



PDC Energy, Inc.
Fourth Quarter 2016 Groundwater Monitoring Summary

January 13, 2017

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 October 11, 2016, groundwater samples were collected from all nine monitoring well locations (BH01 – BH09). Nine groundwater samples were submitted to Summit Scientific Laboratories for 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. Fourth quarter 2016 analytical results indicate that the benzene concentration is above the applicable COGCC Table 910-1 groundwater standard at monitoring well BH04. BTEX concentrations are below COGCC regulatory standards at the remaining eight well 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 first quarter 2017.

Temporary monitoring wells BH01, BH02 and BH08 were replaced following the fourth quarter 2016 sampling event due to failed well seals. The replacement wells will be incorporated into the monitoring well network during the first quarter 2017.

The first quarter 2017 groundwater sampling event will be conducted during January 2017.

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 ⁽²⁾ (feet)
COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400	
GW01	11/12/2013	230	370	160	2,200	~ 5
BH01	1/10/2014	270	2,300	390	5,800	7.41
BH01	4/29/2014	19	130	160	3,100	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	13	1.3	230	1,100	6.68
BH01	4/20/2016	<1.0	<1.0	<1.0	<1.0	6.44
BH01	7/18/2016	<1.0	<1.0	35	130	5.25
BH01	10/11/2016	1.5	<1.0	29	180	4.39
BH02	1/10/2014	920	4.8	54	2,300	6.98
BH02	4/29/2014	180	<1.0	67	370	7.13
BH02	7/29/2014	27	<1.0	8.0	49	5.07
BH02	10/27/2014	65	<1.0	20	140	4.42
BH02	1/22/2015	14	<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	19	<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
BH02	7/18/2016	15	<1.0	<1.0	2.8	5.18
BH02	10/11/2016	3.4	<1.0	<1.0	<1.0	4.58
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

TABLE 1
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GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE

Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water ⁽²⁾ (feet)
COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400	
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
BH03	7/18/2016	<1.0	<1.0	<1.0	<1.0	5.11
BH03	10/11/2016	<1.0	<1.0	<1.0	<1.0	4.26
BH04	1/10/2014	12,000	7,600	940	14,000	4.35
BH04	4/29/2014	150	1.4	33	330	4.64
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
BH04	7/18/2016	<1.0	<1.0	<1.0	<1.0	4.81
BH04	10/11/2016	100	<1.0	<1.0	<1.0	4.41
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
BH05	7/18/2016	<1.0	<1.0	<1.0	<1.0	2.75
BH05	10/11/2016	<1.0	<1.0	<1.0	<1.0	1.57
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

**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 ⁽²⁾ (feet)
COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400	
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
BH06	7/18/2016	<1.0	<1.0	<1.0	<1.0	2.48
BH06	10/11/2016	<1.0	<1.0	<1.0	<1.0	1.66
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
BH07	4/20/2016	<1.0	<1.0	<1.0	<1.0	3.96
BH07	7/18/2016	<1.0	<1.0	<1.0	<1.0	2.72
BH07	10/11/2016	<1.0	<1.0	<1.0	<1.0	1.89
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
BH08	7/18/2016	<1.0	<1.0	<1.0	<1.0	4.35
BH08	10/11/2016	<1.0	<1.0	<1.0	<1.0	1.78
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

TABLE 1
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GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE

Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water ⁽²⁾ (feet)
COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400	
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
BH09	7/18/2016	<1.0	<1.0	<1.0	<1.0	2.53
BH09	10/11/2016	<1.0	<1.0	<1.0	<1.0	1.67

