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**Corporate Office**

1775 Sherman Street, #3000  
Denver, Colorado 80203  
303.860.5800  
www.pdce.com

October 10, 2017

Mr. Chris Canfield, P.G.  
Environmental Protection Specialist  
Colorado Oil and Gas Conservation Commission  
1120 Lincoln Street, Suite 801  
Denver, CO 80203

**RE: FORM 27 SUPPLEMENT AND REQUEST FOR NO FURTHER ACTION (NFA)  
JACOBUCCI 13-32, 23-32 TANK BATTERY  
NWSW S32 T1N R67W  
FACILITY #: 331008  
REMEDATION #: 7952**

Dear Mr. Canfield:

PDC Energy, Inc. (PDC) is submitting this Form 27 Supplement and Request for No Further Action (NFA) to the Colorado Oil and Gas Conservation Commission (COGCC) to summarize additional remediation and environmental sampling activities that were performed by Tasman Geosciences, Inc. (Tasman), on behalf of PDC at the Jacobucci 13, 32, 23-32 tank battery (Site).

On February 11, 2013, a historic release was discovered during dump line replacement activities, as described in the Form 19 submitted to the COGCC on March 25, 2013. The proposed remedial strategy was submitted to the COGCC in a Form 27 on June 17, 2013, and Remediation Number 7952 was issued to the project.

A summary of remediation and environmental sampling activities conducted in accordance with the approved Form 27 is provided below.

#### **Groundwater Monitoring and Remediation Activities**

Quarterly groundwater monitoring was initiated on April 15, 2013, at seven monitoring wells (BH01 – BH07) [Figure 1]. Prior to the third quarter 2014 quarterly groundwater sampling event, one additional monitoring well (BH08) was added to the monitoring network. Groundwater samples were submitted to Summit Scientific Laboratories (Summit) in Golden, Colorado for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by United States Environmental Protection Agency (USEPA) Method 8260B. Quarterly groundwater monitoring data is summarized in Table 1.

Enhanced fluid recovery (EFR) and air sparge (AS) was the selected remediation strategy for the Site between second quarter 2013 and fourth quarter 2015. A summary of EFR/AS operational data is provided in Table 2. Due to a Site-wide decrease in dissolved-phase BTEX concentrations, monitored natural attenuation (MNA) was initiated during the first quarter 2016.

During the fourth quarter 2017, four consecutive quarters of post-remediation BTEX concentrations in compliance with COGCC Table 910-1 standards were achieved. Groundwater analytical results from the third and fourth quarters of 2017 are illustrated on Figure 1. The laboratory reports are included in Attachment A.

### **Request for No Further Action**

Based on the groundwater analytical data provided herein, remaining petroleum hydrocarbon impacts above regulatory standards are no longer present on Site. Consequently, PDC is requesting a No Further Action (NFA) determination from the COGCC for this release.

