

**PDC Energy, Inc.**  
**Second Quarter 2016 Groundwater Monitoring Summary**

May 6, 2016

Jerke UP 8-7 Tank Battery  
SENE S7 T4N R65W  
Weld County, API # 05-123-13481  
Facility ID # 323755  
Remediation # 9300

This groundwater summary has been prepared by Tasman Geosciences, Inc. for the Jerke UP 8-7 tank battery. On April 20, 2016, groundwater samples were collected from nine monitoring well locations (BH01 – BH09). Groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by 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 BTEX concentrations are below applicable COGCC Table 910-1 groundwater standards in all nine sample locations.

Tasman initiated enhanced fluid recovery (EFR) and air sparge (AS) events at the site during the first quarter 2014. A summary of the EFR/AS operational data is provided in Table 2. EFR/AS will continue as the selected remediation strategy through the third quarter 2016, to ensure that constituent concentrations remain below regulatory standards.

The third quarter 2016 groundwater sampling event will be conducted during July 2016.

**TABLE 1**  
**JERKE UP 8-7 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 <sup>(2)</sup> (feet)
<b>COGCC Table 910-1 Groundwater Standard (µg/L) <sup>(1)</sup></b>		<b>5</b>	<b>560</b>	<b>700</b>	<b>1,400</b>	
GW01	11/12/2013	<b>230</b>	370	160	<b>2,200</b>	~ 5
BH01	1/10/2014	<b>270</b>	<b>2,300</b>	390	<b>5,800</b>	7.41
BH01	4/29/2014	<b>19</b>	130	160	<b>3,100</b>	7.52
BH01	7/29/2014	4.3	<1.0	54	450	5.12
BH01	10/27/2014	1.6	<1.0	9.0	43	4.80
BH01	1/22/2015	2.2	2.4	73.0	690	6.92
BH01	4/20/2015	<1.0	<1.0	<1.0	<1.0	7.49
BH01	7/27/2015	<1.0	<1.0	<1.0	<1.0	4.02
BH01	10/6/2015	1.6	<1.0	56	280	4.67
BH01	1/28/2016	<b>13</b>	1.3	230	1,100	6.68
BH01	4/20/2016	<1.0	<1.0	<1.0	<1.0	6.44
BH02	1/10/2014	<b>920</b>	4.8	54	<b>2,300</b>	6.98
BH02	4/29/2014	<b>180</b>	<1.0	67	370	7.13
BH02	7/29/2014	<b>27</b>	<1.0	8.0	49	5.07
BH02	10/27/2014	<b>65</b>	<1.0	20	140	4.42
BH02	1/22/2015	<b>14</b>	<1.0	8.8	65	6.20
BH02	4/20/2015	<1.0	<1.0	<1.0	13	5.44
BH02	7/27/2015	1.5	<1.0	1.0	8.3	4.42
BH02	10/6/2015	<b>19</b>	<1.0	1.8	13	4.74
BH02	1/28/2016	1.7	<1.0	<1.0	11	6.79
BH02	4/20/2016	<1.0	<1.0	<1.0	<1.0	6.18
BH03	1/10/2014	1.1	1.1	15	240	7.08
BH03	4/29/2014	<1.0	<1.0	2.0	22	7.37
BH03	7/29/2014	<1.0	<1.0	<1.0	3.9	4.59
BH03	10/27/2014	<1.0	<1.0	<1.0	<1.0	4.42
BH03	1/22/2015	<1.0	<1.0	<1.0	<1.0	6.58
BH03	4/20/2015	<1.0	<1.0	<1.0	<1.0	7.14
BH03	7/27/2015	<1.0	<1.0	<1.0	<1.0	4.00
BH03	10/6/2015	<1.0	<1.0	<1.0	<1.0	4.53
BH03	1/28/2016	<1.0	<1.0	<1.0	<1.0	6.61
BH03	4/20/2016	<1.0	<1.0	<1.0	<1.0	6.35
BH04	1/10/2014	<b>12,000</b>	<b>7,600</b>	<b>940</b>	<b>14,000</b>	4.35
BH04	4/29/2014	<b>150</b>	1.4	33	330	4.64

