

**PDC Energy, Inc.**  
**First Quarter 2017 Groundwater Monitoring Summary**

February 13, 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 January 20, 2017, groundwater monitoring was conducted at seven temporary monitoring well locations (BH02 – BH08). Monitoring well BH01 was damaged prior to the sampling event and was subsequently not sampled. On February 1, 2017, monitoring well BH01 was repaired and sampled. Eight 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 reports are included in Attachment A. Sample locations and corresponding analytical results are illustrated on Figure 1. First quarter 2017 analytical results indicate that BTEX concentrations are below the applicable COGCC Table 910-1 groundwater standards at all eight well locations.

Enhanced fluid recovery (EFR) and air sparge (AS) events were initiated at the site during the second quarter 2013. A summary of the EFR/AS operational data is provided in Table 2. EFR/AS continued as the selected remediation strategy through the end of the fourth quarter 2015. 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 second 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.

The second quarter 2017 groundwater sampling event will be conducted during April 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 <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	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
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

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<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>	
BH02	7/12/2016	<1.0	<1.0	<1.0	<1.0	4.93
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
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
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

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<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	7/12/2016	<1.0	<1.0	<1.0	<1.0	4.76
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
BH05	4/15/2013	<b>67</b>	<b>590</b>	19	370	NM
BH05	7/25/2013	<b>5.2</b>	<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
BH06	4/15/2013	<b>10,000</b>	<b>31,000</b>	<b>950</b>	<b>14,000</b>	NM
BH06	7/25/2013	<b>1,500</b>	61	150	<b>5,900</b>	6.77
BH06	10/30/2013	<b>39</b>	<1.0	<1.0	8.4	4.84
BH06	1/22/2014	<b>64</b>	<1.0	40	570	5.03
BH06	4/28/2014	<b>65</b>	<1.0	56	680	5.01
BH06	7/24/2014	<b>35</b>	<1.0	4.4	320	6.46
BH06	10/27/2014	<b>8.8</b>	<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

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<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>	
BH06	7/12/2016	<1.0	<1.0	<1.0	<1.0	5.28
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
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
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

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Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water <sup>(2)</sup> (feet)
COGCC Table 910-1 Groundwater Standard (µg/L) <sup>(1)</sup>		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		-	-

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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

**TABLE 3**  
**JACOBUCCI 13-32, 23-32 TANK BATTERY**  
**GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE**  
**GRO / NAPHTHALENE**

Sample ID	Date Sampled	Naphthalene (µg/L)	TPH-GRO (µg/L)
<b>CDPHE WQCC Groundwater Standard <sup>(1)</sup></b>		<b>140</b>	<b>NS</b>
BH01	4/15/2013	<1.0	<500
BH02	4/15/2013	<1.0	<500
BH03	4/15/2013	<1.0	<500
BH04	4/15/2013	<1.0	<500
BH05	4/15/2013	<1.0	2,100
BH06	4/15/2013	85	120,000
BH07	4/15/2013	<1.0	<500

**Notes:**

1. Groundwater standards referenced from Colorado Department of Public Health Water Quality Control Commission 5CCR 1002-41 Basic Standards for Groundwater.