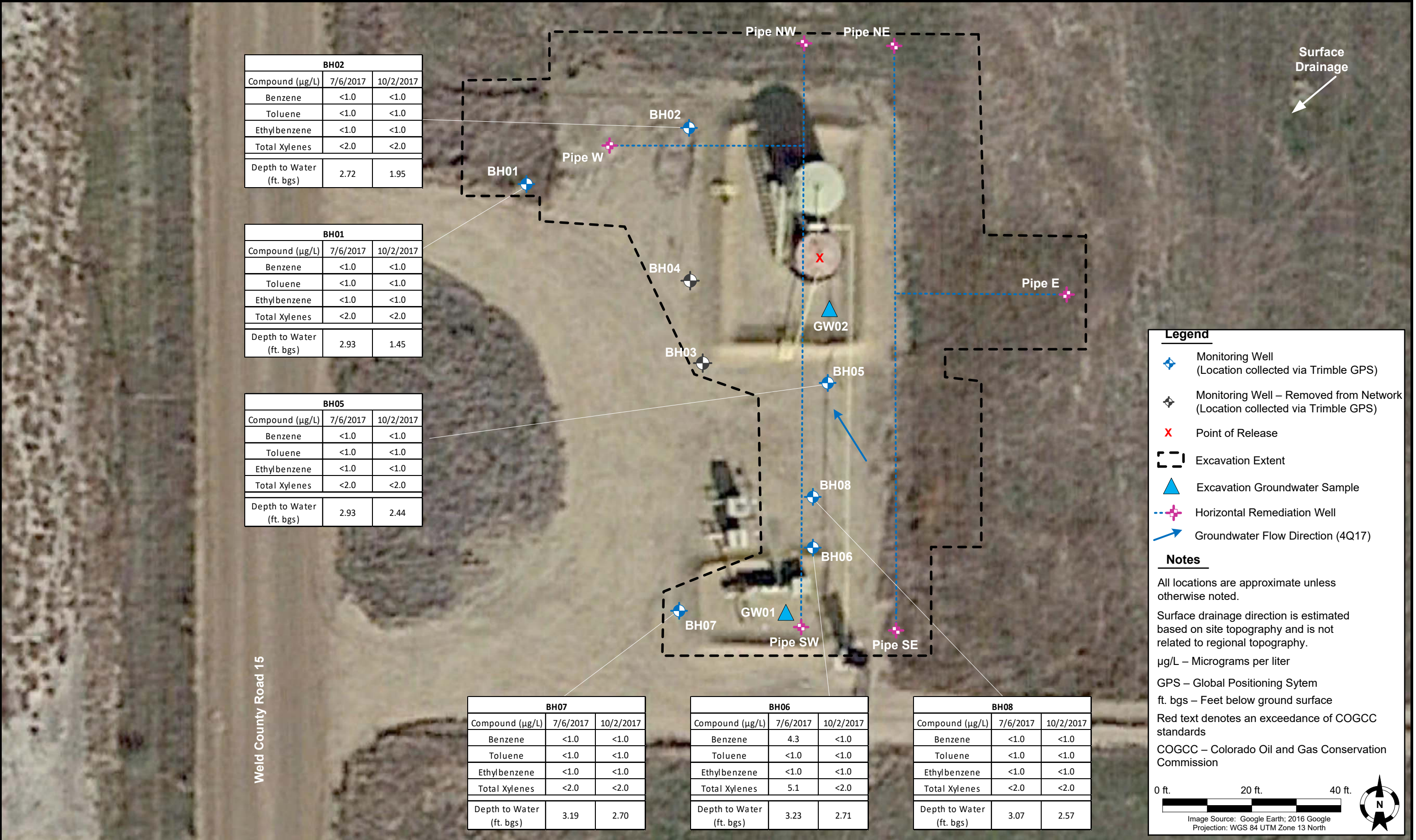
Should you have any questions regarding this location, please contact me by phone at (303) 318-6106.

Sincerely,  
PDC Energy, Inc.

Karen Shanahan Olson  
Senior EHS Manager

### **Enclosures:**

Figure 1 – Groundwater Analytical Results Map  
Table 1 – Groundwater Analytical Results Summary Table  
Table 2 – EFR/AS Operational Summary Table  
Attachment A – Laboratory Analytical Reports





**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	<b>510</b>	<b>3,400</b>	190	<b>3,000</b>	~ 4
GW02	2/19/2013	<b>690</b>	<b>2,800</b>	94	<b>1,500</b>	~ 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
BH01	7/6/2017	<1.0	<1.0	<1.0	<2.0	2.93
BH01	10/2/2017	<1.0	<1.0	<1.0	<2.0	1.45
BH02	4/15/2013	<b>12</b>	1.6	5.3	130	NM
BH02	7/25/2013	<b>7.7</b>	<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	<b>31</b>	<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

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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	
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
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
BH02	7/6/2017	<1.0	<1.0	<1.0	<2.0	2.72
BH02	10/2/2017	<1.0	<1.0	<1.0	<2.0	1.95
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	4/18/2017	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

**TABLE 1**  
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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	
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
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	4/18/2017	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
BH05	7/6/2017	<1.0	<1.0	<1.0	<2.0	2.93
BH05	10/2/2017	<1.0	<1.0	<1.0	<2.0	2.44
BH06	4/15/2013	10,000	31,000	950	14,000	NM
BH06	7/25/2013	1,500	61	150	5,900	6.77

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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)
<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	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
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
BH06	7/6/2017	4.3	<1.0	<1.0	5.1	3.23
BH06	10/2/2017	<1.0	<1.0	<1.0	<2.0	2.71
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

**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)
COGCC Table 910-1 Groundwater Standard (µg/L) <sup>(1)</sup>		5	560	700	1,400	
BH07	4/18/2017	<1.0	<1.0	<1.0	<2.0	2.79
BH07	7/6/2017	<1.0	<1.0	<1.0	<2.0	3.19
BH07	10/2/2017	<1.0	<1.0	<1.0	<2.0	2.70
BH08	7/24/2014	<b>17</b>	1.6	<1.0	61	6.97
BH08	10/27/2014	<b>8.4</b>	<1.0	1.9	19	5.26
BH08	1/19/2015	<b>91</b>	<1.0	18	110	4.89
BH08	4/21/2015	<b>40</b>	<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	<b>6.4</b>	<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	<b>39</b>	<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
BH08	7/6/2017	<1.0	<1.0	<1.0	<2.0	3.07
BH08	10/2/2017	<1.0	<1.0	<1.0	<2.0	2.57

**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

July 13, 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 07/06/17 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 'Ben Shrewsbury', with a long, sweeping horizontal line extending to the right.