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 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)	Average Air Flow Rate (cfm)
First Quarter 2014						
1/30/2014	BH01, BH02, BH04,	6	90	BH01, BH02, BH04,	10	36
2/25/2014	BH05	5	0	BH05	10	8.3
Quarterly Totals		11	90		-	-
Second Quarter 2014						
4/7/2014	BH01, BH02, BH04, BH05	6	120	BH01, BH02, BH04, BH05	10	36.7
4/21/2014	BH01, BH02, BH03, BH04, BH05	6.5	120	BH01, BH02, BH03, BH04, BH05	20	28.4
5/9/2014		8	90		20	35
5/23/2014		6	20		20	24.2
6/9/2014		6	20		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	42
7/18/2014		6	0		15	13.4
9/25/2014		6	100		20	20
Quarterly Totals		19	250		-	-
Fourth Quarter 2014						
10/17/2014	BH01, BH02, BH03, BH05	6	225	BH01, BH02, BH03, BH05	15	17.5
11/3/2014	BH01, BH02, BH03, BH04, BH05	6	50	BH01, BH02, BH03, BH04, BH05	20	30
11/18/2014		6	80		20	30
12/7/2014		6	100		20	31.2
12/20/2014		6	75		20	26
Quarterly Totals		30	530		-	-
First Quarter 2015						
1/9/2015	BH01, BH02, BH03, BH04, BH05	6	0	BH01, BH02, BH03, BH04, BH05	20	25
1/26/2015		6	0		20	25
2/8/2015		6	30		25	35
3/6/2015		6	36		20	27
3/17/2015		6	100		20	35
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)	Average Air Flow Rate (cfm)
Second Quarter 2015						
4/6/2015	BH01, BH02, BH03, BH04, BH05	6	10	BH01, BH02, BH03, BH04, BH05	20	28.6
4/13/2015		6	30		20	20.8
4/30/2015		6	0		20	19
5/14/2015		6	80		20	21.2
5/28/2015		6	15		20	27
6/11/2015	BH02, BH03, BH04, BH05	6	40	BH02, BH03, BH04, BH05	20	27.5
6/22/2015	BH01, BH02, BH03, BH04, BH05	6	35	BH01, BH02, BH03, BH04, BH05	20	22.8
Quarterly Totals		42	210		-	-
Third Quarter 2015						
7/9/2015	BH01, BH02, BH03, BH04, BH05	6	184	BH01, BH02, BH03, BH04, BH05	20	22
7/23/2015		6	45		20	29
8/6/2015	BH02, BH03, BH04, BH05	6	30	BH02, BH03, BH04, BH05	20	27.5
8/20/2015	BH01, BH02, BH03, BH04, BH05	6	80	BH01, BH02, BH03, BH04, BH05	20	21.3
Quarterly Totals		24	339		-	-
Fourth Quarter 2015						
10/13/2015	BH01, BH02, BH03, BH04, BH05	6	42	BH03, BH04, BH05	20	23.3
10/27/2015		6	80	BH01, BH02, BH03, BH04, BH05	20	25
11/9/2015	BH01, BH02, BH03, BH05	6	150	BH04	20	35
11/24/2015	BH01, BH02, BH03, BH04, BH05	6	92	BH02, BH04	20	27.5
12/7/2015		6	184		20	27.5
Quarterly Totals		30	548		-	-

**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)	Average Air Flow Rate (cfm)
First Quarter 2016						
1/7/2016	BH01, BH02, BH03,	6	90	BH02, BH04	20	25
1/26/2016	BH04, BH05	6	80		20	32.5
1/30/2016	BH01, BH02, BH03, BH05	6	160	None	0	0
2/17/2016	BH01, BH02, BH03, BH04, BH05	6	84	BH02, BH04	20	27.5
3/1/2016	BH01, BH02, BH03,	6	80		20	25
3/17/2016	BH04, BH05, Pipe	6	350		25	30
Quarterly Totals		36	844		-	-
Second Quarter 2016						
4/1/2016	BH01, BH02, BH03, BH04, BH05, Pipe	6	240	BH02, BH04	20	40.5
4/15/2016	BH01, BH02, BH03, BH07, Pipe	6	80	BH01, BH02, BH03, BH04, BH05, BH07	20	25
4/28/2016		6	80		20	28.8
5/12/2016		6	45		15	21.9
5/25/2016		6	84		20	30.8
6/9/2016		6	42		20	25.8
6/22/2016		6	92		20	25
Quarterly Totals		42	663		-	-
Third Quarter 2016						
7/7/2016	BH01, BH02, BH03, BH07, Pipe	6	84	BH01, BH02, BH03, BH04, BH05, BH07	15	13
7/20/2016		6	135		17.5	15
8/21/2016		6	80		20	20
8/31/2016		6	42		20	33
9/28/2016		6	152		20	30
Quarterly Totals		30	493		-	-

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)	Average Air Flow Rate (cfm)
Fourth Quarter 2016						
10/13/2016	BH01, BH02, BH03, BH07, Pipe	6	276	BH01, BH02, BH03, BH04, BH05, BH07	20	25
10/26/2016	BH01, BH02, BH03	6	84	BH01, BH02, BH03, BH04, BH05	20	20
11/9/2016	BH01, BH02, BH03, BH07, Pipe	6	126	BH01, BH02, BH04, BH05, BH07	20	20
12/11/2016		6	100	BH01, BH02, BH03, BH04, BH05, BH07	20	25
Quarterly Totals		24	586		-	-

Notes:

EFR = Enhanced fluid recovery

AS = Air sparge

psi = Pounds per square inch

cfm = Cubic feet per minute



BH04		
Compound (µg/L)	7/18/2016	10/11/2016
Benzene	<1.0	100
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH05		
Compound (µg/L)	7/18/2016	10/11/2016
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

