



PDC Energy, Inc.
First Quarter 2017 Groundwater Monitoring Summary

February 24, 2017

Seele 31, 41, 42-31 Tank Battery
NENE Section 31 T4N R67W
Weld County, API # 05-123-20280
Facility ID # 331069
Remediation # 6926

This groundwater monitoring summary has been prepared by Tasman Geosciences, Inc. for the Seele 31, 41, 42-31 tank battery. On January 17, 2017, groundwater monitoring was conducted at all six temporary monitoring well locations (BH01, BH02R, BH03, BH07 – BH09). Monitoring well BH01 contained insufficient water for sample collection. Water was not encountered in BH03. Four groundwater samples were submitted to Summit Scientific Laboratories for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) using USEPA Method 8260B. Analytical results are summarized in Table 1, and the laboratory report is included as Attachment A. Sample locations and corresponding analytical results are illustrated on Figure 1. First quarter 2017 analytical results indicate that BTEX concentrations are below applicable COGCC Table 910-1 groundwater standards in the four well locations.

Enhanced fluid recovery (EFR) with air sparge (AS) events were initiated in third quarter 2012. EFR/AS events were discontinued in the second quarter of 2013 due to a site-wide decrease in groundwater elevation. EFR/AS events were reinitiated during the third quarter 2014, following the installation of new wells. EFR/AS was discontinued during the fourth quarter 2015, as constituent concentrations were reduced below regulatory standards. Monitored natural attenuation (MNA) was implemented as the selected remediation strategy during the fourth quarter 2015 and continued into the second quarter 2016. EFR/AS events were reinitiated during the second quarter 2016 due to a rebound in dissolved phase hydrocarbon concentrations in two wells. A summary of EFR/AS operational data is provided in Table 2. EFR/AS events will continue as the selected remediation strategy for the site through the second quarter 2017.

Historical groundwater sampling results for naphthalene, methyl tert-butyl ether (MTBE) and gasoline range organics (GRO) are presented in Table 3. Analysis of these constituents was discontinued following the third quarter 2012.

Second quarter 2017 groundwater sampling will be conducted during April 2017.

TABLE 1
SEELE 31, 41, 42-31 TANK BATTERY
GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE

Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water ⁽²⁾ (feet)
COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400	
BH01	1/27/2012	5,300	1,200	180	1,300	13.14
BH01	7/17/2012	900	2.2	10	78	12.60
BH01	10/1/2012	<1.0	<1.0	<1.0	<1.0	13.82
BH01	1/28/2013	DRY	DRY	DRY	DRY	DRY
BH01	5/3/2013	3,000	2.3	17	240	13.90
BH01	7/25/2013	DRY	DRY	DRY	DRY	DRY
BH01	11/1/2013	<1.0	<1.0	4.2	28	13.09
BH01	1/29/2014	DRY	DRY	DRY	DRY	DRY
BH01	4/28/2014	DRY	DRY	DRY	DRY	14.26
BH01	7/25/2014	<1.0	<1.0	1.6	4.3	12.47
BH01	10/27/2014	DRY	DRY	DRY	DRY	13.36
BH01	1/20/2015	DRY	DRY	DRY	DRY	DRY
BH01	4/24/2015	DRY	DRY	DRY	DRY	DRY
BH01	7/31/2015	<1.0	<1.0	49	100	12.87
BH01	10/6/2015	DRY	DRY	DRY	DRY	13.82
BH01	1/21/2016	DRY	DRY	DRY	DRY	DRY
BH01	4/13/2016	290	2.4	130	280	13.01
BH01	7/18/2016	<1.0	<1.0	<1.0	<1.0	12.28
BH01	10/24/2016	DRY	DRY	DRY	DRY	DRY
BH01	1/17/2017	DRY	DRY	DRY	DRY	11.00
BH02	1/27/2012	7,500	680	240	1,400	11.93
BH02	7/17/2012	10,000	2,200	220	2,140	10.92
BH02	10/1/2012	DRY	DRY	DRY	DRY	DRY
BH02	1/28/2013	DRY	DRY	DRY	DRY	DRY
BH02	5/3/2013	DRY	DRY	DRY	DRY	DRY
BH02	7/25/2013	DRY	DRY	DRY	DRY	DRY
BH02	10/31/2013	DRY	DRY	DRY	DRY	DRY
BH02	1/29/2014	DRY	DRY	DRY	DRY	DRY
BH02	4/28/2014	DRY	DRY	DRY	DRY	DRY
BH02R	7/25/2014	93	14	89	230	10.12
BH02R	10/27/2014	1.4	<1.0	1.5	8.7	10.72
BH02R	1/20/2015	<1.0	<1.0	<1.0	<1.0	11.42
BH02R	4/24/2015	<1.0	<1.0	<1.0	<1.0	11.28