Ben Shrewsbury  
Laboratory Manager





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

Project: Jacobucci 13-32, 23-32

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
07/13/17 16:32

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1707030-01	Water	07/06/17 09:05	07/06/17 17:00
BH02	1707030-02	Water	07/06/17 09:43	07/06/17 17:00
BH05	1707030-03	Water	07/06/17 09:37	07/06/17 17:00
BH06	1707030-04	Water	07/06/17 09:40	07/06/17 17:00
BH07	1707030-05	Water	07/06/17 09:45	07/06/17 17:00
BH08	1707030-06	Water	07/06/17 09:47	07/06/17 17:00

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: Jacobucci 13-32, 23-32

Project Number: [none]  
Project Manager: Mark Longhurst

Reported:  
07/13/17 16:32

# Summit Scientific

1707030

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 G., Mith W., Bradley A.

Page 1 of 2  
Project Manager: Mark Longhurst  
E-Mail: mark.longhurst@pdce.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			
BK01	7/6/17	09:05	3	X											
BK02		09:43													
BK05		09:37													
BK06		09:40													
BK07		09:45													
BK08		09:47													
Relinquished by: <i>Max G.</i> Date/Time: 7/6/17 17:00 Received by: <i>MM</i> Date/Time: 7/6/17 17:00 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"/> Relinquished by: <i>MM</i> Date/Time: 7/6/17 17:45 Received by: Date/Time: Sample Integrity: Temperature Upon Receipt: 8.4°C Intact: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO Notes: on ice															

www.s2scientific.com

Summit Scientific

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



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

Project: Jacobucci 13-32, 23-32

Project Number: [none]  
Project Manager: Mark Longhurst

Reported:  
07/13/17 16:32

**Sample Receipt Checklist**  
S2 Work Order: 1707030  
Client: PDC/Tasman Client Project ID: Jacobucci 13-32, 23-32  
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>8.4</u>				

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
NOTE: If samples are delivered the same day of sampling, this requirement is met provided that there is evidence that cooling has begun.				<u>on ice</u>
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"/>			<u>HCC</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 <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.				

Nakitz  
Custodian Printed Name

[Signature]  
Signature or Initials of Custodian

7/6/17 17:45  
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:**  
07/13/17 16:32

**BH01**  
**1707030-01 (Water)**

**Summit Scientific**

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

Date Sampled: **07/06/17 09:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1707053	07/08/17	07/08/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **07/06/17 09:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		121 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		91.6 %	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:**  
07/13/17 16:32

**BH02**  
**1707030-02 (Water)**

**Summit Scientific**

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

Date Sampled: **07/06/17 09:43**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1707053	07/08/17	07/08/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **07/06/17 09:43**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		117 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		90.2 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.9 %	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:**  
07/13/17 16:32

**BH05**  
**1707030-03 (Water)**

**Summit Scientific**

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

Date Sampled: **07/06/17 09:37**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1707053	07/08/17	07/08/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **07/06/17 09:37**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		121 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		91.2 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.7 %	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:**  
07/13/17 16:32

**BH06**  
**1707030-04 (Water)**

**Summit Scientific**

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

Date Sampled: **07/06/17 09:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>4.3</b>	1.0	ug/l	1	1707053	07/08/17	07/08/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>5.1</b>	2.0	"	"	"	"	"	"	

Date Sampled: **07/06/17 09:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		119 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		90.3 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.8 %	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:**  
07/13/17 16:32

**BH07**  
**1707030-05 (Water)**

**Summit Scientific**

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

Date Sampled: **07/06/17 09:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1707053	07/08/17	07/08/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **07/06/17 09:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		121 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		90.2 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.7 %	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:**  
07/13/17 16:32

**BH08**  
**1707030-06 (Water)**

**Summit Scientific**

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

Date Sampled: **07/06/17 09:47**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1707053	07/08/17	07/08/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **07/06/17 09:47**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		121 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		90.2 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		100 %	45-146		"	"	"	"	

