.02	E200.8	09/12/16 15:38	JRH	7439-89-6	
Iron	17.6	mg/L	0.02	E200.8	09/12/16 15:36	JRH	7439-89-6	
Manganese, Dissolved	0.035	mg/L	0.005	E200.8	09/12/16 15:38	JRH	7439-96-5	
Manganese	0.344	mg/L	0.005	E200.8	09/12/16 15:36	JRH	7439-96-5	

Organics - Volatiles

1,4-Dioxane*	47	ug/L	3	SW8260B - SIM	09/15/16 17:33	JGH	123-91-1	

Volatile Organics - DEQ List

Diethyl ether*	Not detected	ug/L	10	SW5030C/8260C	09/30/16 14:03	JGH	60-29-7	H
Acetone	Not detected	ug/L	50	SW5030C/8260C	09/30/16 14:03	JGH	67-64-1	H
Methyl iodide*	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	74-88-4	H
Carbon disulfide	Not detected	ug/L	5	SW5030C/8260C	09/30/16 14:03	JGH	75-15-0	H
tert-Methyl butyl ether (MTBE)	Not detected	ug/L	5	SW5030C/8260C	09/30/16 14:03	JGH	1634-04-4	H
Acrylonitrile	Not detected	ug/L	2	SW5030C/8260C	09/30/16 14:03	JGH	107-13-1	H
2-Butanone (MEK)	Not detected	ug/L	25	SW5030C/8260C	09/30/16 14:03	JGH	78-93-3	H
Dichlorodifluoromethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 14:03	JGH	75-71-8	H
Chloromethane*	Not detected	ug/L	5	SW5030C/8260C	09/30/16 14:03	JGH	74-87-3	H
Vinyl chloride	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	75-01-4	H
Bromomethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 14:03	JGH	74-83-9	H
Chloroethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 14:03	JGH	75-00-3	H
Trichlorofluoromethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	75-69-4	H
1,1-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	75-35-4	H

H-Sample submitted and run outside of holding time



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S75934.04 (continued)

Sample Tag: TW-14-01_090816

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Organics - Volatiles (continued)								
Volatile Organics - DEQ List (continued)								
Methylene chloride	Not detected	ug/L	5	SW5030C/8260C	09/30/16 14:03	JGH	75-09-2	H
trans-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	156-60-5	H
1,1-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	75-34-3	H
cis-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	156-59-2	H
Tetrahydrofuran*	Not detected	ug/L	90	SW5030C/8260C	09/30/16 14:03	JGH	109-99-9	H
Chloroform	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	67-66-3	H
Bromochloromethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	74-97-5	H
1,1,1-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	71-55-6	H
4-Methyl-2-pentanone (MIBK)	Not detected	ug/L	50	SW5030C/8260C	09/30/16 14:03	JGH	108-10-1	H
2-Hexanone	Not detected	ug/L	50	SW5030C/8260C	09/30/16 14:03	JGH	591-78-6	H
Carbon tetrachloride	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	56-23-5	H
Benzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	71-43-2	H
1,2-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	107-06-2	H
Trichloroethene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	79-01-6	H
1,2-Dichloropropane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	78-87-5	H
Bromodichloromethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	75-27-4	H
Dibromomethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 14:03	JGH	74-95-3	H
cis-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	10061-01-5	H
Toluene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	108-88-3	H
trans-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	10061-02-6	H
1,1,2-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	79-00-5	H
Tetrachloroethene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	127-18-4	H
trans-1,4-Dichloro-2-butene*	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	110-57-6	H
Dibromochloromethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 14:03	JGH	124-48-1	H
1,2-Dibromoethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	106-93-4	H
Chlorobenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	108-90-7	H
1,1,1,2-Tetrachloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	630-20-6	H
Ethylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	100-41-4	H
p,m-Xylene*	Not detected	ug/L	2	SW5030C/8260C	09/30/16 14:03	JGH		H
o-Xylene*	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	95-47-6	H
Styrene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	100-42-5	H
Isopropylbenzene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 14:03	JGH	98-82-8	H
Bromoform	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	75-25-2	H
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	79-34-5	H
1,2,3-Trichloropropane*	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	96-18-4	H
n-Propylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	103-65-1	H
Bromobenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	108-86-1	H
1,3,5-Trimethylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	108-67-8	H
tert-Butylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	98-06-6	H
1,2,4-Trimethylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	95-63-6	H
sec-Butylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	135-98-8	H
p-Isopropyltoluene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 14:03	JGH	99-87-6	H
1,3-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	541-73-1	H
1,4-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	106-46-7	H
1,2-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	95-50-1	H
1,2,3-Trimethylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	526-73-8	H
n-Butylbenzene	Not detected	ug/L	1	SW5030C/8260C	09/30/16 14:03	JGH	104-51-8	H
Hexachloroethane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 14:03	JGH	67-72-1	H

H-Sample submitted and run outside of holding time



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S75934.04 (continued)

Sample Tag: TW-14-01_090816

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Organics - Volatiles (continued)								
Volatile Organics - DEQ List (continued)								
1,2-Dibromo-3-chloropropane	Not detected	ug/L	5	SW5030C/8260C	09/30/16 14:03	JGH	96-12-8	H
1,2,4-Trichlorobenzene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 14:03	JGH	120-82-1	H
1,2,3-Trichlorobenzene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 14:03	JGH	87-61-6	H
Naphthalene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 14:03	JGH	91-20-3	H
2-Methylnaphthalene	Not detected	ug/L	5	SW5030C/8260C	09/30/16 14:03	JGH	91-57-6	H

H-Sample submitted and run outside of holding time



Analytical Laboratory Report

Report ID: S75966.01(01)
Generated on 09/13/2016

Report to

Attention: Gwen Kubacki
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 248-994-2240 FAX: 248-994-2241
Email: gwen.kubacki@arcadis.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

Kevin George (kgeorge@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S75966.01-S75966.04
Project: B0064479.2016.00501
Collected Date: 09/09/2016
Submitted Date/Time: 09/09/2016 15:25
Sampled by: Christine Gregg
P.O. #: B0064479.2016.00501

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Results relate only to items tested as received by laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
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j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods



Analytical Laboratory Report

Method Summary

Method	Version
E300.0	EPA Method 300.0 Revision 2.1



Analytical Laboratory Report

Sample Summary (4 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S75966.01	MW-15_72_090916	Groundwater	09/09/16 08:40
S75966.02	MW-16_77_090916	Groundwater	09/09/16 14:00
S75966.03	MW-16_75_090916	Groundwater	09/09/16 11:45
S75966.04	MW-16_74_090916	Groundwater	09/09/16 13:05



Analytical Laboratory Report

Lab Sample ID: S75966.01
Sample Tag: MW-15_72_090916
Collected Date/Time: 09/09/2016 08:40
Matrix: Groundwater
COC Reference: 100829

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	10.6	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Inorganics								
Fluoride (Undistilled)	Not detected	mg/L	0.5	E300.0	09/13/16 10:57	JDP	16984-48-8	



Analytical Laboratory Report

Lab Sample ID: S75966.02
Sample Tag: MW-16_77_090916
Collected Date/Time: 09/09/2016 14:00
Matrix: Groundwater
COC Reference: 100829

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	10.6	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Inorganics								
Fluoride (Undistilled)	0.6	mg/L	0.5	E300.0	09/13/16 11:10	JDP	16984-48-8	



Analytical Laboratory Report

Lab Sample ID: S75966.03
Sample Tag: MW-16_75_090916
Collected Date/Time: 09/09/2016 11:45
Matrix: Groundwater
COC Reference: 100829

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	10.6	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Inorganics								
Fluoride (Undistilled)	Not detected	mg/L	0.5	E300.0	09/13/16 11:23	JDP	16984-48-8	



Analytical Laboratory Report

Lab Sample ID: S75966.04
Sample Tag: MW-16_74_090916
Collected Date/Time: 09/09/2016 13:05
Matrix: Groundwater
COC Reference: 100829

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	10.6	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Inorganics								
Fluoride (Undistilled)	Not detected	mg/L	0.5	E300.0	09/13/16 11:35	JDP	16984-48-8	

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME		Gwen Kubacki	
COMPANY		Arcadis	
ADDRESS		28550 Cabot Dr Suite 500	
CITY		STATE	ZIP CODE
Novi		Mi	48377
PHONE NO.	FAX NO.	P.O. NO.	
248-994-2040			
E-MAIL ADDRESS		QUOTE NO.	
Gwen.Kubacki@Arcadis.com			

CONTACT NAME		☐ SAME	
COMPANY			
ADDRESS			
CITY		STATE	ZIP CODE
PHONE NO.	E-MAIL ADDRESS		

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME P0064479.2016.00501	SAMPLER(S) - PLEASE PRINT/SIGN NAME Christine Gregg
TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☐ STANDARD ☐ OTHER	
DELIVERABLES REQUIRED ☐ STD ☐ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER	

Certifications

☐ OHIO VAP ☐ Drinking Water

☐ DoD ☐ NPDES

Project Locations

☐ Detroit ☐ New York

☐ Other _____

Special Instructions

MATRIX CODE:	GW=GROUNDWATER SL=SLUDGE	WW=WASTEWATER DW=DRINKING WATER	S=SOIL O=OIL	L=LIQUID WP=WPIE	SD=SOLID A=AIR W=WASTE

Containers & Preservatives

[illegible]

RELINQUISHED BY:	<i>[Signature]</i>	1 Sampler	DATE	TIME
SIGNATURE/ORGANIZATION	Arcadist		9/9/18	15:25
RECEIVED BY:	<i>[Signature]</i>		DATE	TIME
SIGNATURE/ORGANIZATION	Nont		9/9/18	15:25
RELINQUISHED BY:			DATE	TIME
SIGNATURE/ORGANIZATION				
RECEIVED BY:			DATE	TIME
SIGNATURE/ORGANIZATION				

RELINQUISHED BY: SIGNATURE/ORGANIZATION _____			DATE _____	TIME _____
RECEIVED BY: SIGNATURE/ORGANIZATION _____			DATE _____	TIME _____
SEAL NO. _____	SEAL INTACT YES ☐ NO ☐	INITIALS _____	NOTES: TEMP. ON ARRIVAL _____ 10.6	
SEAL NO. _____	SEAL INTACT YES ☐ NO ☐	INITIALS _____		

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



Analytical Laboratory Report

Report ID: S76842.01(01)
Generated on 10/27/2016

Report to

Attention: Andrea Krevinghaus
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-841-1474 (Cell) FAX: 248-994-2241
Email: andrea.krevinghaus@arcadis-us.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S76842.01-S76842.05
Project: RACER, Lansing Plant 2
Collected Date: 10/13/2016 - 10/14/2016
Submitted Date/Time: 10/17/2016 09:56
Sampled by: Unknown
P.O. #: B0064479.2016.00501

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

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40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
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Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

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New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702

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Y	Elevated reporting limit due to high target concentration
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p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

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MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods



Analytical Laboratory Report

Method Summary

Method	Version
N/A	Not Applicable
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs



Analytical Laboratory Report

Sample Summary (5 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S76842.01	TW-14-01_101316	Groundwater	10/13/16 17:25
S76842.02	TW-16-01_101316	Groundwater	10/13/16 18:30
S76842.03	TW-14-02_101316	Groundwater	10/13/16 19:25
S76842.04	PW-14-01_101416	Groundwater	10/14/16 16:10
S76842.05	Trip Blank	Water	10/13/16 00:01



Analytical Laboratory Report

Lab Sample ID: S76842.01
Sample Tag: TW-14-01_101316
Collected Date/Time: 10/13/2016 17:25
Matrix: Groundwater
COC Reference: 093888

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.7	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	10/26/16 10:00	JML		
Organics - Volatiles								
1,4-Dioxane*	43	ug/L	3	SW8260B - SIM	10/25/16 17:00	JGH	123-91-1	



Analytical Laboratory Report

Lab Sample ID: S76842.02
Sample Tag: TW-16-01_101316
Collected Date/Time: 10/13/2016 18:30
Matrix: Groundwater
COC Reference: 093888

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.7	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	10/26/16 10:00	JML		
Organics - Volatiles								
1,4-Dioxane*	240	ug/L	30	SW8260B - SIM	10/26/16 17:02	JGH	123-91-1	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S76842.03
Sample Tag: TW-14-02_101316
Collected Date/Time: 10/13/2016 19:25
Matrix: Groundwater
COC Reference: 093888

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.7	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	10/26/16 10:00	JML		
Organics - Volatiles								
1,4-Dioxane*	1,900	ug/L	200	SW8260B - SIM	10/26/16 17:50	JGH	123-91-1	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S76842.04
Sample Tag: PW-14-01_101416
Collected Date/Time: 10/14/2016 16:10
Matrix: Groundwater
COC Reference: 093888

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.7	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	10/26/16 10:00	JML		
Organics - Volatiles								
1,4-Dioxane*	320	ug/L	30	SW8260B - SIM	10/26/16 17:26	JGH	123-91-1	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S76842.05
Sample Tag: Trip Blank
Collected Date/Time: 10/13/2016 00:01
Matrix: Water
COC Reference: 093888

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	5.7	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	10/26/16 10:00	JML		
Organics - Volatiles								
1,4-Dioxane*	Not detected	ug/L	3	SW8260B - SIM	10/25/16 15:05	JGH	123-91-1	

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Andren Krewinghaus			
COMPANY ARCANIS			
ADDRESS 28550 Cast Dr.			
CITY Novi MI 48577			STATE MI
ZIP CODE 48577			
PHONE NO. 248-994-2240		FAX NO. 248-994-2241	P.O. NO. B0064479.221600501
E-MAIL ADDRESS Andren.Krewinghaus@arcanis-us.com			QUOTE NO.

CONTACT NAME		~~X~~ SAME	
COMPANY			
ADDRESS			
CITY		STATE	ZIP CODE
PHONE NO.		E-MAIL ADDRESS	

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME	Racer, Linsby Plant 2	SAMPLER(S) - PLEASE PRINT/SIGN NAME
TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER		
DELIVERABLES REQUIRED ☒ STD ☐ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER		

MATRIX	GW=GROUNDWATER	WW=WASTEWATER	S=SOIL	L=LIQUID	SD=SOLID	# Containers & Preservatives
CODE:	SL=SLUDGE	DW=DRINKING WATER	O=OIL	WP=WIPE	A=AIR W=WASTE	

[illegible]

Certifications	
☐ OHIO VAP	☐ Drinking Water
☐ DoD	☐ NPDES
Project Locations	
☐ Detroit	☐ New York
☐ Other	
Special Instructions	
1, 4, Dioxin X X X X	

RELINQUISHED BY: SIGNATURE/ORGANIZATION		☒ Sampler	DATE 12/17/16	TIME 956
RECEIVED BY: SIGNATURE/ORGANIZATION			DATE 10/17/16	TIME 954
RELINQUISHED BY: SIGNATURE/ORGANIZATION			DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION			DATE	TIME

RELINQUISHED BY: SIGNATURE/ORGANIZATION			DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION			DATE	TIME
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS	NOTES:	TEMP. ON ARRIVAL <u>57</u>
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS	5 cups 14pt on net 74	

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



Analytical Laboratory Report

Report ID: S77009.01(01)
Generated on 11/03/2016

Report to

Attention: Gwen Kubacki
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 248-994-2240 FAX: 248-994-2241
Email: gwen.kubacki@arcadis.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S77009.01-S77009.05
Project: RACER, Lansing Plant 2
Collected Date: 10/20/2016
Submitted Date/Time: 10/21/2016 10:33
Sampled by: Dale Arnet
P.O. #: B0064479.2016.00501

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A handwritten signature in black ink, reading "Maya Murshak".

Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
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40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
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Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
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Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702

Qualifier Descriptions

Qualifier	Description
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E	Concentration exceeds calibration range
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G	Estimated result due to extraction run outside of holding time
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T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods



Analytical Laboratory Report

Method Summary

Method	Version
N/A	Not Applicable
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs



Analytical Laboratory Report

Sample Summary (5 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S77009.01	TW-14-01_102016	Groundwater	10/20/16 17:15
S77009.02	TW-16-01_102016	Groundwater	10/20/16 17:40
S77009.03	AS-16-01_102016	Groundwater	10/20/16 18:05
S77009.04	TW-14-02_102016	Groundwater	10/20/16 18:40
S77009.05	PW-14-01_102016	Groundwater	10/20/16 19:00



Analytical Laboratory Report

Lab Sample ID: S77009.01
Sample Tag: TW-14-01_102016
Collected Date/Time: 10/20/2016 17:15
Matrix: Groundwater
COC Reference: 72086

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	6.0	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	10/27/16 10:00	JML		
Organics - Volatiles								
1,4-Dioxane*	36	ug/L	3	SW8260B - SIM	10/26/16 20:30	JGH	123-91-1	



Analytical Laboratory Report

Lab Sample ID: S77009.02
Sample Tag: TW-16-01_102016
Collected Date/Time: 10/20/2016 17:40
Matrix: Groundwater
COC Reference: 72086

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	6.0	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	10/27/16 10:00	JML		
Organics - Volatiles								
1,4-Dioxane*	139	ug/L	3	SW8260B - SIM	10/26/16 20:53	JGH	123-91-1	



Analytical Laboratory Report

Lab Sample ID: S77009.03
Sample Tag: AS-16-01_102016
Collected Date/Time: 10/20/2016 18:05
Matrix: Groundwater
COC Reference: 72086

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	6.0	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags

Extraction / Prep.

pH check for VOCs*	<2	STD Units		N/A	10/27/16 10:00	JML		

Organics - Volatiles

1,4-Dioxane*	200	ug/L	30	SW8260B - SIM	11/02/16 16:45	JGH	123-91-1	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S77009.04
Sample Tag: TW-14-02_102016
Collected Date/Time: 10/20/2016 18:40
Matrix: Groundwater
COC Reference: 72086

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	6.0	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags

Extraction / Prep.

pH check for VOCs*	<2	STD Units		N/A	10/27/16 10:00	JML		

Organics - Volatiles

1,4-Dioxane*	2,100	ug/L	200	SW8260B - SIM	11/02/16 17:09	JGH	123-91-1	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S77009.05
Sample Tag: PW-14-01_102016
Collected Date/Time: 10/20/2016 19:00
Matrix: Groundwater
COC Reference: 72086

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	6.0	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	10/27/16 10:00	JML		
Organics - Volatiles								
1,4-Dioxane*	260	ug/L	30	SW8260B - SIM	11/01/16 23:02	JGH	123-91-1	Y

Y-Elevated reporting limit due to high target concentration

Merit

Laboratories, Inc.

2680 East Lansing Dr., East Lansing, MI 48823
 Phone (517) 332-0167 Fax (517) 332-4034
 www.meritlabs.com

C.O.C. PAGE # 1 OF 1

72086

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Gwen Kubacki
 COMPANY ARCADES
 ADDRESS 28550 Cedar Dr
 CITY Novi MI 48377 STATE MI ZIP CODE 48377
 PHONE NO. 248-994-2240 FAX NO. 248-994-2241 P.O. NO. 80064479.2016.00501
 E-MAIL ADDRESS Gwen.Kubacki@arcadis-us.com QUOTE NO.

CONTACT NAME SAME
 COMPANY
 ADDRESS
 CITY STATE ZIP CODE
 PHONE NO. E-MAIL ADDRESS

PROJECT NO./NAME Racer, Lansing Plant 2 SAMPLER(S) - PLEASE PRINT/SIGN NAME Dale Arnes
 TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER
 DELIVERABLES REQUIRED ☒ STD ☐ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID
 SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIFE A=AIR W=WASTE

Containers & Preservatives

MERIT LAB NO. FOR LAB USE ONLY	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	# Containers & Preservatives							
	DATE	TIME				NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	
77009.01	10/21/16	1715	TW-14-01-102016	GW	3	☒							X
.02	10/21/16	1740	TW-16-01-102016	GW	3	☒							X
.03	10/21/16	1805	AS-16-01-102016	GW	3	☒							X
.04	10/21/16	1840	TW-14-02-102016	GW	3	☒							X
.05	10/21/16	1900	PW-14-01-102016	GW	3	☒							X

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

Certifications

☐ OHIO VAP ☐ Drinking Water☐ DoD ☐ NPDES

Project Locations

☐ Detroit ☐ New York☐ Other

Special Instructions

RELINQUISHED BY: Dale Arnes ☒ Sampler DATE 10/21/16 TIME
 SIGNATURE/ORGANIZATION
 RECEIVED BY: M Chilcote DATE 10/21/16 TIME 1033
 SIGNATURE/ORGANIZATION
 RELINQUISHED BY: DATE TIME
 SIGNATURE/ORGANIZATION
 RECEIVED BY: DATE TIME
 SIGNATURE/ORGANIZATION

RELINQUISHED BY: DATE TIME
 SIGNATURE/ORGANIZATION
 RECEIVED BY: DATE TIME
 SIGNATURE/ORGANIZATION
 SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS
 SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS
 NOTES: TEMP. ON ARRIVAL 6.0

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



Analytical Laboratory Report

Report ID: S77168.01(01)

Generated on 11/04/2016

Report to

Attention: Randy Christensen
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1940 FAX: 248-994-2241

Email: randy.christensen@arcadis.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)

Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S77168.01-S77168.06

Project: RACER B0064479.2016.00501

Collected Date: 10/26/2016 - 10/27/2016

Submitted Date/Time: 10/28/2016 08:00

Sampled by: Christine Gregg

P.O. #: B0064479.2016.0501

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A handwritten signature in black ink, reading "Maya Murshak".

Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods



Analytical Laboratory Report

Method Summary

Method	Version
N/A	Not Applicable
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs



Analytical Laboratory Report

Sample Summary (6 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S77168.01	PW-14-01_102616	Liquid	10/26/16 16:50
S77168.02	TW-16-01_102716	Liquid	10/27/16 12:15
S77168.03	AS-16-01_102716	Liquid	10/27/16 12:45
S77168.04	TW-14-01_102716	Liquid	10/27/16 14:10
S77168.05	AS-16-02_102716	Liquid	10/27/16 16:45
S77168.06	TW-14-02_102716	Liquid	10/27/16 18:30



Analytical Laboratory Report

Lab Sample ID: S77168.01
Sample Tag: PW-14-01_102616
Collected Date/Time: 10/26/2016 16:50
Matrix: Liquid
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	2.5	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags

Extraction / Prep.

pH check for VOCs*	<2	STD Units		N/A	11/03/16 12:30	JML		

Organics - Volatiles

1,4-Dioxane*	390	ug/L	30	SW8260B - SIM	11/03/16 17:29	JGH	123-91-1	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S77168.02
Sample Tag: TW-16-01_102716
Collected Date/Time: 10/27/2016 12:15
Matrix: Liquid
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	2.5	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	11/03/16 12:30	JML		
Organics - Volatiles								
1,4-Dioxane*	124	ug/L	3	SW8260B - SIM	11/03/16 16:17	JGH	123-91-1	



Analytical Laboratory Report

Lab Sample ID: S77168.03
Sample Tag: AS-16-01_102716
Collected Date/Time: 10/27/2016 12:45
Matrix: Liquid
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	2.5	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags

Extraction / Prep.

pH check for VOCs*	<2	STD Units		N/A	11/03/16 12:30	JML		

Organics - Volatiles

1,4-Dioxane*	240	ug/L	30	SW8260B - SIM	11/03/16 17:52	JGH	123-91-1	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S77168.04
Sample Tag: TW-14-01_102716
Collected Date/Time: 10/27/2016 14:10
Matrix: Liquid
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	2.5	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	11/03/16 12:30	JML		
Organics - Volatiles								
1,4-Dioxane*	63	ug/L	3	SW8260B - SIM	11/03/16 16:41	JGH	123-91-1	



Analytical Laboratory Report

Lab Sample ID: S77168.05
Sample Tag: AS-16-02_102716
Collected Date/Time: 10/27/2016 16:45
Matrix: Liquid
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	2.5	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	>2	STD Units		N/A	11/03/16 12:30	JML		
Organics - Volatiles								
1,4-Dioxane*	86	ug/L	3	SW8260B - SIM	11/03/16 17:05	JGH	123-91-1	



Analytical Laboratory Report

Lab Sample ID: S77168.06
Sample Tag: TW-14-02_102716
Collected Date/Time: 10/27/2016 18:30
Matrix: Liquid
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	2.5	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags

Extraction / Prep.

pH check for VOCs*	<2	STD Units		N/A	11/03/16 12:30	JML		

Organics - Volatiles

1,4-Dioxane*	3,000	ug/L	800	SW8260B - SIM	11/03/16 18:17	JGH	123-91-1	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Supplemental Report

Report ID: S77471.01(02)

Generated on 12/02/2016

Replaces report S77471.01(01) generated on 11/29/2016

Report to

Attention: Andrea Krevinghaus
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-841-1474 (Cell) FAX: 248-994-2241

Email: andrea.krevinghaus@arcadis-us.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)

Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S77471.01-S77471.05

Project: RACER, Lansing Plant 2, B0064479.2016.00501

Collected Date: 11/10/2016

Submitted Date/Time: 11/11/2016 09:30

Sampled by: Dale Arnet

P.O. #: B0064479.2016.00501

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Maya Murshak
Technical Director



Analytical Laboratory Report

Supplemental Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

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40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

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Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Report Narrative

All analyses complete



Analytical Laboratory Report

Supplemental Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods



Analytical Laboratory Report

Supplemental Report

Method Summary

Method	Version
E300.0	EPA Method 300.0 Revision 2.1
N/A	Not Applicable
SM2320B	Standard Method 2320 B 20th Edition
SM4500-N(org)/NH	Standard Method 4500 N(org)B / NH3D 20th Edition
SM4500-PE	Standard Method 4500 P E 20th Edition
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs



Analytical Laboratory Report

Supplemental Report

Sample Summary (5 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S77471.01	TW-14-01_111016	Groundwater	11/10/16 15:50
S77471.02	TW-16-01_111016	Groundwater	11/10/16 16:10
S77471.03	PW-14-01_111016	Groundwater	11/10/16 16:35
S77471.04	TW-14-02_111016	Groundwater	11/10/16 17:00
S77471.05	Trip Blank	Water	11/10/16 00:01



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S77471.01
Sample Tag: TW-14-01_111016
Collected Date/Time: 11/10/2016 15:50
Matrix: Groundwater
COC Reference: 094565

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.3	IR
1	250ml Plastic	H2SO4	Yes	5.3	IR
1	250ml Plastic	None	Yes	5.3	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	11/15/16 10:00	JML		
Inorganics								
Alkalinity as CaCO3	366	mg/L	2	SM2320B	11/15/16 11:55	JKB		
Fluoride (Undistilled)	Not detected	mg/L	1.0	E300.0	11/11/16 12:19	JDP	16984-48-8	
Nitrate-N	Not detected	mg/L	0.5	E300.0	11/11/16 12:19	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	11/11/16 12:19	JDP	14797-65-0	
Total Kjeldahl Nitrogen	9.0	mg/L	0.1	SM4500-N(org)/NH	12/01/16 16:09	MJC		
Total Phosphorus	1.6	mg/L	0.5	SM4500-PE	11/18/16 17:56	MJC	7723-14-0	
Organics - Volatiles								
1,4-Dioxane*	52	ug/L	3	SW8260B - SIM	11/14/16 18:09	JGH	123-91-1	



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S77471.02
Sample Tag: TW-16-01_111016
Collected Date/Time: 11/10/2016 16:10
Matrix: Groundwater
COC Reference: 094565

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.3	IR
1	250ml Plastic	H2SO4	Yes	5.3	IR
1	250ml Plastic	None	Yes	5.3	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	11/15/16 10:00	JML		
Inorganics								
Alkalinity as CaCO3	438	mg/L	2	SM2320B	11/15/16 12:00	JKB		
Fluoride (Undistilled)	Not detected	mg/L	1.0	E300.0	11/11/16 12:31	JDP	16984-48-8	
Nitrate-N	Not detected	mg/L	0.5	E300.0	11/11/16 12:31	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	11/11/16 12:31	JDP	14797-65-0	
Total Kjeldahl Nitrogen	1.8	mg/L	0.1	SM4500-N(org)/NH	12/01/16 16:25	MJC		
Total Phosphorus	0.40	mg/L	0.05	SM4500-PE	11/18/16 18:31	MJC	7723-14-0	
Organics - Volatiles								
1,4-Dioxane*	240	ug/L	30	SW8260B - SIM	11/15/16 16:53	JGH	123-91-1	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S77471.03
Sample Tag: PW-14-01_111016
Collected Date/Time: 11/10/2016 16:35
Matrix: Groundwater
COC Reference: 094565

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.3	IR
1	250ml Plastic	H2SO4	Yes	5.3	IR
1	250ml Plastic	None	Yes	5.3	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	11/15/16 10:00	JML		
Inorganics								
Alkalinity as CaCO3	382	mg/L	2	SM2320B	11/15/16 12:05	JKB		
Fluoride (Undistilled)	Not detected	mg/L	1.0	E300.0	11/11/16 12:44	JDP	16984-48-8	
Nitrate-N	0.7	mg/L	0.5	E300.0	11/11/16 12:44	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	11/11/16 12:44	JDP	14797-65-0	
Total Kjeldahl Nitrogen	1.4	mg/L	0.1	SM4500-N(org)/NH	12/01/16 16:37	MJC		
Total Phosphorus	1.25	mg/L	0.05	SM4500-PE	11/18/16 18:38	MJC	7723-14-0	
Organics - Volatiles								
1,4-Dioxane*	190	ug/L	30	SW8260B - SIM	11/15/16 17:17	JGH	123-91-1	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S77471.04
Sample Tag: TW-14-02_111016
Collected Date/Time: 11/10/2016 17:00
Matrix: Groundwater
COC Reference: 094565

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.3	IR
1	250ml Plastic	H2SO4	Yes	5.3	IR
1	250ml Plastic	None	Yes	5.3	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	11/15/16 10:00	JML		
Inorganics								
Alkalinity as CaCO3	366	mg/L	2	SM2320B	11/15/16 12:10	JKB		
Fluoride (Undistilled)	Not detected	mg/L	1.0	E300.0	11/11/16 13:48	JDP	16984-48-8	
Nitrate-N	Not detected	mg/L	0.5	E300.0	11/11/16 13:48	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	11/11/16 13:48	JDP	14797-65-0	
Total Kjeldahl Nitrogen	1.7	mg/L	0.1	SM4500-N(org)/NH	12/01/16 16:56	MJC		
Total Phosphorus	0.41	mg/L	0.05	SM4500-PE	11/18/16 18:45	MJC	7723-14-0	
Organics - Volatiles								
1,4-Dioxane*	2,600	ug/L	300	SW8260B - SIM	11/15/16 18:29	JGH	123-91-1	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S77471.05
Sample Tag: Trip Blank
Collected Date/Time: 11/10/2016 00:01
Matrix: Water
COC Reference: 094565

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	5.3	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags

Extraction / Prep.

pH check for VOCs*	<2	STD Units		N/A	11/15/16 10:00	JML		

Organics - Volatiles

1,4-Dioxane*	Not detected	ug/L	3	SW8260B - SIM	11/14/16 17:21	JGH	123-91-1	



C.O.C. PAGE # 1 OF 1

094565

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Andrea Kreutzhaus			
COMPANY ARCADIS			
ADDRESS 28550 Cabot Dr.			
CITY Novi		STATE MI	ZIP CODE 48832
PHONE NO. 248-994-2240		FAX NO. 248-994-2241	P.O. NO.
E-MAIL ADDRESS Andrea.Kreutzhaus@arcadis-us.com			QUOTE NO.

CONTACT NAME		☒ SAME	
COMPANY			
ADDRESS			
CITY		STATE	ZIP CODE
PHONE NO.	E-MAIL ADDRESS		

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME <i>Racer, Larry / Plat 2 / 60064479, 2016, 0050</i>	SAMPLER(S) - PLEASE PRINT/SIGN NAME <i>Dale Hunt / Dan</i>
TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER	
DELIVERABLES REQUIRED ☒ STD ☐ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER	

MATRIX	GW=GROUNDWATER	WW=WASTEWATER	S=SOIL	L=LIQUID	SD=SOLID
CODE:	SL=SLUDGE	DW=DRINKING WATER	O=OIL	WP=WPIE	A=AIR W=WASTE

Containers & Preservatives[illegible]

RELINQUISHED BY:	<i>Dale Arnesen / ARLANDS</i>	☒ Sampler	DATE	TIME
SIGNATURE/ORGANIZATION			<i>11/14/16</i>	
RECEIVED BY:	<i>M Chilcote</i>		DATE	TIME
SIGNATURE/ORGANIZATION			<i>11/11/16</i>	<i>0930</i>
RELINQUISHED BY:			DATE	TIME
SIGNATURE/ORGANIZATION				
RECEIVED BY:			DATE	TIME
SIGNATURE/ORGANIZATION				

RELINQUISHED BY:			DATE	TIME
SIGNATURE/ORGANIZATION				
RECEIVED BY:			DATE	TIME
SIGNATURE/ORGANIZATION				
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS	NOTES: TEMP. ON ARRIVAL <u>6.3</u> <i>Sample kept in wet bag</i>	
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS		

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



Analytical Laboratory Report

Supplemental Report

Report ID: S77499.01(02)
Generated on 12/02/2016
Replaces report S77499.01(01) generated on 11/29/2016

Report to

Attention: Andrea Krevinghaus
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-841-1474 (Cell) FAX: 248-994-2241
Email: andrea.krevinghaus@arcadis-us.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S77499.01-S77499.07
Project: B0064479.2016.00501
Collected Date: 11/11/2016
Submitted Date/Time: 11/11/2016 17:32
Sampled by: Dale Arnet
P.O. #: B0064479.2016.00501

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Maya Murshak
Technical Director



Analytical Laboratory Report

Supplemental Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Report Narrative

All analyses complete



Analytical Laboratory Report

Supplemental Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods



Analytical Laboratory Report

Supplemental Report

Method Summary

Method	Version
E300.0	EPA Method 300.0 Revision 2.1
N/A	Not Applicable
SM2320B	Standard Method 2320 B 20th Edition
SM4500-N(org)/NH	Standard Method 4500 N(org)B / NH3D 20th Edition
SM4500-PE	Standard Method 4500 P E 20th Edition
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs



Analytical Laboratory Report

Supplemental Report

Sample Summary (7 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S77499.01	MW-16-75_111116	Groundwater	11/11/16 13:15
S77499.02	AS-16-02_111116	Groundwater	11/11/16 15:15
S77499.03	MW-15-72_111116	Groundwater	11/11/16 15:40
S77499.04	MW-16-77_111116	Groundwater	11/11/16 16:00
S77499.05	MW-16-74_111116	Groundwater	11/11/16 16:15
S77499.06	AS-16-01_111116	Groundwater	11/11/16 16:30
S77499.07	Trip Blank	Water	11/11/16 00:01



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S77499.01
Sample Tag: MW-16-75_111116
Collected Date/Time: 11/11/2016 13:15
Matrix: Groundwater
COC Reference: 094566

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	8.3	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Inorganics								
Fluoride (Undistilled)	Not detected	mg/L	1.0	E300.0	11/12/16 09:59	JDP	16984-48-8	



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S77499.02
Sample Tag: AS-16-02_111116
Collected Date/Time: 11/11/2016 15:15
Matrix: Groundwater
COC Reference: 094566

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	8.3	IR
1	250ml Plastic	H2SO4	Yes	8.3	IR
3	40ml Glass	HCL	Yes	8.3	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	>2	STD Units		N/A	11/15/16 10:00	JML		
Inorganics								
Alkalinity as CaCO3	5,980	mg/L	20	SM2320B	11/15/16 12:15	JKB		
Fluoride (Undistilled)	Not detected	mg/L	1.0	E300.0	11/12/16 10:12	JDP	16984-48-8	
Nitrate-N	Not detected	mg/L	0.5	E300.0	11/12/16 10:12	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	11/12/16 10:12	JDP	14797-65-0	
Total Kjeldahl Nitrogen	4,580	mg/L	20	SM4500-N(org)/NH	12/01/16 17:14	MJC		
Total Phosphorus	3,540	mg/L	250	SM4500-PE	11/18/16 18:09	MJC	7723-14-0	
Organics - Volatiles								
1,4-Dioxane*	180	ug/L	30	SW8260B - SIM	11/15/16 17:41	JGH	123-91-1	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S77499.03
Sample Tag: MW-15-72_111116
Collected Date/Time: 11/11/2016 15:40
Matrix: Groundwater
COC Reference: 094566

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	8.3	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Inorganics								
Fluoride (Undistilled)	Not detected	mg/L	1.0	E300.0	11/12/16 10:25	JDP	16984-48-8	



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S77499.04
Sample Tag: MW-16-77_111116
Collected Date/Time: 11/11/2016 16:00
Matrix: Groundwater
COC Reference: 094566

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	8.3	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Inorganics								
Fluoride (Undistilled)	Not detected	mg/L	1.0	E300.0	11/12/16 10:38	JDP	16984-48-8	



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S77499.05
Sample Tag: MW-16-74_111116
Collected Date/Time: 11/11/2016 16:15
Matrix: Groundwater
COC Reference: 094566

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	8.3	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Inorganics								
Fluoride (Undistilled)	Not detected	mg/L	1.0	E300.0	11/12/16 10:50	JDP	16984-48-8	



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S77499.06
Sample Tag: AS-16-01_111116
Collected Date/Time: 11/11/2016 16:30
Matrix: Groundwater
COC Reference: 094566

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	8.3	IR
1	250ml Plastic	H2SO4	Yes	8.3	IR
3	40ml Glass	HCL	Yes	8.3	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	11/15/16 10:00	JML		
Inorganics								
Alkalinity as CaCO3	1,104	mg/L	2	SM2320B	11/15/16 12:20	JKB		
Fluoride (Undistilled)	Not detected	mg/L	1.0	E300.0	11/12/16 11:03	JDP	16984-48-8	
Nitrate-N	Not detected	mg/L	0.5	E300.0	11/12/16 11:03	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	11/12/16 11:03	JDP	14797-65-0	
Total Kjeldahl Nitrogen	850	mg/L	10	SM4500-N(org)/NH	12/01/16 17:26	MJC		
Total Phosphorus	703	mg/L	13	SM4500-PE	11/18/16 18:25	MJC	7723-14-0	
Organics - Volatiles								
1,4-Dioxane*	180	ug/L	30	SW8260B - SIM	11/15/16 18:05	JGH	123-91-1	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S77499.07
Sample Tag: Trip Blank
Collected Date/Time: 11/11/2016 00:01
Matrix: Water
COC Reference: 094566

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	n/a	n/a	Yes	n/a	n/a

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Other / Misc.								
No Analyses*	Completed				11/14/16 16:17	JAL		



C.O.C. PAGE # 1 OF 1

094566

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Andrea Krevinghaus			
COMPANY ARCADIS			
ADDRESS 28550 Cahot Dr.			
CITY Nowi, MS		STATE MI	ZIP CODE 48377
PHONE NO. 248-994-2240		FAX NO. 248-994-2241	P.O. NO.
E-MAIL ADDRESS Andrea.Krevinghaus@arcadis-us.com			QUOTE NO.

CONTACT NAME		☒ SAME	
COMPANY			
ADDRESS			
CITY		STATE	ZIP CODE
PHONE NO.	E-MAIL ADDRESS		

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME	B0064479.2016.00501	SAMPLER(S) - PLEASE PRINT/SIGN NAME	Don Amst / Don
TURNAROUND TIME REQUIRED		☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER _____	
DELIVERABLES REQUIRED		☒ STD ☐ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER _____	

MATRIX	GW=GROUNDWATER	WW=WASTEWATER	S=SOIL	L=LIQUID	SD=SOLID
CODE:	SL=SLUDGE	DW=DRINKING WATER	O=OIL	WP=WPIE	A=AIR
					W=WASTE

Containers & Preservatives[illegible]

RELINQUISHED BY: SIGNATURE/ORGANIZATION	<i>D. A. A. / ARCADES</i>	☒ Sampler	DATE 11/11/16	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION	<i>Sam Smith</i>		DATE 11/11/16	TIME 1132
RELINQUISHED BY: SIGNATURE/ORGANIZATION			DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION			DATE	TIME

RELINQUISHED BY: SIGNATURE/ORGANIZATION			DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION			DATE	TIME
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS	NOTES:	TEMP. ON ARRIVAL <u>8.3</u>
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS		

Samples kept on wet ice

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



Analytical Laboratory Report

Report ID: S77804.01(01)

Generated on 12/01/2016

Report to

Attention: Gwen Kubacki

Arcadis

28550 Cabot Drive

Suite 500

Novi, MI 48377

Phone: 248-994-2240 FAX: 248-994-2241

Email: gwen.kubacki@arcadis.com

Report produced by

Merit Laboratories, Inc.

2680 East Lansing Drive

East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)

Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S77804.01-S77804.04

Project: B0064479.2016.00501

Collected Date: 11/25/2016

Submitted Date/Time: 11/29/2016 08:00

Sampled by: Gwen Kubacki

P.O. #: B0064479.2016.00501

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Sample Summary (Page 5)

A handwritten signature in black ink, reading "Maya Murshak".

Maya Murshak

Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods



Analytical Laboratory Report

Method Summary

Method	Version
N/A	Not Applicable
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs



Analytical Laboratory Report

Sample Summary (4 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S77804.01	TW-14-02_112516	Liquid	11/25/16 17:00
S77804.02	PW-14-01_112516	Liquid	11/25/16 16:15
S77804.03	TW-16-01_112516	Liquid	11/25/16 15:15
S77804.04	TW-14-01_112516	Liquid	11/25/16 12:30



Analytical Laboratory Report

Lab Sample ID: S77804.01
Sample Tag: TW-14-02_112516
Collected Date/Time: 11/25/2016 17:00
Matrix: Liquid
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.8	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags

Extraction / Prep.

pH check for VOCs*	<2	STD Units		N/A	11/30/16 10:30	JML		

Organics - Volatiles

1,4-Dioxane*	2,400	ug/L	300	SW8260B - SIM	11/30/16 16:35	JGH	123-91-1	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S77804.02
Sample Tag: PW-14-01_112516
Collected Date/Time: 11/25/2016 16:15
Matrix: Liquid
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.8	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags

Extraction / Prep.

pH check for VOCs*	<2	STD Units		N/A	11/30/16 10:30	JML		

Organics - Volatiles

1,4-Dioxane*	160	ug/L	30	SW8260B - SIM	11/30/16 16:09	JGH	123-91-1	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S77804.03
Sample Tag: TW-16-01_112516
Collected Date/Time: 11/25/2016 15:15
Matrix: Liquid
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.8	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	11/30/16 10:30	JML		
Organics - Volatiles								
1,4-Dioxane*	148	ug/L	3	SW8260B - SIM	11/30/16 15:21	JGH	123-91-1	



Analytical Laboratory Report

Lab Sample ID: S77804.04
Sample Tag: TW-14-01_112516
Collected Date/Time: 11/25/2016 12:30
Matrix: Liquid
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.8	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	11/30/16 10:30	JML		
Organics - Volatiles								
1,4-Dioxane*	43	ug/L	3	SW8260B - SIM	11/30/16 03:09	JGH	123-91-1	



Analytical Laboratory Report

Report ID: S77995.01(01)

Generated on 12/15/2016

Report to

Attention: Andrea Krevinghaus
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-841-1474 (Cell) FAX: 248-994-2241

Email: andrea.krevinghaus@arcadis-us.com

Additional Contacts: Alex Villhauer, Randy Christensen, Patrick Curry, Jesse Wright, Kristen Padron

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)

Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S77995.01-S77995.04

Project: Racer / Lansing Plant 2 / B0064479.2016.00501

Collected Date: 12/06/2016

Submitted Date/Time: 12/07/2016 10:55

Sampled by: Dale Arnett

P.O. #: B0064479.2016.00501

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods



Analytical Laboratory Report

Method Summary

Method	Version
E300.0	EPA Method 300.0 Revision 2.1
N/A	Not Applicable
SM2320B	Standard Method 2320 B 20th Edition
SM4500-N(org)/NH	Standard Method 4500 N(org)B / NH3D 20th Edition
SM4500-PE	Standard Method 4500 P E 20th Edition
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs



Analytical Laboratory Report

Sample Summary (4 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S77995.01	PW-14-01_120616	Groundwater	12/06/16 13:30
S77995.02	TW-14-02_120616	Groundwater	12/06/16 13:45
S77995.03	TW-16-01_120616	Groundwater	12/06/16 15:25
S77995.04	TW-14-01_120616	Groundwater	12/06/16 15:40



Analytical Laboratory Report

Lab Sample ID: S77995.01
Sample Tag: PW-14-01_120616
Collected Date/Time: 12/06/2016 13:30
Matrix: Groundwater
COC Reference: 094963