TPH-GRO = Total Petroleum Hydrocarbons - Gasoline Range Organics

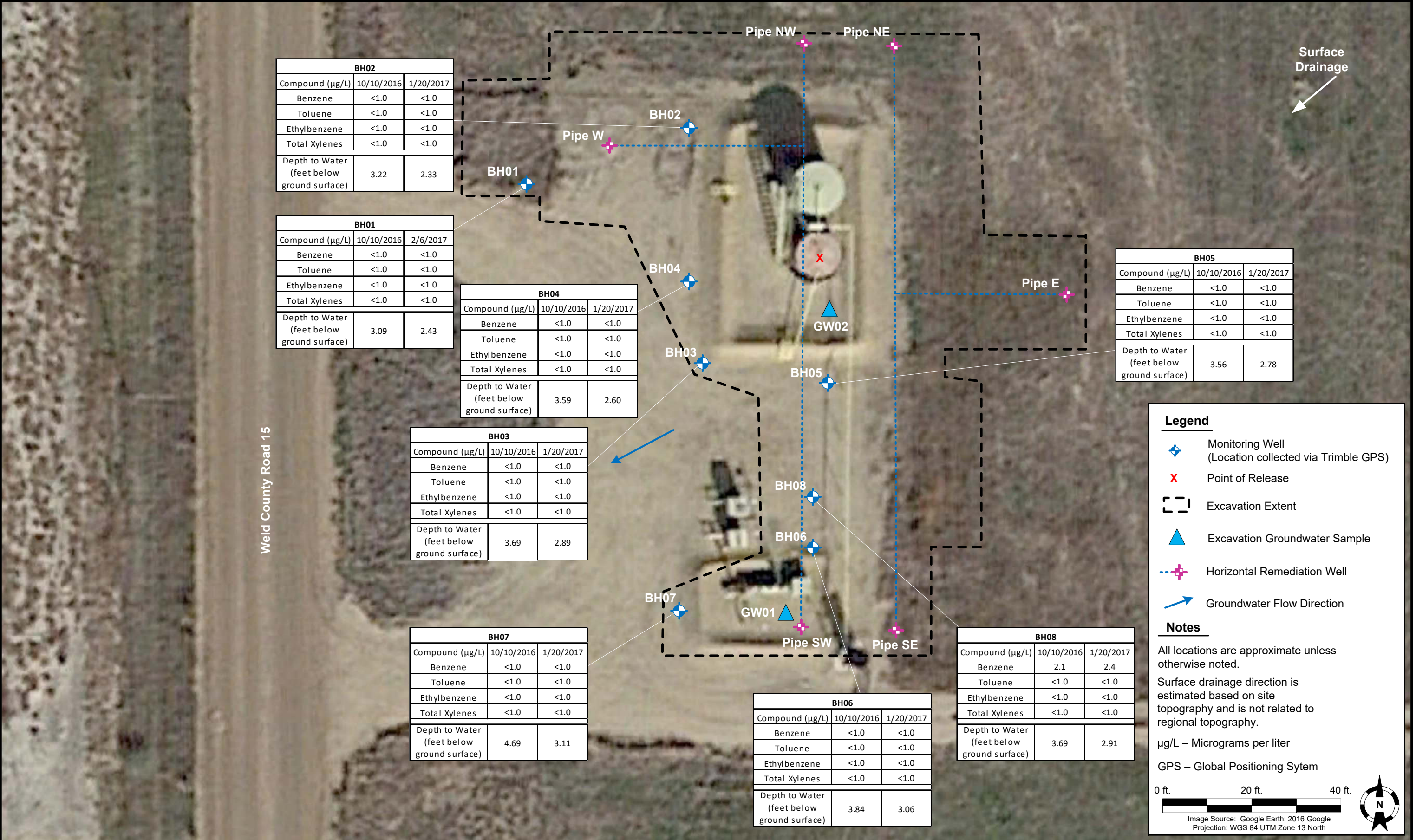
µg/L = Micrograms per liter

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

NS = No Standard

NA = Not Analyzed

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



## **ATTACHMENT A**

# Summit Scientific

---

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

January 26, 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 01/20/17 16:30. 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:**  
01/26/17 08:17

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH02	1701142-01	Water	01/20/17 09:50	01/20/17 16:30
BH03	1701142-02	Water	01/20/17 09:59	01/20/17 16:30
BH04	1701142-03	Water	01/20/17 09:55	01/20/17 16:30
BH05	1701142-04	Water	01/20/17 10:06	01/20/17 16:30
BH06	1701142-05	Water	01/20/17 10:19	01/20/17 16:30
BH07	1701142-06	Water	01/20/17 10:15	01/20/17 16:30
BH08	1701142-07	Water	01/20/17 10:12	01/20/17 16:30

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: Jacobucci 13-32, 23-32

Project Number: [none]  
Project Manager: Mark Longhurst

Reported:  
01/26/17 08:17

## Summit Scientific

1701142

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

Client: PDC / Tasman Geosciences  
Address: 6899 Pecos St, Unit C  
City/State/Zip: Denver, CO 80221  
Phone: 303-487-1228 Fax:  
Sampler Name: Max Garcia  
Project Manager: Mark Longhurst  
E-Mail: mark.longhurst@pdce.com  
Project Name: Jacobucci 13-32, 23-32  
Project Number: N/A  
Page 1 of 4

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)	
BH02	1/20/17	09:50	3	X								
BH03		09:54										
BH04		09:55										
BH05		10:06										
BH06		10:19										
BH07		10:15										
BH08		10:12										

Relinquished by: Max Garcia Date/Time: 1/20/17 1630 Received by: [Signature] Date/Time: 1/20/17 1630  
Relinquished by: [Signature] Date/Time: 1/20/17 1700 Received by: [Signature] Date/Time: 1/20/17 1700  
Relinquished by: [Signature] Date/Time: 1/20/17 1700 Received in Lab by: [Signature] Date/Time: 1/20/17 1700

Turn Around Time (Check)  
Same Day ☐ 72 Hours ☐  
24 Hours ☐ Standard ☒  
48 Hours ☐

Sample Integrity:  
Temperature Upon Receipt: 0.2°C  
Inact: Yes ☒ No ☐

Notes: on ice

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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: Jacobucci 13-32, 23-32

Project Number: [none]  
Project Manager: Mark Longhurst

Reported:  
01/26/17 08:17

### Sample Receipt Checklist

S2 Work Order: 1701142

Client: PDC Hasman

Client Project ID: Jacobucci 13-32, 23-32

Shipped Via: 8/10

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

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

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

Cooler ID					
Temp (°C)	<u>0.2</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> ?	<input checked="" type="checkbox"/>			
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect				<u>HCl</u>
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 of initials of Custodian

1/20/17 17:00  
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:**  
01/26/17 08:17

**BH02**  
**1701142-01 (Water)**

**Summit Scientific**

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

Date Sampled: **01/20/17 09:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1701214	01/24/17	01/24/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **01/20/17 09:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		117 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		93.1 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		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: Jacobucci 13-32, 23-32  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
01/26/17 08:17

**BH03**  
**1701142-02 (Water)**

**Summit Scientific**

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

Date Sampled: **01/20/17 09:59**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1701214	01/24/17	01/24/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **01/20/17 09:59**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		118 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		93.5 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		96.6 %	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: Jacobucci 13-32, 23-32  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
01/26/17 08:17

**BH04**  
**1701142-03 (Water)**

**Summit Scientific**

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

Date Sampled: **01/20/17 09:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1701214	01/24/17	01/24/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **01/20/17 09:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		117 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		93.0 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		96.8 %	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: Jacobucci 13-32, 23-32  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
01/26/17 08:17

**BH05**  
**1701142-04 (Water)**

**Summit Scientific**

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

Date Sampled: **01/20/17 10:06**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1701214	01/24/17	01/24/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **01/20/17 10:06**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		117 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		94.5 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.9 %	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: Jacobucci 13-32, 23-32  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
01/26/17 08:17

**BH06**  
**1701142-05 (Water)**

**Summit Scientific**

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

Date Sampled: **01/20/17 10:19**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1701214	01/24/17	01/24/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **01/20/17 10:19**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		114 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		92.3 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.5 %	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: Jacobucci 13-32, 23-32  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
01/26/17 08:17

**BH07**  
**1701142-06 (Water)**

**Summit Scientific**

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

Date Sampled: **01/20/17 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1701214	01/24/17	01/24/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **01/20/17 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		117 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		93.6 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.4 %	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: Jacobucci 13-32, 23-32  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
01/26/17 08:17

**BH08**  
**1701142-07 (Water)**

**Summit Scientific**

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

Date Sampled: **01/20/17 10:12**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>2.4</b>	1.0	ug/l	1	1701214	01/24/17	01/24/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **01/20/17 10:12**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		114 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		92.9 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.0 %	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: Jacobucci 13-32, 23-32  
Project Number: [none]  
Project Manager: Mark Longhurst