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BH04	7/29/2014	110	4.0	4.8	31	2.03
BH04	10/27/2014	NS	NS	NS	NS	NM
BH04	1/22/2015	9.5	<1.0	24	320	6.63
BH04	4/20/2015	NS	NS	NS	NS	7.09
BH04	7/27/2015	80	<1.0	11	270	4.04
BH04	10/6/2015	150	<1.0	5.8	6.2	4.65
BH04	1/28/2016	2.3	<1.0	<1.0	8.9	6.62
BH04	4/20/2016	<1.0	<1.0	<1.0	<1.0	6.11
BH05	1/10/2014	1,800	240	230	3,100	4.13
BH05	4/29/2014	1.8	<1.0	<1.0	<1.0	4.47
BH05	7/29/2014	<1.0	<1.0	<1.0	<1.0	1.65
BH05	10/27/2014	5.6	<1.0	<1.0	<1.0	1.52
BH05	1/22/2015	<1.0	<1.0	<1.0	<1.0	3.80
BH05	4/20/2015	<1.0	<1.0	<1.0	<1.0	4.41
BH05	7/27/2015	<1.0	<1.0	<1.0	<1.0	1.30
BH05	10/6/2015	<1.0	<1.0	<1.0	<1.0	1.83
BH05	1/28/2016	180	<1.0	10	64	3.84
BH05	4/20/2016	<1.0	<1.0	<1.0	<1.0	3.67
BH06	1/10/2014	<1.0	<1.0	<1.0	<1.0	4.63
BH06	4/29/2014	<1.0	<1.0	<1.0	<1.0	4.66
BH06	7/29/2014	1.3	<1.0	<1.0	<1.0	2.07
BH06	10/27/2014	<1.0	<1.0	<1.0	<1.0	1.95
BH06	1/22/2015	<1.0	<1.0	<1.0	<1.0	3.83
BH06	4/20/2015	<1.0	<1.0	<1.0	<1.0	4.46
BH06	7/27/2015	<1.0	<1.0	<1.0	<1.0	1.35
BH06	10/6/2015	2.2	<1.0	<1.0	<1.0	1.84
BH06	1/28/2016	<1.0	<1.0	<1.0	<1.0	3.88
BH06	4/20/2016	<1.0	<1.0	<1.0	<1.0	3.72
BH07	4/29/2014	<1.0	<1.0	<1.0	<1.0	5.51
BH07	7/29/2014	<1.0	<1.0	<1.0	<1.0	2.90
BH07	10/27/2014	<1.0	<1.0	<1.0	<1.0	2.73
BH07	1/22/2015	<1.0	<1.0	<1.0	<1.0	4.63
BH07	4/20/2015	<1.0	<1.0	<1.0	<1.0	5.44