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	6.8	IR
1	250ml Plastic	H2SO4	Yes	6.8	IR
1	250ml Plastic	None	Yes	6.8	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	12/08/16 10:00	JML		
Inorganics								
Alkalinity as CaCO3	398	mg/L	2	SM2320B	12/12/16 15:20	JKB		
Nitrate-N	1.0	mg/L	0.5	E300.0	12/07/16 12:48	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	12/07/16 12:48	JDP	14797-65-0	
Total Kjeldahl Nitrogen	0.9	mg/L	0.1	SM4500-N(org)/NH	12/09/16 17:42	MJC		
Total Phosphorus	0.33	mg/L	0.01	SM4500-PE	12/14/16 17:25	MJC	7723-14-0	
Organics - Volatiles								
1,4-Dioxane*	134	ug/L	3	SW8260B - SIM	12/07/16 12:21	JGH	123-91-1	



Analytical Laboratory Report

Lab Sample ID: S77995.02
Sample Tag: TW-14-02_120616
Collected Date/Time: 12/06/2016 13:45
Matrix: Groundwater
COC Reference: 094963

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	6.8	IR
1	250ml Plastic	H2SO4	Yes	6.8	IR
1	250ml Plastic	None	Yes	6.8	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	12/08/16 10:00	JML		
Inorganics								
Alkalinity as CaCO3	374	mg/L	2	SM2320B	12/12/16 15:30	JKB		
Nitrate-N	Not detected	mg/L	0.5	E300.0	12/07/16 13:01	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	12/07/16 13:01	JDP	14797-65-0	
Total Kjeldahl Nitrogen	2.0	mg/L	0.1	SM4500-N(org)/NH	12/09/16 17:55	MJC		
Total Phosphorus	0.77	mg/L	0.05	SM4500-PE	12/14/16 18:06	MJC	7723-14-0	
Organics - Volatiles								
1,4-Dioxane*	2,000	ug/L	300	SW8260B - SIM	12/07/16 15:56	JGH	123-91-1	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S77995.03
Sample Tag: TW-16-01_120616
Collected Date/Time: 12/06/2016 15:25
Matrix: Groundwater
COC Reference: 094963

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	6.8	IR
1	250ml Plastic	H2SO4	Yes	6.8	IR
1	250ml Plastic	None	Yes	6.8	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	12/08/16 10:00	JML		
Inorganics								
Alkalinity as CaCO3	396	mg/L	2	SM2320B	12/12/16 15:40	JKB		
Nitrate-N	Not detected	mg/L	0.5	E300.0	12/07/16 13:14	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	12/07/16 13:14	JDP	14797-65-0	
Total Kjeldahl Nitrogen	1.8	mg/L	0.1	SM4500-N(org)/NH	12/09/16 18:09	MJC		
Total Phosphorus	0.24	mg/L	0.05	SM4500-PE	12/14/16 18:20	MJC	7723-14-0	
Organics - Volatiles								
1,4-Dioxane*	125	ug/L	3	SW8260B - SIM	12/07/16 15:08	JGH	123-91-1	



Analytical Laboratory Report

Lab Sample ID: S77995.04
Sample Tag: TW-14-01_120616
Collected Date/Time: 12/06/2016 15:40
Matrix: Groundwater
COC Reference: 094963

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	6.8	IR
1	250ml Plastic	H2SO4	Yes	6.8	IR
1	250ml Plastic	None	Yes	6.8	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	12/08/16 10:00	JML		
Inorganics								
Alkalinity as CaCO3	400	mg/L	2	SM2320B	12/12/16 15:45	JKB		
Nitrate-N	Not detected	mg/L	0.5	E300.0	12/07/16 13:27	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	12/07/16 13:27	JDP	14797-65-0	
Total Kjeldahl Nitrogen	1.3	mg/L	0.1	SM4500-N(org)/NH	12/09/16 18:20	MJC		
Total Phosphorus	0.15	mg/L	0.05	SM4500-PE	12/14/16 18:40	MJC	7723-14-0	
Organics - Volatiles								
1,4-Dioxane*	31	ug/L	3	SW8260B - SIM	12/07/16 15:31	JGH	123-91-1	



C.O.C. PAGE #

○

094963

INVOICE TO

CONTACT NAME		☒ SAME	
COMPANY			
ADDRESS			
CITY		STATE	ZIP CODE
PHONE NO.	E-MAIL ADDRESS		

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

Certifications

☐ OHIO VAP ☐ Drinking Water

☐ DoD ☐ NPDES

Project Locations

☐ Detroit ☐ New York

☐ Other _____

Special Instructions

Containers & Preservatives[illegible]

RELINQUISHED BY:			DATE	TIME
SIGNATURE/ORGANIZATION				
RECEIVED BY:			DATE	TIME
SIGNATURE/ORGANIZATION				
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS	NOTES: TEMP. ON ARRIVAL _____ 6.8	
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS		

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Rev. 5-18-19



Analytical Laboratory Report

Supplemental Report

Report ID: S78459.01(02)
Generated on 01/10/2017
Replaces report S78459.01(01) generated on 01/06/2017

Report to

Attention: Andrea Krevinghaus
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-841-1474 (Cell) FAX: 248-994-2241
Email: andrea.krevinghaus@arcadis-us.com

Additional Contacts: Gwen Kubacki

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S78459.01-S78459.04
Project: Racer, Lansing, Plant 2 / B0064479.2016.00501
Collected Date: 12/28/2016
Submitted Date/Time: 12/29/2016 10:20
Sampled by: Dale Arnett
P.O. #: B0064479.2016.00501

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Maya Murshak
Technical Director



Analytical Laboratory Report

Supplemental Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Report Narrative

All analyses complete



Analytical Laboratory Report

Supplemental Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods



Analytical Laboratory Report

Supplemental Report

Method Summary

Method	Version
E300.0	EPA Method 300.0 Revision 2.1
N/A	Not Applicable
SM4500-N(org)/NH	Standard Method 4500 N(org)B / NH3D 20th Edition
SM4500-PE	Standard Method 4500 P E 20th Edition
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs



Analytical Laboratory Report

Supplemental Report

Sample Summary (4 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S78459.01	TW-16-01_122816_A	Groundwater	12/28/16 13:05
S78459.02	PW-14-01_122816	Groundwater	12/28/16 15:05
S78459.03	TW-14-02_122816	Groundwater	12/28/16 15:20
S78459.04	TW-14-01_122816	Groundwater	12/28/16 16:45



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S78459.01
Sample Tag: TW-16-01_122816_A
Collected Date/Time: 12/28/2016 13:05
Matrix: Groundwater
COC Reference: 095459

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
2	40ml Glass	HCL	Yes	5.6	IR
1	250ml Plastic	H2SO4	Yes	5.6	IR
1	250ml Plastic	None	Yes	5.6	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	01/06/17 17:20	JML		
Inorganics								
Nitrate-N	Not detected	mg/L	0.5	E300.0	12/29/16 12:08	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	12/29/16 12:08	JDP	14797-65-0	
Total Kjeldahl Nitrogen	0.4	mg/L	0.1	SM4500-N(org)/NH	01/03/17 15:31	MJC		
Total Phosphorus	0.03	mg/L	0.01	SM4500-PE	12/30/16 12:59	MJC	7723-14-0	
Organics - Volatiles								
1,4-Dioxane*	117	ug/L	3	SW8260B - SIM	01/10/17 16:20	JGH	123-91-1	



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S78459.02
Sample Tag: PW-14-01_122816
Collected Date/Time: 12/28/2016 15:05
Matrix: Groundwater
COC Reference: 095459

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
2	40ml Glass	HCL	Yes	5.6	IR
1	250ml Plastic	H2SO4	Yes	5.6	IR
1	250ml Plastic	None	Yes	5.6	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	01/06/17 17:20	JML		
Inorganics								
Nitrate-N	Not detected	mg/L	0.5	E300.0	12/29/16 12:21	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	12/29/16 12:21	JDP	14797-65-0	
Total Kjeldahl Nitrogen	0.5	mg/L	0.1	SM4500-N(org)/NH	01/03/17 15:46	MJC		
Total Phosphorus	0.12	mg/L	0.01	SM4500-PE	12/30/16 13:04	MJC	7723-14-0	
Organics - Volatiles								
1,4-Dioxane*	83	ug/L	3	SW8260B - SIM	01/10/17 16:38	JGH	123-91-1	



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S78459.03
Sample Tag: TW-14-02_122816
Collected Date/Time: 12/28/2016 15:20
Matrix: Groundwater
COC Reference: 095459

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
2	40ml Glass	HCL	Yes	5.6	IR
1	250ml Plastic	H2SO4	Yes	5.6	IR
1	250ml Plastic	None	Yes	5.6	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	01/06/17 17:20	JML		
Inorganics								
Nitrate-N	Not detected	mg/L	0.5	E300.0	12/29/16 12:34	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	12/29/16 12:34	JDP	14797-65-0	
Total Kjeldahl Nitrogen	1.8	mg/L	0.1	SM4500-N(org)/NH	01/03/17 16:15	MJC		
Total Phosphorus	0.45	mg/L	0.05	SM4500-PE	12/30/16 13:08	MJC	7723-14-0	
Organics - Volatiles								
1,4-Dioxane*	2,000	ug/L	100	SW8260B - SIM	01/10/17 16:56	JGH	123-91-1	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S78459.04
Sample Tag: TW-14-01_122816
Collected Date/Time: 12/28/2016 16:45
Matrix: Groundwater
COC Reference: 095459

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
2	40ml Glass	HCL	Yes	5.6	IR
1	250ml Plastic	H2SO4	Yes	5.6	IR
1	250ml Plastic	None	Yes	5.6	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	<2	STD Units		N/A	01/06/17 17:20	JML		
Inorganics								
Nitrate-N	Not detected	mg/L	0.5	E300.0	12/29/16 12:47	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	12/29/16 12:47	JDP	14797-65-0	
Total Kjeldahl Nitrogen	3.5	mg/L	0.1	SM4500-N(org)/NH	01/03/17 16:29	MJC		
Total Phosphorus	1.27	mg/L	0.05	SM4500-PE	12/30/16 13:13	MJC	7723-14-0	
Organics - Volatiles								
1,4-Dioxane*	26	ug/L	3	SW8260B - SIM	01/10/17 16:02	JGH	123-91-1	

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Andrea Krevinshaus / Gwen, Kubacki			
COMPANY ARCADIS			
ADDRESS 28550 Cabot Dr.			
CITY Novi		STATE MI	ZIP CODE 48377
PHONE NO. 248-994-2240		FAX NO. 248-994-2241	P.O. NO.
E-MAIL ADDRESS Andrea.Krevinshaus@arcadis-us.com Gwen.Kubacki@arcadis-us.com			QUOTE NO.

CONTACT NAME		☒ SAME	
COMPANY			
ADDRESS			
CITY		STATE	ZIP CODE
PHONE NO.		E-MAIL ADDRESS	

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME Racer, Leasing, Plans 2 / 600 647 79. 2016. 00501	SAMPLER(S). PLEASE PRINT SIGN NAME Dale Ainsell / Dale A
TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER	
DELIVERABLES REQUIRED ☒ STD ☐ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER	

MATRIX	GW=GROUNDWATER	WW=WASTEWATER	S=SOIL	L=LIQUID	SD=SOLID
CODE:	SL=SLUDGE	DW=DRINKING WATER	O=OIL	WP=WIPE	A=AIR
					W=WASTE

Containers & Preservatives

[illegible]

RELINQUISHED BY:	Dale M. Arnes / ARCADIS	☒ Sampler	DATE	TIME
SIGNATURE/ORGANIZATION			12/29/16	10:20
RECEIVED BY:	OR / Mear		DATE	TIME
SIGNATURE/ORGANIZATION			12/29/16	10:50
RELINQUISHED BY:			DATE	TIME
SIGNATURE/ORGANIZATION				
RECEIVED BY:	Sam Smith SWS		DATE	TIME
SIGNATURE/ORGANIZATION			12/29/16	

RELINQUISHED BY: SIGNATURE/ORGANIZATION			DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION			DATE	TIME
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS	NOTES: TEMP. ON ARRIVAL _____	
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS	Sample Mps on wet Ice 5.4	

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



Analytical Laboratory Report

Supplemental Report

Report ID: S78902.01(02)

Generated on 01/30/2017

Replaces report S78902.01(01) generated on 01/30/2017

Report to

Attention: Gwen Kubacki
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 248-994-2240 FAX: 248-994-2241

Email: gwen.kubacki@arcadis.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)

Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S78902.01-S78902.02

Project: B0064479.2016.00501

Collected Date: 01/20/2017

Submitted Date/Time: 01/20/2017 16:30

Sampled by: Kaitlyn Voet

P.O. #: B0064479.2016.00501

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Maya Murshak
Technical Director



Analytical Laboratory Report

Supplemental Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

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Report Narrative

Removed estimated original run per client request



Analytical Laboratory Report

Supplemental Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods



Analytical Laboratory Report

Supplemental Report

Method Summary

Method	Version
N/A	Not Applicable
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs



Analytical Laboratory Report

Supplemental Report

Sample Summary (2 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S78902.01	TW-14-02_012017	Groundwater	01/20/17 13:15
S78902.02	Trip Blank	Groundwater	01/20/17 00:01



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S78902.01
Sample Tag: TW-14-02_012017
Collected Date/Time: 01/20/2017 13:15
Matrix: Groundwater
COC Reference: 095502

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	6.0	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags

Extraction / Prep.

pH check for VOCs*	<2	STD Units		N/A	01/26/17 13:20	KCV		

Organics - Volatiles

1,4-Dioxane* (Replicate 01)	1,700	ug/L	200	SW8260B - SIM	01/27/17 18:44	JGH	123-91-1	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Supplemental Report

Lab Sample ID: S78902.02
Sample Tag: Trip Blank
Collected Date/Time: 01/20/2017 00:01
Matrix: Groundwater
COC Reference: 095502

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	6.0	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags

Other / Misc.

Hold until notified*	Completed				01/23/17 13:50	SRS		

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Gwendolyn Kubacki			
COMPANY Arcadis			
ADDRESS 28550 Cabot Drive Ste 500			
CITY Novi		STATE MI	ZIP CODE 48377
PHONE NO. 248 994 2262		FAX NO.	P.O. NO.
E-MAIL ADDRESS gwen.kubacki@arcadis.com		QUOTE NO.	

CONTACT NAME		☒ SAME	
COMPANY			
ADDRESS			
CITY		STATE	ZIP CODE
PHONE NO.	E-MAIL ADDRESS		

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME B0064479.2016.00501	SAMPLER(S) - PLEASE PRINT/SIGN NAME Kaitlyn Voet Kaitlyn Voet
TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER	
DELIVERABLES REQUIRED ☐ STD ☐ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER	

MATRIX CODE:	GW=GROUNDWATER SL=SLUDGE	WW=WASTEWATER DW=DRINKING WATER	S=SOIL O=OIL	L=LIQUID WP=WIPE	SD=SOLID A=AIR W=WASTE

[illegible]

Containers & Preservatives

[illegible]

Certifications

☐ OHIO VAP ☐ Drinking Water

☐ DoD ☐ NPDES

Project Locations

☐ Detroit ☐ New York

☐ Other _____

Special Instructions

analyze 1,4-D only
lab provided

RELINQUISHED BY:	<i>Kourtney Vett</i>	<i>Armadis</i> [★] Sampler	DATE	TIME
SIGNATURE/ORGANIZATION			11/20/17	16:30
RECEIVED BY:	<i>[Signature]</i>		DATE	TIME
SIGNATURE/ORGANIZATION			11/29/17	16:30
RELINQUISHED BY:			DATE	TIME
SIGNATURE/ORGANIZATION				
RECEIVED BY:			DATE	TIME
SIGNATURE/ORGANIZATION				

RELINQUISHED BY: SIGNATURE/ORGANIZATION			DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION			DATE	TIME
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS	NOTES: TEMP. ON ARRIVAL <i>6.0</i>	
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS		

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



Analytical Laboratory Report

Report ID: S79051.01(01)

Generated on 02/16/2017

Report to

Attention: Gwen Kubacki
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 248-994-2240 FAX: 248-994-2241

Email: gwen.kubacki@arcadis.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)

Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S79051.01-S79051.04

Project: RACER Biosparge B0064479.2017.00501

Collected Date: 01/30/2017

Submitted Date/Time: 01/31/2017 09:00

Sampled by: Christine Gregg

P.O. #: B0064479.2017.00501

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
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Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
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Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702

Qualifier Descriptions

Qualifier	Description
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MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods



Analytical Laboratory Report

Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
E300.0	EPA Method 300.0 Revision 2.1
N/A	Not Applicable
SM2320B	Standard Method 2320 B 20th Edition
SM4500-N(org)/NH	Standard Method 4500 N(org)B / NH3D 20th Edition
SM4500-PE	Standard Method 4500 P E 20th Edition
SM5310C	Standard Method 5310C 20th Edition
SW3015A	SW 846 Method 3015A Revision 1 February 2007
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs



Analytical Laboratory Report

Sample Summary (4 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S79051.01	TW-14-01_013017	Groundwater	01/30/17 14:00
S79051.02	TW-16-01_013017	Groundwater	01/30/17 15:15
S79051.03	TW-14-02_013017	Groundwater	01/30/17 16:30
S79051.04	PW-14-01_013017	Groundwater	01/30/17 17:50



Analytical Laboratory Report

Lab Sample ID: S79051.01
Sample Tag: TW-14-01_013017
Collected Date/Time: 01/30/2017 14:00
Matrix: Groundwater
COC Reference: 095584

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.7	IR
1	125ml Plastic	HNO3	Yes	5.7	IR
1	250ml Plastic	H2SO4	Yes	5.7	IR
2	40ml Glass	H2SO4	Yes	5.7	IR
1	500ml Plastic	None	Yes	5.7	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
Metal Digestion	Completed			SW3015A	01/31/17 10:30	CCM		
Metal Digestion	Completed			SW3015A	01/31/17 10:30	CCM		
pH check for VOCs*	<2	STD Units		N/A	02/01/17 11:00	JML		
Inorganics								
Alkalinity as CaCO3	360	mg/L	1	SM2320B	02/06/17 12:30	JKB		
Fluoride (Undistilled)	Not detected	mg/L	0.5	E300.0	01/31/17 11:56	JDP	16984-48-8	
Nitrate-N	Not detected	mg/L	0.5	E300.0	01/31/17 11:56	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	01/31/17 11:56	JDP	14797-65-0	
TOC	5.0	mg/L	1	SM5310C	02/02/17 14:18	JKB		
Total Kjeldahl Nitrogen	0.4	mg/L	0.1	SM4500-N(org)/NH	02/15/17 15:40	MJC		
Total Phosphorus	0.05	mg/L	0.01	SM4500-PE	02/03/17 13:04	MJC	7723-14-0	
Metals								
Iron, Dissolved	0.80	mg/L	0.02	E200.8	01/31/17 11:38	CCM	7439-89-6	
Iron	3.04	mg/L	0.02	E200.8	01/31/17 11:35	CCM	7439-89-6	
Manganese, Dissolved	0.089	mg/L	0.005	E200.8	01/31/17 11:38	CCM	7439-96-5	
Manganese	0.139	mg/L	0.005	E200.8	01/31/17 11:35	CCM	7439-96-5	
Organics - Volatiles								
1,4-Dioxane*	31	ug/L	3	SW8260B - SIM	01/31/17 15:36	JML	123-91-1	



Analytical Laboratory Report

Lab Sample ID: S79051.02
Sample Tag: TW-16-01_013017
Collected Date/Time: 01/30/2017 15:15
Matrix: Groundwater
COC Reference: 095584

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.7	IR
1	125ml Plastic	HNO3	Yes	5.7	IR
1	250ml Plastic	H2SO4	Yes	5.7	IR
2	40ml Glass	H2SO4	Yes	5.7	IR
1	500ml Plastic	None	Yes	5.7	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
Metal Digestion	Completed			SW3015A	01/31/17 10:30	CCM		
Metal Digestion	Completed			SW3015A	01/31/17 10:30	CCM		
pH check for VOCs*	<2	STD Units		N/A	02/01/17 11:00	JML		
Inorganics								
Alkalinity as CaCO3	395	mg/L	1	SM2320B	02/06/17 12:40	JKB		
Fluoride (Undistilled)	Not detected	mg/L	0.5	E300.0	01/31/17 12:08	JDP	16984-48-8	
Nitrate-N	Not detected	mg/L	0.5	E300.0	01/31/17 12:08	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	01/31/17 12:08	JDP	14797-65-0	
TOC	6.7	mg/L	1	SM5310C	02/02/17 14:41	JKB		
Total Kjeldahl Nitrogen	0.8	mg/L	0.1	SM4500-N(org)/NH	02/15/17 16:09	MJC		
Total Phosphorus	0.11	mg/L	0.01	SM4500-PE	02/03/17 14:10	MJC	7723-14-0	
Metals								
Iron, Dissolved	0.70	mg/L	0.02	E200.8	01/31/17 11:42	CCM	7439-89-6	
Iron	6.72	mg/L	0.02	E200.8	01/31/17 11:41	CCM	7439-89-6	
Manganese, Dissolved	0.047	mg/L	0.005	E200.8	01/31/17 11:42	CCM	7439-96-5	
Manganese	0.184	mg/L	0.005	E200.8	01/31/17 11:41	CCM	7439-96-5	
Organics - Volatiles								
1,4-Dioxane*	128	ug/L	3	SW8260B - SIM	01/31/17 15:54	JML	123-91-1	



Analytical Laboratory Report

Lab Sample ID: S79051.03
Sample Tag: TW-14-02_013017
Collected Date/Time: 01/30/2017 16:30
Matrix: Groundwater
COC Reference: 095584

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.7	IR
1	125ml Plastic	HNO3	Yes	5.7	IR
1	250ml Plastic	H2SO4	Yes	5.7	IR
2	40ml Glass	H2SO4	Yes	5.7	IR
1	500ml Plastic	None	Yes	5.7	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
Metal Digestion	Completed			SW3015A	01/31/17 10:30	CCM		
Metal Digestion	Completed			SW3015A	01/31/17 10:30	CCM		
pH check for VOCs*	<2	STD Units		N/A	02/01/17 11:00	JML		
Inorganics								
Alkalinity as CaCO3	341	mg/L	1	SM2320B	02/06/17 12:45	JKB		
Fluoride (Undistilled)	Not detected	mg/L	0.5	E300.0	01/31/17 12:21	JDP	16984-48-8	
Nitrate-N	Not detected	mg/L	0.5	E300.0	01/31/17 12:21	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	01/31/17 12:21	JDP	14797-65-0	
TOC	7.4	mg/L	1	SM5310C	02/02/17 15:05	JKB		
Total Kjeldahl Nitrogen	0.7	mg/L	0.1	SM4500-N(org)/NH	02/15/17 16:29	MJC		
Total Phosphorus	0.09	mg/L	0.01	SM4500-PE	02/03/17 14:24	MJC	7723-14-0	
Metals								
Iron, Dissolved	0.91	mg/L	0.02	E200.8	01/31/17 11:43	CCM	7439-89-6	
Iron	5.18	mg/L	0.02	E200.8	01/31/17 11:42	CCM	7439-89-6	
Manganese, Dissolved	0.026	mg/L	0.005	E200.8	01/31/17 11:43	CCM	7439-96-5	
Manganese	0.111	mg/L	0.005	E200.8	01/31/17 11:42	CCM	7439-96-5	
Organics - Volatiles								
1,4-Dioxane*	2,200	ug/L	200	SW8260B - SIM	01/31/17 17:25	JML	123-91-1	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S79051.04
Sample Tag: PW-14-01_013017
Collected Date/Time: 01/30/2017 17:50
Matrix: Groundwater
COC Reference: 095584

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.7	IR
1	125ml Plastic	HNO3	Yes	5.7	IR
1	250ml Plastic	H2SO4	Yes	5.7	IR
2	40ml Glass	H2SO4	Yes	5.7	IR
1	500ml Plastic	None	Yes	5.7	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
Metal Digestion	Completed			SW3015A	01/31/17 10:30	CCM		
Metal Digestion	Completed			SW3015A	01/31/17 10:30	CCM		
pH check for VOCs*	<2	STD Units		N/A	02/01/17 11:00	JML		
Inorganics								
Alkalinity as CaCO3	352	mg/L	1	SM2320B	02/06/17 12:50	JKB		
Fluoride (Undistilled)	Not detected	mg/L	0.5	E300.0	01/31/17 12:34	JDP	16984-48-8	
Nitrate-N	Not detected	mg/L	0.5	E300.0	01/31/17 12:34	JDP	14797-55-8	
Nitrite-N	Not detected	mg/L	0.5	E300.0	01/31/17 12:34	JDP	14797-65-0	
TOC	6.5	mg/L	1	SM5310C	02/02/17 15:29	JKB		
Total Kjeldahl Nitrogen	0.5	mg/L	0.1	SM4500-N(org)/NH	02/15/17 16:46	MJC		
Total Phosphorus	0.07	mg/L	0.01	SM4500-PE	02/03/17 14:29	MJC	7723-14-0	
Metals								
Iron, Dissolved	0.09	mg/L	0.02	E200.8	01/31/17 11:44	CCM	7439-89-6	
Iron	0.19	mg/L	0.02	E200.8	01/31/17 11:44	CCM	7439-89-6	
Manganese, Dissolved	0.009	mg/L	0.005	E200.8	01/31/17 11:44	CCM	7439-96-5	
Manganese	0.010	mg/L	0.005	E200.8	01/31/17 11:44	CCM	7439-96-5	
Organics - Volatiles								
1,4-Dioxane*	6	ug/L	3	SW8260B - SIM	02/01/17 14:54	JML	123-91-1	



Merit
Laboratories, Inc.