Reported:  
01/26/17 08:17

## 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 1701214 - EPA 5030 Water MS

##### Blank (1701214-BLK1)

Prepared & Analyzed: 01/24/17

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	14.4		"	13.3		108	37-154			
Surrogate: Toluene-d8	12.5		"	13.3		93.8	45-149			
Surrogate: 4-Bromofluorobenzene	13.4		"	13.3		101	45-146			

##### LCS (1701214-BS1)

Prepared & Analyzed: 01/24/17

Benzene	38.4	1.0	ug/l	33.3		115	51-132			
Toluene	38.1	1.0	"	33.3		114	51-138			
Ethylbenzene	40.5	1.0	"	33.1		122	58-146			
m,p-Xylene	74.7	2.0	"	66.5		112	57-144			
o-Xylene	39.1	1.0	"	32.7		120	53-146			
Surrogate: 1,2-Dichloroethane-d4	15.4		"	13.3		116	37-154			
Surrogate: Toluene-d8	13.0		"	13.3		97.9	45-149			
Surrogate: 4-Bromofluorobenzene	13.4		"	13.3		100	45-146			

##### Matrix Spike (1701214-MS1)

Source: 1701142-01

Prepared & Analyzed: 01/24/17

Benzene	38.6	1.0	ug/l	33.3	ND	116	34-141			
Toluene	38.6	1.0	"	33.3	ND	116	27-151			
Ethylbenzene	41.7	1.0	"	33.1	ND	126	29-160			
m,p-Xylene	77.0	2.0	"	66.5	ND	116	20-166			
o-Xylene	40.2	1.0	"	32.7	ND	123	33-159			
Surrogate: 1,2-Dichloroethane-d4	15.9		"	13.3		119	37-154			
Surrogate: Toluene-d8	12.9		"	13.3		96.5	45-149			
Surrogate: 4-Bromofluorobenzene	13.3		"	13.3		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: Jacobucci 13-32, 23-32  
Project Number: [none]  
Project Manager: Mark Longhurst

Reported:  
01/26/17 08:17

**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 1701214 - EPA 5030 Water MS**

Matrix Spike Dup (1701214-MSD1)	Source: 1701142-01			Prepared & Analyzed: 01/24/17						
Benzene	37.7	1.0	ug/l	33.3	ND	113	34-141	2.44	32	
Toluene	37.4	1.0	"	33.3	ND	112	27-151	3.11	25	
Ethylbenzene	41.4	1.0	"	33.1	ND	125	29-160	0.529	50	
m,p-Xylene	75.3	2.0	"	66.5	ND	113	20-166	2.27	36	
o-Xylene	39.7	1.0	"	32.7	ND	122	33-159	1.25	26	
Surrogate: 1,2-Dichloroethane-d4	15.6		"	13.3		117	37-154			
Surrogate: Toluene-d8	12.8		"	13.3		95.6	45-149			
Surrogate: 4-Bromofluorobenzene	13.4		"	13.3		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: Jacobucci 13-32, 23-32

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
01/26/17 08:17

### 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

---

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

February 09, 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 02/06/17 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:**  
02/09/17 08:25

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1702047-01	Water	02/06/17 13:05	02/06/17 17:00

Summit Scientific

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

*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: Jacobucci 13-32, 23-32

Project Number: [none]  
Project Manager: Mark Longhurst

Reported:  
02/09/17 08:25

# Summit Scientific

1702047

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

Page 4 of 4

Client: PDC / Tasman Geosciences  
Address: 6899 Pecos St, Unit C  
City/State/Zip: Denver, CO 80221  
Phone: 303-487-1228 Fax:  
Sampler Name: Max Garza, Matt Rehner  
Project Manager: Mark Longhurst  
E-Mail: mark.longhurst@pdee.com  
Project Name: Jacobucci 13-32, 23-32  
Project Number: N/A

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)	BTEX - 8260																			
6701	2/6/17	13:05	3			X		X				X																			

Relinquished by: Max Garza	Date/Time: 2/6/17 1700	Received by: MR	Date/Time: 2/6/17 1700	Turn Around Time (Check)	Notes:
Relinquished by: MR	Date/Time: 2/6/17 1720	Received by:	Date/Time:	Same Day <input type="checkbox"/>	72 Hours <input type="checkbox"/>
Relinquished by:	Date/Time:	Received in Lab by:	Date/Time:	24 Hours <input type="checkbox"/>	Standard <input checked="" type="checkbox"/>
				48 Hours <input type="checkbox"/>	
				Sample Integrity:	
				Temperature Upon Receipt: 6.2°C	
				Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