**TABLE 1**  
**JERKE UP 8-7 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 <sup>(2)</sup> (feet)
<b>COGCC Table 910-1 Groundwater Standard (µg/L) <sup>(1)</sup></b>		<b>5</b>	<b>560</b>	<b>700</b>	<b>1,400</b>	
BH07	7/27/2015	<1.0	<1.0	<1.0	<1.0	2.36
BH07	10/6/2015	<1.0	<1.0	<1.0	<1.0	2.83
BH07	1/28/2016	<1.0	<1.0	<1.0	<1.0	4.20
BH07	4/20/2016	<1.0	<1.0	<1.0	<1.0	3.96
BH08	4/29/2014	<1.0	<1.0	<1.0	<1.0	7.38
BH08	7/29/2014	<1.0	<1.0	<1.0	<1.0	3.78
BH08	10/27/2014	<1.0	<1.0	<1.0	<1.0	3.04
BH08	1/22/2015	<1.0	<1.0	<1.0	<1.0	5.51
BH08	4/20/2015	<1.0	<1.0	<1.0	<1.0	6.31
BH08	7/27/2015	<1.0	<1.0	<1.0	<1.0	3.24
BH08	10/6/2015	<1.0	<1.0	<1.0	<1.0	3.71
BH08	1/28/2016	<1.0	<1.0	<1.0	<1.0	5.72
BH08	4/20/2016	<1.0	<1.0	<1.0	<1.0	5.54
BH09	4/29/2014	<1.0	<1.0	<1.0	<1.0	4.59
BH09	7/29/2014	<1.0	<1.0	<1.0	<1.0	2.00
BH09	10/27/2014	<1.0	<1.0	<1.0	<1.0	1.85
BH09	1/22/2015	<1.0	<1.0	<1.0	<1.0	3.76
BH09	4/20/2015	<1.0	<1.0	<1.0	<1.0	4.53
BH09	7/27/2015	<1.0	<1.0	<1.0	<1.0	1.43
BH09	10/6/2015	<1.0	<1.0	<1.0	<1.0	2.01
BH09	1/28/2016	<1.0	<1.0	<1.0	<1.0	3.96
BH09	4/20/2016	<1.0	<1.0	<1.0	<1.0	3.80

**Notes:**

1. Groundwater standards referenced from 2 CCR 404-1, Table 910-1, effective March 16, 2016.
2. Depth to water measured from top of well casing or ground surface for monitoring well samples and excavation samples, respectively.

COGCC = Colorado Oil and Gas Conservation Commission

µg/L = Micrograms per liter

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

NS = Not sampled

NM = Not measured

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

**TABLE 2**  
**JERKE UP 8-7 TANK BATTERY**  
**EFR / AS OPERATIONAL SUMMARY TABLE**

Date	EFR Wells	Total EFR/AS Duration (hours)	Approximate Gallons Extracted	AS Wells	Air Injection Pressure (psi)
First Quarter 2014					
1/30/2014	BH01, BH02, BH04, BH05	6	90	BH01, BH02, BH04, BH05	10
2/25/2014		5	0		10
Quarterly Totals		11	90		-
Second Quarter 2014					
4/7/2014	BH01, BH02, BH04, BH05	6	120	BH01, BH02, BH04, BH05	10
4/21/2014	BH01, BH02, BH03, BH04, BH05	6.5	120	BH01, BH02, BH03, BH04, BH05	20
5/9/2014		8	90		20
5/23/2014		6	20		20
6/9/2014		6	20		20
Quarterly Totals		32.5	370		-
Third Quarter 2014					
7/2/2014	BH01, BH02, BH03, BH04, BH05	7	150	BH01, BH02, BH03, BH04, BH05	25
7/18/2014		6	0		15
9/25/2014		6	100		20
Quarterly Totals		19	250		-
Fourth Quarter 2014					
10/17/2014	BH01, BH02, BH03, BH05	6	225	BH01, BH02, BH03, BH05	15
11/3/2014	BH01, BH02, BH03, BH04, BH05	6	50	BH01, BH02, BH03, BH04, BH05	20
11/18/2014		6	80		20
12/7/2014		6	100		20
12/20/2014		6	75		20
Quarterly Totals		30	530		-
First Quarter 2015					
1/9/2015	BH01, BH02, BH03, BH04, BH05	6	0	BH01, BH02, BH03, BH04, BH05	20
1/26/2015		6	0		20
2/8/2015		6	30		25
3/6/2015		6	36		20
3/17/2015		6	100		20
Quarterly Totals		30	166		-

