

PDC Energy, Inc.
Second Quarter 2016 Groundwater Monitoring Summary

May 2, 2016

received 08/08/2016
Project 6926
Document 2526723

Seele 31, 41, 42-31 Tank Battery
NENE Section 31 T4N R67W
Weld County, API # 05-123-20280
Facility ID # 331188
Remediation # 6926

This groundwater monitoring summary has been prepared by Tasman Geosciences, Inc. for the Seele 31, 41, 42-31 tank battery. On April 13, 2016, groundwater sampling was conducted at five of the six temporary monitoring well locations (BH01, BH02R, BH07 – BH09). Monitoring well BH03 contained insufficient water and was not sampled. Groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, and total xylene (BTEX) constituents 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. Second quarter 2016 analytical results indicate that benzene concentrations are above applicable COGCC Table 910-1 groundwater standards in wells BH01 and BH02R. BTEX concentrations are below COGCC regulatory standards at the three remaining monitoring well locations.

Enhanced fluid recovery (EFR) with air sparge (AS) events were initiated in August 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 restarted during the third quarter 2014, following the installation of new wells. A summary of EFR/AS operational data is provided in Table 2. 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 April 2016. Based on the results of the second quarter 2016 monitoring event, EFR/AS events will be re-initiated.

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.

Third quarter 2016 groundwater sampling will be conducted during July 2016.

TABLE 1
SEEE 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
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
SEEE 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	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
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
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
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

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	
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
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

Notes:

1. Groundwater standards referenced from 2 CCR 404-1, Table 910-1, effective March 16, 2016.

COGCC = Colorado Oil and Gas Conservation Commission

2. Depth to water measured from top of well casing

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)
Third Quarter 2012					
8/22/2012	BH01, BH02, BH03	7	42	BH01, BH02, BH03	8
9/5/2012		7	42		8
Quarterly Totals		14	84		-
Fourth Quarter 2012					
10/2/2012	BH01, BH02, BH03	7	42	BH01, BH02, BH03	8
10/15/2012		7	42		8
10/29/2012		7	0		8
11/12/2012		6.25	0		8
11/26/2012		6	0		8
Quarterly Totals		33.25	84		-
First Quarter 2013					
1/8/2013	BH01, BH03	5.5	0	BH02, BH03	10
1/21/2013	BH01, BH02, BH03	7	6.5	None	0
2/8/2013		6.5	6		0
3/14/2013		6.25	3	BH01, BH02, BH03	10
Quarterly Totals		25.25	15.5		-
Second Quarter 2013					
4/2/2013	BH01, BH02, BH03	4.25	6	BH01, BH02, BH03	10
Quarterly Totals		4.25	6		
Third Quarter 2014					
9/3/2014	BH02, BH03, BH08	6	0	BH02R, BH09	20
9/17/2014	BH02, BH02R, BH03, BH09	6	75		20
Quarterly Totals		12	75		
Fourth Quarter 2014					
10/3/2014	BH03, BH08	6	9	BH02R, BH09	20
10/21/2014	BH02, BH03, BH08	6	50		20
11/4/2014		8	45		20
11/19/2014		6	0		20
12/5/2014	BH02, BH08	6	10		20
12/15/2014	BH02, BH03, BH08	6	50		20
12/28/2014		6	0		20
Quarterly Totals		44	164		
First Quarter 2015					
1/12/2015	BH02, BH07, BH08	6	10	BH02R, BH09	20
1/22/2015	BH02, BH03, BH08	6	0		20
2/11/2015	BH02, BH02R, BH03, BH07, BH08	6	50		20
3/11/2015		6	50	BH02R, BH07, BH09	20
3/26/2015		6	50		20
Quarterly Totals		30	160		

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)
Second Quarter 2015					
4/1/2015	BH02, BH02R, BH03, BH07, BH08	6	10	BH02R, BH07, BH09	20
4/22/2015		6	90		20
5/6/2015		6	50		20
5/20/2015		6	40		20
6/3/2015		6	30		20
6/17/2015		6	30		30
Quarterly Totals		36	250		
Third Quarter 2015					
7/1/2015	BH02, BH02R, BH03, BH07, BH08	6	60	BH02R, BH07, BH09	20
7/15/2015		6	45		20
7/29/2015		6	75		20
8/12/2015		6	40		20
8/26/2015		6	50		20
9/9/2015		6	50		20
9/23/2015		6	80		20
Quarterly Totals		42	400		
Fourth Quarter 2015					
10/21/2015	BH02, BH02R, BH03, BH07, BH08	6	60	BH02R, BH07, BH09	20
Quarterly Totals		6	60		

Notes:

EFR = Enhanced fluid recovery

AS = Air sparge

psi = Pounds per square inch

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.



County Road 40

BH07		
Compound (µg/L)	1/21/2016	4/13/2016
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

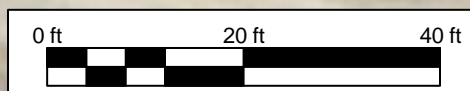
BH01		
Compound (µg/L)	1/21/2016	4/13/2016
Benzene	DRY	290
Toluene	DRY	2.4
Ethylbenzene	DRY	130
Total Xylenes	DRY	280

BH03		
Compound (µg/L)	1/21/2016	4/13/2016
Benzene	DRY	DRY
Toluene	DRY	DRY
Ethylbenzene	DRY	DRY
Total Xylenes	DRY	DRY

BH02R		
Compound (µg/L)	1/21/2016	4/13/2016
Benzene	<1.0	12
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	2.0
Total Xylenes	<1.0	7.6

BH08		
Compound (µg/L)	1/21/2016	4/13/2016
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)	1/21/2016	4/13/2016
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0