TABLE 1
SEELE 31, 41, 42-31 TANK BATTERY
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Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water ⁽²⁾ (feet)
COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400	
BH02R	7/31/2015	<1.0	<1.0	<1.0	<1.0	9.70
BH02R	10/6/2015	<1.0	<1.0	<1.0	<1.0	10.68
BH02R	1/21/2016	<1.0	<1.0	<1.0	<1.0	11.51
BH02R	4/13/2016	12	<1.0	2.0	7.6	10.15
BH02R	7/18/2016	3.5	<1.0	1.5	<1.0	9.05
BH02R	10/24/2016	<1.0	<1.0	<1.0	<1.0	9.79
BH02R	1/17/2017	<1.0	<1.0	<1.0	<1.0	11.30
BH03	1/27/2012	16,000	4,400	420	2,900	15.02
BH03	7/17/2012	18,000	2,700	15	3,590	12.56
BH03	10/1/2012	7,300	1,400	250	2,400	12.69
BH03	1/28/2013	DRY	DRY	DRY	DRY	DRY
BH03	5/3/2013	DRY	DRY	DRY	DRY	DRY
BH03	7/25/2013	DRY	DRY	DRY	DRY	DRY
BH03	10/31/2013	DRY	DRY	DRY	DRY	DRY
BH03	1/29/2014	DRY	DRY	DRY	DRY	DRY
BH03	4/28/2014	DRY	DRY	DRY	DRY	DRY
BH03	7/25/2014	DRY	DRY	DRY	DRY	DRY
BH03	10/27/2014	DRY	DRY	DRY	DRY	DRY
BH03	1/20/2015	DRY	DRY	DRY	DRY	DRY
BH03	4/24/2015	DRY	DRY	DRY	DRY	DRY
BH03	7/31/2015	DRY	DRY	DRY	DRY	DRY
BH03	10/6/2015	DRY	DRY	DRY	DRY	DRY
BH03	1/21/2016	DRY	DRY	DRY	DRY	DRY
BH03	4/13/2016	DRY	DRY	DRY	DRY	DRY
BH03	7/18/2016	DRY	DRY	DRY	DRY	DRY
BH03	10/24/2016	DRY	DRY	DRY	DRY	DRY
BH03	1/17/2017	DRY	DRY	DRY	DRY	DRY
BH07	7/25/2014	<1.0	<1.0	<1.0	<1.0	9.01
BH07	10/27/2014	160	<1.0	<1.0	<1.0	9.75
BH07	1/20/2015	120	<1.0	<1.0	<1.0	10.63
BH07	4/24/2015	<1.0	<1.0	<1.0	<1.0	10.60
BH07	7/31/2015	<1.0	<1.0	<1.0	<1.0	9.69
BH07	10/6/2015	<1.0	<1.0	<1.0	<1.0	10.49

