

PDC Energy, Inc.
Second Quarter 2017 Groundwater Monitoring Summary

July 18, 2017

Jacobucci 13-32, 23-32 Tank Battery
NWSW Section 32 T1N R67W
Weld County, API # 05-123-20024
Facility ID # 331008
Remediation # 7952

This groundwater summary has been prepared by Tasman Geosciences, Inc. for the Jacobucci 13-32, 23-32 tank battery. On April 18, 2017, groundwater monitoring was conducted at six temporary monitoring well locations (BH01, BH02, and BH05 – BH08). Monitoring wells BH03 and BH04 have exhibited eight or more quarters with BTEX concentrations below COGCC Table 910-1 groundwater standards and were removed from the monitoring well network as approved by the COGCC during the first quarter 2017. Six groundwater samples were submitted to Summit Scientific Laboratory 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 in Attachment A. Sample locations and corresponding analytical results are illustrated on Figure 1. Second quarter 2017 analytical results indicate that BTEX concentrations are below the applicable COGCC Table 910-1 groundwater standards at all six well locations.

Enhanced fluid recovery (EFR) and air sparge (AS) was initiated at the site during the second quarter 2013. EFR/AS continued as the selected remediation strategy through the end of the fourth quarter 2015. A summary of the EFR/AS operational data is provided in Table 2. Monitored natural attenuation (MNA) was implemented as the selected remediation strategy during the first quarter 2016, and will continue as the selected remediation strategy through the third quarter 2017.

Historical groundwater sampling results for naphthalene and gasoline range organics (GRO) are presented in Table 3. Analysis of these constituents was discontinued following the second quarter 2013.

Third quarter 2017 groundwater sampling event will be conducted during July 2017.