2680 East Lansing Dr., East Lansing, MI 48823
Phone (517) 332-0167 Fax (517) 332-4034
www.meritlabs.com

C.O.C. PAGE # 1 OF 1

095584

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME <u>Gwen Kubacki</u>		
COMPANY <u>Arcadis</u>		
ADDRESS <u>28550 Cabot Drive, Suite 500</u>		
CITY <u>Novi</u>	STATE <u>MI</u>	ZIP CODE <u>48377</u>
PHONE NO. <u>248-994-2262</u>	FAX NO.	
E-MAIL ADDRESS <u>Gwen.Kubacki@Arcadis.com</u>		QUOTE NO. <u>B0064479.2017</u>

CONTACT NAME <u>SAME</u>		
COMPANY		
ADDRESS		
CITY	STATE	ZIP CODE
PHONE NO.	E-MAIL ADDRESS	

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME <u>RAEL Biospange B0064479.2017.00501</u>	SAMPLER(S) - PLEASE PRINT/SIGN NAME <u>Christine Gregg</u>
TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER	
DELIVERABLES REQUIRED ☐ STD ☐ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER	

MATRIX CODE:	GW=GROUNDWATER SL=SLUDGE	WW=WASTEWATER DW=DRINKING WATER	S=SOIL O=OIL	L=LIQUID WP=WIPE	SD=SOLID A=AIR	W=WASTE

Containers & Preservatives

MERIT LAB NO. FOR LAB USE ONLY	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION
	DATE	TIME	
79051.01	1/30/17	1400	TW-14-01-013017
.02	1	1515	TW-16-01-013017
.03	1	1630	TW-14-02-013017
.04	1/30/17	1750	PW-14-01-013017

14-Dioxane Only (8240B Sims)	Nitrate/Nitrite (E300)	Soluble Fluoride (300)	Alkalinity (2320B)	TKN (4500-Norg/NH3)	Total Phosphorus (Sm 4500-PE)	Total Dissolved Iron + Manganese (E200.8)	TOC (Sm 5310C)
X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X

Certifications	
☐ OHIO VAP	☐ Drinking Water
☐ DoD	☐ NPDES
Project Locations	
☐ Detroit	☐ New York
☐ Other	
Special Instructions	

No samples field filtered. Lab filter as needed.

RELINQUISHED BY: SIGNATURE/ORGANIZATION <u>[Signature]</u> Arcadis	SAMPLER ☒	DATE <u>1/31/2017</u>	TIME <u>0900</u>
RECEIVED BY: SIGNATURE/ORGANIZATION <u>M Chalcote</u>		DATE <u>1/31/17</u>	TIME <u>0900</u>
RELINQUISHED BY: SIGNATURE/ORGANIZATION		DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION		DATE	TIME

RELINQUISHED BY: SIGNATURE/ORGANIZATION	DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION	DATE	TIME
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS
NOTES:		TEMP. ON ARRIVAL <u>6.7</u>



Analytical Laboratory Report

Report ID: S79075.01(01)

Generated on 02/01/2017

Report to

Attention: Gwen Kubacki
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 248-994-2240 FAX: 248-994-2241
Email: gwen.kubacki@arcadis.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S79075.01-S79075.04
Project: RACER Lansing Biosparge
Collected Date: 01/31/2017
Submitted Date/Time: 02/01/2017 08:00
Sampled by: Christine Gregg
P.O. #: B0064479.2017.00501

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Report Narrative (Page 2)
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Qualifier Descriptions (Page 3)
Glossary of Abbreviations (Page 3)
Method Summary (Page 4)
Sample Summary (Page 5)

A handwritten signature in black ink, reading "Maya Murshak".

Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
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Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods



Analytical Laboratory Report

Method Summary

Method	Version
E300.0	EPA Method 300.0 Revision 2.1



Analytical Laboratory Report

Sample Summary (4 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S79075.01	MW-15-72_013117	Groundwater	01/31/17 14:00
S79075.02	MW-16-77_013117	Groundwater	01/31/17 15:20
S79075.03	MW-16-75_013117	Groundwater	01/31/17 16:00
S79075.04	MW-16-74_013117	Groundwater	01/31/17 16:20



Analytical Laboratory Report

Lab Sample ID: S79075.01
Sample Tag: MW-15-72_013117
Collected Date/Time: 01/31/2017 14:00
Matrix: Groundwater
COC Reference: 75241

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	5.7	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Inorganics								
Fluoride (Undistilled)	Not detected	mg/L	0.5	E300.0	02/01/17 10:47	JDP	16984-48-8	



Analytical Laboratory Report

Lab Sample ID: S79075.02
Sample Tag: MW-16-77_013117
Collected Date/Time: 01/31/2017 15:20
Matrix: Groundwater
COC Reference: 75241

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	5.7	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Inorganics								
Fluoride (Undistilled)	Not detected	mg/L	0.5	E300.0	02/01/17 11:00	JDP	16984-48-8	



Analytical Laboratory Report

Lab Sample ID: S79075.03
Sample Tag: MW-16-75_013117
Collected Date/Time: 01/31/2017 16:00
Matrix: Groundwater
COC Reference: 75241

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	5.7	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Inorganics								
Fluoride (Undistilled)	Not detected	mg/L	0.5	E300.0	02/01/17 11:12	JDP	16984-48-8	



Analytical Laboratory Report

Lab Sample ID: S79075.04
Sample Tag: MW-16-74_013117
Collected Date/Time: 01/31/2017 16:20
Matrix: Groundwater
COC Reference: 75241

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	5.7	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Inorganics								
Fluoride (Undistilled)	Not detected	mg/L	0.5	E300.0	02/01/17 11:25	JDP	16984-48-8	



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OF

75241

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

Ray 5.18.12



Analytical Laboratory Report

Report ID: S79103.01(01)
Generated on 02/16/2017

Report to

Attention: Gwen Kubacki
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 248-994-2240 FAX: 248-994-2241
Email: gwen.kubacki@arcadis.com

Report produced by

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Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S79103.01-S79103.02
Project: RACER Lansing Biosparge B0064479.2017.00501
Collected Date: 02/01/2017
Submitted Date/Time: 02/01/2017 16:38
Sampled by: Christine Gregg
P.O. #: B0064479.2017.00501

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Sample Summary (Page 5)

Maya Murshak
Technical Director



Analytical Laboratory Report

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Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
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Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702

Qualifier Descriptions

Qualifier	Description
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MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods



Analytical Laboratory Report

Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
E300.0	EPA Method 300.0 Revision 2.1
N/A	Not Applicable
SM2320B	Standard Method 2320 B 20th Edition
SM4500-N(org)/NH	Standard Method 4500 N(org)B / NH3D 20th Edition
SM4500-PE	Standard Method 4500 P E 20th Edition
SM5310C	Standard Method 5310C 20th Edition
SW3015A	SW 846 Method 3015A Revision 1 February 2007
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs



Analytical Laboratory Report

Sample Summary (2 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S79103.01	AS-16-01_020117	Groundwater	02/01/17 10:45
S79103.02	AS-16-02_020117	Groundwater	02/01/17 11:50



Analytical Laboratory Report

Lab Sample ID: S79103.01
Sample Tag: AS-16-01_020117
Collected Date/Time: 02/01/2017 10:45
Matrix: Groundwater
COC Reference: 095585

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	2.6	IR
1	125ml Plastic	HNO3	Yes	2.6	IR
1	250ml Plastic	H2SO4	Yes	2.6	IR
2	40ml Glass	H2SO4	Yes	2.6	IR
1	500ml Plastic	None	Yes	2.6	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags

Extraction / Prep.

Metal Digestion	Completed			SW3015A	02/06/17 10:00	CCM		
Metal Digestion	Completed			SW3015A	02/06/17 10:00	CCM		
pH check for VOCs*	<2	STD Units		N/A	02/03/17 10:15	KCV		

Inorganics

Alkalinity as CaCO3	398	mg/L	1	SM2320B	02/06/17 12:55	JKB		
Fluoride (Undistilled)	Not detected	mg/L	0.5	E300.0	02/02/17 10:13	JDP	16984-48-8	
Nitrate-N	Not detected	mg/L	0.5	E300.0	02/02/17 10:13	JDP	14797-55-8	
Nitrite-N	1.1	mg/L	0.5	E300.0	02/02/17 10:13	JDP	14797-65-0	
TOC	43	mg/L	1	SM5310C	02/02/17 15:53	JKB		
Total Kjeldahl Nitrogen	279	mg/L	1	SM4500-N(org)/NH	02/15/17 21:29	MJC		
Total Phosphorus	99	mg/L	5	SM4500-PE	02/06/17 13:38	MJC	7723-14-0	

Metals

Iron, Dissolved	0.04	mg/L	0.02	E200.8	02/06/17 12:08	CCM	7439-89-6	
Iron	2.85	mg/L	0.02	E200.8	02/06/17 12:06	CCM	7439-89-6	
Manganese, Dissolved	0.024	mg/L	0.005	E200.8	02/06/17 12:08	CCM	7439-96-5	
Manganese	0.080	mg/L	0.005	E200.8	02/06/17 12:06	CCM	7439-96-5	

Organics - Volatiles

1,4-Dioxane*	10	ug/L	3	SW8260B - SIM	02/07/17 12:48	JML	123-91-1	



Analytical Laboratory Report

Lab Sample ID: S79103.02
Sample Tag: AS-16-02_020117
Collected Date/Time: 02/01/2017 11:50
Matrix: Groundwater
COC Reference: 095585

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
2	40ml Glass	HCL	Yes	2.6	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
Extraction / Prep.								
pH check for VOCs*	>2	STD Units		N/A	02/03/17 10:15	KCV		
Organics - Volatiles								
1,4-Dioxane*	130	ug/L	30	SW8260B - SIM	02/02/17 16:09	JML	123-91-1	Y

Y-Elevated reporting limit due to high target concentration

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME		GWEN KUBACKI	
COMPANY		ARCADIS	
ADDRESS		28550 CABOT DRIVE, SUITE 500	
CITY		STATE	ZIP CODE
NOVI		MI	48377
PHONE NO.	FAX NO.	P.O. NO.	
248-994-2262		B00064479, 2017, 00501	
E-MAIL ADDRESS		QUOTE NO.	
GWEN.KUBACKI@ARCADIS.COM			

CONTACT NAME		BY SAME	
COMPANY			
ADDRESS			
CITY		STATE	ZIP CODE
PHONE NO.	E-MAIL ADDRESS		

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME B0064479.2017.00SD1 RIVER LANSING BIOSPARGE	SAMPLER(S) - PLEASE PRINT/SIGN NAME CHRISTINE GREGG CWB
TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER	
DELIVERABLES REQUIRED ☐ STD ☐ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER	

MATRIX CODE:	GW=GROUNDWATER SL=SLUDGE	WW=WASTEWATER DW=DRINKING WATER	S=SOIL O=OIL	L=LIQUID WP=WIPE	SD=SOLID A=AIR	W=WASTE

[illegible]

Containers & Preservatives

[illegible][illegible]

Certifications

☐ OHIO VAP ☐ Drinking Water

☐ DoD ☐ NPDES

Project Locations

☐ Detroit ☐ New York

☐ Other _____

Special Instructions

RELINQUISHED BY:	<i>Aracelis</i>	✓	DATE	TIME
SIGNATURE/ORGANIZATION			2/1/17	16:30
RECEIVED BY:	<i>M. Catcole</i>		DATE	TIME
SIGNATURE/ORGANIZATION			2/1/17	16:30
RELINQUISHED BY:			DATE	TIME
SIGNATURE/ORGANIZATION				
RECEIVED BY:			DATE	TIME
SIGNATURE/ORGANIZATION				

RELINQUISHED BY:			DATE	TIME
SIGNATURE/ORGANIZATION				
RECEIVED BY:			DATE	TIME
SIGNATURE/ORGANIZATION				
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS	NOTES: TEMP. ON ARRIVAL <u>2.6</u>	
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS		

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



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

September 22, 2016

Gwen Kubacker
Arcadis
28550 Cabot Dr
Suite 500
Novi, MI 48377

RE: **RACER / B0064479.2016.00501**

Pace Workorder: 20238

Dear Gwen Kubacker:

Enclosed are the analytical results for sample(s) received by the laboratory on Tuesday, September 13, 2016. 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 09/22/2016
Ruth.Welsh@pacelabs.com

Customer Service Representative

Enclosures

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

Total Number of Pages ____

Report ID: 20238 - 839996

Page 1 of 11



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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 and Solid & Hazardous Waste
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:	NELAP: New Jersey, Department of Environmental Protection
Accreditation ID:	PA026
Scope:	Non-Potable Water; Solid and Chemical Materials
Accreditor:	NELAP: New York, Department of Health Wadsworth Center
Accreditation ID:	11815
Scope:	Non-Potable Water; Solid and Hazardous Waste
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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Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

SAMPLE SUMMARY

Workorder: 20238 RACER / B0064479.2016.00501

Lab ID	Sample ID	Matrix	Date Collected	Date Received
202380001	TW-14-02_090816	Water	9/8/2016 09:00	9/13/2016 11:00
202380002	PW-14-01_090816	Water	9/8/2016 10:35	9/13/2016 11:00
202380003	TW-16-01_090816	Water	9/8/2016 13:10	9/13/2016 11:00
202380004	TW-14-01_090816	Water	9/8/2016 16:35	9/13/2016 11:00



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Fax: (412) 826-3433

ANALYTICAL RESULTS

Workorder: 20238 RACER / B0064479.2016.00501

Lab ID: 202380001
Sample ID: TW-14-02_090816

Date Received: 9/13/2016 11:00 Matrix: Water
Date Collected: 9/8/2016 09:00

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	<0.10	ug/l	0.10	0.011	1	9/21/2016 08:19	BW	n



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ANALYTICAL RESULTS

Workorder: 20238 RACER / B0064479.2016.00501

Lab ID: 202380002
Sample ID: PW-14-01_090816

Date Received: 9/13/2016 11:00 Matrix: Water
Date Collected: 9/8/2016 10:35

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	<0.10	ug/l	0.10	0.011	1	9/21/2016 08:32	BW	n



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ANALYTICAL RESULTS

Workorder: 20238 RACER / B0064479.2016.00501

Lab ID: 202380003
Sample ID: TW-16-01_090816

Date Received: 9/13/2016 11:00 Matrix: Water
Date Collected: 9/8/2016 13:10

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	<0.10	ug/l	0.10	0.011	1	9/21/2016 08:49	BW	n



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ANALYTICAL RESULTS

Workorder: 20238 RACER / B0064479.2016.00501

Lab ID: 202380004
Sample ID: TW-14-01_090816

Date Received: 9/13/2016 11:00 Matrix: Water
Date Collected: 9/8/2016 16:35

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	<0.10	ug/l	0.10	0.011	1	9/21/2016 09:02	BW	n



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ANALYTICAL RESULTS QUALIFIERS

Workorder: 20238 RACER / B0064479.2016.00501

DEFINITIONS/QUALIFIERS

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



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

QUALITY CONTROL DATA

Workorder: 20238 RACER / B0064479.2016.00501

QC Batch: DISG/5618 Analysis Method: AM20GAX
QC Batch Method: AM20GAX
Associated Lab Samples: 202380001, 202380002, 202380003, 202380004

METHOD BLANK: 44271

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK Propane	ug/l	<0.10	0.10	n

LABORATORY CONTROL SAMPLE & LCSD: 44272 44273

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK Propane	ug/l	56	56	55	100	100	80-120	0	20	n



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QUALITY CONTROL DATA QUALIFIERS

Workorder: 20238 RACER / B0064479.2016.00501

QUALITY CONTROL PARAMETER QUALIFIERS

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



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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 20238 RACER / B0064479.2016.00501

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
202380001	TW-14-02_090816			AM20GAX	DISG/5618
202380002	PW-14-01_090816			AM20GAX	DISG/5618
202380003	TW-16-01_090816			AM20GAX	DISG/5618
202380004	TW-14-01_090816			AM20GAX	DISG/5618



CERTIFICATE OF ANALYSIS

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Cooler Receipt Form

Client Name: Arcaoli's Project: Racer Lansing Lab Work Order: 20238

A. Shipping/Container Information (circle appropriate response)

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

Tracking Number: 7772 1000 3782

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

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

Type of Ice: Wet Blue None Ice Intact: Yes Melted

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

Comments: _____

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

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

Comments: _____

Cooler contents examined/received by: LG Date: 9.13.16

Project Manager Review: AW Date: 9-14-16



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

September 22, 2016

Gwen Kubacker
Arcadis
28550 Cabot Dr
Suite 500
Novi, MI 48377

RE: **RACER / B0064479.2016.00501**

Pace Workorder: 20239

Dear Gwen Kubacker:

Enclosed are the analytical results for sample(s) received by the laboratory on Tuesday, September 13, 2016. 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 09/22/2016
Ruth.Welsh@pacelabs.com

Customer Service Representative

Enclosures

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

Total Number of Pages 13

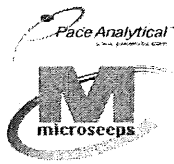
Report ID: 20239 - 840005

Page 1 of 11



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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 and Solid & Hazardous Waste
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:	NELAP: New Jersey, Department of Environmental Protection
Accreditation ID:	PA026
Scope:	Non-Potable Water; Solid and Chemical Materials
Accreditor:	NELAP: New York, Department of Health Wadsworth Center
Accreditation ID:	11815
Scope:	Non-Potable Water; Solid and Hazardous Waste
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

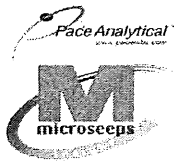
Workorder: 20239 RACER / B0064479.2016.00501

Lab ID	Sample ID	Matrix	Date Collected	Date Received
202390001	MW-15-72_090916	Water	9/9/2016 08:40	9/13/2016 11:00
202390002	MW-16-75_090916	Water	9/9/2016 11:45	9/13/2016 11:00
202390003	MW-16-74_090916	Water	9/9/2016 13:05	9/13/2016 11:00
202390004	MW-16-77_090916	Water	9/9/2016 14:00	9/13/2016 11:00



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ANALYTICAL RESULTS

Workorder: 20239 RACER / B0064479.2016.00501

Lab ID: 202390001
Sample ID: MW-15-72_090916

Date Received: 9/13/2016 11:00 Matrix: Water
Date Collected: 9/9/2016 08:40

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	<0.10	ug/l	0.10	0.011	1	9/21/2016 09:17	BW	n



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ANALYTICAL RESULTS

Workorder: 20239 RACER / B0064479.2016.00501

Lab ID: 202390002
Sample ID: MW-16-75_090916

Date Received: 9/13/2016 11:00 Matrix: Water
Date Collected: 9/9/2016 11:45

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	3.2	ug/l	0.10	0.011	1	9/21/2016 09:31	BW	n



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ANALYTICAL RESULTS

Workorder: 20239 RACER / B0064479.2016.00501

Lab ID: 202390003
Sample ID: MW-16-74_090916

Date Received: 9/13/2016 11:00 Matrix: Water
Date Collected: 9/9/2016 13:05

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	<0.10	ug/l	0.10	0.011	1	9/21/2016 09:44	BW	n



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ANALYTICAL RESULTS

Workorder: 20239 RACER / B0064479.2016.00501

Lab ID: 202390004
Sample ID: MW-16-77_090916

Date Received: 9/13/2016 11:00 Matrix: Water
Date Collected: 9/9/2016 14:00

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	0.17	ug/l	0.10	0.011	1	9/21/2016 09:59	BW	n



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ANALYTICAL RESULTS QUALIFIERS