TABLE 1
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Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water ⁽²⁾ (feet)
COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400	
BH07	1/21/2016	<1.0	<1.0	<1.0	<1.0	11.27
BH07	4/13/2016	<1.0	<1.0	<1.0	<1.0	9.65
BH07	7/18/2016	<1.0	<1.0	<1.0	<1.0	8.67
BH07	10/24/2016	<1.0	<1.0	<1.0	<1.0	9.38
BH07	1/17/2017	<1.0	<1.0	<1.0	<1.0	10.60
BH08	7/25/2014	3.8	<1.0	6.2	210	9.95
BH08	10/27/2014	5.5	<1.0	<1.0	36	10.86
BH08	1/20/2015	<1.0	<1.0	<1.0	<1.0	11.57
BH08	4/24/2015	<1.0	<1.0	<1.0	<1.0	11.43
BH08	7/31/2015	<1.0	<1.0	<1.0	<1.0	9.74
BH08	10/6/2015	<1.0	<1.0	<1.0	<1.0	10.87
BH08	1/21/2016	<1.0	<1.0	<1.0	<1.0	11.82
BH08	4/13/2016	<1.0	<1.0	<1.0	<1.0	10.04
BH08	7/18/2016	<1.0	<1.0	<1.0	<1.0	9.43
BH08	10/24/2016	<1.0	<1.0	<1.0	<1.0	10.07
BH08	1/17/2017	<1.0	<1.0	<1.0	<1.0	11.22
BH09	7/25/2014	810	<1.0	72	510	11.46
BH09	10/27/2014	<1.0	<1.0	<1.0	<1.0	11.73
BH09	1/20/2015	<1.0	<1.0	<1.0	<1.0	12.62
BH09	4/24/2015	<1.0	<1.0	<1.0	<1.0	12.33
BH09	7/31/2015	<1.0	<1.0	<1.0	<1.0	10.78
BH09	10/6/2015	<1.0	<1.0	<1.0	<1.0	11.85
BH09	1/21/2016	<1.0	<1.0	<1.0	<1.0	13.21
BH09	4/13/2016	<1.0	<1.0	<1.0	<1.0	11.60
BH09	7/18/2016	<1.0	<1.0	<1.0	5.8	10.75
BH09	10/24/2016	<1.0	<1.0	<1.0	<1.0	11.24
BH09	1/17/2017	<1.0	<1.0	<1.0	<1.0	12.56

TABLE 1
SEELE 31, 41, 42-31 TANK BATTERY
GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE

Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water ⁽²⁾ (feet)
COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400	

Notes:

1. Groundwater standards referenced from 2 CCR 404-1, Table 910-1, effective January 30, 2015.
2. Depth to water measurements collected prior to fourth quarter 2016 were measured from top of casing or ground surface for monitoring well samples and excavation samples, respectively. Subsequent monitoring well measurements were collected from top of casing and used to adjust water levels and product thickness to reflect depth of water from ground surface.

COGCC = Colorado Oil and Gas Conservation Commission

µg/L = Micrograms per liter

(<) = Analytical result is less than the indicated laboratory reporting limit.

DRY = Well contained insufficient volume to collect sample.

BOLD = Analytical result is in exceedance of COGCC groundwater standards.

TABLE 2
SEELE 31, 41, 42-31 TANK BATTERY
EFR / AS OPERATIONAL SUMMARY TABLE

Date	EFR Wells	Total EFR/AS Duration (hours)	Approximate Gallons Extracted	AS Wells	Air Injection Pressure (psi)	Average Air Flow Rate (cfm)
Third Quarter 2012						
8/22/2012	BH01, BH02, BH03	7	42	BH01, BH02, BH03	8	NR
9/5/2012		7	42		8	NR
Quarterly Totals		14	84		-	-
Fourth Quarter 2012						
10/2/2012	BH01, BH02, BH03	7	42	BH01, BH02, BH03	8	NR
10/15/2012		7	42		8	NR
10/29/2012		7	0		8	NR
11/12/2012		6.25	0		8	NR
11/26/2012		6	0		8	NR
Quarterly Totals		33.25	84		-	-
First Quarter 2013						
1/8/2013	BH01, BH03	5.5	0	BH02, BH03	10	NR
1/21/2013	BH01, BH02, BH03	7	6.5	None	0	NR
2/8/2013		6.5	6		0	NR
3/14/2013		6.25	3	BH01, BH02, BH03	10	NR
Quarterly Totals		25.25	15.5		-	-
Second Quarter 2013						
4/2/2013	BH01, BH02, BH03	4.25	6	BH01, BH02, BH03	10	NR
Quarterly Totals		4.25	6		-	-
Third Quarter 2014						
9/3/2014	BH02, BH03, BH08	6	0	BH02R, BH09	20	20
9/17/2014	BH02, BH02R, BH03, BH09	6	75		20	19
Quarterly Totals		12	75		-	-
Fourth Quarter 2014						
10/3/2014	BH03, BH08	6	9	BH02R, BH09	20	21
10/21/2014	BH02, BH03, BH08	6	50		20	15
11/4/2014		8	45		20	31
11/19/2014		6	0		20	25
12/5/2014	BH02, BH08	6	10		20	20
12/15/2014	BH02, BH03, BH08	6	50		20	25
12/28/2014		6	0		20	20
Quarterly Totals		44	164		-	-