Surface
Drainage

BH08		
Compound (µg/L)	7/18/2016	10/11/2016
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)	7/18/2016	10/11/2016
Benzene	15	3.4
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	2.8	<1.0

BH07		
Compound (µg/L)	7/18/2016	10/11/2016
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)	7/18/2016	10/11/2016
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)	7/18/2016	10/11/2016
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	10/11/2016
Benzene	<1.0	1.5
Toluene	<1.0	<1.0
Ethylbenzene	35	29
Total Xylenes	130	180

BH09		
Compound (µg/L)	7/18/2016	10/11/2016
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

DRAWN BY: TJB

DATE: 10/24/2016

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

All locations are approximate unless otherwise noted

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

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 17, 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 10/11/16 16:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



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:
10/17/16 11:44

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1610091-01	Water	10/11/16 13:01	10/11/16 16:00
BH02	1610091-02	Water	10/11/16 13:04	10/11/16 16:00
BH03	1610091-03	Water	10/11/16 13:17	10/11/16 16:00
BH04	1610091-04	Water	10/11/16 13:24	10/11/16 16:00
BH05	1610091-05	Water	10/11/16 13:32	10/11/16 16:00
BH06	1610091-06	Water	10/11/16 13:39	10/11/16 16:00
BH07	1610091-07	Water	10/11/16 13:47	10/11/16 16:00
BH08	1610091-08	Water	10/11/16 13:57	10/11/16 16:00
BH09	1610091-09	Water	10/11/16 14:05	10/11/16 16:00

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:
 10/17/16 11:44

Summit Scientific

1610091

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

Page 1 of 1

Client: PDC Energy
 Address: _____
 City/State/Zip: _____
 Phone: _____ Fax: _____
 Sampler Name: Tyler Brisson
 Project Manager: Mark Longhurst
 E-Mail: mark.longhurst@pdce.com
 Project Name: Jerke Up 8-7
 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)	
B401	10/11/16	13:01	3	X								
B402		13:04										
B403		13:17										
B404		13:24										
B405		13:32										
B406		13:39										
B407		13:47										
B408		13:57										
B409		14:05										

Relinquished by: <u>[Signature]</u>	Date/Time: <u>10/11/16 1600</u>	Received by: <u>[Signature]</u>	Date/Time: <u>10/11/16 1600</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>crice</u>
Relinquished by: <u>[Signature]</u>	Date/Time: <u>10/11/16 1645</u>	Received by: <u>[Signature]</u>	Date/Time: <u>10/11/16 1645</u>		
Relinquished by: _____	Date/Time: _____	Received in Lab by: _____	Date/Time: _____		

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Project Number: [none]
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Reported:
10/17/16 11:44

Sample Receipt Checklist

S2 Work Order: 1610091
 Client: PDC Energy Client Project ID: Jerke Up 8-7
 Shipped Via: P/V Airbill #: _____
(UPS, FedEx, Hand Delivered, Pick-up, etc.)
 Matrix (check all that apply): Air Soil/Solid Water Other: _____
(Describe)

Cooler ID					
Temp (°C)	<u>0.6</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?			<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"/>			<u>HCL</u>
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.

Nakita
Custodian Printed Name

[Signature]
Signature or initials of Custodian

10/11/16 1145
Date/Time

[Signature]



PDC Energy
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 Denver CO, 80203

Project: Jerke Up 8-7

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/17/16 11:44

BH01
1610091-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/11/16 13:01**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	1.5	1.0	ug/l	1	1610129	10/13/16	10/13/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	29	1.0	"	"	"	"	"	"	
Xylenes (total)	180	1.0	"	"	"	"	"	"	

Date Sampled: **10/11/16 13:01**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		99.2 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		96.9 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.9 %	45-146		"	"	"	"	

Summit Scientific

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PDC Energy
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 Denver CO, 80203

Project: Jerke Up 8-7

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/17/16 11:44

BH02
1610091-02 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/11/16 13:04**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	3.4	1.0	ug/l	1	1610129	10/13/16	10/13/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **10/11/16 13:04**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		98.6 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		95.9 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		103 %	45-146		"	"	"	"	

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 Denver CO, 80203

Project: Jerke Up 8-7

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/17/16 11:44

BH03
1610091-03 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/11/16 13:17**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1610129	10/13/16	10/13/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **10/11/16 13:17**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		97.1 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		97.1 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		101 %	45-146		"	"	"	"	

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 Denver CO, 80203

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Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/17/16 11:44

BH04
1610091-04 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/11/16 13:24**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	100	1.0	ug/l	1	1610129	10/13/16	10/13/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **10/11/16 13:24**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		94.9 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		95.3 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		99.9 %	45-146		"	"	"	"	