Workorder: 20239 RACER / B0064479.2016.00501

DEFINITIONS/QUALIFIERS

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



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QUALITY CONTROL DATA

Workorder: 20239 RACER / B0064479.2016.00501

QC Batch: DISG/5618 Analysis Method: AM20GAX
QC Batch Method: AM20GAX
Associated Lab Samples: 202390001, 202390002, 202390003, 202390004

METHOD BLANK: 44271

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK				
Propane	ug/l	<0.10	0.10	n

LABORATORY CONTROL SAMPLE & LCSD: 44272 44273

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK										
Propane	ug/l	56	56	55	100	100	80-120	0	20	n



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QUALITY CONTROL DATA QUALIFIERS

Workorder: 20239 RACER / B0064479.2016.00501

QUALITY CONTROL PARAMETER QUALIFIERS

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



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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 20239 RACER / B0064479.2016.00501

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
202390001	MW-15-72_090916			AM20GAX	DISG/5618
202390002	MW-16-75_090916			AM20GAX	DISG/5618
202390003	MW-16-74_090916			AM20GAX	DISG/5618
202390004	MW-16-77_090916			AM20GAX	DISG/5618



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Project Number/Name	ACEE	BOB64479, 2016.00501

Project Location Lansing, MI

Laboratory Pace

Project Manager _____

Sampler(s)/Affiliation Christine Greig (Arceadis)

Propane
AM20GAX

[illegible]

Sample Matrix: L = Liquid; S = Solid; A = Air

Total No. of Bottles/
Containers

Relinquished by: <u>022026</u>	Organization: <u>Arccadis</u>	Date: <u>7/9/16</u>	Time: <u>17:55</u>	Seal Intact?
Received by: <u>Arccadis Sample Storage</u>	Organization: <u>Arccadis</u>	Date: <u>7/9/16</u>	Time: <u>17:55</u>	Yes ☐ No ☒ N/A

Relinquished by: <u>Spencer H. Williams</u>	Organization: <u>AKAIDS</u>	Date <u>9/12/16</u>	Time <u>1540</u>	Seal Intact?
Received by: <u>Michael Woods</u>	Organization: <u>International</u>	Date <u>9/12/16</u>	Time <u>1540</u>	Yes No N/A

Special Instructions/Remarks: R10: R100000000-9/12/10-18300 / K10: K100000000-9/12/10-18300

Recd: PAs 9.13.16 1100 14°C

Delivery Method: ☐ In Person

□ Common Carrier

☐ Lab Courier

☐ Other

SPECIFY

SPECIFY

AG 05-12/01

Cooler Receipt Form

Client Name: Arcadis Project: Racer Lansing Lab Work Order: 20239

A. Shipping/Container Information (circle appropriate response)

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

Tracking Number: 7772 1000 3782

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

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

Type of Ice: Wet Blue None Ice Intact: Yes Melted

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

Comments: _____

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

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

Comments: _____

Cooler contents examined/received by: LG Date: 9.13.16

Project Manager Review: RW Date: 9.14.16



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

September 22, 2016

Gwen Kubacker
Arcadis
28550 Cabot Dr
Suite 500
Novi, MI 48377

RE: **RACER / B0064479.2016.00501**

Pace Workorder: 20240

Dear Gwen Kubacker:

Enclosed are the analytical results for sample(s) received by the laboratory on Tuesday, September 13, 2016. 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 09/22/2016
Ruth.Welsh@pacelabs.com

Customer Service Representative

Enclosures

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

Total Number of Pages 11

Report ID: 20240 - 840012

Page 1 of 9



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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 and Solid & Hazardous Waste
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:	NELAP: New Jersey, Department of Environmental Protection
Accreditation ID:	PA026
Scope:	Non-Potable Water; Solid and Chemical Materials
Accreditor:	NELAP: New York, Department of Health Wadsworth Center
Accreditation ID:	11815
Scope:	Non-Potable Water; Solid and Hazardous Waste
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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220 William Pitt Way
Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

SAMPLE SUMMARY

Workorder: 20240 RACER / B0064479.2016.00501

Lab ID	Sample ID	Matrix	Date Collected	Date Received
202400001	AS-16-01_090716	Water	9/7/2016 12:40	9/13/2016 11:00
202400002	AS-16-02_090716	Water	9/7/2016 15:35	9/13/2016 11:00



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Phone: (412) 826-5245
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ANALYTICAL RESULTS

Workorder: 20240 RACER / B0064479.2016.00501

Lab ID: 202400001
Sample ID: AS-16-01_090716

Date Received: 9/13/2016 11:00 Matrix: Water
Date Collected: 9/7/2016 12:40

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	0.26	ug/l	0.10	0.011	1	9/21/2016 10:12	BW	n



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ANALYTICAL RESULTS

Workorder: 20240 RACER / B0064479.2016.00501

Lab ID: 202400002
Sample ID: AS-16-02_090716

Date Received: 9/13/2016 11:00 Matrix: Water
Date Collected: 9/7/2016 15:35

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	0.43	ug/l	0.10	0.011	1	9/21/2016 10:31	BW	n



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ANALYTICAL RESULTS QUALIFIERS

Workorder: 20240 RACER / B0064479.2016.00501

DEFINITIONS/QUALIFIERS

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



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QUALITY CONTROL DATA

Workorder: 20240 RACER / B0064479.2016.00501

QC Batch: DISG/5618 Analysis Method: AM20GAX
QC Batch Method: AM20GAX
Associated Lab Samples: 202400001, 202400002

METHOD BLANK: 44271

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK				
Propane	ug/l	<0.10	0.10	n

LABORATORY CONTROL SAMPLE & LCSD: 44272 44273

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK										
Propane	ug/l	56	56	55	100	100	80-120	0	20	n



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QUALITY CONTROL DATA QUALIFIERS

Workorder: 20240 RACER / B0064479.2016.00501

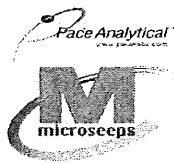
QUALITY CONTROL PARAMETER QUALIFIERS

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



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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 20240 RACER / B0064479.2016.00501

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
202400001	AS-16-01_090716			AM20GAX	DISG/5618
202400002	AS-16-02_090716			AM20GAX	DISG/5618



CERTIFICATE OF ANALYSIS

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CHAIN-OF-CUSTODY / Analytical Request Document
The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A		Section B		Section C	
Required Client Information:		Required Project Information:		Invoice Information:	
Company:	Arcadis	Report To:		Attention:	
Address:	28550 Cabot Dr. Suite 500 NW Atlanta, GA 30329	Copy To:		Company Name:	
Email To:	Gwen.Kuback@arcadis.com	Purchase Order No.:		Address:	
Phone:	Fax:	Project Name:		Pace Quote Reference:	
Requested Due Date/TAT:		Project Number:	B006479.0010.00501	Pace Project Manager:	
				Pace Profile #:	
				REGULATORY AGENCY	
				NPDES GROUND WATER DRINKING WATER	
				UST RCRA OTHER	
				Site Location STATE: MI	
				008553	

[illegible]

***Important Note:** By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Cooler Receipt Form

Client Name: Arcadis Project: Racer Lansing Lab Work Order: 20240

A. Shipping/Container Information (circle appropriate response)

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

Tracking Number: 7772 1000 3782

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

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

Type of Ice: Wet Blue None Ice Intact: Yes Melted

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

Comments: _____

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

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

Comments: _____

Cooler contents examined/received by: LG Date: 9.13.16

Project Manager Review: LG Date: 9.14.16



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

October 31, 2016

Gwen Kubacki
Arcadis
28550 Cabot Dr
Suite 500
Novi, MI 48377

RE: **RACER / B0064479.2016.00501**

Pace Workorder: 20764

Dear Gwen Kubacki:

Enclosed are the analytical results for sample(s) received by the laboratory on Wednesday, October 26, 2016. 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 10/31/2016
Ruth.Welsh@pacelabs.com

Customer Service Representative

Enclosures

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

Total Number of Pages 15

Report ID: 20764 - 856646

Page 1 of 13



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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 and Solid & Hazardous Waste
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:	NELAP: New Jersey, Department of Environmental Protection
Accreditation ID:	PA026
Scope:	Non-Potable Water; Solid and Chemical Materials
Accreditor:	NELAP: New York, Department of Health Wadsworth Center
Accreditation ID:	11815
Scope:	Non-Potable Water; Solid and Hazardous Waste
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: 20764 RACER / B0064479.2016.00501

Lab ID	Sample ID	Matrix	Date Collected	Date Received
207640001	TW-14-01_102016	Water	10/20/2016 17:15	10/26/2016 11:00
207640002	TW-16-01_102016	Water	10/20/2016 17:40	10/26/2016 11:00
207640003	AS-16-01_102016	Water	10/20/2016 18:05	10/26/2016 11:00
207640004	TW-14-02_102016	Water	10/20/2016 18:40	10/26/2016 11:00
207640005	PW-14-01_102016	Water	10/20/2016 19:00	10/26/2016 11:00



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PROJECT SUMMARY

Workorder: 20764 RACER / B0064479.2016.00501

Workorder Comments

The container pH for samples 20764 (0001, 0004) were measured as below the expected pH (< 10) for those samples preserved with trisodium phosphate, as assigned to PAES method AM20GAX.



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ANALYTICAL RESULTS

Workorder: 20764 RACER / B0064479.2016.00501

Lab ID: 207640001
Sample ID: TW-14-01_102016

Date Received: 10/26/2016 11:00 Matrix: Water
Date Collected: 10/20/2016 17:15

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	77	ug/l	0.10	0.019	1	10/29/2016 13:08	TD	n



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ANALYTICAL RESULTS

Workorder: 20764 RACER / B0064479.2016.00501

Lab ID: 207640002
Sample ID: TW-16-01_102016

Date Received: 10/26/2016 11:00 Matrix: Water
Date Collected: 10/20/2016 17:40

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	220	ug/l	0.10	0.019	1	10/29/2016 13:21	TD	n



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ANALYTICAL RESULTS

Workorder: 20764 RACER / B0064479.2016.00501

Lab ID: 207640003
Sample ID: AS-16-01_102016

Date Received: 10/26/2016 11:00 Matrix: Water
Date Collected: 10/20/2016 18:05

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	230	ug/l	0.10	0.019	1	10/29/2016 13:37	TD	n



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ANALYTICAL RESULTS

Workorder: 20764 RACER / B0064479.2016.00501

Lab ID: 207640004
Sample ID: TW-14-02_102016

Date Received: 10/26/2016 11:00 Matrix: Water
Date Collected: 10/20/2016 18:40

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	4.2	ug/l	0.10	0.019	1	10/29/2016 13:50	TD	n



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ANALYTICAL RESULTS

Workorder: 20764 RACER / B0064479.2016.00501

Lab ID: 207640005
Sample ID: PW-14-01_102016

Date Received: 10/26/2016 11:00 Matrix: Water
Date Collected: 10/20/2016 19:00

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	56	ug/l	0.10	0.019	1	10/29/2016 14:02	TD	n



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ANALYTICAL RESULTS QUALIFIERS

Workorder: 20764 RACER / B0064479.2016.00501

DEFINITIONS/QUALIFIERS

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



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QUALITY CONTROL DATA

Workorder: 20764 RACER / B0064479.2016.00501

QC Batch: DISG/5707 Analysis Method: AM20GAX
QC Batch Method: AM20GAX
Associated Lab Samples: 207640001, 207640002, 207640003, 207640004, 207640005

METHOD BLANK: 45130

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK Propane	ug/l	<0.10	0.10	n

LABORATORY CONTROL SAMPLE & LCSD: 45132 45134

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK Propane	ug/l	56	55	54	98	97	80-120	1	20	n



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QUALITY CONTROL DATA QUALIFIERS

Workorder: 20764 RACER / B0064479.2016.00501

QUALITY CONTROL PARAMETER QUALIFIERS

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



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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 20764 RACER / B0064479.2016.00501

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
207640001	TW-14-01_102016			AM20GAX	DISG/5707
207640002	TW-16-01_102016			AM20GAX	DISG/5707
207640003	AS-16-01_102016			AM20GAX	DISG/5707
207640004	TW-14-02_102016			AM20GAX	DISG/5707
207640005	PW-14-01_102016			AM20GAX	DISG/5707



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20764

CHAIN-OF-CUSTODY / Analytical Request Document
The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A
Required Client Information:

Company: ARCAOS
Address: 2850 Cabot Dr
City: Novi, MI 48377
Email To: Joanna.Kubacki@arcaos.com
Phone: 248-944-3343 Fax: 248-944-2241
Requested Due Date(TAT): Standard (14 days)

Section B
Required Project Information:

Report To: Joanna Kubacki
Copy To: Andria Kucyba
Purchase Order No.:
Project Name: Pace, Lansing Plant 2
Project Number: 80064479.2016.00501

Section C
Invoice Information:

Attention:
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☒ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location
STATE: MI

2064420

Section D
Required Client Information

SAMPLE ID
(A-Z, 0-9, -)
Sample IDs MUST BE UNIQUE

Matrix Codes
MAY 1 CODE
Drinking Water DW
Water WT
Waste Water WW
Product P
Soil/Solid SL
Oil OL
Wipe WP
Air AR
Tissue TS
Other OT

MATRIX CODE (see valid codes to left)

SAMPLE TYPE (G=GRAB C=COMP)

ITEM #	DATE	TIME	DATE	TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives								Analysis Test	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
							COMPOSITE START	COMPOSITE END/GRAB	Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃				
1	Tw-14-01	102016	1715	1715	3	3												
2	Tw-16-01	102016	1740	1740	3	3												
3	AS-16-01	102016	1805	1805	3	3												
4	Tw-14-02	102016	1840	1840	3	3												
5	PW-14-01	102016	1900	1900	3	3												
6																		
7																		
8																		
9																		
10																		
11																		
12																		

ADDITIONAL COMMENTS

RELINQUISHED BY / AFFILIATION

DATE

TIME

ACCEPTED BY / AFFILIATION

DATE

TIME

SAMPLE CONDITIONS

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Dan M. Auer
SIGNATURE of SAMPLER: Dan M. Auer

DATE Signed (MM/DD/YY): 10/21/16

Temp in °C
Received on Ice (Y/N)
Custody Sealed Cooler (Y/N)
Samples Intact (Y/N)

Cooler Receipt Form

Client Name: Armadillo Project: Racer Lab Work Order: 20764

A. Shipping/Container Information (circle appropriate response)

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

Tracking Number: 777556922290

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: 2.1°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?			☒	

Comments: _____

Cooler contents examined/received by: LY Date: 10-26-16

Project Manager Review: AW Date: 10-27-16



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

November 4, 2016

Gwen Kubacki
Arcadis
28550 Cabot Dr
Suite 500
Novi, MI 48377

RE: **RACER / B0064479.2016.00501**

Pace Workorder: 20811

Dear Gwen Kubacki:

Enclosed are the analytical results for sample(s) received by the laboratory on Monday, October 31, 2016. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

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

Sincerely,

Ruth Welsh 11/04/2016
Ruth.Welsh@pacelabs.com

Customer Service Representative

Enclosures

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

Total Number of Pages 16

Report ID: 20811 - 858964

Page 1 of 13



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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 and Solid & Hazardous Waste
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:	NELAP: New Jersey, Department of Environmental Protection
Accreditation ID:	PA026
Scope:	Non-Potable Water; Solid and Chemical Materials
Accreditor:	NELAP: New York, Department of Health Wadsworth Center
Accreditation ID:	11815
Scope:	Non-Potable Water; Solid and Hazardous Waste
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: 20811 RACER / B0064479.2016.00501

Lab ID	Sample ID	Matrix	Date Collected	Date Received
208110001	PW-14-01_102616	Water	10/26/2016 16:50	10/31/2016 08:30
208110002	TW-16-01_102716	Water	10/27/2016 12:15	10/31/2016 08:30
208110003	AS-16-01_102716	Water	10/27/2016 12:45	10/31/2016 08:30
208110004	TW-14-01_102716	Water	10/27/2016 14:10	10/31/2016 08:30
208110005	AS-16-02_102716	Water	10/27/2016 16:45	10/31/2016 08:30
208110006	TW-14-02_102716	Water	10/27/2016 18:30	10/31/2016 08:30



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ANALYTICAL RESULTS

Workorder: 20811 RACER / B0064479.2016.00501

Lab ID: 208110001
Sample ID: PW-14-01_102616

Date Received: 10/31/2016 08:30 Matrix: Water
Date Collected: 10/26/2016 16:50

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	250	ug/l	0.10	0.019	1	11/4/2016 11:43	MM	n



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ANALYTICAL RESULTS

Workorder: 20811 RACER / B0064479.2016.00501

Lab ID: 208110002
Sample ID: TW-16-01_102716

Date Received: 10/31/2016 08:30 Matrix: Water
Date Collected: 10/27/2016 12:15

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	220	ug/l	0.10	0.019	1	11/4/2016 11:56	MM	n



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ANALYTICAL RESULTS

Workorder: 20811 RACER / B0064479.2016.00501

Lab ID: 208110003
Sample ID: AS-16-01_102716

Date Received: 10/31/2016 08:30 Matrix: Water
Date Collected: 10/27/2016 12:45

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	270	ug/l	0.10	0.019	1	11/4/2016 12:09	MM	n



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ANALYTICAL RESULTS

Workorder: 20811 RACER / B0064479.2016.00501

Lab ID: 208110004
Sample ID: TW-14-01_102716

Date Received: 10/31/2016 08:30 Matrix: Water
Date Collected: 10/27/2016 14:10

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	17	ug/l	0.10	0.019	1	11/4/2016 12:21	MM	n



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ANALYTICAL RESULTS

Workorder: 20811 RACER / B0064479.2016.00501

Lab ID: 208110005
Sample ID: AS-16-02_102716

Date Received: 10/31/2016 08:30 Matrix: Water
Date Collected: 10/27/2016 16:45

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	310	ug/l	0.10	0.019	1	11/4/2016 12:37	MM	n



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ANALYTICAL RESULTS

Workorder: 20811 RACER / B0064479.2016.00501

Lab ID: 208110006
Sample ID: TW-14-02_102716

Date Received: 10/31/2016 08:30 Matrix: Water
Date Collected: 10/27/2016 18:30

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	1.5	ug/l	0.10	0.019	1	11/4/2016 12:51	MM	n



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Fax: (412) 826-3433

ANALYTICAL RESULTS QUALIFIERS

Workorder: 20811 RACER / B0064479.2016.00501

DEFINITIONS/QUALIFIERS

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



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QUALITY CONTROL DATA

Workorder: 20811 RACER / B0064479.2016.00501

QC Batch: DISG/5720 Analysis Method: AM20GAX
QC Batch Method: AM20GAX
Associated Lab Samples: 208110001, 208110002, 208110003, 208110004, 208110005, 208110006

METHOD BLANK: 45268

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK Propane	ug/l	<0.10	0.10	n

LABORATORY CONTROL SAMPLE & LCSD: 45269 45270

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK Propane	ug/l	56	53	53	95	95	80-120	0	20	n



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220 William Pitt Way
Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

QUALITY CONTROL DATA QUALIFIERS

Workorder: 20811 RACER / B0064479.2016.00501

QUALITY CONTROL PARAMETER QUALIFIERS

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



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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 20811 RACER / B0064479.2016.00501

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
208110001	PW-14-01_102616			AM20GAX	DISG/5720
208110002	TW-16-01_102716			AM20GAX	DISG/5720
208110003	AS-16-01_102716			AM20GAX	DISG/5720
208110004	TW-14-01_102716			AM20GAX	DISG/5720
208110005	AS-16-02_102716			AM20GAX	DISG/5720
208110006	TW-14-02_102716			AM20GAX	DISG/5720



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CHAIN-OF-CUSTODY / Analytical Request Document
 The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information: **Section B** Required Project Information: **Section C** Invoice Information:

Company: Arcaadis		Report To:	Attention:	
Address: 28550 Cabot Dr		Report To:	Company Name:	
City/State/Zip: NOVA MI 48337		Purchase Order No.:	Address:	
Email To: Even. Kubiak@Arcaadis.com		Pace Quote Reference:		
Phone:	Fax: RUSSH	Project Name: Arcaadis Lansing-Bioscience		
Requested Due Date/AT: Standard		Project Number: 6004479.2016.00501	Pace Project Manager:	
		Pace Profile #:		
		Requested Analysis Filtered (Y/N)		
		Regulatory Agency		
		NPDES	GROUND WATER	DRINKING WATER
		UST	RCRA	OTHER
		Site Location		
		STATE: MI		

Section D Required Client Information		Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION (°C)		↓ Analysis Test ↓		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
ITEM #	SAMPLE ID (A-Z, 0-9 / -) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COMPOSITE START	COMPOSITE END	# OF CONTAINERS	Preservatives	↓ Analysis Test ↓																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	Arcaadis	10/26/16	19:15	Arcaadis Sample Storage	10/26/16	19:15	
	Arcaadis Storage	10/26/16	16:20	Kelly B. Buehler	10/26/16	16:20	
	Kelly Buehler	10/26/16	15:00	Felix	10/26/16	15:00	
		10/31/16	08:30				

SAMPLER NAME AND SIGNATURE		Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER: Christina Gregg	DATE Signed: 10/26/16				
SIGNATURE of SAMPLER: <i>[Signature]</i>	DATE Signed (MM/DD/YY): 10/26/16				



220 William Pitt Way
Pittsburgh, PA 15238
412-826-5245

CHAIN-OF-CUSTODY / Analytical Request Document

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Section A
Required Client Information:

Section B
Required Project Information:

Section C
Invoice Information:

Company: <u>Arcadis</u>	Report To:	Company Name:	Attention:
Address: <u>28550 Cabot Dr, Ste 500</u>	Copy To:	Address:	
Email To: <u>NOV, 14 48377</u>	Purchase Order No.:	Pace Quote Reference:	
Phone: <u>Green. Kubiak@Arcadis.com</u>	Project Name: <u>DATE - using Biospace</u>	Pace Project Manager:	
Requested Due Date/AT: <u>2016-08-10</u>	Project Number: <u>60064479.2016.00501</u>	Pace Profile #:	
REGULATORY AGENCY		NPDES	GROUND WATER
		UST	RCRA
Site Location		DRINKING WATER	OTHER
STATE: <u>PA</u>			

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Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		Pace Project No./ Lab I.D.	
Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives		Analysis Test		Requested Analysis Filtered (Y/N)		Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)			

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	<u>Bob Arcadis</u>	10/27/16	22:30	<u>Arcadis Sample Storage</u>	10/27/16	22:30	
	<u>Arcadis Storage</u>	10/28/16	16:20	<u>Kelly Drineag</u>	10/28/16	16:20	
	<u>Kelly Drineag</u>	10/28/16	18:00	<u>Felix</u>	10/28/16	18:00	
				<u>NOVA PACS</u>	10/31	08:30	4.2
SAMPLER NAME AND SIGNATURE		PRINT Name of SAMPLER: <u>Christine Gress</u>					
		SIGNATURE of SAMPLER: <u>[Signature]</u>					
		DATE Signed (MM/DD/YY): <u>10/27/16</u>					
Temp in °C		Received on Ice (Y/N)					
		Custody Sealed Cooler (Y/N)					
		Samples Intact (Y/N)					

Cooler Receipt Form

Client Name: Arcadis Project: Racer Lab Work Order: 20811

A. Shipping/Container Information (circle appropriate response)

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

Tracking Number: 777589182880

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: 4.2°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?			☒	

Comments: _____

Cooler contents examined/received by: LY Date: 10-31-16

Project Manager Review: EW Date: 11-1-16



Pace Analytical Energy Services LLC
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November 23, 2016

Gwen Kubacki
Arcadis
28550 Cabot Dr
Suite 500
Novi, MI 48377

RE: **RACER / B0064479.2016.00501**

Pace Workorder: 20991

Dear Gwen Kubacki:

Enclosed are the analytical results for sample(s) received by the laboratory on Tuesday, November 15, 2016. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

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

Sincerely,

Ruth Welsh 11/23/2016
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 21

Report ID: 20991 - 866767

Page 1 of 18



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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 and Solid & Hazardous Waste
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:	NELAP: New Jersey, Department of Environmental Protection
Accreditation ID:	PA026
Scope:	Non-Potable Water; Solid and Chemical Materials
Accreditor:	NELAP: New York, Department of Health Wadsworth Center
Accreditation ID:	11815
Scope:	Non-Potable Water; Solid and Hazardous Waste
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

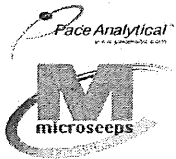
Workorder: 20991 RACER / B0064479.2016.00501

Lab ID	Sample ID	Matrix	Date Collected	Date Received
209910001	TW-14-01_111016	Water	11/10/2016 15:50	11/15/2016 10:30
209910002	TW-16-01_111016	Water	11/10/2016 16:10	11/15/2016 10:30
209910003	PW-14-01_111016	Water	11/10/2016 16:35	11/15/2016 10:30
209910004	TW-14-02_111016	Water	11/10/2016 17:00	11/15/2016 10:30
209910005	MW-16-75_111116	Water	11/11/2016 13:15	11/15/2016 10:30
209910006	AS-16-02_111116	Water	11/11/2016 15:15	11/15/2016 10:30
209910007	MW-15-72_111116	Water	11/11/2016 15:40	11/15/2016 10:30
209910008	MW-16-77_111116	Water	11/11/2016 16:00	11/15/2016 10:30
209910009	MW-16-74_111116	Water	11/11/2016 16:15	11/15/2016 10:30
209910010	AS-16-01_111116	Water	11/11/2016 16:30	11/15/2016 10:30



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PROJECT SUMMARY

Workorder: 20991 RACER / B0064479.2016.00501

Workorder Comments

The container pH for samples 20991 (0004, 0006, 0007, 0010) were measured as below the expected pH (< 10) for those samples preserved with trisodium phosphate, as assigned to PAES method AM20Gax.



