



PDC Energy, Inc.
Fourth Quarter 2016 Groundwater Monitoring Summary

January 12, 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 October 24, 2016, groundwater monitoring was conducted at all six temporary monitoring well locations (BH01, BH02R, BH03, BH07 – BH09). Monitoring wells BH01 and BH03 contained insufficient water and were not sampled. 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. Fourth quarter 2016 analytical results indicate that BTEX concentrations were below applicable COGCC Table 910-1 groundwater standards in 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 were discontinued during the fourth quarter 2015, as constituent concentrations had remained 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 first 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.

First quarter 2017 groundwater sampling will be conducted during January 2017.

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

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
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
BH02R	7/31/2015	<1.0	<1.0	<1.0	<1.0	9.70

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

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	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	9.45
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
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
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

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

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	10/24/2016	<1.0	<1.0	<1.0	<1.0	9.07
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	9.65
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	10.96

Notes:

1. Groundwater standards referenced from 2 CCR 404-1, Table 910-1, effective January 30, 2015.

2. Depth to water measured from top of well casing.

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		-	-

Notes:

EFR = Enhanced fluid recovery

AS = Air sparge

psi = Pounds per square inch

cfm = Cubic feet per minute

NR = Not recorded



County Road 40

BH07		
Compound (µg/L)	7/18/2016	10/24/2016
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH01		
Compound (µg/L)	7/18/2016	10/24/2016
Benzene	<1.0	DRY
Toluene	<1.0	DRY
Ethylbenzene	<1.0	DRY
Total Xylenes	<1.0	DRY

BH03		
Compound (µg/L)	7/18/2016	10/24/2016
Benzene	DRY	DRY
Toluene	DRY	DRY
Ethylbenzene	DRY	DRY
Total Xylenes	DRY	DRY

BH02R		
Compound (µg/L)	7/18/2016	10/24/2016
Benzene	3.5	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	1.5	<1.0
Total Xylenes	<1.0	<1.0

BH08		
Compound (µg/L)	7/18/2016	10/24/2016
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH09		
Compound (µg/L)	7/18/2016	10/24/2016
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	5.8	<1.0



Surface
Drainage

Buried PDC Dump Lines

PDC Separator and
Meter Housing

PDC Tank Battery

Buried DCP Sales Line

Buried K-M Lines

K-M Separator and
Meter Housing

Kerr-McGee
Tank Battery

Note: Surface drainage direction
is estimated based on site
topography and is not related to
regional topography.

DRAWN BY: BRN

DATE: 11/3/2016

Facility Diagram
PDC Energy – DJ Basin
Seele 31, 41, 42-31 Tank Battery
NENE S31 T4N R67W
Weld County, CO



6899 Pecos St., Unit C
Denver CO 80221

LEGEND

- Excavation Extent
- Monitoring Well
- Monitoring Well – Destroyed
- Point of Release
- Groundwater Flow Direction

All locations are
approximate unless
otherwise noted

FIGURE 1
GROUNDWATER
ANALYTICAL
RESULTS MAP

ATTACHMENT A

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

October 29, 2016

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 10/24/16 16:50. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to be 'Ben Shrewsbury', with a long, sweeping horizontal line extending to the right.

Ben Shrewsbury
Laboratory Manager



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

Project: Seele 31, 41, 42-31

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/29/16 16:25

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH02R	1610198-01	Water	10/24/16 14:00	10/24/16 16:50
BH07	1610198-02	Water	10/24/16 13:48	10/24/16 16:50
BH08	1610198-03	Water	10/24/16 13:50	10/24/16 16:50
BH09	1610198-04	Water	10/24/16 14:05	10/24/16 16:50

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:
10/29/16 16:25

Summit Scientific

1610198

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 80231

Phone: Fax:

Sampler Name: Mitch Weller / Max Garcia

Project Manager: Mark Longhurst

E-Mail: mark.longhurst@pdc.com

Project Name: Seele 31, 41, 42-31 Tank Battery

Project Number:

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)	BTX	2260	
BH 02E	10-24-16	1400	3			X		X						
BH 07		1348				X		X						
BH 08		1350				X		X						
BH 09		1405				X		X						
Relinquished by: <i>Mitch Weller</i>		Date/Time: 10-24-16		Received by: <i>[Signature]</i>		Date/Time: 10/24/16		Turn Around Time (Check)				Notes:		
Relinquished by: <i>[Signature]</i>		Date/Time: 10/24/16		Received by: <i>[Signature]</i>		Date/Time: 16:50		Same Day <input type="checkbox"/> 72 Hours <input type="checkbox"/>						
Relinquished by: <i>[Signature]</i>		Date/Time: 16:05		Received in Lab by: <i>[Signature]</i>		Date/Time: 10-24-16 1605		24 Hours <input type="checkbox"/> 48 Hours <input type="checkbox"/>						
Relinquished by:		Date/Time:		Received in Lab by:		Date/Time:		Sample Integrity:						
								Temperature Upon Receipt: 3.5						
								Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>						