TABLE 2
SEELE 31, 41, 42-31 TANK BATTERY
EFR / AS OPERATIONAL SUMMARY TABLE

Date	EFR Wells	Total EFR/AS Duration (hours)	Approximate Gallons Extracted	AS Wells	Air Injection Pressure (psi)	Average Air Flow Rate (cfm)
First Quarter 2015						
1/12/2015	BH02, BH07, BH08	6	10	BH02R, BH09	20	20
1/22/2015	BH02, BH03, BH08	6	0		20	25
2/11/2015	BH02, BH02R, BH03, BH07, BH08	6	50		20	30
3/11/2015		6	50	BH02R, BH07, BH09	20	21.7
3/26/2015		6	50		20	21.7
Quarterly Totals		30	160		-	-
Second Quarter 2015						
4/1/2015	BH02, BH02R, BH03, BH07, BH08	6	10	BH02R, BH07, BH09	20	16.7
4/22/2015		6	90		20	20
5/6/2015		6	50		20	20
5/20/2015		6	40		20	16.3
6/3/2015		6	30		20	20
6/17/2015		6	30		30	27.5
Quarterly Totals		36	250		-	-
Third Quarter 2015						
7/1/2015	BH02, BH02R, BH03, BH07, BH08	6	60	BH02R, BH07, BH09	20	12.5
7/15/2015		6	45		20	15
7/29/2015		6	75		20	15
8/12/2015		6	40		20	22.5
8/26/2015		6	50		20	19.7
9/9/2015		6	50		20	20
9/23/2015		6	80		20	17.5
Quarterly Totals		42	400		-	-
Fourth Quarter 2015						
10/21/2015	BH02, BH02R, BH03, BH07, BH08	6	60	BH02R, BH07, BH09	20	20
Quarterly Totals		6	60		-	-
Second Quarter 2016						
4/25/2016	BH07	6	60	BH01, BH02R	20	25
5/13/2016	BH01, BH02R	6	65	BH07	20	25
5/26/2016	BH01, BH07	6	36	BH01, BH02R	20	22.3
6/10/2016	BH01, BH02R, BH07	6	20		10	25
Quarterly Totals		24	181		-	-

TABLE 2
SEELE 31, 41, 42-31 TANK BATTERY
EFR / AS OPERATIONAL SUMMARY TABLE

Date	EFR Wells	Total EFR/AS Duration (hours)	Approximate Gallons Extracted	AS Wells	Air Injection Pressure (psi)	Average Air Flow Rate (cfm)
Third Quarter 2016						
7/8/2016	BH01, BH02R, BH07	6	60	BH01, BH02R	20	26.3
7/22/2016		6	65		20	23.8
8/20/2016		6	36		20	20
9/2/2016		6	20		10	15
9/30/2016		6	40		15	25
Quarterly Totals		30	221		-	-
Fourth Quarter 2016						
10/13/2016	BH01, BH02R, BH07	6	20	BH01, BH02R	20	15
10/27/2016		6	84		15	15
11/22/2016		6	2		20	15
12/9/2016		5	0		10	17.5
12/23/2016		6	35	BH01, BH02R, BH07	20	25
Quarterly Totals		29	141		-	-
First Quarter 2017						
1/3/2017	BH01, BH02R, BH07	6	0	BH01, BH02R	20	27.5
1/20/2017		6	20		20	25
2/17/2017		6	70		20	30
2/27/2017		6	35		20	30
3/13/2017		6	42		20	10
3/29/2017		6	70		20	30
Quarterly Totals		36	237		-	-

Notes:

EFR = Enhanced fluid recovery

AS = Air sparge

psi = Pounds per square inch

cfm = Cubic feet per minute

NR = Not recorded

TABLE 3
SEELE 31, 41, 42-31 TANK BATTERY
GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE
GRO / NAPHTHALENE / MTBE

Sample ID	Date Sampled	Naphthalene (µg/L)	MTBE (µg/L)	TPH-GRO (µg/L)
CDPHE WQCC Groundwater Standard ⁽¹⁾		140	20	NS
BH01	1/27/2012	68	<5.0	11,000
BH01	7/17/2012	18	NA	2,000
BH02	1/27/2012	7,900	<5.0	24,000
BH02	7/17/2012	57	NA	20,000
BH03	1/27/2012	73	<5.0	62,000
BH03	7/17/2012	52	NA	20,000

Notes:

1. Groundwater standards referenced from Colorado Department of Public Health Water Quality Control Commission 5CCR 1002-41 Basic Standards for Groundwater.