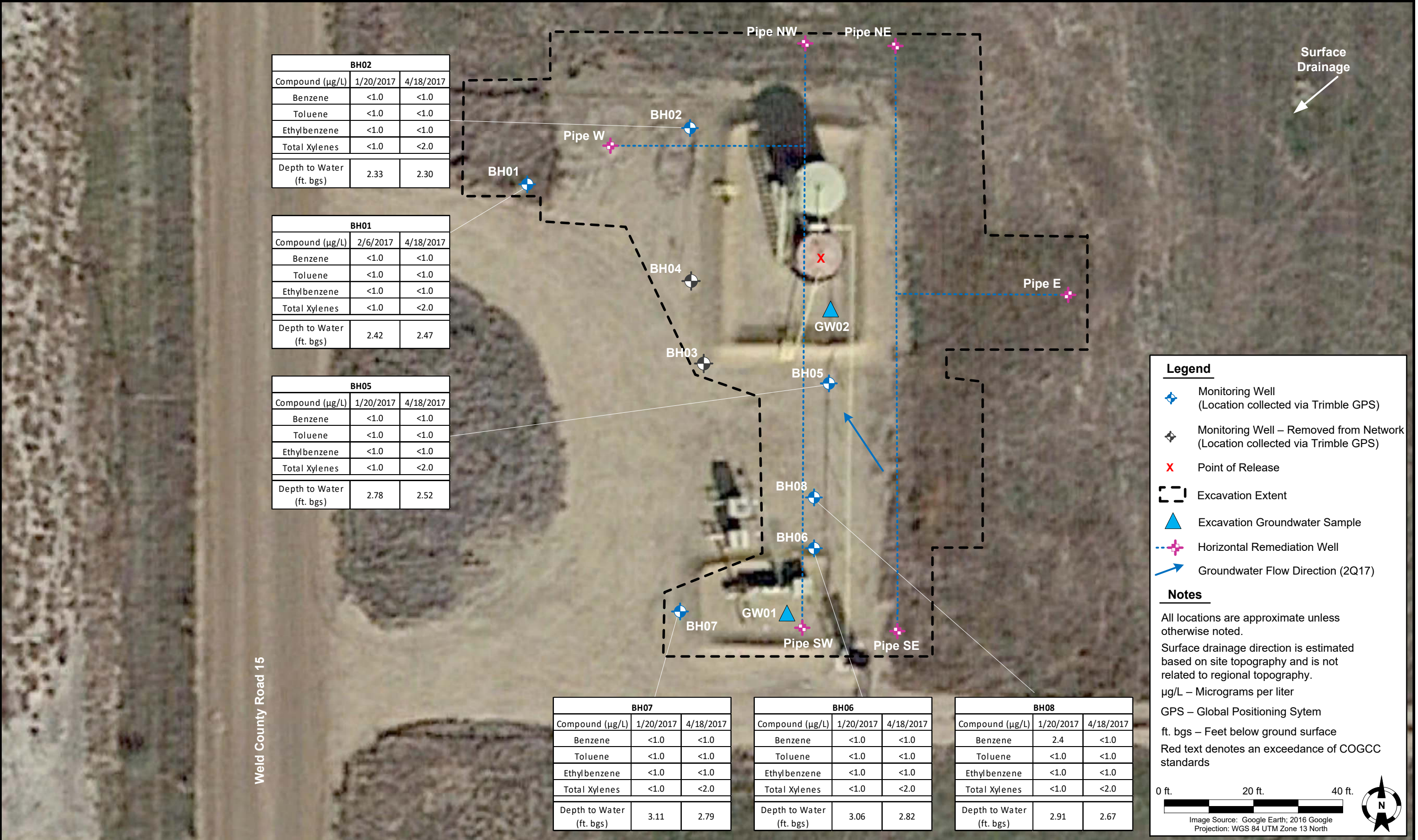


TABLE 1
JACOBUCCI 13-32, 23-32 TANK BATTERY
GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE

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	2/12/2013	510	3,400	190	3,000	~ 4
GW02	2/19/2013	690	2,800	94	1,500	~ 4
BH01	4/15/2013	<1.0	<1.0	<1.0	<1.0	NM
BH01	7/25/2013	<1.0	<1.0	<1.0	<1.0	6.04
BH01	10/30/2013	<1.0	<1.0	<1.0	<1.0	5.66
BH01	1/22/2014	<1.0	<1.0	<1.0	<1.0	4.32
BH01	4/28/2014	<1.0	<1.0	<1.0	<1.0	4.52
BH01	7/24/2014	<1.0	<1.0	<1.0	<1.0	6.02
BH01	10/27/2014	<1.0	<1.0	<1.0	<1.0	4.44
BH01	1/19/2015	<1.0	<1.0	<1.0	<1.0	4.16
BH01	4/21/2015	<1.0	<1.0	<1.0	<1.0	3.14
BH01	7/20/2015	<1.0	<1.0	<1.0	<1.0	4.03
BH01	10/15/2015	<1.0	<1.0	<1.0	<1.0	4.05
BH01	1/6/2016	<1.0	<1.0	<1.0	<1.0	3.05
BH01	4/11/2016	<1.0	<1.0	<1.0	<1.0	3.21
BH01	7/12/2016	<1.0	<1.0	<1.0	<1.0	4.94
BH01	10/10/2016	<1.0	<1.0	<1.0	<1.0	3.09
BH01	2/6/2017	<1.0	<1.0	<1.0	<1.0	2.42
BH01	4/18/2017	<1.0	<1.0	<1.0	<2.0	2.47
BH02	4/15/2013	12	1.6	5.3	130	NM
BH02	7/25/2013	7.7	<1.0	7.1	16	6.00
BH02	10/30/2013	<1.0	<1.0	<1.0	<1.0	4.33
BH02	1/22/2014	31	<1.0	<1.0	<1.0	4.50
BH02	4/28/2014	<1.0	<1.0	<1.0	<1.0	4.54
BH02	7/24/2014	<1.0	<1.0	<1.0	<1.0	5.68
BH02	10/27/2014	<1.0	<1.0	<1.0	<1.0	4.52
BH02	1/19/2015	<1.0	<1.0	<1.0	<1.0	4.10
BH02	4/21/2015	<1.0	<1.0	<1.0	<1.0	3.29
BH02	7/20/2015	<1.0	<1.0	<1.0	<1.0	3.49
BH02	10/15/2015	<1.0	<1.0	<1.0	<1.0	2.09
BH02	1/6/2016	<1.0	<1.0	<1.0	<1.0	3.29
BH02	4/11/2016	100	3.2	<1.0	4.3	3.23
BH02	4/25/2016	15	<1.0	<1.0	<1.0	3.18
BH02	7/12/2016	<1.0	<1.0	<1.0	<1.0	4.93