**TABLE 2**  
**JERKE UP 8-7 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					
4/6/2015	BH01, BH02, BH03, BH04, BH05	6	10	BH01, BH02, BH03, BH04, BH05	20
4/13/2015		6	30		20
4/30/2015		6	0		20
5/14/2015		6	80		20
5/28/2015		6	15		20
6/11/2015	BH02, BH03, BH04, BH05	6	40	BH02, BH03, BH04, BH05	20
6/22/2015	BH01, BH02, BH03, BH04, BH05	6	35	BH01, BH02, BH03, BH04, BH05	20
Quarterly Totals		42	210		-
Third Quarter 2015					
7/9/2015	BH01, BH02, BH03, BH04, BH05	6	184	BH01, BH02, BH03, BH04, BH05	20
7/23/2015		6	45		20
8/6/2015	BH02, BH03, BH04, BH05	6	30	BH02, BH03, BH04, BH05	20
8/20/2015	BH01, BH02, BH03, BH04, BH05	6	80	BH01, BH02, BH03, BH04, BH05	20
Quarterly Totals		24	339		-
Fourth Quarter 2015					
10/13/2015	BH01, BH02, BH03, BH04, BH05	6	42	BH03, BH04, BH05	20
10/27/2015		6	80	BH01, BH02, BH03, BH04, BH05	20
11/9/2015	BH01, BH02, BH03, BH05	6	150	BH04	20
11/24/2015	BH01, BH02, BH03, BH04, BH05	6	92	BH02, BH04	20
12/7/2015		6	184		20
Quarterly Totals		30	548		-
First Quarter 2016					
1/7/2016	BH01, BH02, BH03, BH04, BH05	6	90	BH02, BH04	20
1/26/2016		6	80		20
1/30/2016	BH01, BH02, BH03, BH05	6	160	None	0
2/17/2016	BH01, BH02, BH03, BH04, BH05	6	84	BH02, BH04	20
3/1/2016	BH01, BH02, BH03, BH04, BH05, Pipe	6	80		20
3/17/2016		6	350		25
Quarterly Totals		36	844		-

**TABLE 2**  
**JERKE UP 8-7 TANK BATTERY**  
**EFR / AS OPERATIONAL SUMMARY TABLE**

Date	EFR Wells	Total EFR/AS Duration (hours)	Approximate Gallons Extracted	AS Wells	Air Injection Pressure (psi)
<b>Second Quarter 2016</b>					
4/1/2016	BH01, BH02, BH03, BH04, BH05, Pipe	6	240	BH02, BH04	20
4/15/2016	BH01, BH02, BH03,	6	80	BH01, BH02, BH03,	20
4/28/2016	BH07, Pipe	6	80	BH04, BH05, BH07	20
<b>Quarterly Totals</b>		<b>18</b>	<b>400</b>		-

**Notes:**

EFR = Enhanced fluid recovery

AS = Air sparge

psi = Pounds per square inch





BH04		
Compound (µg/L)	1/28/2016	4/20/2016
Benzene	2.3	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	8.9	<1.0

BH05		
Compound (µg/L)	1/28/2016	4/20/2016
Benzene	180	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	10	<1.0
Total Xylenes	64	<1.0

Surface  
Drainage

BH08		
Compound (µg/L)	1/28/2016	4/20/2016
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH02		
Compound (µg/L)	1/28/2016	4/20/2016
Benzene	1.7	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	11	<1.0

BH07		
Compound (µg/L)	1/28/2016	4/20/2016
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH03		
Compound (µg/L)	1/28/2016	4/20/2016
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH06		
Compound (µg/L)	1/28/2016	4/20/2016
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)	1/28/2016	4/20/2016
Benzene	13	<1.0
Toluene	1.3	<1.0
Ethylbenzene	230	<1.0
Total Xylenes	1,100	<1.0

BH09		
Compound (µg/L)	1/28/2016	4/20/2016
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

0 ft 35 ft 70 ft

Noble Tank  
Battery

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

DRAWN BY: KBW

DATE: 4/26/2016

**Facility Diagram**  
PDC Energy – DJ Basin  
Jerke UP 8-7 Tank Battery  
SENE S7 T4N R65W  
Weld County, CO



6899 Pecos Street  
Unit C  
Denver, CO 80221

**LEGEND**

- Excavation Extent
- Excavation Groundwater Sample Location
- Monitoring Well Location
- Point of Release
- Groundwater Flow Direction

All locations are approximate unless otherwise noted

**FIGURE 1**  
GROUNDWATER ANALYTICAL RESULTS MAP



## **ATTACHMENT A**

# Summit Scientific

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741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

April 25, 2016

Mark Longhurst  
PDC Energy  
1775 Sherman St. STE. 3000  
Denver, CO 80203  
RE: Jerke Up 8-7

Enclosed are the results of analyses for samples received by Summit Scientific on 04/20/16 17:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Mindy Mach For Paul Shrewsbury  
President



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

Project: Jerke Up 8-7  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/25/16 15:41

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1604167-01	Water	04/20/16 15:23	04/20/16 17:00
BH02	1604167-02	Water	04/20/16 14:40	04/20/16 17:00
BH03	1604167-03	Water	04/20/16 15:30	04/20/16 17:00
BH04	1604167-04	Water	04/20/16 15:15	04/20/16 17:00
BH05	1604167-05	Water	04/20/16 14:57	04/20/16 17:00
BH06	1604167-06	Water	04/20/16 15:09	04/20/16 17:00
BH07	1604167-07	Water	04/20/16 14:53	04/20/16 17:00
BH08	1604167-08	Water	04/20/16 14:36	04/20/16 17:00
BH09	1604167-09	Water	04/20/16 15:33	04/20/16 17:00





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

Project: Jerke Up 8-7  
Project Number: [none]  
Project Manager: Mark Longhurst

Reported:  
04/25/16 15:41

### Sample Receipt Checklist

S2 Work Order: 1604167

Client: PDC

Client Project ID: Jerke Up 8-7

Shipped Via: Pick-up  
(UPS, FedEx, Hand Delivered, Pick-up, etc.)

Airbill #: \_\_\_\_\_

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

Cooler ID					
Temp (°C)	<u>50° 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 <sup>(1)</sup> ?			<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 <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
If custody seals are present, are they intact <sup>(1)</sup> ?			<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 <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	<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) <sup>(1)</sup> ?				
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect	<input checked="" type="checkbox"/>			
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ?			<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):				
<sup>(1)</sup> If NO, then contact the client before proceeding with analysis and note in case narrative.				

Nakita  
Custodian Printed Name

[Signature]  
Signature or Initials of Custodian

4/20/16 1740  
Date/Time



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

Project: Jerke Up 8-7  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/25/16 15:41

**BH01**  
**1604167-01 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **04/20/16 15:23**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1604233	04/22/16	04/22/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **04/20/16 15:23**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		86.9 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		103 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		85.7 %	45-146		"	"	"	"	



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

Project: Jerke Up 8-7  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/25/16 15:41

**BH02**  
**1604167-02 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **04/20/16 14:40**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	1.0	ug/l	1	1604233	04/22/16	04/22/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **04/20/16 14:40**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		84.6 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		103 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		83.5 %	45-146		"	"	"	"	





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

Project: Jerke Up 8-7  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/25/16 15:41

**BH03**  
**1604167-03 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **04/20/16 15:30**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	1.0	ug/l	1	1604233	04/22/16	04/22/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **04/20/16 15:30**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		86.4 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		102 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		87.6 %	45-146		"	"	"	"	



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

Project: Jerke Up 8-7  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/25/16 15:41

**BH04**  
**1604167-04 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **04/20/16 15:15**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	1.0	ug/l	1	1604233	04/22/16	04/22/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **04/20/16 15:15**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		88.4 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		103 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		87.2 %	45-146		"	"	"	"	



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

Project: Jerke Up 8-7  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/25/16 15:41

**BH05**  
**1604167-05 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **04/20/16 14:57**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	1.0	ug/l	1	1604233	04/22/16	04/22/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **04/20/16 14:57**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		89.0 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		102 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		91.0 %	45-146		"	"	"	"	



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

Project: Jerke Up 8-7  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/25/16 15:41

**BH06**  
**1604167-06 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **04/20/16 15:09**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	1.0	ug/l	1	1604233	04/22/16	04/22/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **04/20/16 15:09**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		92.5 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		102 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		90.8 %	45-146		"	"	"	"	