Summit Scientific

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Project: Jerke Up 8-7

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/17/16 11:44

BH05
1610091-05 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/11/16 13:32**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1610129	10/13/16	10/13/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **10/11/16 13:32**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		95.3 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		98.6 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		99.3 %	45-146		"	"	"	"	

Summit Scientific

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 Denver CO, 80203

Project: Jerke Up 8-7

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/17/16 11:44

BH06
1610091-06 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/11/16 13:39**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1610129	10/13/16	10/13/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **10/11/16 13:39**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		95.0 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		95.0 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		101 %	45-146		"	"	"	"	

Summit Scientific

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Project: Jerke Up 8-7

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 Project Manager: Mark Longhurst

Reported:
 10/17/16 11:44

BH07
1610091-07 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/11/16 13:47**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1610129	10/13/16	10/13/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **10/11/16 13:47**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		98.6 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		97.4 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		98.5 %	45-146		"	"	"	"	

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 Denver CO, 80203

Project: Jerke Up 8-7

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 Project Manager: Mark Longhurst

Reported:
 10/17/16 11:44

BH08
1610091-08 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/11/16 13:57**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1610129	10/13/16	10/13/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **10/11/16 13:57**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		96.5 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		95.5 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		97.7 %	45-146		"	"	"	"	

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Project: Jerke Up 8-7

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 10/17/16 11:44

BH09
1610091-09 (Water)

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Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/11/16 14:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1610129	10/13/16	10/13/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **10/11/16 14:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		93.7 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		97.1 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		98.4 %	45-146		"	"	"	"	

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10/17/16 11:44

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Summit Scientific

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

Batch 1610129 - EPA 5030 Water MS

Blank (1610129-BLK1)

Prepared & Analyzed: 10/12/16

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	12.4		"	13.3		92.8	37-154			
Surrogate: Toluene-d8	13.4		"	13.3		100	45-149			
Surrogate: 4-Bromofluorobenzene	13.3		"	13.3		99.5	45-146			

LCS (1610129-BS1)

Prepared & Analyzed: 10/12/16

Benzene	22.0	1.0	ug/l	33.3		66.0	51-132			
Toluene	24.4	1.0	"	33.3		73.1	51-138			
Ethylbenzene	30.2	1.0	"	33.1		91.4	58-146			
m,p-Xylene	65.1	2.0	"	66.5		97.8	57-144			
o-Xylene	31.2	1.0	"	32.7		95.6	53-146			
Surrogate: 1,2-Dichloroethane-d4	13.4		"	13.3		100	37-154			
Surrogate: Toluene-d8	12.8		"	13.3		95.6	45-149			
Surrogate: 4-Bromofluorobenzene	12.9		"	13.3		96.9	45-146			

Matrix Spike (1610129-MS1)

Source: 1610073-01

Prepared & Analyzed: 10/12/16

Benzene	22.4	1.0	ug/l	33.3	ND	67.2	34-141			
Toluene	25.6	1.0	"	33.3	ND	76.9	27-151			
Ethylbenzene	31.0	1.0	"	33.1	ND	93.7	29-160			
m,p-Xylene	66.4	2.0	"	66.5	ND	99.8	20-166			
o-Xylene	32.4	1.0	"	32.7	ND	99.2	33-159			
Surrogate: 1,2-Dichloroethane-d4	13.3		"	13.3		99.8	37-154			
Surrogate: Toluene-d8	12.7		"	13.3		95.6	45-149			
Surrogate: 4-Bromofluorobenzene	13.4		"	13.3		101	45-146			

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 Project Manager: Mark Longhurst

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

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

Batch 1610129 - EPA 5030 Water MS

Matrix Spike Dup (1610129-MSD1)	Source: 1610073-01			Prepared & Analyzed: 10/12/16						
Benzene	22.7	1.0	ug/l	33.3	ND	68.1	34-141	1.42	32	
Toluene	25.4	1.0	"	33.3	ND	76.2	27-151	0.862	25	
Ethylbenzene	32.3	1.0	"	33.1	ND	97.6	29-160	4.14	50	
m,p-Xylene	69.3	2.0	"	66.5	ND	104	20-166	4.21	36	
o-Xylene	33.9	1.0	"	32.7	ND	104	33-159	4.67	26	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>14.1</i>		<i>"</i>	<i>13.3</i>		<i>106</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>12.9</i>		<i>"</i>	<i>13.3</i>		<i>96.5</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>13.8</i>		<i>"</i>	<i>13.3</i>		<i>103</i>	<i>45-146</i>			

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1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Jerke Up 8-7

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/17/16 11:44

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