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ANALYTICAL RESULTS

Workorder: 20991 RACER / B0064479.2016.00501

Lab ID: 209910001
Sample ID: TW-14-01_111016

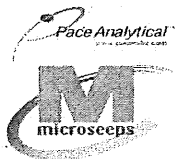
Date Received: 11/15/2016 10:30 Matrix: Water
Date Collected: 11/10/2016 15:50

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	22	ug/l	0.10	0.019	1	11/23/2016 05:48	TD	n



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ANALYTICAL RESULTS

Workorder: 20991 RACER / B0064479.2016.00501

Lab ID: 209910002
Sample ID: TW-16-01_111016

Date Received: 11/15/2016 10:30 Matrix: Water
Date Collected: 11/10/2016 16:10

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	320	ug/l	0.10	0.019	1	11/23/2016 06:11	TD	n



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ANALYTICAL RESULTS

Workorder: 20991 RACER / B0064479.2016.00501

Lab ID: 209910003
Sample ID: PW-14-01_111016

Date Received: 11/15/2016 10:30 Matrix: Water
Date Collected: 11/10/2016 16:35

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	120	ug/l	0.10	0.019	1	11/23/2016 06:33	TD	n



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ANALYTICAL RESULTS

Workorder: 20991 RACER / B0064479.2016.00501

Lab ID: 209910004
Sample ID: TW-14-02_111016

Date Received: 11/15/2016 10:30 Matrix: Water
Date Collected: 11/10/2016 17:00

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	100	ug/l	0.10	0.019	1	11/23/2016 06:45	TD	n



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ANALYTICAL RESULTS

Workorder: 20991 RACER / B0064479.2016.00501

Lab ID: 209910005
Sample ID: MW-16-75_111116

Date Received: 11/15/2016 10:30 Matrix: Water
Date Collected: 11/11/2016 13:15

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	0.51	ug/l	0.10	0.019	1	11/23/2016 06:58	TD	n



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ANALYTICAL RESULTS

Workorder: 20991 RACER / B0064479.2016.00501

Lab ID: 209910006
Sample ID: AS-16-02_111116

Date Received: 11/15/2016 10:30 Matrix: Water
Date Collected: 11/11/2016 15:15

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	360	ug/l	0.10	0.019	1	11/23/2016 07:10	TD	n



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ANALYTICAL RESULTS

Workorder: 20991 RACER / B0064479.2016.00501

Lab ID: 209910007
Sample ID: MW-15-72_111116

Date Received: 11/15/2016 10:30 Matrix: Water
Date Collected: 11/11/2016 15:40

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	<0.10	ug/l	0.10	0.019	1	11/23/2016 07:23	TD	n



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ANALYTICAL RESULTS

Workorder: 20991 RACER / B0064479.2016.00501

Lab ID: 209910008
Sample ID: MW-16-77_111116

Date Received: 11/15/2016 10:30 Matrix: Water
Date Collected: 11/11/2016 16:00

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	0.11	ug/l	0.10	0.019	1	11/23/2016 07:36	TD	n



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ANALYTICAL RESULTS

Workorder: 20991 RACER / B0064479.2016.00501

Lab ID: 209910009
Sample ID: MW-16-74_111116

Date Received: 11/15/2016 10:30 Matrix: Water
Date Collected: 11/11/2016 16:15

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	0.37	ug/l	0.10	0.019	1	11/23/2016 07:48	TD	n



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ANALYTICAL RESULTS

Workorder: 20991 RACER / B0064479.2016.00501

Lab ID: 209910010
Sample ID: AS-16-01_111116

Date Received: 11/15/2016 10:30 Matrix: Water
Date Collected: 11/11/2016 16:30

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	260	ug/l	0.10	0.019	1	11/23/2016 08:01	TD	n



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ANALYTICAL RESULTS QUALIFIERS

Workorder: 20991 RACER / B0064479.2016.00501

DEFINITIONS/QUALIFIERS

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



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QUALITY CONTROL DATA

Workorder: 20991 RACER / B0064479.2016.00501

QC Batch: DISG/5766

Analysis Method: AM20GAX

QC Batch Method: AM20GAX

Associated Lab Samples: 209910001, 209910002, 209910003, 209910004, 209910005, 209910006, 209910007, 209910008, 209910009, 209910010

METHOD BLANK: 45701

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK				
Propane	ug/l	<0.10	0.10	n

LABORATORY CONTROL SAMPLE & LCSD: 45703

45705

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK										
Propane	ug/l	56	56	52	100	94	80-120	6.2	20	n



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QUALITY CONTROL DATA QUALIFIERS

Workorder: 20991 RACER / B0064479.2016.00501

QUALITY CONTROL PARAMETER QUALIFIERS

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



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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 20991 RACER / B0064479.2016.00501

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
209910001	TW-14-01_111016			AM20GAX	DISG/5766
209910002	TW-16-01_111016			AM20GAX	DISG/5766
209910003	PW-14-01_111016			AM20GAX	DISG/5766
209910004	TW-14-02_111016			AM20GAX	DISG/5766
209910005	MW-16-75_111116			AM20GAX	DISG/5766
209910006	AS-16-02_111116			AM20GAX	DISG/5766
209910007	MW-15-72_111116			AM20GAX	DISG/5766
209910008	MW-16-77_111116			AM20GAX	DISG/5766
209910009	MW-16-74_111116			AM20GAX	DISG/5766
209910010	AS-16-01_111116			AM20GAX	DISG/5766



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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

2107185

Section A

Required Client Information:

Section B

Required Project Information:

Section C

Invoice Information:

Company: ARC ADP		Report To: ARC ADP		Attention: ARC ADP	
Address: 2850 Cedar Dr.		Copy To: Gunn Kubeck		Company Name: ARC ADP	
Phone: 857-991-2242		Purchase Order No.: 200991		Address: ARC ADP	
Fax: 857-991-2241		Project Name: Page Analyticals		Reference: Page Quote	
Requested Due Date/TAT: See below		Project Number: 8006479,2016,03501		Manager: Page Profile #	
Matrix Codes		COLLECTED		Preservatives	
Drinking Water		DW		H ₂ SO ₄	
Water		WT		HNO ₃	
Waste Water		WW		HCl	
Product		P		NaOH	
Soil/Solid		SL		Na ₂ S ₂ O ₃	
Oil		OL		Methanol	
Wipe		WP		Other	
Air		AR		Analysis Test ↓	
Tissue		TS		↓	
Other		OT		Residual Chlorine (Y/N)	

ITEM #	MATRIX CODE	SAMPLE TYPE	DATE	TIME	DATE	TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol	Other	Analysis Test ↓	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Page Project No./ Lab I.D.
1	TV-14-01-111016	MT G	11/14/16	1550				2												
2	TV-16-01-111016							2												
3	PW-14-01-111016							2												
4	TV-14-02-111016							2												
5	TV-16-02-111016							2												
6	AS-16-02-111016							2												
7	MW-15-02-111016							2												
8	MW-16-02-111016							2												
9	MW-16-02-111016							2												
10	AS-16-01-111016							2												
11																				
12																				

Section D Required Client Information		Section B Required Project Information		Section C Invoice Information	
Matrix Codes		COLLECTED		Preservatives	
Drinking Water		DW		H ₂ SO ₄	
Water		WT		HNO ₃	
Waste Water		WW		HCl	
Product		P		NaOH	
Soil/Solid		SL		Na ₂ S ₂ O ₃	
Oil		OL		Methanol	
Wipe		WP		Other	
Air		AR		Analysis Test ↓	
Tissue		TS		↓	
Other		OT		Residual Chlorine (Y/N)	

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
Sample 1: 11/14/16	ARC ADP	11/14/16	1550	ARC ADP	11/14/16	1550	
Sample 2: 11/14/16	ARC ADP	11/14/16	1550	ARC ADP	11/14/16	1550	
Sample 3: 11/14/16	ARC ADP	11/14/16	1550	ARC ADP	11/14/16	1550	
Sample 4: 11/14/16	ARC ADP	11/14/16	1550	ARC ADP	11/14/16	1550	
Sample 5: 11/14/16	ARC ADP	11/14/16	1550	ARC ADP	11/14/16	1550	
Sample 6: 11/14/16	ARC ADP	11/14/16	1550	ARC ADP	11/14/16	1550	
Sample 7: 11/14/16	ARC ADP	11/14/16	1550	ARC ADP	11/14/16	1550	
Sample 8: 11/14/16	ARC ADP	11/14/16	1550	ARC ADP	11/14/16	1550	
Sample 9: 11/14/16	ARC ADP	11/14/16	1550	ARC ADP	11/14/16	1550	
Sample 10: 11/14/16	ARC ADP	11/14/16	1550	ARC ADP	11/14/16	1550	
Sample 11: 11/14/16	ARC ADP	11/14/16	1550	ARC ADP	11/14/16	1550	
Sample 12: 11/14/16	ARC ADP	11/14/16	1550	ARC ADP	11/14/16	1550	

SAMPLER NAME AND SIGNATURE		DATE Signed	
PRINT Name of SAMPLER: Page Analyticals		11/14/16	
SIGNATURE of SAMPLER: Page Analyticals		11/14/16	

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
4.2	Y	N	N

NON-CONFORMANCE FORM

PAES Work Order #: 20991

Date: 11.15.16 Time of Receipt: 1030 Receiver: LY

Client: Arcadis

REASON FOR NON-CONFORMANCE:

MW-16-77 111116: one vial broke.

ACTION TAKEN:

Client name: _____ Date: _____ Time: _____

OK to proceed with remaining vial

Customer Service Initials: lw

Date: 11-15-16

Cooler Receipt Form

Client Name: Arcaadis Project: Racer Lab Work Order: 20991

A. Shipping/Container Information (circle appropriate response)

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

Tracking Number: 77710850602

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: 4.2°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?			☒	

Comments: _____

Cooler contents examined/received by: LG Date: 11-15-16

Project Manager Review: EW Date: 11-15-16



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

December 6, 2016

Gwen Kubacki
Arcadis
28550 Cabot Dr
Suite 500
Novi, MI 48377

RE: **LANSING / B0064479.2016.00501**

Pace Workorder: 21130

Dear Gwen Kubacki:

Enclosed are the analytical results for sample(s) received by the laboratory on Tuesday, November 29, 2016. 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 12/06/2016
Ruth.Welsh@pacelabs.com

Customer Service Representative

Enclosures

As a valued client we would appreciate your comments on our service.

Please email PAESfeedback@pacelabs.com.

Total Number of Pages 16

Report ID: 21130 - 869978

Page 1 of 12



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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 and Solid & Hazardous Waste
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:	NELAP: New Jersey, Department of Environmental Protection
Accreditation ID:	PA026
Scope:	Non-Potable Water; Solid and Chemical Materials
Accreditor:	NELAP: New York, Department of Health Wadsworth Center
Accreditation ID:	11815
Scope:	Non-Potable Water; Solid and Hazardous Waste
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: 21130 LANSING / B0064479.2016.00501

Lab ID	Sample ID	Matrix	Date Collected	Date Received
211300001	TW-14-02_112516	Water	11/25/2016 17:00	11/29/2016 10:45
211300002	PW-14-01_112516	Water	11/25/2016 16:15	11/29/2016 10:45
211300003	TW-16-01_112516	Water	11/25/2016 15:15	11/29/2016 10:45
211300004	TW-14-01_112516	Water	11/25/2016 12:30	11/29/2016 10:45



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PROJECT SUMMARY

Workorder: 21130 LANSING / B0064479.2016.00501

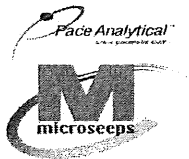
Workorder Comments

This report was revised and reissued on 12-6-2016 to correct the sample ID for 211300002 per client request.



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ANALYTICAL RESULTS

Workorder: 21130 LANSING / B0064479.2016.00501

Lab ID: 211300001
Sample ID: TW-14-02_112516

Date Received: 11/29/2016 10:45 Matrix: Water
Date Collected: 11/25/2016 17:00

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	75	ug/l	0.10	0.011	1	12/2/2016 12:18	BW	n



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ANALYTICAL RESULTS

Workorder: 21130 LANSING / B0064479.2016.00501

Lab ID: 211300002
Sample ID: PW-14-01_112516

Date Received: 11/29/2016 10:45 Matrix: Water
Date Collected: 11/25/2016 16:15

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	67	ug/l	0.10	0.011	1	12/2/2016 12:30	BW	n



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ANALYTICAL RESULTS

Workorder: 21130 LANSING / B0064479.2016.00501

Lab ID: 211300003
Sample ID: TW-16-01_112516

Date Received: 11/29/2016 10:45 Matrix: Water
Date Collected: 11/25/2016 15:15

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	120	ug/l	0.10	0.011	1	12/2/2016 12:42	BW	n



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ANALYTICAL RESULTS

Workorder: 21130 LANSING / B0064479.2016.00501

Lab ID: 211300004
Sample ID: TW-14-01_112516

Date Received: 11/29/2016 10:45 Matrix: Water
Date Collected: 11/25/2016 12:30

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	22	ug/l	0.10	0.011	1	12/2/2016 12:55	BW	n



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ANALYTICAL RESULTS QUALIFIERS

Workorder: 21130 LANSING / B0064479.2016.00501

DEFINITIONS/QUALIFIERS

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

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



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QUALITY CONTROL DATA

Workorder: 21130 LANSING / B0064479.2016.00501

QC Batch: DISG/5783 Analysis Method: AM20GAX
QC Batch Method: AM20GAX
Associated Lab Samples: 211300001, 211300002, 211300003, 211300004

METHOD BLANK: 45815

Parameter	Units	Blank Result	Reporting Limit Qualifiers
RISK Propane	ug/l	<0.10	0.10 n

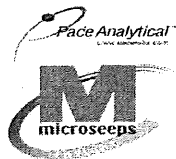
LABORATORY CONTROL SAMPLE & LCSD: 45816 45817

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK Propane	ug/l	56	53	54	94	98	80-120	4.2	20	n



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QUALITY CONTROL DATA QUALIFIERS

Workorder: 21130 LANSING / B0064479.2016.00501

QUALITY CONTROL PARAMETER QUALIFIERS

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



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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 21130 LANSING / B0064479.2016.00501

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
211300001	TW-14-02_112516			AM20GAX	DISG/5783
211300002	PW-14-01_112516			AM20GAX	DISG/5783
211300003	TW-16-01_112516			AM20GAX	DISG/5783
211300004	TW-14-01_112516			AM20GAX	DISG/5783



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Sampler(s)/Affiliation Yves Kiyooki/HCMR

Total

Total No. of Bottles/
Containers

4.20C

AC 06 12/01

Cooler Receipt Form

Client Name: Arcoadi's Project: Lansing Lab Work Order: 21130

B0064479.2016.00501

A. Shipping/Container Information (circle appropriate response)

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

Tracking Number: 7778 68861522

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: 4.2°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?			☒	

Comments: _____

Cooler contents examined/received by: LG Date: 11.29.16

Project Manager Review: RW Date: 11-30-16

Ruth Welsh - RE: Racer / Lansing

From: "Kubacki, Gwendolyn" <Gwen.Kubacki@arcadis.com>
To: Ruth Welsh <Ruth.Welsh@pacelabs.com>
Date: 12/5/2016 10:37 PM
Subject: RE: Racer / Lansing
Attachments: AGM-Nov1 21130.pdf

Hi Ruth,

Concerning the report workorder number 21130 (attached), the second sample on the COC should be PW-14-01_112516, not TW-14-01_112516. I apologize for the handwriting. Can you correct on the report?

Thanks,
Gwen

From: Ruth Welsh [Ruth.Welsh@pacelabs.com]
Sent: Monday, December 5, 2016 5:28 PM
To: Krevinghaus, Andrea <Andrea.Krevinghaus@arcadis.com>; Kubacki, Gwendolyn <Gwen.Kubacki@arcadis.com>
Subject: Racer / Lansing

Please see the attached reports for the project referenced above

Pace Analytical will be closed on Monday December 26, 2016 and January 2, 2017 in observance of the Christmas and New Year's holidays

Ruth Welsh
Customer Service
Pace Analytical Energy Services, LLC
220 William Pitt Way
Pittsburgh, PA 15238
[412-826-4482](tel:412-826-4482) (direct)
[412-826-5245](tel:412-826-5245) (main)
[412-826-3433](tel:412-826-3433) (fax)

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

December 19, 2016

Gwen Kubacki
Arcadis
28550 Cabot Dr
Suite 500
Novi, MI 48377

RE: **RACER / B0064479.2016.00501**

Pace Workorder: 21262

Dear Gwen Kubacki:

Enclosed are the analytical results for sample(s) received by the laboratory on Monday, December 12, 2016. 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 12/19/2016
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 17

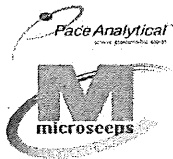
Report ID: 21262 - 875738

Page 1 of 15



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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 and Solid & Hazardous Waste
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:	NELAP: New Jersey, Department of Environmental Protection
Accreditation ID:	PA026
Scope:	Non-Potable Water; Solid and Chemical Materials
Accreditor:	NELAP: New York, Department of Health Wadsworth Center
Accreditation ID:	11815
Scope:	Non-Potable Water; Solid and Hazardous Waste
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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Phone: (412) 826-5245
Fax: (412) 826-3433

SAMPLE SUMMARY

Workorder: 21262 RACER / B0064479.2016.00501

Lab ID	Sample ID	Matrix	Date Collected	Date Received
212620001	PW-14-01_120616	Water	12/6/2016 13:30	12/12/2016 08:30
212620002	TW-14-02_120616	Water	12/6/2016 13:45	12/12/2016 08:30
212620003	TW-16-01_120616	Water	12/6/2016 15:25	12/12/2016 08:30
212620004	TW-14-01_120616	Water	12/6/2016 15:40	12/12/2016 08:30
212620005	MW-15-72_120716	Water	12/7/2016 14:45	12/12/2016 08:30
212620006	MW-16-77_120716	Water	12/7/2016 14:55	12/12/2016 08:30
212620007	MW-16-75_120716	Water	12/7/2016 15:05	12/12/2016 08:30
212620008	MW-16-74_120716	Water	12/7/2016 15:15	12/12/2016 08:30



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ANALYTICAL RESULTS

Workorder: 21262 RACER / B0064479.2016.00501

Lab ID: 212620001
Sample ID: PW-14-01_120616

Date Received: 12/12/2016 08:30 Matrix: Water

Date Collected: 12/6/2016 13:30

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	140	ug/l	0.10	0.019	1	12/17/2016 11:03	TD	n

Report ID: 21262 - 875738

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ANALYTICAL RESULTS

Workorder: 21262 RACER / B0064479.2016.00501

Lab ID: 212620002
Sample ID: TW-14-02_120616

Date Received: 12/12/2016 08:30 Matrix: Water

Date Collected: 12/6/2016 13:45

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	97	ug/l	0.10	0.019	1	12/17/2016 11:18	TD	n



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ANALYTICAL RESULTS

Workorder: 21262 RACER / B0064479.2016.00501

Lab ID: 212620003
Sample ID: TW-16-01_120616

Date Received: 12/12/2016 08:30 Matrix: Water

Date Collected: 12/6/2016 15:25

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	240	ug/l	0.10	0.019	1	12/17/2016 11:32	TD	n