TPH-GRO = Total Petroleum Hydrocarbons - Gasoline Range Organics

MTBE = Methyl tert-butyl ether

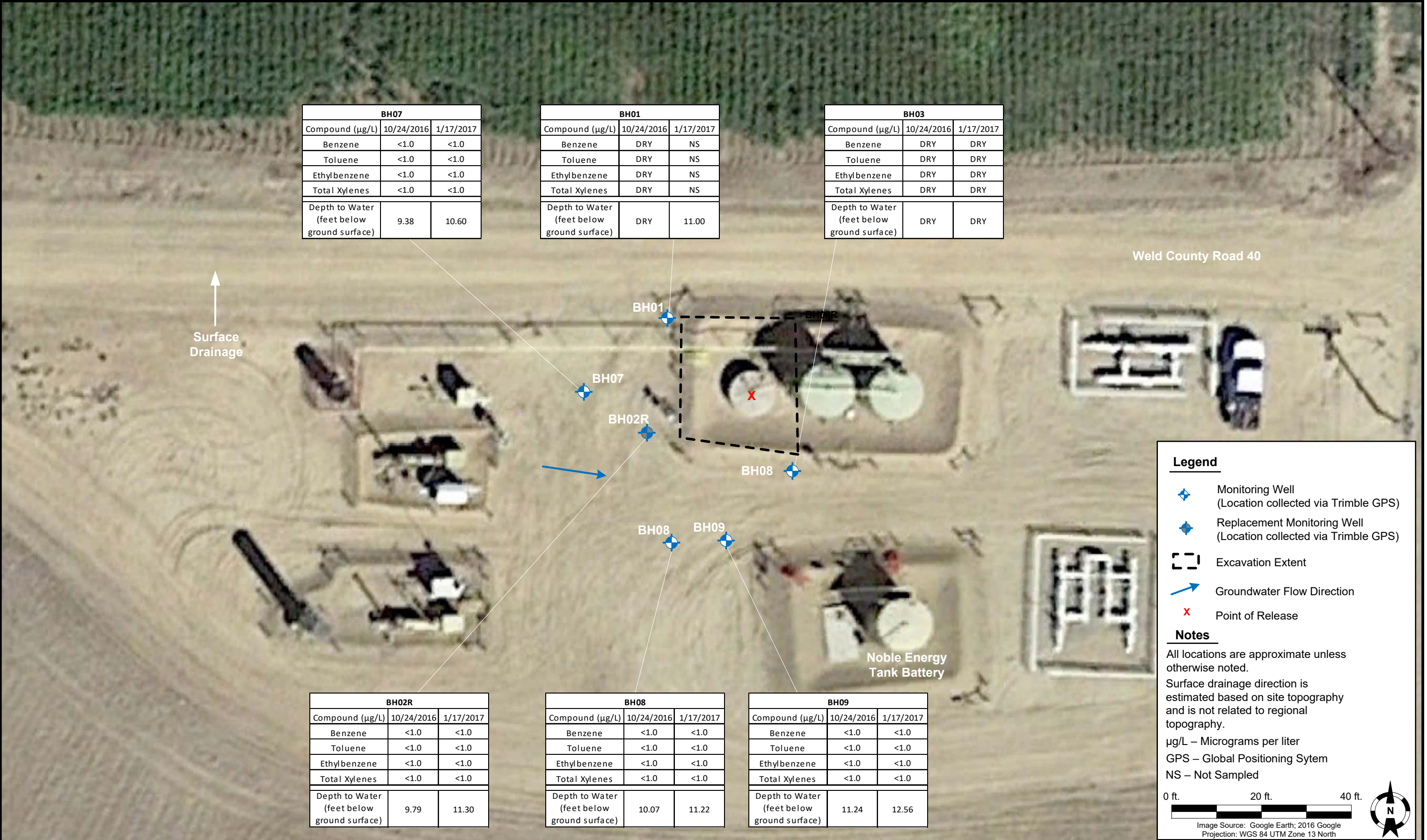
µg/L = Micrograms per liter

(<) = Analytical result is less than the indicated laboratory reporting limit.

NS = No Standard

NA = Not Analyzed

BOLD = Analytical result is in exceedance of applicable groundwater standards.