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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	
BH02	10/10/2016	<1.0	<1.0	<1.0	<1.0	3.22
BH02	1/20/2017	<1.0	<1.0	<1.0	<1.0	2.33
BH02	4/18/2017	<1.0	<1.0	<1.0	<2.0	2.30
BH03	4/15/2013	3.1	<1.0	<1.0	<1.0	NM
BH03	7/25/2013	<1.0	2.2	<1.0	5.0	6.37
BH03	10/30/2013	<1.0	<1.0	<1.0	<1.0	4.52
BH03	1/22/2014	<1.0	<1.0	<1.0	<1.0	4.74
BH03	4/28/2014	<1.0	<1.0	<1.0	<1.0	4.88
BH03	7/24/2014	<1.0	<1.0	<1.0	<1.0	6.35
BH03	10/27/2014	<1.0	<1.0	<1.0	<1.0	4.72
BH03	1/19/2015	6.5	<1.0	<1.0	<1.0	4.48
BH03	4/21/2015	<1.0	<1.0	<1.0	<1.0	3.10
BH03	7/20/2015	<1.0	<1.0	<1.0	<1.0	4.07
BH03	10/15/2015	<1.0	<1.0	<1.0	<1.0	3.87
BH03	1/6/2016	<1.0	<1.0	<1.0	<1.0	3.09
BH03	4/11/2016	<1.0	<1.0	<1.0	<1.0	3.04
BH03	7/12/2016	<1.0	<1.0	<1.0	<1.0	4.81
BH03	10/10/2016	<1.0	<1.0	<1.0	<1.0	3.69
BH03	1/20/2017	<1.0	<1.0	<1.0	<1.0	2.89
BH03	5/3/2017	Well Removed From Monitoring Network				
BH04	4/15/2013	<1.0	<1.0	<1.0	<1.0	NM
BH04	7/25/2013	2.7	<1.0	<1.0	2.4	5.95
BH04	10/30/2013	<1.0	<1.0	<1.0	<1.0	3.99
BH04	1/22/2014	<1.0	<1.0	<1.0	<1.0	4.22
BH04	4/28/2014	<1.0	<1.0	<1.0	<1.0	4.81
BH04	7/24/2014	<1.0	<1.0	<1.0	<1.0	6.21
BH04	10/27/2014	<1.0	<1.0	<1.0	<1.0	4.38
BH04	1/19/2015	<1.0	<1.0	<1.0	<1.0	4.25
BH04	4/21/2015	<1.0	<1.0	<1.0	<1.0	3.41
BH04	7/20/2015	<1.0	<1.0	<1.0	<1.0	3.87
BH04	10/15/2015	<1.0	<1.0	<1.0	<1.0	4.25
BH04	1/6/2016	<1.0	<1.0	<1.0	<1.0	3.11
BH04	4/11/2016	<1.0	<1.0	<1.0	<1.0	3.09
BH04	7/12/2016	<1.0	<1.0	<1.0	<1.0	4.76