Surface
Drainage

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



6899 Pecos St., Unit C
Denver CO 80221

LEGEND

- Excavation Extent
 - Monitoring Well Location
 - Monitoring Well Location – Sampling Discontinued
 - Bore Hole Location – No Well Installed
 - 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

April 18, 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 04/13/16 17:00. 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:
04/18/16 14:33

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1604089-01	Water	04/13/16 10:33	04/13/16 17:00
BH02R	1604089-02	Water	04/13/16 10:37	04/13/16 17:00
BH07	1604089-03	Water	04/13/16 10:30	04/13/16 17:00
BH08	1604089-04	Water	04/13/16 10:45	04/13/16 17:00
BH09	1604089-05	Water	04/13/16 10:35	04/13/16 17:00

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:
04/18/16 14:33

Sample Receipt Checklist

S2 Work Order: 1604081

Client: PDC Energy Client Project ID: Seele 31, 41, 42-31

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

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

Cooler ID					(Describe)
Temp (°C)	<u>4.8°C</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"/>			
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?				
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⁾ ?				
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.

Mindy March
Custodian Printed Name

[Signature]
Signature or Initials of Custodian

4/15/16 9:45
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:
04/18/16 14:33

BH01
1604089-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **04/13/16 10:33**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	290	1.0	ug/l	1	1604149	04/15/16	04/15/16	EPA 8260B	
Toluene	2.4	1.0	"	"	"	"	"	"	
Ethylbenzene	130	1.0	"	"	"	"	"	"	
Xylenes (total)	280	1.0	"	"	"	"	"	"	

Date Sampled: **04/13/16 10:33**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		101 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		104 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		109 %	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:
04/18/16 14:33

BH02R
1604089-02 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **04/13/16 10:37**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	12	1.0	ug/l	1	1604149	04/15/16	04/15/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	2.0	1.0	"	"	"	"	"	"	
Xylenes (total)	7.6	1.0	"	"	"	"	"	"	

Date Sampled: **04/13/16 10:37**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		<i>116 %</i>	<i>37-154</i>		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		<i>103 %</i>	<i>45-149</i>		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		<i>108 %</i>	<i>45-146</i>		"	"	"	"	

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:
04/18/16 14:33

BH07
1604089-03 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **04/13/16 10:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1604149	04/15/16	04/15/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **04/13/16 10:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		95.8 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		104 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		109 %	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:
04/18/16 14:33

BH08
1604089-04 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **04/13/16 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1604149	04/15/16	04/15/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **04/13/16 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		96.3 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		103 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		105 %	45-146		"	"	"	"	

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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:
04/18/16 14:33

BH09
1604089-05 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **04/13/16 10:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1604149	04/15/16	04/15/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **04/13/16 10:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		96.2 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		104 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		109 %	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:
04/18/16 14:33

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 1604149 - EPA 5030 Water MS

Blank (1604149-BLK1)

Prepared & Analyzed: 04/14/16

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	13.0		"	13.3		97.4	37-154			
Surrogate: Toluene-d8	13.9		"	13.3		104	45-149			
Surrogate: 4-Bromofluorobenzene	14.2		"	13.3		107	45-146			

LCS (1604149-BS1)

Prepared & Analyzed: 04/14/16

Benzene	33.0	1.0	ug/l	33.3		98.9	51-132			
Toluene	32.0	1.0	"	33.3		96.1	51-138			
Ethylbenzene	35.0	1.0	"	33.1		106	58-146			
m,p-Xylene	72.5	2.0	"	66.5		109	57-144			
o-Xylene	34.1	1.0	"	32.7		105	53-146			
Surrogate: 1,2-Dichloroethane-d4	12.9		"	13.3		96.5	37-154			
Surrogate: Toluene-d8	13.8		"	13.3		103	45-149			
Surrogate: 4-Bromofluorobenzene	14.3		"	13.3		107	45-146			

Matrix Spike (1604149-MS1)

Source: 1604088-01

Prepared & Analyzed: 04/14/16

Benzene	33.2	1.0	ug/l	33.3	ND	99.6	34-141			
Toluene	32.4	1.0	"	33.3	ND	97.1	27-151			
Ethylbenzene	35.2	1.0	"	33.1	ND	106	29-160			
m,p-Xylene	72.6	2.0	"	66.5	ND	109	20-166			
o-Xylene	34.0	1.0	"	32.7	ND	104	33-159			
Surrogate: 1,2-Dichloroethane-d4	12.7		"	13.3		95.3	37-154			
Surrogate: Toluene-d8	13.7		"	13.3		103	45-149			
Surrogate: 4-Bromofluorobenzene	14.1		"	13.3		105	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:
04/18/16 14:33

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 1604149 - EPA 5030 Water MS

Matrix Spike Dup (1604149-MSD1)		Source: 1604088-01			Prepared & Analyzed: 04/14/16					
Benzene	32.9	1.0	ug/l	33.3	ND	98.6	34-141	0.999	32	
Toluene	32.2	1.0	"	33.3	ND	96.7	27-151	0.434	25	
Ethylbenzene	34.4	1.0	"	33.1	ND	104	29-160	2.27	50	
m,p-Xylene	70.8	2.0	"	66.5	ND	106	20-166	2.58	36	
o-Xylene	33.7	1.0	"	32.7	ND	103	33-159	0.974	26	
Surrogate: 1,2-Dichloroethane-d4	13.9		"	13.3		104	37-154			
Surrogate: Toluene-d8	14.0		"	13.3		105	45-149			
Surrogate: 4-Bromofluorobenzene	14.4		"	13.3		108	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:
04/18/16 14:33

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

A handwritten signature in black ink, appearing to be 'MSM'.