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:
10/29/16 16:25

Sample Receipt Checklist

S2 Work Order: 1610198
Client: PDC/Tasman Client Project ID: Seele 31, 41, 42-31
Shipped Via: hand delivered Airbill #: _____
(UPS, FedEx, Hand Delivered, Pick-up, etc.)
Matrix (check all that apply): Air Soil/Solid Water Other: _____
(Describe)

Cooler ID					
Temp (°C)	<u>3.5</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⁾ ?	<input checked="" type="checkbox"/>			<u>on ice</u>
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⁾ ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
If custody seals are present, are they intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Are short holding time analytes or samples with HTs due within 48 hours present?			<input checked="" type="checkbox"/>	
Is a chain-of-custody (COC) form present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client w/ date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.		<input checked="" type="checkbox"/>		
Are samples preserved that require preservation (excluding cooling) ⁽¹⁾ ?		<input checked="" type="checkbox"/>		
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⁾ ?			<input checked="" type="checkbox"/>	
Record the pH in Comments.				
If dissolved metals are requested, were samples field filtered?			<input checked="" type="checkbox"/>	
Additional Comments (if any):				

⁽¹⁾ If NO, then contact the client before proceeding with analysis and note in case narrative.

Eric Harvill
Custodian Printed Name

[Signature]
Signature or Initials of Custodian

10-24-16 16:50
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:
10/29/16 16:25

BH02R
1610198-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/24/16 14:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1610274	10/27/16	10/27/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **10/24/16 14:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		119 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		95.9 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	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:
10/29/16 16:25

BH07
1610198-02 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/24/16 13:48**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1610274	10/27/16	10/27/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **10/24/16 13:48**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		118 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		96.8 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		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:
10/29/16 16:25

BH08
1610198-03 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/24/16 13:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1610274	10/27/16	10/27/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **10/24/16 13:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		118 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		94.8 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.8 %	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:
10/29/16 16:25

BH09
1610198-04 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/24/16 14:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1610274	10/27/16	10/27/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **10/24/16 14:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		118 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		94.8 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	45-146		"	"	"	"	

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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:
10/29/16 16:25

Volatile Organic Compounds by EPA Method 8260B - Quality Control

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

Batch 1610274 - EPA 5030 Water MS

Blank (1610274-BLK1)

Prepared: 10/25/16 Analyzed: 10/26/16

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	15.6		"	13.3	117	37-154				
Surrogate: Toluene-d8	12.9		"	13.3	97.1	45-149				
Surrogate: 4-Bromofluorobenzene	13.4		"	13.3	101	45-146				

LCS (1610274-BS1)

Prepared: 10/25/16 Analyzed: 10/26/16

Benzene	31.1	1.0	ug/l	33.3	93.2	51-132				
Toluene	33.2	1.0	"	33.3	99.6	51-138				
Ethylbenzene	28.6	1.0	"	33.1	86.5	58-146				
m,p-Xylene	51.6	2.0	"	66.5	77.5	57-144				
o-Xylene	26.9	1.0	"	32.7	82.4	53-146				
Surrogate: 1,2-Dichloroethane-d4	13.7		"	13.3	102	37-154				
Surrogate: Toluene-d8	16.0		"	13.3	120	45-149				
Surrogate: 4-Bromofluorobenzene	14.1		"	13.3	106	45-146				

Matrix Spike (1610274-MS1)

Source: 1610204-08

Prepared: 10/25/16 Analyzed: 10/26/16

Benzene	35.3	1.0	ug/l	33.3	ND	106	34-141			
Toluene	36.2	1.0	"	33.3	2.75	100	27-151			
Ethylbenzene	34.6	1.0	"	33.1	ND	105	29-160			
m,p-Xylene	62.6	2.0	"	66.5	2.70	90.1	20-166			
o-Xylene	32.7	1.0	"	32.7	ND	100	33-159			
Surrogate: 1,2-Dichloroethane-d4	15.0		"	13.3	113	37-154				
Surrogate: Toluene-d8	14.4		"	13.3	108	45-149				
Surrogate: 4-Bromofluorobenzene	13.8		"	13.3	103	45-146				

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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:
10/29/16 16:25

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 1610274 - EPA 5030 Water MS

Matrix Spike Dup (1610274-MSD1)		Source: 1610204-08			Prepared: 10/25/16		Analyzed: 10/26/16			
Benzene	38.5	1.0	ug/l	33.3	ND	116	34-141	8.76	32	
Toluene	39.6	1.0	"	33.3	2.75	111	27-151	9.01	25	
Ethylbenzene	40.3	1.0	"	33.1	ND	122	29-160	15.3	50	
m,p-Xylene	73.0	2.0	"	66.5	2.70	106	20-166	15.3	36	
o-Xylene	38.4	1.0	"	32.7	ND	118	33-159	16.3	26	
Surrogate: 1,2-Dichloroethane-d4	15.3		"	13.3		115	37-154			
Surrogate: Toluene-d8	13.7		"	13.3		103	45-149			
Surrogate: 4-Bromofluorobenzene	13.5		"	13.3		101	45-146			

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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:
10/29/16 16:25

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