DATE:	February 7, 2017
DESIGNED BY:	C. Hamlin
DRAWN BY:	T. Blessing



TASMAN
GEOSCIENCES

Tasman Geosciences, Inc.
6899 Pecos Street – Unit C
Denver, CO 80221

PDC Energy, Inc. – DJ Basin
Seele 31, 41, 42-31 Tank Battery
NENE, Section 31, Township 4 North, Range 67 West
Weld County, Colorado

**GROUNDWATER
ANALYTICAL RESULTS
MAP**

**FIGURE
1**

ATTACHMENT A

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

January 23, 2017

Mark Longhurst
PDC Energy
1775 Sherman St. STE. 3000
Denver, CO 80203
RE: Seele 31, 41, 42-31

Enclosed are the results of analyses for samples received by Summit Scientific on 01/17/17 16:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. Shrewsbury', with a stylized, cursive script.

Paul Shrewsbury
President



PDC Energy
1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Seele 31, 41, 42-31

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/23/17 09:39

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH02R	1701098-01	Water	01/17/17 10:00	01/17/17 16:30
BH07	1701098-02	Water	01/17/17 09:50	01/17/17 16:30
BH08	1701098-03	Water	01/17/17 09:55	01/17/17 16:30
BH09	1701098-04	Water	01/17/17 10:15	01/17/17 16:30

Summit Scientific

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



PDC Energy
1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Seele 31, 41, 42-31

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/23/17 09:39

Summit Scientific

1701098

741 Corporate Circle Suite 1 • Golden, Colorado 80401
303-277-9310 • 303-374-5933 Fax

Page 1 of 1

Client: PDC / Tasman Geosciences
Address: 6899 Pecos St, Unit C
City/State/Zip: Denver, CO 80221
Phone: 303-487-1228 Fax:
Sampler Name: Max Garcia
Project Manager: Mark Longhurst
E-Mail: mark.longhurst@pdc.com
Project Name: Seele 31, 41, 42-31
Project Number: N/A

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix		Analyze For:				Special Instructions
				HCl	HNO ₃	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	BTEX - 8280		
BH02R	1/12/17	10:00	3											
BH07		09:50												
BH08		09:55												
BH09		10:15												
[Handwritten signature across the table]														
Relinquished by: Max Garcia		Date/Time: 1/12/17 1630		Received by: [Signature]		Date/Time: 1/17/17 1630		Turn Around Time (Check)				Notes:		
Relinquished by: [Signature]		Date/Time: 1/17/17 1700		Received by: [Signature]		Date/Time: 1/17/17 1700		Sample Integrity:				un ice		
Relinquished by:		Date/Time:		Received in Lab by:		Date/Time:		Temperature Upon Receipt: 2.0°C						
								Intact: Yes No						

www.s2scientific.com

Summit Scientific

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



PDC Energy
1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Seele 31, 41, 42-31

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/23/17 09:39

Sample Receipt Checklist

S2 Work Order: 1701098

Client: PDC / Tasman Client Project ID: Seele 31, 41, 42-31

Shipped Via: P/V Airbill #: _____
(UPS, FedEx, Hand Delivered, Pick-up, etc.)

Matrix (check all that apply): ☐ Air ☐ Soil/Solid ☒ Water ☐ Other: _____
(Describe)

Cooler ID					
Temp (°C)	<u>2.0</u>				

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature just above 0°C to ≤ 6°C ⁽¹⁾ ?	✓			
NOTE: If samples are delivered the same day of sampling, this requirement is waived provided that there is evidence that cooling has begun.				
Were all samples received intact ⁽¹⁾ ?	✓			
Was adequate sample volume provided ⁽¹⁾ ?	✓			
If custody seals are present, are they intact ⁽¹⁾ ?			✓	
Are short holding time analytes or samples with HTs due within 48 hours present?			✓	
Is a chain-of-custody (COC) form present and filled out completely ⁽¹⁾ ?	✓			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	✓			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	✓			
Is the COC properly relinquished by the client w/ date and time recorded ⁽¹⁾ ?	✓			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.		✓		
Are samples preserved that require preservation (excluding cooling) ⁽¹⁾ ?		✓		
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect				
If samples are acid preserved for metals, is the pH ≤ 2 ⁽¹⁾ ?			✓	
Record the pH in Comments.				
If dissolved metals are requested, were samples field filtered?			✓	
Additional Comments (if any):				
⁽¹⁾ If NO, then contact the client before proceeding with analysis and note in case narrative.				