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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	
BH04	10/10/2016	<1.0	<1.0	<1.0	<1.0	3.59
BH04	1/20/2017	<1.0	<1.0	<1.0	<1.0	2.60
BH04	5/3/2017	Well Removed From Monitoring Network				
BH05	4/15/2013	67	590	19	370	NM
BH05	7/25/2013	5.2	<1.0	<1.0	3.0	6.14
BH05	10/30/2013	<1.0	<1.0	<1.0	<1.0	4.51
BH05	1/22/2014	<1.0	<1.0	<1.0	<1.0	4.64
BH05	4/28/2014	1.9	<1.0	<1.0	<1.0	4.81
BH05	7/24/2014	<1.0	<1.0	<1.0	<1.0	6.29
BH05	10/27/2014	<1.0	<1.0	<1.0	<1.0	4.64
BH05	1/19/2015	<1.0	<1.0	<1.0	<1.0	4.41
BH05	4/21/2015	<1.0	<1.0	<1.0	<1.0	3.37
BH05	7/20/2015	<1.0	<1.0	<1.0	<1.0	4.06
BH05	10/15/2015	<1.0	<1.0	<1.0	<1.0	4.16
BH05	1/6/2016	<1.0	<1.0	<1.0	<1.0	3.18
BH05	4/11/2016	2.7	<1.0	<1.0	<1.0	3.15
BH05	7/12/2016	<1.0	<1.0	<1.0	<1.0	4.93
BH05	10/10/2016	<1.0	<1.0	<1.0	<1.0	3.56
BH05	1/20/2017	<1.0	<1.0	<1.0	<1.0	2.78
BH05	4/18/2017	<1.0	<1.0	<1.0	<2.0	2.52
BH06	4/15/2013	10,000	31,000	950	14,000	NM
BH06	7/25/2013	1,500	61	150	5,900	6.77
BH06	10/30/2013	39	<1.0	<1.0	8.4	4.84
BH06	1/22/2014	64	<1.0	40	570	5.03
BH06	4/28/2014	65	<1.0	56	680	5.01
BH06	7/24/2014	35	<1.0	4.4	320	6.46
BH06	10/27/2014	8.8	<1.0	8.1	12	4.87
BH06	1/19/2015	1.4	<1.0	4.0	13	5.55
BH06	4/21/2015	1.4	<1.0	1.8	13	3.74
BH06	7/20/2015	<1.0	<1.0	<1.0	<1.0	4.52
BH06	10/15/2015	<1.0	<1.0	<1.0	<1.0	4.35
BH06	1/6/2016	<1.0	<1.0	<1.0	<1.0	3.57
BH06	4/11/2016	<1.0	<1.0	<1.0	<1.0	3.50
BH06	7/12/2016	<1.0	<1.0	<1.0	<1.0	5.28