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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: Jacobucci 13-32, 23-32

Project Number: [none]  
Project Manager: Mark Longhurst

Reported:  
02/09/17 08:25

**Sample Receipt Checklist**

S2 Work Order: 1702047

Client: PDC/Tasman Client Project ID: Jacobucci 13-32, 23-32

Shipped Via: P/U (UPS, FedEx, Hand Delivered, Pick-up, etc.) Airbill #: \_\_\_\_\_

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

Cooler ID	Temp (°C)				
	<u>6.2</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> ?	<input checked="" type="checkbox"/>			
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.			<input checked="" type="checkbox"/>	
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

2/6/17 1726  
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:**  
02/09/17 08:25

**BH01**  
**1702047-01 (Water)**

**Summit Scientific**

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

Date Sampled: **02/06/17 13:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1702059	02/07/17	02/07/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **02/06/17 13:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		116 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		93.6 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.7 %	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:  
02/09/17 08:25

## 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 1702059 - EPA 5030 Water MS

##### Blank (1702059-BLK1)

Prepared & Analyzed: 02/06/17

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	13.3		"	13.3		99.5	37-154			
Surrogate: Toluene-d8	13.6		"	13.3		102	45-149			
Surrogate: 4-Bromofluorobenzene	13.8		"	13.3		103	45-146			

##### LCS (1702059-BS1)

Prepared & Analyzed: 02/06/17

Benzene	30.4	1.0	ug/l	33.3		91.4	51-132			
Toluene	33.0	1.0	"	33.3		99.2	51-138			
Ethylbenzene	37.9	1.0	"	33.1		115	58-146			
m,p-Xylene	75.9	2.0	"	66.5		114	57-144			
o-Xylene	38.2	1.0	"	32.7		117	53-146			
Surrogate: 1,2-Dichloroethane-d4	13.3		"	13.3		99.5	37-154			
Surrogate: Toluene-d8	13.2		"	13.3		99.0	45-149			
Surrogate: 4-Bromofluorobenzene	14.1		"	13.3		106	45-146			

##### Matrix Spike (1702059-MS1)

Source: 1702030-01

Prepared & Analyzed: 02/06/17

Benzene	37.3	1.0	ug/l	33.3	2.28	105	34-141			
Toluene	34.0	1.0	"	33.3	ND	102	27-151			
Ethylbenzene	67.2	1.0	"	33.1	2.54	196	29-160			QM-07
m,p-Xylene	191	2.0	"	66.5	9.23	272	20-166			QM-07
o-Xylene	36.9	1.0	"	32.7	ND	113	33-159			
Surrogate: 1,2-Dichloroethane-d4	14.1		"	13.3		106	37-154			
Surrogate: Toluene-d8	13.4		"	13.3		101	45-149			
Surrogate: 4-Bromofluorobenzene	14.0		"	13.3		105	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:**  
02/09/17 08:25

**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 1702059 - EPA 5030 Water MS**

Matrix Spike Dup (1702059-MSD1)		Source: 1702030-01			Prepared & Analyzed: 02/06/17					
Benzene	37.0	1.0	ug/l	33.3	2.28	104	34-141	0.753	32	
Toluene	33.6	1.0	"	33.3	ND	101	27-151	1.39	25	
Ethylbenzene	63.7	1.0	"	33.1	2.54	185	29-160	5.33	50	QM-07
m,p-Xylene	178	2.0	"	66.5	9.23	254	20-166	6.81	36	QM-07
o-Xylene	38.2	1.0	"	32.7	ND	117	33-159	3.30	26	
Surrogate: 1,2-Dichloroethane-d4	14.1		"	13.3		106	37-154			
Surrogate: Toluene-d8	13.1		"	13.3		98.2	45-149			
Surrogate: 4-Bromofluorobenzene	14.8		"	13.3		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:**  
02/09/17 08:25

### Notes and Definitions

QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.
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