Nakita
Custodian Printed Name

ML
Signature or Initials of Custodian

1/17/17 17:20
Date/Time



PDC Energy
1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Seele 31, 41, 42-31
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/23/17 09:39

BH02R
1701098-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/17/17 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1701156	01/19/17	01/19/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **01/17/17 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		108 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		92.3 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		93.3 %	45-146		"	"	"	"	

Summit Scientific

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



PDC Energy
1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Seele 31, 41, 42-31
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/23/17 09:39

BH07
1701098-02 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/17/17 09:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1701156	01/19/17	01/19/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **01/17/17 09:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		105 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		91.5 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.3 %	45-146		"	"	"	"	

Summit Scientific

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PDC Energy
1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Seele 31, 41, 42-31

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/23/17 09:39

BH08
1701098-03 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/17/17 09:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1701156	01/19/17	01/19/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **01/17/17 09:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		107 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		90.6 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.5 %	45-146		"	"	"	"	

Summit Scientific

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PDC Energy
1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Seele 31, 41, 42-31

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/23/17 09:39

BH09
1701098-04 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/17/17 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1701156	01/19/17	01/19/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **01/17/17 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		107 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		91.0 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		94.7 %	45-146		"	"	"	"	

Summit Scientific

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PDC Energy
1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Seele 31, 41, 42-31

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/23/17 09:39

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Summit Scientific

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

Batch 1701156 - EPA 5030 Water MS

Blank (1701156-BLK1)

Prepared & Analyzed: 01/19/17

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	13.7		"	13.3	103	37-154				
Surrogate: Toluene-d8	12.5		"	13.3	94.1	45-149				
Surrogate: 4-Bromofluorobenzene	13.5		"	13.3	101	45-146				

LCS (1701156-BS1)

Prepared & Analyzed: 01/19/17

Benzene	39.4	1.0	ug/l	33.3	118	51-132				
Toluene	38.4	1.0	"	33.3	115	51-138				
Ethylbenzene	42.1	1.0	"	33.1	127	58-146				
m,p-Xylene	79.8	2.0	"	66.5	120	57-144				
o-Xylene	41.2	1.0	"	32.7	126	53-146				
Surrogate: 1,2-Dichloroethane-d4	13.9		"	13.3	104	37-154				
Surrogate: Toluene-d8	12.7		"	13.3	95.1	45-149				
Surrogate: 4-Bromofluorobenzene	13.4		"	13.3	101	45-146				

Matrix Spike (1701156-MS1)

Source: 1701098-01

Prepared & Analyzed: 01/19/17

Benzene	40.1	1.0	ug/l	33.3	ND	120	34-141			
Toluene	39.6	1.0	"	33.3	ND	119	27-151			
Ethylbenzene	43.8	1.0	"	33.1	ND	132	29-160			
m,p-Xylene	82.5	2.0	"	66.5	ND	124	20-166			
o-Xylene	42.1	1.0	"	32.7	ND	129	33-159			
Surrogate: 1,2-Dichloroethane-d4	14.7		"	13.3	110	37-154				
Surrogate: Toluene-d8	12.8		"	13.3	96.4	45-149				
Surrogate: 4-Bromofluorobenzene	13.4		"	13.3	101	45-146				

Summit Scientific

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PDC Energy
1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Seele 31, 41, 42-31

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/23/17 09:39

Volatile Organic Compounds by EPA Method 8260B - Quality Control
Summit Scientific

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

Batch 1701156 - EPA 5030 Water MS

Matrix Spike Dup (1701156-MSD1)		Source: 1701098-01			Prepared & Analyzed: 01/19/17					
Benzene	39.0	1.0	ug/l	33.3	ND	117	34-141	2.83	32	
Toluene	38.8	1.0	"	33.3	ND	116	27-151	2.17	25	
Ethylbenzene	43.5	1.0	"	33.1	ND	132	29-160	0.619	50	
m,p-Xylene	82.2	2.0	"	66.5	ND	124	20-166	0.425	36	
o-Xylene	42.2	1.0	"	32.7	ND	129	33-159	0.309	26	
Surrogate: 1,2-Dichloroethane-d4	14.6		"	13.3		110	37-154			
Surrogate: Toluene-d8	12.7		"	13.3		95.3	45-149			
Surrogate: 4-Bromofluorobenzene	13.7		"	13.3		103	45-146			

Summit Scientific

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PDC Energy
1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Seele 31, 41, 42-31

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/23/17 09:39

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference