

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

March 25, 2016

Jerke UP 8-7 Tank Battery  
SENE S7 T4N R65W  
Weld County, API # 05-123-13481  
Spill Tracking # 200437785  
Remediation # 9300

This groundwater summary has been prepared by Tasman Geosciences, Inc. for the Jerke UP 8-7 tank battery. On January 28, 2016, groundwater samples were collected from nine monitoring well locations. 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. First quarter 2016 analytical results indicate that benzene concentrations are above applicable COGCC Table 910-1 groundwater standards in monitoring wells BH01 and BH05. Constituent concentrations are below COGCC regulatory standards at the remaining seven monitoring 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 remain the selected remediation strategy through the second quarter 2016 to address remaining dissolved phase petroleum hydrocarbon impacts on site.

The second quarter 2016 groundwater sampling event will be conducted during April 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
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
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
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
BH04	7/29/2014	<b>110</b>	4.0	4.8	31	2.03
BH04	10/27/2014	NS	NS	NS	NS	NM
BH04	1/22/2015	<b>9.5</b>	<1.0	24	320	6.63

**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>	
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
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
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
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
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
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

**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>	
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
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

**Notes:**

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

COGCC = Colorado Oil and Gas Conservation Commission

2. Depth to water measured from top of well casing or ground surface for monitoring well samples and excavation samples, respectively.

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		-

**Notes:**

EFR = Enhanced fluid recovery

AS = Air sparge

psi = Pounds per square inch





Surface  
Drainage

BH04		
Compound (µg/L)	10/6/2015	1/28/2016
Benzene	150	2.3
Toluene	<1.0	<1.0
Ethylbenzene	5.8	<1.0
Total Xylenes	6.2	8.9

BH05		
Compound (µg/L)	10/6/2015	1/28/2016
Benzene	<1.0	180
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	10
Total Xylenes	<1.0	64

BH02		
Compound (µg/L)	10/6/2015	1/28/2016
Benzene	19	1.7
Toluene	<1.0	<1.0
Ethylbenzene	1.8	<1.0
Total Xylenes	13	11

BH08		
Compound (µg/L)	10/6/2015	1/28/2016
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

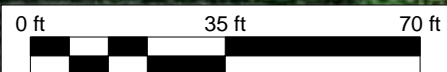
BH03		
Compound (µg/L)	10/6/2015	1/28/2016
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH07		
Compound (µg/L)	10/6/2015	1/28/2016
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)	10/6/2015	1/28/2016
Benzene	2.2	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH01		
Compound (µg/L)	10/6/2015	1/28/2016
Benzene	1.6	13
Toluene	<1.0	1.3
Ethylbenzene	56	230
Total Xylenes	280	1,100

BH09		
Compound (µg/L)	10/6/2015	1/28/2016
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0



Noble Tank  
Battery

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

DRAWN BY: ESS

DATE: 2/29/2016

**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

---

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

February 03, 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 01/28/16 18:00. 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: Jerke Up 8-7  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
02/03/16 08:36

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1601241-01	Water	01/28/16 10:00	01/28/16 18:00
BH02	1601241-02	Water	01/28/16 10:05	01/28/16 18:00
BH03	1601241-03	Water	01/28/16 10:10	01/28/16 18:00
BH04	1601241-04	Water	01/28/16 10:15	01/28/16 18:00
BH05	1601241-05	Water	01/28/16 10:20	01/28/16 18:00
BH06	1601241-06	Water	01/28/16 10:25	01/28/16 18:00
BH07	1601241-07	Water	01/28/16 10:30	01/28/16 18:00
BH08	1601241-08	Water	01/28/16 10:35	01/28/16 18:00
BH09	1601241-09	Water	01/28/16 10:40	01/28/16 18:00

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: Jerke Up 8-7

Project Number: [none]  
Project Manager: Mark Longhurst

Reported:  
02/03/16 08:36

# Summit Scientific

741 Corporate Circle Suite 1 • Golden, Colorado 80401  
303-277-9310 • 303-277-9531 Fax

Client: PDC  
Address: \_\_\_\_\_  
City/State/Zip: \_\_\_\_\_  
Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
Sampler Name: \_\_\_\_\_

Project Manager: Mark Longhurst  
E-Mail: \_\_\_\_\_  
Project Name: Jerke Up B-7  
Project Number: \_\_\_\_\_

Page 1 of 1

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix		Analyze For:				Special Instructions
				HCl	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)			
BH01	1/28/16	10:20	3	X				X						
BH02		10:25												
BH03		10:10												
BH04		10:15												
BH05		10:20												
BH06		10:25												
BH07		10:30												
BH08		10:35												
BH09		10:40												

Relinquished by: <u>[Signature]</u>	Date/Time: <u>1/28/16</u>	Received by: <u>[Signature]</u>	Date/Time: <u>1/28/16 1800</u>	Turn Around Time (Check) Same Day <input type="checkbox"/> 72 Hours <input type="checkbox"/> 24 Hours <input type="checkbox"/> Standard <input checked="" type="checkbox"/> 48 Hours <input type="checkbox"/>	Notes: <u>OK</u>
Relinquished by: <u>[Signature]</u>	Date/Time: <u>1/28/16</u>	Received by:	Date/Time:	Sample Integrity: Temperature Upon Receipt: <u>34°C</u> Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Relinquished by:	Date/Time:	Received in Lab by:	Date/Time:		

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

**Reported:**  
02/03/16 08:36

**BH01**  
**1601241-01 (Water)**

**Summit Scientific**

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

Date Sampled: **01/28/16 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>13</b>	1.0	ug/l	1	1601283	03/01/16	03/01/16	EPA 8260B	
<b>Toluene</b>	<b>1.3</b>	1.0	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>230</b>	1.0	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>1100</b>	10	"	10	"	"	"	"	

Date Sampled: **01/28/16 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		96.9 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		92.7 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		105 %	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:**  
02/03/16 08:36

**BH02**  
**1601241-02 (Water)**

**Summit Scientific**

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

Date Sampled: **01/28/16 10:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>1.7</b>	1.0	ug/l	1	1601283	03/01/16	03/01/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>11</b>	1.0	"	"	"	"	"	"	

Date Sampled: **01/28/16 10:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		93.5 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		95.3 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		103 %	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:**  
02/03/16 08:36

**BH03**  
**1601241-03 (Water)**

**Summit Scientific**

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

Date Sampled: **01/28/16 10:10**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	1.0	ug/l	1	1601283	03/01/16	03/01/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **01/28/16 10:10**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		95.0 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		97.3 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		100 %	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:**  
02/03/16 08:36

**BH04**  
**1601241-04 (Water)**

**Summit Scientific**

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

Date Sampled: **01/28/16 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>2.3</b>	1.0	ug/l	1	1601283	03/01/16	03/01/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>8.9</b>	1.0	"	"	"	"	"	"	

Date Sampled: **01/28/16 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		99.4 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		96.2 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		101 %	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:**  
02/03/16 08:36

**BH05**  
**1601241-05 (Water)**

**Summit Scientific**

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

Date Sampled: **01/28/16 10:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>180</b>	1.0	ug/l	1	1601283	03/01/16	03/01/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>10</b>	1.0	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>64</b>	1.0	"	"	"	"	"	"	

Date Sampled: **01/28/16 10:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		103 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		101 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		97.7 %	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:**  
02/03/16 08:36

**BH06**  
**1601241-06 (Water)**

**Summit Scientific**

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

Date Sampled: **01/28/16 10:25**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	1.0	ug/l	1	1601283	03/01/16	03/01/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **01/28/16 10:25**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		100 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		97.1 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		105 %	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:**  
02/03/16 08:36

**BH07**  
**1601241-07 (Water)**

**Summit Scientific**

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

Date Sampled: **01/28/16 10:30**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1601283	03/01/16	03/01/16	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	1.0		"	"	"	"	"	"	