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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	10/10/2016	<1.0	<1.0	<1.0	<1.0	3.84
BH06	1/20/2017	<1.0	<1.0	<1.0	<1.0	3.06
BH06	4/18/2017	<1.0	<1.0	<1.0	<2.0	2.82
BH07	4/15/2013	4.7	39	2.8	41	NM
BH07	7/25/2013	<1.0	<1.0	<1.0	<1.0	6.87
BH07	10/30/2013	<1.0	<1.0	<1.0	<1.0	4.67
BH07	1/22/2014	<1.0	<1.0	<1.0	<1.0	4.73
BH07	4/28/2014	<1.0	<1.0	<1.0	<1.0	4.95
BH07	7/24/2014	<1.0	<1.0	<1.0	<1.0	6.66
BH07	10/27/2014	<1.0	<1.0	<1.0	<1.0	5.02
BH07	1/19/2015	<1.0	<1.0	<1.0	<1.0	5.31
BH07	4/21/2015	<1.0	<1.0	<1.0	<1.0	4.18
BH07	7/20/2015	<1.0	<1.0	<1.0	<1.0	5.89
BH07	10/15/2015	<1.0	<1.0	<1.0	<1.0	4.95
BH07	1/6/2016	<1.0	<1.0	<1.0	<1.0	4.78
BH07	4/11/2016	<1.0	<1.0	<1.0	<1.0	4.83
BH07	7/12/2016	<1.0	<1.0	<1.0	<1.0	6.06
BH07	10/10/2016	<1.0	<1.0	<1.0	<1.0	4.69
BH07	1/20/2017	<1.0	<1.0	<1.0	<1.0	3.11
BH07	4/18/2017	<1.0	<1.0	<1.0	<2.0	2.79
BH08	7/24/2014	17	1.6	<1.0	61	6.97
BH08	10/27/2014	8.4	<1.0	1.9	19	5.26
BH08	1/19/2015	91	<1.0	18	110	4.89
BH08	4/21/2015	40	<1.0	2.7	8.5	4.04
BH08	7/20/2015	3.3	<1.0	<1.0	<1.0	4.74
BH08	10/15/2015	1.3	<1.0	<1.0	9.5	4.84
BH08	1/6/2016	<1.0	<1.0	<1.0	<1.0	3.65
BH08	4/11/2016	6.4	<1.0	<1.0	<1.0	3.79
BH08	4/25/2016	3.7	<1.0	<1.0	<1.0	3.59
BH08	7/12/2016	39	<1.0	1.4	2.7	5.58
BH08	10/10/2016	2.1	<1.0	<1.0	<1.0	3.69
BH08	1/20/2017	2.4	<1.0	<1.0	<1.0	2.91
BH08	4/18/2017	<1.0	<1.0	<1.0	<2.0	2.67

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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	

Notes:

1. Groundwater standards referenced from 2 CCR 404-1, Table 910-1, effective January 30, 2015.
2. Depth to water measurements collected prior to fourth quarter 2016 were measured from top of casing or ground surface for monitoring well samples and excavation samples, respectively. Subsequent monitoring well measurements were collected from top of casing and adjusted using survey data and product thickness to reflect depth of water from ground surface.

COGCC = Colorado Oil and Gas Conservation Commission

µg/L = Micrograms per liter

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

NM = Not Measured

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

TABLE 2
JACOBUCCI 13-32, 23-32 TANK BATTERY
EFR / AS OPERATIONAL SUMMARY TABLE

Date	EFR Wells	Total Duration (hours)	Approximate Gallons Extracted	AS Wells	Air Injection Pressure (psi)	Average Air Flow Rate (cfm)
Second Quarter 2013						
4/25/2013	BH02, BH05, BH06	6	130	BH02, BH05, BH06	10	NR
4/26/2013	Pipe, BH02	5.5	120	BH05, BH06	10	NR
5/16/2013	BH03, BH05, BH07	6.5	90	BH02, BH03, BH05, BH06, BH07	10	NR
5/28/2013	BH02, BH03, BH07	4	80	BH05, BH06, BH07	10	NR
6/7/2013	BH05, BH06, BH07	7	183		10	NR
6/19/2013	BH03, BH05, BH06, BH07	6.5	265	BH03, BH05, BH06, BH07	10	NR
Quarterly Totals		35.5	868		-	-
Third Quarter 2013						
7/9/2013	BH02, BH03, BH05, BH07	6	142	BH03, BH05, BH06	10	NR
7/23/2013	BH02, BH03, BH07	6	160	BH03, BH05, BH06, BH07	10	NR
8/7/2013	BH02, BH03, BH05, BH06, BH07	7	290	BH02, BH03, BH05, BH06, BH07	10	NR
8/23/2013		6.5	180		10	NR
9/10/2013		6.5	210		10	NR
9/23/2013	BH02, BH03, BH04, BH05, BH06, BH07	6	100	BH02, BH03, BH04, BH05, BH06, BH07	10	NR
Quarterly Totals		38	1082		-	-
Fourth Quarter 2013						
10/8/2013	BH02, BH03, BH05, BH06	6	450	BH02, BH03, BH05, BH06	10	NR
10/15/2013	BH02, BH05, BH06	6	180	BH02, BH05, BH06	15	NR
11/5/2013	BH02, BH03, BH05, BH06	6	270	BH02, BH03, BH05, BH06	10	NR
11/19/2013	BH05, BH06	6	120	BH05, BH06	10	NR
12/3/2013		6	60		10	NR
12/23/2013		6	50		10	NR
Quarterly Totals		36	1130		-	-
First Quarter 2014						
1/16/2014	BH05, BH06	6	120	BH05, BH06	10	NR
2/3/2014	BH02, BH06	5.5	114	BH02, BH06	10	15
2/10/2014		5	0		10	9
3/3/2014		6	115		10	27
3/12/2014		6	135		10	11.5
3/19/2014		6	135		10	9
Quarterly Totals		34.5	619		-	-
Second Quarter 2014						
4/10/2014	BH02, BH06	7	165	BH02, BH06	15	22.5
4/22/2014	BH02, BH04, BH06, BH07	8	450		20	35
5/9/2014		6	220		20	28
5/22/2014		6	220		10	17.5
6/6/2014		6	180		10	19.5
6/30/2014		6	50		20	50
Quarterly Totals		39	1285		-	-