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ANALYTICAL RESULTS

Workorder: 21262 RACER / B0064479.2016.00501

Lab ID: 212620004
Sample ID: TW-14-01_120616

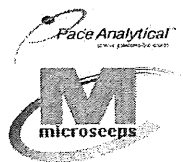
Date Received: 12/12/2016 08:30 Matrix: Water
Date Collected: 12/6/2016 15:40

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	120	ug/l	0.10	0.019	1	12/17/2016 11:45	TD	n



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ANALYTICAL RESULTS

Workorder: 21262 RACER / B0064479.2016.00501

Lab ID: 212620005
Sample ID: MW-15-72_120716

Date Received: 12/12/2016 08:30 Matrix: Water

Date Collected: 12/7/2016 14:45

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	<0.10	ug/l	0.10	0.019	1	12/17/2016 11:59	TD	n



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ANALYTICAL RESULTS

Workorder: 21262 RACER / B0064479.2016.00501

Lab ID: 212620006
Sample ID: MW-16-77_120716

Date Received: 12/12/2016 08:30 Matrix: Water

Date Collected: 12/7/2016 14:55

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	0.10	ug/l	0.10	0.019	1	12/17/2016 12:11	TD	n



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ANALYTICAL RESULTS

Workorder: 21262 RACER / B0064479.2016.00501

Lab ID: 212620007
Sample ID: MW-16-75_120716

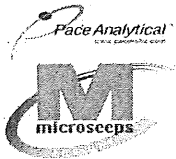
Date Received: 12/12/2016 08:30 Matrix: Water
Date Collected: 12/7/2016 15:05

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	1.2	ug/l	0.10	0.019	1	12/17/2016 13:10	TD	n



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ANALYTICAL RESULTS

Workorder: 21262 RACER / B0064479.2016.00501

Lab ID: 212620008
Sample ID: MW-16-74_120716

Date Received: 12/12/2016 08:30 Matrix: Water

Date Collected: 12/7/2016 15:15

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	7.8	ug/l	0.10	0.019	1	12/17/2016 12:58	TD	n

Report ID: 21262 - 875738

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ANALYTICAL RESULTS QUALIFIERS

Workorder: 21262 RACER / B0064479.2016.00501

DEFINITIONS/QUALIFIERS

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



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QUALITY CONTROL DATA

Workorder: 21262 RACER / B0064479.2016.00501

QC Batch: DISG/5825 Analysis Method: AM20GAX
QC Batch Method: AM20GAX
Associated Lab Samples: 212620001, 212620002, 212620003, 212620004, 212620005, 212620006, 212620007, 212620008

METHOD BLANK: 46143

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK				
Propane	ug/l	<0.10	0.10	n

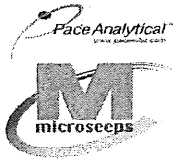
LABORATORY CONTROL SAMPLE & LCSD: 46145 46147

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK										
Propane	ug/l	56	53	53	95	96	80-120	1	20	n



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QUALITY CONTROL DATA QUALIFIERS

Workorder: 21262 RACER / B0064479.2016.00501

QUALITY CONTROL PARAMETER QUALIFIERS

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



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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 21262 RACER / B0064479.2016.00501

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
212620001	PW-14-01_120616			AM20GAX	DISG/5825
212620002	TW-14-02_120616			AM20GAX	DISG/5825
212620003	TW-16-01_120616			AM20GAX	DISG/5825
212620004	TW-14-01_120616			AM20GAX	DISG/5825
212620005	MW-15-72_120716			AM20GAX	DISG/5825
212620006	MW-16-77_120716			AM20GAX	DISG/5825
212620007	MW-16-75_120716			AM20GAX	DISG/5825
212620008	MW-16-74_120716			AM20GAX	DISG/5825



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Cooler Receipt Form

Client Name: Arcadis Project: Racer Lab Work Order: 21262

Lansing Plant 2

A. Shipping/Container Information (circle appropriate response)

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

Tracking Number: 777915960409

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: 4°C Radiation Screened: Yes No Chain of Custody Present: Yes No

Comments: _____

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

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

Comments: _____

Cooler contents examined/received by: CG Date: 12.12.16

Project Manager Review: EW Date: 12-13-16



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Phone: (412) 826-5245
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December 5, 2016

Andrea Krevinghaus
Arcadis Novi
28550 Cabot Drive
Suite 500
Novi, MI 48377

RE: **RACER / B0064479.2016.00501**

Pace Workorder: 21129

Dear Andrea Krevinghaus:

Enclosed are the analytical results for sample(s) received by the laboratory on Tuesday, November 29, 2016. 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 12/05/2016
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 14

Report ID: 21129 - 869794

Page 1 of 12



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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 and Solid & Hazardous Waste
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:	NELAP: New Jersey, Department of Environmental Protection
Accreditation ID:	PA026
Scope:	Non-Potable Water; Solid and Chemical Materials
Accreditor:	NELAP: New York, Department of Health Wadsworth Center
Accreditation ID:	11815
Scope:	Non-Potable Water; Solid and Hazardous Waste
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: 21129 RACER / B0064479.2016.00501

Lab ID	Sample ID	Matrix	Date Collected	Date Received
211290001	TW-14-02-1140_111816	Water	11/18/2016 11:40	11/29/2016 10:45
211290002	TW-14-02-1355_111816	Water	11/18/2016 13:55	11/29/2016 10:45
211290003	TW-14-02-1455_111816	Water	11/18/2016 14:55	11/29/2016 10:45
211290004	TW-14-02-1555_111816	Water	11/18/2016 15:55	11/29/2016 10:45



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PROJECT SUMMARY

Workorder: 21129 RACER / B0064479.2016.00501

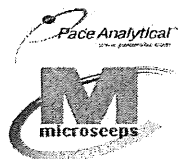
Workorder Comments

The container pH for samples 21129 (0001) were measured as below the expected pH (< 10) for those samples preserved with trisodium phosphate, as assigned to PAES method AM20GAX.



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ANALYTICAL RESULTS

Workorder: 21129 RACER / B0064479.2016.00501

Lab ID: 211290001

Date Received: 11/29/2016 10:45 Matrix: Water

Sample ID: TW-14-02-1140_111816

Date Collected: 11/18/2016 11:40

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	29	ug/l	0.10	0.011	1	12/2/2016 11:26	BW	n



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ANALYTICAL RESULTS

Workorder: 21129 RACER / B0064479.2016.00501

Lab ID: 211290002

Date Received: 11/29/2016 10:45 Matrix: Water

Sample ID: TW-14-02-1355_111816

Date Collected: 11/18/2016 13:55

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	23	ug/l	0.10	0.011	1	12/2/2016 11:38	BW	n



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ANALYTICAL RESULTS

Workorder: 21129 RACER / B0064479.2016.00501

Lab ID: 211290003 Date Received: 11/29/2016 10:45 Matrix: Water
Sample ID: TW-14-02-1455_111816 Date Collected: 11/18/2016 14:55

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	24	ug/l	0.10	0.011	1	12/2/2016 11:50	BW	n



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ANALYTICAL RESULTS

Workorder: 21129 RACER / B0064479.2016.00501

Lab ID: 211290004

Date Received: 11/29/2016 10:45 Matrix: Water

Sample ID: TW-14-02-1555_111816

Date Collected: 11/18/2016 15:55

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	84	ug/l	0.10	0.011	1	12/2/2016 12:03	BW	n



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ANALYTICAL RESULTS QUALIFIERS

Workorder: 21129 RACER / B0064479.2016.00501

DEFINITIONS/QUALIFIERS

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



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QUALITY CONTROL DATA

Workorder: 21129 RACER / B0064479.2016.00501

QC Batch: DISG/5783 Analysis Method: AM20GAX
QC Batch Method: AM20GAX
Associated Lab Samples: 211290001, 211290002, 211290003, 211290004

METHOD BLANK: 45815

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK				
Propane	ug/l	<0.10	0.10	n

LABORATORY CONTROL SAMPLE & LCSD: 45816 45817

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK										
Propane	ug/l	56	53	54	94	98	80-120	4.2	20	n



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QUALITY CONTROL DATA QUALIFIERS

Workorder: 21129 RACER / B0064479.2016.00501

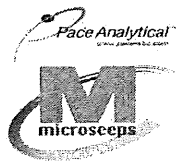
QUALITY CONTROL PARAMETER QUALIFIERS

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



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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 21129 RACER / B0064479.2016.00501

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
211290001	TW-14-02-1140_111816			AM20GAX	DISG/5783
211290002	TW-14-02-1355_111816			AM20GAX	DISG/5783
211290003	TW-14-02-1455_111816			AM20GAX	DISG/5783
211290004	TW-14-02-1555_111816			AM20GAX	DISG/5783



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CHAIN-OF-CUSTODY RECORD

Page 1 of 1

ANALYSIS / METHOD / SIZE

1001

Sample Matrix: L = Liquid; S = Solid; A = Air

Total No. of Bottles/ Containers	8

Received by: ARCADIS Bridge Organization: ARCADIS Date 11/11/16 Time 2:10
Yes No Yes No N/A

Received by: Michelle Logg Organization: FACE Date 11 / 20 / 16 Time 1303
Yes No Yes No N/A

Rec'd 11/28/16 1:15P
Hodex

AG 05-12/01

Cooler Receipt Form

Client Name: Arcadio's Project: Lansing Lab Work Order: 21129

B0064479.2016.00501

A. Shipping/Container Information (circle appropriate response)

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

Tracking Number: 7778 08861502

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: 4.2°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?			☒	

Comments: _____

Cooler contents examined/received by: LG Date: 11.29.16

Project Manager Review: EW Date: 11.30.16



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

January 6, 2017

Gwen Kubacki
Arcadis
28550 Cabot Dr
Suite 500
Novi, MI 48377

RE: **RACER / B0064479.2016.00501**

Pace Workorder: 21453

Dear Gwen Kubacki:

Enclosed are the analytical results for sample(s) received by the laboratory on Thursday, January 05, 2017. 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 01/06/2017
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 9

Report ID: 21453 - 881069

Page 1 of 9



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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 and Solid & Hazardous Waste
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:	NELAP: New Jersey, Department of Environmental Protection
Accreditation ID:	PA026
Scope:	Non-Potable Water; Solid and Chemical Materials
Accreditor:	NELAP: New York, Department of Health Wadsworth Center
Accreditation ID:	11815
Scope:	Non-Potable Water; Solid and Hazardous Waste
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: 21453 RACER / B0064479.2016.00501

Lab ID	Sample ID	Matrix	Date Collected	Date Received
214530001	TW-14-02_122816	Water	12/28/2016 15:20	1/5/2017 11:00



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PROJECT SUMMARY

Workorder: 21453 RACER / B0064479.2016.00501

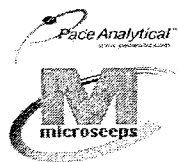
Workorder Comments

The container pH for samples 21453 (0001) were measured as below the expected pH (< 10) for those samples preserved with trisodium phosphate, as assigned to PAES method AM20GAX.



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ANALYTICAL RESULTS

Workorder: 21453 RACER / B0064479.2016.00501

Lab ID: 214530001
Sample ID: TW-14-02_122816

Date Received: 1/5/2017 11:00 Matrix: Water
Date Collected: 12/28/2016 15:20

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	120	ug/l	0.10	0.011	1	1/6/2017 11:56	BW	n



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ANALYTICAL RESULTS QUALIFIERS

Workorder: 21453 RACER / B0064479.2016.00501

DEFINITIONS/QUALIFIERS

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



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QUALITY CONTROL DATA

Workorder: 21453 RACER / B0064479.2016.00501

QC Batch: DISG/5860 Analysis Method: AM20GAX
QC Batch Method: AM20GAX
Associated Lab Samples: 214530001

METHOD BLANK: 46475

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK Propane	ug/l	<0.10	0.10	n

LABORATORY CONTROL SAMPLE & LCSD: 46476 46477

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK Propane	ug/l	56	57	55	103	99	80-120	4	20	n



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QUALITY CONTROL DATA QUALIFIERS

Workorder: 21453 RACER / B0064479.2016.00501

QUALITY CONTROL PARAMETER QUALIFIERS

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



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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 21453 RACER / B0064479.2016.00501

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
214530001	TW-14-02_122816			AM20GAX	DISG/5860



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Cooler Receipt Form

Client Name: Arcadis Project: Racer Lab Work Order: 21453

A. Shipping/Container Information (circle appropriate response)

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

Tracking Number: 778090422261

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: 4.20C 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?			☒	

Comments: _____

Cooler contents examined/received by: LG Date: 1-5-17

Project Manager Review: RW Date: 1-6-17



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

January 12, 2017

Gwen Kubacki
Arcadis
28550 Cabot Dr
Suite 500
Novi, MI 48377

RE: **RACER / B0064479.2016.00501**

Pace Workorder: 21445

Dear Gwen Kubacki:

Enclosed are the analytical results for sample(s) received by the laboratory on Thursday, January 05, 2017. 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 01/12/2017
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 ____

Report ID: 21445 - 881059

Page 1 of 16



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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 and Solid & Hazardous Waste
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:	NELAP: New Jersey, Department of Environmental Protection
Accreditation ID:	PA026
Scope:	Non-Potable Water; Solid and Chemical Materials
Accreditor:	NELAP: New York, Department of Health Wadsworth Center
Accreditation ID:	11815
Scope:	Non-Potable Water; Solid and Hazardous Waste
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: 21445 RACER / B0064479.2016.00501

Lab ID	Sample ID	Matrix	Date Collected	Date Received
214450001	TW-16-01_122816_A	Water	12/28/2016 13:05	1/5/2017 11:00
214450002	TW-16-01_122816_B	Water	12/28/2016 13:30	1/5/2017 11:00
214450003	PW-14-01_122816	Water	12/28/2016 15:05	1/5/2017 11:00
214450005	TW-14-01_122816	Water	12/28/2016 16:45	1/5/2017 11:00
214450006	MW-15-72_122916	Water	12/29/2016 15:20	1/5/2017 11:00
214450007	MW-16-77_122916	Water	12/29/2016 15:30	1/5/2017 11:00
214450008	MW-16-75_122916	Water	12/29/2016 15:40	1/5/2017 11:00
214450009	MW-16-74_122916	Water	12/29/2016 15:50	1/5/2017 11:00



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

PROJECT SUMMARY

Workorder: 21445 RACER / B0064479.2016.00501

Workorder Comments

The container pH for samples 21445 (0006) were measured as below the expected pH (< 10) for those samples preserved with trisodium phosphate, as assigned to PAES method AM20Gax.



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Fax: (412) 826-3433

ANALYTICAL RESULTS

Workorder: 21445 RACER / B0064479.2016.00501

Lab ID: 214450001
Sample ID: TW-16-01_122816_A

Date Received: 1/5/2017 11:00 Matrix: Water
Date Collected: 12/28/2016 13:05

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	550	ug/l	0.10	0.011	1	1/6/2017 10:07	BW	n



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ANALYTICAL RESULTS

Workorder: 21445 RACER / B0064479.2016.00501

Lab ID: 214450002

Date Received: 1/5/2017 11:00 Matrix: Water

Sample ID: TW-16-01_122816_B

Date Collected: 12/28/2016 13:30

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	390	ug/l	0.10	0.011	1	1/6/2017 10:20	BW	n



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ANALYTICAL RESULTS

Workorder: 21445 RACER / B0064479.2016.00501

Lab ID: 214450003
Sample ID: PW-14-01_122816

Date Received: 1/5/2017 11:00 Matrix: Water
Date Collected: 12/28/2016 15:05

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	180	ug/l	0.10	0.011	1	1/6/2017 10:36	BW	n



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ANALYTICAL RESULTS

Workorder: 21445 RACER / B0064479.2016.00501

Lab ID: 214450005
Sample ID: TW-14-01_122816

Date Received: 1/5/2017 11:00 Matrix: Water
Date Collected: 12/28/2016 16:45

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	32	ug/l	0.10	0.011	1	1/6/2017 10:49	BW	n



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ANALYTICAL RESULTS

Workorder: 21445 RACER / B0064479.2016.00501

Lab ID: 214450006
Sample ID: MW-15-72_122916

Date Received: 1/5/2017 11:00 Matrix: Water
Date Collected: 12/29/2016 15:20

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	<0.10	ug/l	0.10	0.011	1	1/6/2017 11:02	BW	n



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ANALYTICAL RESULTS

Workorder: 21445 RACER / B0064479.2016.00501

Lab ID: 214450007
Sample ID: MW-16-77_122916

Date Received: 1/5/2017 11:00 Matrix: Water
Date Collected: 12/29/2016 15:30

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	<0.10	ug/l	0.10	0.011	1	1/6/2017 11:18	BW	n



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ANALYTICAL RESULTS

Workorder: 21445 RACER / B0064479.2016.00501

Lab ID: 214450008
Sample ID: MW-16-75_122916

Date Received: 1/5/2017 11:00 Matrix: Water
Date Collected: 12/29/2016 15:40

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	1.0	ug/l	0.10	0.011	1	1/6/2017 11:31	BW	n



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ANALYTICAL RESULTS

Workorder: 21445 RACER / B0064479.2016.00501

Lab ID: **214450009**
Sample ID: **MW-16-74_122916**

Date Received: 1/5/2017 11:00 Matrix: Water
Date Collected: 12/29/2016 15:50

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Propane	28	ug/l	0.10	0.011	1	1/6/2017 11:44	BW	n



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ANALYTICAL RESULTS QUALIFIERS

Workorder: 21445 RACER / B0064479.2016.00501

DEFINITIONS/QUALIFIERS

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

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



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QUALITY CONTROL DATA

Workorder: 21445 RACER / B0064479.2016.00501

QC Batch: DISG/5860

Analysis Method: AM20GAX

QC Batch Method: AM20GAX

Associated Lab Samples: 214450001, 214450002, 214450003, 214450005, 214450006, 214450007, 214450008, 214450009

METHOD BLANK: 46475

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK Propane	ug/l	<0.10	0.10	n

LABORATORY CONTROL SAMPLE & LCSD: 46476 46477

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK Propane	ug/l	56	57	55	103	99	80-120	4	20	n



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QUALITY CONTROL DATA QUALIFIERS

Workorder: 21445 RACER / B0064479.2016.00501

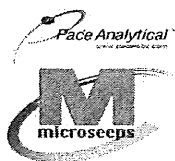
QUALITY CONTROL PARAMETER QUALIFIERS

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



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Pace Analytical Energy Services LLC

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Pittsburgh, PA 15238

Phone: (412) 826-5245

Fax: (412) 826-3433

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 21445 RACER / B0064479.2016.00501

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
214450001	TW-16-01_122816_A			AM20GAX	DISG/5860
214450002	TW-16-01_122816_B			AM20GAX	DISG/5860
214450003	PW-14-01_122816			AM20GAX	DISG/5860
214450005	TW-14-01_122816			AM20GAX	DISG/5860
214450006	MW-15-72_122916			AM20GAX	DISG/5860
214450007	MW-16-77_122916			AM20GAX	DISG/5860
214450008	MW-16-75_122916			AM20GAX	DISG/5860
214450009	MW-16-74_122916			AM20GAX	DISG/5860



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NON-CONFORMANCE FORM

PAES Work Order #: 21445

Date: 1.5.17 Time of Receipt: 11:00 Receiver: LG

Client: Arcadis

REASON FOR NON-CONFORMANCE:

1. MW-15-72 122916: ID on the 3rd vial was
MW-16-75-122916
2. MW-16-77-122916: Time on vial was 15:40

ACTION TAKEN:

Client name: _____ Date: _____ Time: _____

1. Only use the 2 vials with correct ID
2. Logged per CCE

Customer Service Initials: GW

Date: 1-9-17

Cooler Receipt Form

Client Name: Arcades Project: Racer Lab Work Order: 21445

A. Shipping/Container Information (circle appropriate response)

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

Tracking Number: 72809002261

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: 4-20°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?			☒	

Comments: _____

Cooler contents examined/received by: AV Date: 1-5-17

Project Manager Review: EW Date: 1-6-17



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

February 10, 2017

Gwen Kubacki
Arcadis
28550 Cabot Dr
Suite 500
Novi, MI 48377

RE: **RACER LANSING BIOSPARGE**

Pace Workorder: 21643

Dear Gwen Kubacki:

Enclosed are the analytical results for sample(s) received by the laboratory on Thursday, February 02, 2017. 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 02/10/2017
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 13

Report ID: 21643 - 889909

Page 1 of 11



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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 and Solid & Hazardous Waste
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:	NELAP: New Jersey, Department of Environmental Protection
Accreditation ID:	PA026
Scope:	Non-Potable Water; Solid and Chemical Materials
Accreditor:	NELAP: New York, Department of Health Wadsworth Center
Accreditation ID:	11815
Scope:	Non-Potable Water; Solid and Hazardous Waste
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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Fax: (412) 826-3433

SAMPLE SUMMARY

Workorder: 21643 RACER LANSING BIOSPARGE

Lab ID	Sample ID	Matrix	Date Collected	Date Received
216430001	MW-15-72_013117	Water	1/31/2017 14:00	2/2/2017 11:15
216430002	MW-16-77_013117	Water	1/31/2017 15:20	2/2/2017 11:15
216430003	MW-16-75_013117	Water	1/31/2017 16:00	2/2/2017 11:15
216430004	MW-16-74_013117	Water	1/31/2017 16:20	2/2/2017 11:15



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ANALYTICAL RESULTS

Workorder: 21643 RACER LANSING BIOSPARGE

Lab ID: **216430001**
Sample ID: **MW-15-72_013117**

Date Received: 2/2/2017 11:15 Matrix: Water
Date Collected: 1/31/2017 14:00

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers

RISK - PAES

Analysis Desc: AM20GAX Analytical Method: AM20GAX

Propane	<0.10	ug/l	0.10	0.011	1	2/9/2017 09:18	BW	n



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ANALYTICAL RESULTS

Workorder: 21643 RACER LANSING BIOSPARGE

Lab ID: **216430002**
Sample ID: **MW-16-77_013117**

Date Received: 2/2/2017 11:15 Matrix: Water
Date Collected: 1/31/2017 15:20

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers

RISK - PAES

Analysis Desc: AM20GAX Analytical Method: AM20GAX

Propane	<0.10	ug/l	0.10	0.011	1	2/9/2017 09:31	BW	n



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ANALYTICAL RESULTS

Workorder: 21643 RACER LANSING BIOSPARGE

Lab ID: **216430003**
Sample ID: **MW-16-75_013117**

Date Received: 2/2/2017 11:15 Matrix: Water
Date Collected: 1/31/2017 16:00

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers

RISK - PAES

Analysis Desc: AM20GAX Analytical Method: AM20GAX

Propane	1.7	ug/l	0.10	0.011	1	2/9/2017 09:44	BW	n



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ANALYTICAL RESULTS

Workorder: 21643 RACER LANSING BIOSPARGE

Lab ID: **216430004**
Sample ID: **MW-16-74_013117**

Date Received: 2/2/2017 11:15 Matrix: Water
Date Collected: 1/31/2017 16:20

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers

RISK - PAES

Analysis Desc: AM20GAX Analytical Method: AM20GAX

Propane	13	ug/l	0.10	0.011	1	2/9/2017 09:56	BW	n



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ANALYTICAL RESULTS QUALIFIERS

Workorder: 21643 RACER LANSING BIOSPARGE

DEFINITIONS/QUALIFIERS

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



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QUALITY CONTROL DATA

Workorder: 21643 RACER LANSING BIOSPARGE

QC Batch: DISG/5908 Analysis Method: AM20GAX
QC Batch Method: AM20GAX
Associated Lab Samples: 216430001, 216430002, 216430003, 216430004

METHOD BLANK: 46947

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK Propane	ug/l	<0.10	0.10	n

LABORATORY CONTROL SAMPLE & LCSD: 46948 46949

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK Propane	ug/l	56	55	57	99	103	80-120	4	20	n



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QUALITY CONTROL DATA QUALIFIERS

Workorder: 21643 RACER LANSING BIOSPARGE

QUALITY CONTROL PARAMETER QUALIFIERS

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



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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 21643 RACER LANSING BIOSPARGE

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
216430001	MW-15-72_013117			AM20GAX	DISG/5908
216430002	MW-16-77_013117			AM20GAX	DISG/5908
216430003	MW-16-75_013117			AM20GAX	DISG/5908
216430004	MW-16-74_013117			AM20GAX	DISG/5908



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Cooler Receipt Form

Client Name: Arcadis Project: Racer/ Lab Work Order: 21643

B0064479 2017 00501

A. Shipping/Container Information (circle appropriate response)

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

Tracking Number: 7783 3274 6733

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

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

Type of Ice: Wet Blue None Ice Intact: Yes Melted

Cooler Temperature: 1.2°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?			☒	

Comments: _____

Cooler contents examined/received by: LG Date: 2.2.17

Project Manager Review: LM Date: 2/2/17



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

February 9, 2017

Gwen Kubacki
Arcadis
28550 Cabot Dr
Suite 500
Novi, MI 48377

RE: **RACER BIOSPARGE**

Pace Workorder: 21666

Dear Gwen Kubacki:

Enclosed are the analytical results for sample(s) received by the laboratory on Friday, February 03, 2017. 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,

A handwritten signature in black ink that reads 'Ruth Welsh'.