Date Sampled: **01/28/16 10:30**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		96.8 %		37-154		"	"	"	"	
Surrogate: Toluene-d8		97.1 %		45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %		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:**  
02/03/16 08:36

**BH08**  
**1601241-08 (Water)**

**Summit Scientific**

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

Date Sampled: **01/28/16 10:35**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1601283	03/01/16	03/01/16	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	1.0		"	"	"	"	"	"	

Date Sampled: **01/28/16 10:35**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		96.2 %		37-154		"	"	"	"	
Surrogate: Toluene-d8		95.9 %		45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.3 %		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: Jerke Up 8-7  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
02/03/16 08:36

**BH09**  
**1601241-09 (Water)**

**Summit Scientific**

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

Date Sampled: **01/28/16 10:40**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1601283	03/01/16	03/01/16	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	1.0		"	"	"	"	"	"	

Date Sampled: **01/28/16 10:40**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		96.7 %		37-154		"	"	"	"	
Surrogate: Toluene-d8		96.5 %		45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %		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:  
02/03/16 08:36

## 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 1601283 - EPA 5030 Water MS

##### Blank (1601283-BLK1)

Prepared & Analyzed: 03/01/16

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		97.9	37-154			
Surrogate: Toluene-d8	13.5		"	13.3		101	45-149			
Surrogate: 4-Bromofluorobenzene	12.5		"	13.3		93.8	45-146			

##### LCS (1601283-BS1)

Prepared & Analyzed: 03/01/16

Benzene	30.6	1.0	ug/l	33.3		91.7	51-132			
Toluene	29.6	1.0	"	33.3		88.7	51-138			
Ethylbenzene	34.7	1.0	"	33.1		105	58-146			
m,p-Xylene	65.2	2.0	"	66.5		98.0	57-144			
o-Xylene	32.1	1.0	"	32.8		97.7	53-146			
Surrogate: 1,2-Dichloroethane-d4	12.4		"	13.3		93.1	37-154			
Surrogate: Toluene-d8	12.6		"	13.3		94.4	45-149			
Surrogate: 4-Bromofluorobenzene	12.7		"	13.3		95.4	45-146			

##### Matrix Spike (1601283-MS1)

Source: 1601245-02

Prepared & Analyzed: 03/01/16

Benzene	32.1	1.0	ug/l	33.3	ND	96.2	34-141			
Toluene	31.1	1.0	"	33.3	ND	93.3	27-151			
Ethylbenzene	35.9	1.0	"	33.1	ND	108	29-160			
m,p-Xylene	67.8	2.0	"	66.5	ND	102	20-166			
o-Xylene	33.7	1.0	"	32.8	ND	103	33-159			
Surrogate: 1,2-Dichloroethane-d4	13.2		"	13.3		98.6	37-154			
Surrogate: Toluene-d8	13.2		"	13.3		98.6	45-149			
Surrogate: 4-Bromofluorobenzene	12.8		"	13.3		95.6	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:  
02/03/16 08:36

**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 1601283 - EPA 5030 Water MS**

Matrix Spike Dup (1601283-MSD1)	Source: 1601245-02			Prepared & Analyzed: 03/01/16						
Benzene	31.3	1.0	ug/l	33.3	ND	93.8	34-141	2.53	32	
Toluene	30.3	1.0	"	33.3	ND	90.8	27-151	2.77	25	
Ethylbenzene	34.8	1.0	"	33.1	ND	105	29-160	2.89	50	
m,p-Xylene	66.7	2.0	"	66.5	ND	100	20-166	1.62	36	
o-Xylene	32.2	1.0	"	32.8	ND	98.1	33-159	4.53	26	
Surrogate: 1,2-Dichloroethane-d4	13.2		"	13.3		99.2	37-154			
Surrogate: Toluene-d8	13.0		"	13.3		97.8	45-149			
Surrogate: 4-Bromofluorobenzene	12.4		"	13.3		93.2	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:**  
02/03/16 08:36

### 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

---

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.*