TABLE 2
JACOBUCCI 13-32, 23-32 TANK BATTERY
EFR / AS OPERATIONAL SUMMARY TABLE

Date	EFR Wells	Total Duration (hours)	Approximate Gallons Extracted	AS Wells	Air Injection Pressure (psi)	Average Air Flow Rate (cfm)
Third Quarter 2014						
7/17/2014	BH04, BH06, BH07,BH08	6	150	BH02, BH06, BH08	10	25
8/10/2014	BH02, BH04, BH06, BH07,BH08	6	450		10	23
8/26/2014	BH01, BH02, BH03, BH04, BH05	6	1260	BH01, BH02, BH03, BH04, BH05	20	33.2
9/12/2014	BH02, BH04, BH06, BH07, BH08	6	500	BH02, BH06, BH08	20	20
9/24/2014		6	300		20	20
Quarterly Totals		30	2660		-	-
Fourth Quarter 2014						
10/21/2014	Pipe SW, Pipe SE	6	1890	BH06, BH07, BH08	10	30
11/4/2014		6	2520		10	30
11/18/2014		6	0		10	30
Quarterly Totals		18	4410		-	-
First Quarter 2015						
1/2/2015	Pipe NE, Pipe NW	6	1890	BH06, BH07, BH08	15	26.7
1/13/2015	Pipe SW, Pipe SE	6	2100		20	31.7
2/5/2015		6	1680		8	26.7
3/6/2015		6	2688	BH03, BH06, BH07, BH08	20	15
3/18/2015		6	1890		20	23.8
Quarterly Totals		30	10248		-	-
Second Quarter 2015						
4/8/2015	Pipe SW, Pipe SE	6	58	BH03, BH06, BH07, BH08	20	22
4/14/2015		6	1470		30	25
4/29/2015		6	2436		20	20
5/13/2015		6	80		20	15
5/27/2015	Pipe SW, Pipe SE, BH08	6	3318	BH03, BH06, BH07	20	25
6/10/2015		6	336		20	20
6/24/2015		6	3150		20	35
Quarterly Totals		42	10848		-	-
Third Quarter 2015						
7/8/2015	Pipe SW, Pipe SE, BH08	6	3360	BH03, BH06, BH07	30	25
7/22/2015		6	3192		20	20
8/5/2015		6	3780		20	15
8/19/2015		6	3360		20	25
9/2/2015		6	2940		20	20
9/18/2015		6	3360		20	20
Quarterly Totals		36	19992		-	-