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

Project: Jerke Up 8-7  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/25/16 15:41

**BH07**  
**1604167-07 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **04/20/16 14:53**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	1.0	ug/l	1	1604233	04/22/16	04/22/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **04/20/16 14:53**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		89.7 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		101 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		86.3 %	45-146		"	"	"	"	



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

Project: Jerke Up 8-7  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/25/16 15:41

**BH08**  
**1604167-08 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **04/20/16 14:36**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	1.0	ug/l	1	1604233	04/22/16	04/22/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **04/20/16 14:36**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		89.1 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		101 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		85.7 %	45-146		"	"	"	"	



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

Project: Jerke Up 8-7  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/25/16 15:41

**BH09**  
**1604167-09 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **04/20/16 15:33**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	1.0	ug/l	1	1604233	04/22/16	04/22/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **04/20/16 15:33**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		88.7 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		101 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		91.2 %	45-146		"	"	"	"	





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

Project: Jerke Up 8-7  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/25/16 15:41

## 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 1604233 - EPA 5030 Water MS

##### Blank (1604233-BLK1)

Prepared & Analyzed: 04/22/16

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	12.6		"	13.3		94.7	37-154			
Surrogate: Toluene-d8	13.6		"	13.3		102	45-149			
Surrogate: 4-Bromofluorobenzene	11.8		"	13.3		88.7	45-146			

##### LCS (1604233-BS1)

Prepared & Analyzed: 04/22/16

Benzene	27.7	1.0	ug/l	50.0		55.4	51-132			
Toluene	29.2	1.0	"	50.0		58.4	51-138			
Ethylbenzene	34.8	1.0	"	50.0		69.7	58-146			
m,p-Xylene	62.1	2.0	"	100		62.1	57-144			
o-Xylene	35.8	1.0	"	50.0		71.6	53-146			
Surrogate: 1,2-Dichloroethane-d4	11.1		"	13.3		83.3	37-154			
Surrogate: Toluene-d8	13.8		"	13.3		104	45-149			
Surrogate: 4-Bromofluorobenzene	12.2		"	13.3		91.2	45-146			

##### Matrix Spike (1604233-MS1)

Source: 1604167-03

Prepared & Analyzed: 04/22/16

Benzene	27.4	1.0	ug/l	50.0	ND	54.9	34-141			
Toluene	29.3	1.0	"	50.0	ND	58.6	27-151			
Ethylbenzene	35.4	1.0	"	50.0	ND	70.7	29-160			
m,p-Xylene	63.0	2.0	"	100	ND	63.0	20-166			
o-Xylene	36.1	1.0	"	50.0	ND	72.2	33-159			
Surrogate: 1,2-Dichloroethane-d4	11.0		"	13.3		82.6	37-154			
Surrogate: Toluene-d8	13.6		"	13.3		102	45-149			
Surrogate: 4-Bromofluorobenzene	12.0		"	13.3		90.2	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: Jerke Up 8-7  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/25/16 15:41

**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 1604233 - EPA 5030 Water MS**

Matrix Spike Dup (1604233-MSD1)		Source: 1604167-03			Prepared & Analyzed: 04/22/16					
Benzene	27.8	1.0	ug/l	50.0	ND	55.5	34-141	1.12	32	
Toluene	29.3	1.0	"	50.0	ND	58.7	27-151	0.0682	25	
Ethylbenzene	35.7	1.0	"	50.0	ND	71.4	29-160	0.873	50	
m,p-Xylene	63.1	2.0	"	100	ND	63.1	20-166	0.0634	36	
o-Xylene	36.3	1.0	"	50.0	ND	72.6	33-159	0.525	26	
Surrogate: 1,2-Dichloroethane-d4	11.4		"	13.3		85.1	37-154			
Surrogate: Toluene-d8	13.4		"	13.3		100	45-149			
Surrogate: 4-Bromofluorobenzene	12.1		"	13.3		91.0	45-146			



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

Project: Jerke Up 8-7

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/25/16 15:41

### 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