Ruth Welsh 02/09/2017
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 10

Report ID: 21666 - 889126

Page 1 of 8



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



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

SAMPLE SUMMARY

Workorder: 21666 RACER BIOSPARGE

Lab ID	Sample ID	Matrix	Date Collected	Date Received
216660001	AS-16-01_020117	Water	2/1/2017 10:45	2/3/2017 14:29



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Fax: (412) 826-3433

ANALYTICAL RESULTS

Workorder: 21666 RACER BIOSPARGE

Lab ID: **216660001**
Sample ID: **AS-16-01_020117**

Date Received: 2/3/2017 14:29 Matrix: Water
Date Collected: 2/1/2017 10:45

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers

RISK - PAES

Analysis Desc: AM20GAX Analytical Method: AM20GAX

Propane	<0.10	ug/l	0.10	0.019	1	2/4/2017 08:46	TD	n



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ANALYTICAL RESULTS QUALIFIERS

Workorder: 21666 RACER BIOSPARGE

DEFINITIONS/QUALIFIERS

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



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QUALITY CONTROL DATA

Workorder: 21666 RACER BIOSPARGE

QC Batch: DISG/5903 Analysis Method: AM20GAX
QC Batch Method: AM20GAX
Associated Lab Samples: 216660001

METHOD BLANK: 46873

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK Propane	ug/l	<0.10	0.10	n

LABORATORY CONTROL SAMPLE & LCSD: 46875 46877

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK Propane	ug/l	56	61	59	110	107	80-120	2.8	20	n

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 46881 46882 Original: 216330008

Parameter	Units	Original Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK Propane	ug/l	0	56	56	56	100	101	70-130	1	20	n



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QUALITY CONTROL DATA QUALIFIERS

Workorder: 21666 RACER BIOSPARGE

QUALITY CONTROL PARAMETER QUALIFIERS

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



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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 21666 RACER BIOSPARGE

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
216660001	AS-16-01_020117			AM20GAX	DISG/5903



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Cooler Receipt Form

Client Name: Arcadis Project: Racer Lab Work Order: 21666

A. Shipping/Container Information (circle appropriate response)

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

Tracking Number: 7783 4383 5633

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: 4.2°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?			☒	

Comments: _____

Cooler contents examined/received by: LY Date: 2.3.17

Project Manager Review: [Signature] Date: 2/3/17



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

February 10, 2017

Gwen Kubacki
Arcadis
28550 Cabot Dr
Suite 500
Novi, MI 48377

RE: **RACER LANSING BIOSPARGE**

Pace Workorder: 21642

Dear Gwen Kubacki:

Enclosed are the analytical results for sample(s) received by the laboratory on Thursday, February 02, 2017. 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 02/10/2017
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 13

Report ID: 21642 - 889900

Page 1 of 11



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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 and Solid & Hazardous Waste
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:	NELAP: New Jersey, Department of Environmental Protection
Accreditation ID:	PA026
Scope:	Non-Potable Water; Solid and Chemical Materials
Accreditor:	NELAP: New York, Department of Health Wadsworth Center
Accreditation ID:	11815
Scope:	Non-Potable Water; Solid and Hazardous Waste
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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Fax: (412) 826-3433

SAMPLE SUMMARY

Workorder: 21642 RACER LANSING BIOSPARGE

Lab ID	Sample ID	Matrix	Date Collected	Date Received
216420001	TW-14-01_013017	Water	1/30/2017 14:00	2/2/2017 11:15
216420002	TW-16-01_013017	Water	1/30/2017 15:15	2/2/2017 11:15
216420003	TW-14-02_013017	Water	1/30/2017 16:30	2/2/2017 11:15
216420004	PW-14-01_013017	Water	1/30/2017 17:50	2/2/2017 11:15



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ANALYTICAL RESULTS

Workorder: 21642 RACER LANSING BIOSPARGE

Lab ID: **216420001**
Sample ID: **TW-14-01_013017**

Date Received: 2/2/2017 11:15 Matrix: Water
Date Collected: 1/30/2017 14:00

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers

RISK - PAES

Analysis Desc: AM20GAX Analytical Method: AM20GAX

Propane	34	ug/l	0.10	0.011	1	2/9/2017 08:12	BW	n



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ANALYTICAL RESULTS

Workorder: 21642 RACER LANSING BIOSPARGE

Lab ID: **216420002**
Sample ID: **TW-16-01_013017**

Date Received: 2/2/2017 11:15 Matrix: Water
Date Collected: 1/30/2017 15:15

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers

RISK - PAES

Analysis Desc: AM20GAX Analytical Method: AM20GAX

Propane	430	ug/l	0.10	0.011	1	2/9/2017 08:25	BW	n



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Fax: (412) 826-3433

ANALYTICAL RESULTS

Workorder: 21642 RACER LANSING BIOSPARGE

Lab ID: **216420003**
Sample ID: **TW-14-02_013017**

Date Received: 2/2/2017 11:15 Matrix: Water
Date Collected: 1/30/2017 16:30

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers

RISK - PAES

Analysis Desc: AM20GAX Analytical Method: AM20GAX

Propane	18	ug/l	0.10	0.011	1	2/9/2017 08:43	BW	n



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

ANALYTICAL RESULTS

Workorder: 21642 RACER LANSING BIOSPARGE

Lab ID: **216420004**
Sample ID: **PW-14-01_013017**

Date Received: 2/2/2017 11:15 Matrix: Water
Date Collected: 1/30/2017 17:50

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers

RISK - PAES

Analysis Desc: AM20GAX

Analytical Method: AM20GAX

Propane	2.0	ug/l	0.10	0.011	1	2/9/2017 09:00	BW	n



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ANALYTICAL RESULTS QUALIFIERS

Workorder: 21642 RACER LANSING BIOSPARGE

DEFINITIONS/QUALIFIERS

MDL	Method Detection Limit. Can be used synonymously with LOD; Limit Of Detection.
PQL	Practical Quantitation 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.



CERTIFICATE OF ANALYSIS

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QUALITY CONTROL DATA

Workorder: 21642 RACER LANSING BIOSPARGE

QC Batch: DISG/5908 Analysis Method: AM20GAX
QC Batch Method: AM20GAX
Associated Lab Samples: 216420001, 216420002, 216420003, 216420004

METHOD BLANK: 46947

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK Propane	ug/l	<0.10	0.10	n

LABORATORY CONTROL SAMPLE & LCSD: 46948 46949

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK Propane	ug/l	56	55	57	99	103	80-120	4	20	n



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

QUALITY CONTROL DATA QUALIFIERS

Workorder: 21642 RACER LANSING BIOSPARGE

QUALITY CONTROL PARAMETER QUALIFIERS

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



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220 William Pitt Way
Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 21642 RACER LANSING BIOSPARGE

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
216420001	TW-14-01_013017			AM20GAX	DISG/5908
216420002	TW-16-01_013017			AM20GAX	DISG/5908
216420003	TW-14-02_013017			AM20GAX	DISG/5908
216420004	PW-14-01_013017			AM20GAX	DISG/5908



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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

220 William Pitt Way
Pittsburgh, PA 15238
412-826-5245



21642

Section A Required Client Information: Company: Arcadis Address: Email To: Phone: Requested Due Date/TAT:		Section B Required Project Information: Report To: Gwen Kubacki Copy To: Purchase Order No.: 80064479.2017.00501 Project Name: PAEA Lansing Biosphere Project Number: 80064479.2017.00501		Section C Invoice Information: Attention: See PO Company Name: Address: Pace Quote Reference: Pace Project Manager: Pace Profile #:		Section D Regulatory Agency NPDES UST RCRA OTHER Site Location STATE: MI		Page: 1 of 1 007351

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives										Analysis Test Y/N	Requested Analysis Filtered (Y/N)										Pace Project No./ Lab I.D.
							DATE	TIME	DATE	TIME	H ₂ SO ₄	HNO ₃	HCl	TSP	BAK	Zinc Acetate & NaOH	Other											
1	TW-14-01-013017	DW	G	1/30/17	1400	3	1/30/17	1400	1/30/17	23:45	Unpreserved			2				X										
2	TW-16-01-013017	WT	G	1/30/17	1515	1	1/30/17	1515	1/30/17	1450				1				X										
3	TW-14-02-013017	WT	G	1/30/17	1630	1	1/30/17	1630	1/30/17	1450				1				X										
4	2W-14-01-013017	WT	G	1/30/17	1750	3	1/30/17	1750	1/30/17	1830				2				X										
5																												
6																												
7																												
8																												
9																												
10																												
11																												
12																												

Section E ADDITIONAL COMMENTS RELINQUISHED BY / AFFILIATION DATE TIME ACCEPTED BY / AFFILIATION DATE TIME SAMPLE CONDITIONS		Temp in °C Received on Ice (Y/N) Custody Sealed Cooler (Y/N) Samples Intact (Y/N)	
ORIGINAL SAMPLER NAME AND SIGNATURE PRINT Name of SAMPLER: Christina Grogg SIGNATURE of SAMPLER: <i>Christina Grogg</i> DATE Signed (MM/DD/YY): 01/30/2017		F-ALL-Q-020rev.07, 15-May-2007	

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Cooler Receipt Form

Client Name: Arcadis Project: Racer/ Lab Work Order: 2164.2

B0064479 2017 00501

A. Shipping/Container Information (circle appropriate response)

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

Tracking Number: 7783 3274 6733

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

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

Type of Ice: Wet Blue None Ice Intact: Yes Melted

Cooler Temperature: 1.20C 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?			☒	

Comments: _____

Cooler contents examined/received by: WJ Date: 2.2.17

Project Manager Review: Zon Date: 2/2/17



10515 Research Drive
Knoxville, TN 37932
Phone: (865) 573-8188
Fax: (865) 573-8133

Client: Gwen Kubacki
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 248-994-2262

Fax:

Identifier: 034NI

Date Rec: 09/09/2016

Report Date: 09/13/2016

Client Project #: B0064479.2016.00501 **Client Project Name:** RACER Lansing

Purchase Order #:

Analysis Requested: CENSUS

Reviewed By:

A handwritten signature in black ink, appearing to read 'Joan Spence', written over a light blue rectangular background.

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Tel. (865) 573-8188 Fax. (865) 573-8133

CENSUS

Client: Arcadis
Project: RACER Lansing

MI Project Number: 034NI
Date Received: 09/09/2016

Sample Information

Client Sample ID:	TW-14-02_0908	PW-14-01_0908	TW-16-01_0908	TW-14-01_0908
	16	16	16	16
Sample Date:	09/08/2016	09/08/2016	09/08/2016	09/08/2016
Units:	cells/mL	cells/mL	cells/mL	cells/mL
Analyst:	JS	JS	JS	JS

Functional Genes

Propane Monooxygenase	PPO	1.80E+00 (J)	1.50E+00 (J)	<4.80E+00	<5.00E+00

Legend:

NA = Not Analyzed NS = Not Sampled J = Estimated gene copies below PQL but above LQL I = Inhibited
< = Result not detected

Quality Assurance/Quality Control Data

Samples Received 9/9/2016

Component	Date Prepared	Date Analyzed	Arrival Temperature	Positive Control	Extraction Blank	Negative Control
PPO	09/09/2016	09/13/2016	4 °C	109%	non-detect	non-detect

Name: Gwen Kubacki
Company: Arcadis
Address: 28550 Cabot Drive
Suite 500
Novi, MI 48377
email: Gwen.Kubacki@Arcadis.com
Phone: 248-994-2240
Fax:

Project Manager: _____
Project Name: RACER Lansing
Project No.: B0064479.2016.00501

Name: _____
Company: _____
Address: _____

email: _____
Phone: _____
Fax: _____

Purchase Order No. _____
Subcontract No. _____
MI Quote No. _____



10515 Research Dr
Knoxville, TN 37932
865-573-8188

www.microbe.com

Please Check One:

- ☐ More samples to follow
- ☐ No Additional Samples

Report Type: ☐ Standard (default) ☐ Microbial Insights Level III raw data(15% surcharge) ☐ Microbial Insights Level IV (25% surcharge) ☐ Comprehensive Interpretive(15%) ☐ Historical Interpretive (35%)

EDD type: ☐ Microbial Insights Standard (default) ☐ All other available EDDs (5% surcharge) Specify EDD Type:

Please contact us with any questions about the analyses or filling out the COC at (865) 573-8188 (9:00 am to 5:00 pm EST, M-F). After hours email: customerservice@microbe.com

[illegible]

It is vital that chain of custody is filled out correctly & that all relative information is provided.

Failure to provide sufficient and/or correct information regarding reporting, invoicing & analyses requested information may result in delays for which MI will not be liable.



10515 Research Drive
Knoxville, TN 37932
Phone: (865) 573-8188
Fax: (865) 573-8133

Client: Andrea Krevinghaus
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone:

Fax:

Identifier: 047NK

Date Rec: 11/11/2016

Report Date: 11/15/2016

Client Project #: B00064479.2016.00501 **Client Project Name:** Racer Lansing Plant 2

Purchase Order #: B0064479.2016-MI-WA02

Analysis Requested: CENSUS

Reviewed By:

A handwritten signature in black ink, appearing to read 'Joan Spence', written over a light blue rectangular background.

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CENSUS

Client: Arcadis
Project: Racer Lansing Plant 2

MI Project Number: 047NK
Date Received: 11/11/2016

Sample Information

Client Sample ID:	TW-14-01_1110	TW-16-01_1110	PW-14-01_1110	TW-14-02_1110
	16	16	16	16
Sample Date:	11/10/2016	11/10/2016	11/10/2016	11/10/2016
Units:	cells/mL	cells/mL	cells/mL	cells/mL
Analyst:	JS	JS	JS	JS

Functional Genes

Propane Monooxygenase	PPO	<7.35E+01	2.15E+01 (J)	4.50E+00 (J)	<9.43E+01

Legend:

NA = Not Analyzed NS = Not Sampled J = Estimated gene copies below PQL but above LQL I = Inhibited
< = Result not detected

Quality Assurance/Quality Control Data

Samples Received 11/11/2016

Component	Date Prepared	Date Analyzed	Arrival Temperature	Positive Control	Extraction Blank	Negative Control
PPO	11/11/2016	11/15/2016	0 °C	109%	non-detect	non-detect



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Phone: (865) 573-8188
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Client: Andrea Krevinghaus
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone:

Fax:

Identifier: 013NL

Date Rec: 12/07/2016

Report Date: 12/12/2016

Client Project #: B0064479.2006.00005 **Client Project Name:** Racer, Lansing, Plant 2

Purchase Order #:

Analysis Requested: CENSUS

Reviewed By:

A handwritten signature in black ink, appearing to read 'Joan Spence', written over a light blue rectangular background.

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Tel. (865) 573-8188 Fax. (865) 573-8133

CENSUS

Client: Arcadis
Project: Racer, Lansing, Plant 2

MI Project Number: 013NL
Date Received: 12/07/2016

Sample Information

Client Sample ID:	PW-14-01_1206	TW-14-02_1206	TW-16-01_1206	TW-14-01_1206
	16	16	16	16
Sample Date:	12/06/2016	12/06/2016	12/06/2016	12/06/2016
Units:	cells/mL	cells/mL	cells/mL	cells/mL
Analyst:	JS	JS	JS	JS

Functional Genes

Propane Monooxygenase	PPO	8.56E+01	<1.61E+02	6.10E+00 (J)	<4.63E+01

Legend:

NA = Not Analyzed NS = Not Sampled J = Estimated gene copies below PQL but above LQL I = Inhibited
< = Result not detected

Quality Assurance/Quality Control Data

Samples Received 12/7/2016

Component	Date Prepared	Date Analyzed	Arrival Temperature	Positive Control	Extraction Blank	Negative Control
PPO	12/07/2016	12/12/2016	0 °C	110%	non-detect	non-detect



~~Analytical Laboratory~~
1914 Holloway Drive 8660 S. Mackinaw Trail
Holt, MI 48842 Cadillac, MI 49601
Phone: 517 699 0345 Phone: 231 775 8368
Fax: 517 699 0388 Fax: 231 775 8584
email: lab@fibertec.us

~~Industrial Hygiene Services, Inc.~~
1914 Holloway Drive
Holt, MI 48842
Phone: 517 699 0345
Fax: 517 699 0382
email: asbestos@fibertecihs.com

~~Geoprobe~~
11766 E. Grand River Rd.
Brighton, MI 48116
Phone: 810 220 3309
Fax: 810 220 3311

Chain of Custody #
154492
PAGE 1 of 1

Client Name: ARCADES				MATRIX (SEE RIGHT CORNER FOR CODE)	# OF CONTAINERS	Microbial PPO	PARAMETERS												Matrix Code				Deliverables	
Contact Person: Andrea Krevinghaus							S	Soil	GW	Ground Water		Level 2												
Project Name/ Number: Racer, Lansing, Plant 2 B0064479.2006.00005							A	Air	SW	Surface Water		Level 3												
Email distribution list: Andrea.krevinghaus@arcadis-us.com Gwen.Kubacki@arcadis-us.com							O	Oil	WW	Waste Water		Level 4												
Quote#							P	Wipe	X	Other: Specify		EDD												
Purchase Order#				Remarks:																				
Date	Time	Sample #	Client Sample Descriptor																					
12/6/16	1330		PW-14-01-120616	GW	1	X													013NL1					
12/6/16	1345		TW-14-02-120616	GW	1	X													2					
12/6/16	1525		TW-16-01-120616	GW	1	X													3					
12/6/16	1540		TW-14-01-120616	GW	1	X													4					
Comments: Samples kept in wet ice																								
Sampled/Relinquished By: Dale Arnett / Dale Arnett				Date/Time: 12/6/16 1730				Received By: Fedex																
Relinquished By:				Date/Time:				Received By: Jeff Aron																
Relinquished By:				Date/Time: 12/7/16 920				Received By Laboratory:																
Turnaround Time ALL RESULTS WILL BE SENT BY THE END OF THE BUSINESS DAY																		LAB USE ONLY						
1 bus. day 2 bus. days 3 bus. days 4 bus. days																		Fibertec project number:						
X 5-7 bus. days (standard) Other (specify time/date requirement):																		Temperature upon receipt at Lab:						
Please see back for terms and conditions																								



10515 Research Drive
Knoxville, TN 37932
Phone: (865) 573-8188
Fax: (865) 573-8133

Client: Gwen Kubacki
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 248-994-2262

Fax:

Identifier: 078OA

Date Rec: 01/31/2017

Report Date: 02/01/2017

Client Project #: B0064479.2017.00501 **Client Project Name:** RACER Lansing Biosparge

Purchase Order #: B0064479.2017.00501

Analysis Requested: CENSUS

Reviewed By:

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Tel. (865) 573-8188 Fax. (865) 573-8133

CENSUS

Client: Arcadis
Project: RACER Lansing Biosparge

MI Project Number: 0780A
Date Received: 01/31/2017

Sample Information

Client Sample ID:	TW-14-01_0130	TW-16-01_0130	TW-14-02_0130	PW-14-01_0130
	17	17	17	17
Sample Date:	01/30/2017	01/30/2017	01/30/2017	01/30/2017
Units:	cells/mL	cells/mL	cells/mL	cells/mL
Analyst:	JS	JS	JS	JS

Functional Genes

Propane Monooxygenase	PPO	8.00E-01 (J)	<5.00E+00	8.64E+01	6.45E+04

Legend:

NA = Not Analyzed NS = Not Sampled J = Estimated gene copies below PQL but above LQL I = Inhibited
< = Result not detected

Quality Assurance/Quality Control Data

Samples Received 1/31/2017

Component	Date Prepared	Date Analyzed	Arrival Temperature	Positive Control	Extraction Blank	Negative Control
PPO	01/31/2017	02/01/2017	2 °C	106%	non-detect	non-detect

It is vital that chain of custody is filled out correctly & that all relative information is provided.
Failure to provide sufficient and/or correct information regarding reporting, invoicing & analyses requested information may result in delays for which MI will not be liable.