TABLE 2
JACOBUCCI 13-32, 23-32 TANK BATTERY
EFR / AS OPERATIONAL SUMMARY TABLE

Date	EFR Wells	Total Duration (hours)	Approximate Gallons Extracted	AS Wells	Air Injection Pressure (psi)	Average Air Flow Rate (cfm)
Fourth Quarter 2015						
10/2/2015	Pipe SW, Pipe SE, BH08	6	3360	BH06, BH07, BH08	20	15
10/14/2015		6	3444	BH06, BH07	20	22
10/30/2015		6	3780	BH03, BH06, BH07	20	25
11/9/2015	Pipe SW, Pipe SE, BH03, BH06	6	3360	BH07, BH08	20	24
11/24/2015		6	3570		20	20
12/11/2015		6	2730		20	16
Quarterly Totals		36	20244		-	-

Notes:

EFR = Enhanced fluid recovery

AS = Air sparge

psi = Pounds per square inch

cfm = Cubic feet per minute

NR = Not recorded

ATTACHMENT A

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

April 21, 2017

Mark Longhurst
PDC Energy
1775 Sherman St. STE. 3000
Denver, CO 80203
RE: Jacobucci 13-32, 23-32

Enclosed are the results of analyses for samples received by Summit Scientific on 04/18/17 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: Jacobucci 13-32, 23-32

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
04/21/17 12:12

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1704178-01	Water	04/18/17 12:02	04/18/17 17:00
BH02	1704178-02	Water	04/18/17 12:09	04/18/17 17:00
BH05	1704178-03	Water	04/18/17 12:15	04/18/17 17:00
BH06	1704178-04	Water	04/18/17 12:21	04/18/17 17:00
BH07	1704178-05	Water	04/18/17 12:28	04/18/17 17:00
BH08	1704178-06	Water	04/18/17 12:37	04/18/17 17:00

Summit Scientific

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

Project: Jacobucci 13-32, 23-32

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
04/21/17 12:12

Sample Receipt Checklist

S2 Work Order: 1704179

Client: Talon Client Project ID: _____

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

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

Cooler ID					
Temp (°C)	<u>18.5</u>				

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature just above 0°C to ≤ 6°C ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
NOTE: If samples are delivered the same day of sampling, this requirement is waived provided that there is evidence that cooling has begun.				<u>OK</u>
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
If custody seals are present, are they intact ⁽¹⁾ ?			<input checked="" type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present?			<input checked="" type="checkbox"/>	
Is a chain-of-custody (COC) form present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client w/ date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.			<input checked="" type="checkbox"/>	
Are samples preserved that require preservation (excluding cooling) ⁽¹⁾ ?			<input checked="" type="checkbox"/>	
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect				
If samples are acid preserved for metals, is the pH ≤ 2 ⁽¹⁾ ?			<input checked="" type="checkbox"/>	
Record the pH in Comments.				
If dissolved metals are requested, were samples field filtered?			<input checked="" type="checkbox"/>	
Additional Comments (if any):				
⁽¹⁾ If NO, then contact the client before proceeding with analysis and note in case narrative.				

Murphy
Custodian Printed Name

MA 4-17-17
Signature or Initials of Custodian

16:30
Date/Time



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

Project: Jacobucci 13-32, 23-32
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
04/21/17 12:12

BH01
1704178-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **04/18/17 12:02**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1704197	04/20/17	04/20/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **04/18/17 12:02**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		85.4 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		99.8 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	45-146		"	"	"	"	

Summit Scientific

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

Project: Jacobucci 13-32, 23-32
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
04/21/17 12:12

BH02
1704178-02 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **04/18/17 12:09**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1704197	04/20/17	04/20/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **04/18/17 12:09**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		87.0 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		102 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		100 %	45-146		"	"	"	"	

Summit Scientific

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

Project: Jacobucci 13-32, 23-32
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
04/21/17 12:12

BH05
1704178-03 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **04/18/17 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1704197	04/20/17	04/20/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **04/18/17 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		89.1 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		100 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.7 %	45-146		"	"	"	"	

Summit Scientific

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

Project: Jacobucci 13-32, 23-32
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
04/21/17 12:12

BH06
1704178-04 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **04/18/17 12:21**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1704197	04/20/17	04/20/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **04/18/17 12:21**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		93.9 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		99.4 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.0 %	45-146		"	"	"	"	

Summit Scientific

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

Project: Jacobucci 13-32, 23-32
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
04/21/17 12:12

BH07
1704178-05 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **04/18/17 12:28**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1704197	04/20/17	04/20/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **04/18/17 12:28**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		87.1 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		96.1 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		111 %	45-146		"	"	"	"	

Summit Scientific

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

Project: Jacobucci 13-32, 23-32
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
04/21/17 12:12

BH08
1704178-06 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **04/18/17 12:37**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1704197	04/20/17	04/20/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **04/18/17 12:37**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		86.1 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		98.5 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.9 %	45-146		"	"	"	"	

Summit Scientific

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

Project: Jacobucci 13-32, 23-32
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
04/21/17 12:12

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 1704197 - EPA 5030 Water MS

Blank (1704197-BLK1)

Prepared & Analyzed: 04/20/17

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	2.0	"							
Surrogate: 1,2-Dichloroethane-d4	11.3		"	13.3		85.0	37-154			
Surrogate: Toluene-d8	12.9		"	13.3		96.9	45-149			
Surrogate: 4-Bromofluorobenzene	12.9		"	13.3		96.7	45-146			

LCS (1704197-BS1)

Prepared & Analyzed: 04/20/17

Benzene	27.7	1.0	ug/l	33.3		83.1	51-132			
Toluene	32.4	1.0	"	33.3		97.2	51-138			
Ethylbenzene	36.5	1.0	"	33.1		110	58-146			
m,p-Xylene	77.6	2.0	"	66.5		117	57-144			
o-Xylene	35.6	1.0	"	32.7		109	53-146			
Surrogate: 1,2-Dichloroethane-d4	11.6		"	13.3		87.2	37-154			
Surrogate: Toluene-d8	12.9		"	13.3		96.5	45-149			
Surrogate: 4-Bromofluorobenzene	12.6		"	13.3		94.3	45-146			

Matrix Spike (1704197-MS1)

Source: 1704176-01

Prepared & Analyzed: 04/20/17

Benzene	26.8	1.0	ug/l	33.3	ND	80.4	34-141			
Toluene	31.7	1.0	"	33.3	ND	95.0	27-151			
Ethylbenzene	35.3	1.0	"	33.1	ND	107	29-160			
m,p-Xylene	75.2	2.0	"	66.5	ND	113	20-166			
o-Xylene	34.4	1.0	"	32.7	ND	105	33-159			
Surrogate: 1,2-Dichloroethane-d4	12.0		"	13.3		89.6	37-154			
Surrogate: Toluene-d8	12.6		"	13.3		94.2	45-149			
Surrogate: 4-Bromofluorobenzene	12.5		"	13.3		93.7	45-146			

Summit Scientific

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

Project: Jacobucci 13-32, 23-32
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
04/21/17 12:12

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 1704197 - EPA 5030 Water MS

Matrix Spike Dup (1704197-MSD1)		Source: 1704176-01			Prepared & Analyzed: 04/20/17					
Benzene	27.7	1.0	ug/l	33.3	ND	83.1	34-141	3.27	32	
Toluene	32.3	1.0	"	33.3	ND	97.0	27-151	2.13	25	
Ethylbenzene	36.7	1.0	"	33.1	ND	111	29-160	4.00	50	
m,p-Xylene	78.4	2.0	"	66.5	ND	118	20-166	4.13	36	
o-Xylene	36.2	1.0	"	32.7	ND	111	33-159	4.96	26	
Surrogate: 1,2-Dichloroethane-d4	12.8		"	13.3		95.9	37-154			
Surrogate: Toluene-d8	12.9		"	13.3		96.9	45-149			
Surrogate: 4-Bromofluorobenzene	12.8		"	13.3		96.0	45-146			

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

Project: Jacobucci 13-32, 23-32

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
04/21/17 12:12

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