Summit Scientific

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



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

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

**Reported:**  
07/13/17 16:32

## 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 1707053 - EPA 5030 Water MS

##### Blank (1707053-BLK1)

Prepared & Analyzed: 07/07/17

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	2.0	"							
Surrogate: 1,2-Dichloroethane-d4	15.0		"	13.3	112	37-154				
Surrogate: Toluene-d8	12.6		"	13.3	94.6	45-149				
Surrogate: 4-Bromofluorobenzene	13.4		"	13.3	101	45-146				

##### LCS (1707053-BS1)

Prepared & Analyzed: 07/07/17

Benzene	30.2	1.0	ug/l	33.3	90.6	51-132				
Toluene	31.0	1.0	"	33.3	93.2	51-138				
Ethylbenzene	31.9	1.0	"	33.1	96.5	58-146				
m,p-Xylene	58.5	2.0	"	66.5	87.9	57-144				
o-Xylene	30.0	1.0	"	32.7	91.7	53-146				
Surrogate: 1,2-Dichloroethane-d4	15.0		"	13.3	112	37-154				
Surrogate: Toluene-d8	14.3		"	13.3	107	45-149				
Surrogate: 4-Bromofluorobenzene	13.6		"	13.3	102	45-146				

##### Matrix Spike (1707053-MS1)

Source: 1707032-01

Prepared & Analyzed: 07/07/17

Benzene	32.8	1.0	ug/l	33.3	ND	98.5	34-141			
Toluene	34.2	1.0	"	33.3	ND	103	27-151			
Ethylbenzene	38.2	1.0	"	33.1	ND	115	29-160			
m,p-Xylene	70.1	2.0	"	66.5	ND	105	20-166			
o-Xylene	35.8	1.0	"	32.7	ND	110	33-159			
Surrogate: 1,2-Dichloroethane-d4	16.1		"	13.3	121	37-154				
Surrogate: Toluene-d8	13.3		"	13.3	99.5	45-149				
Surrogate: 4-Bromofluorobenzene	13.5		"	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:  
07/13/17 16:32

**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 1707053 - EPA 5030 Water MS**

Matrix Spike Dup (1707053-MSD1)	Source: 1707032-01			Prepared & Analyzed: 07/07/17						
Benzene	35.0	1.0	ug/l	33.3	ND	105	34-141	6.51	32	
Toluene	35.8	1.0	"	33.3	ND	107	27-151	4.43	25	
Ethylbenzene	43.2	1.0	"	33.1	ND	131	29-160	12.3	50	
m,p-Xylene	77.8	2.0	"	66.5	ND	117	20-166	10.3	36	
o-Xylene	40.1	1.0	"	32.7	ND	123	33-159	11.1	26	
Surrogate: 1,2-Dichloroethane-d4	16.6		"	13.3		124	37-154			
Surrogate: Toluene-d8	12.5		"	13.3		93.8	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:**  
07/13/17 16:32

### 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

October 05, 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 10/02/17 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 be 'Ben Shrewsbury', with a long, sweeping horizontal line extending to the right.

Ben Shrewsbury  
Laboratory Manager



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

Project: Jacobucci 13-32, 23-32

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
10/05/17 18:10

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1710004-01	Water	10/02/17 10:20	10/02/17 17:00
BH02	1710004-02	Water	10/02/17 10:39	10/02/17 17:00
BH05	1710004-03	Water	10/02/17 10:35	10/02/17 17:00
BH06	1710004-04	Water	10/02/17 10:21	10/02/17 17:00
BH07	1710004-05	Water	10/02/17 10:55	10/02/17 17:00
BH08	1710004-06	Water	10/02/17 10:46	10/02/17 17:00

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.*

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

Page 1 of 1

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

Project Manager: Mark Longhurst  
E-Mail: Mark.Longhurst@pdce.com  
Project Name: Jacobucci 13-32, 23-32  
Project Number: \_\_\_\_\_

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)														
BH01	10/2/2017	10:20	3			X		X					X													
BH02	10/2/2017	10:39	3			X		X					X													
BH05	10/2/2017	10:35	3			X		X					X													
BH06	10/2/2017	10:21	3			X		X					X													
BH07	10/2/2017	10:55	3			X		X					X													
BH08	10/2/2017	10:46	3			X		X					X													
Relinquished by: <u>[Signature]</u> Date/Time: <u>10/2/17 1700</u>				Received by: <u>[Signature]</u> Date/Time: <u>10/2/17 1700</u>				<b>Turn Around Time (Check)</b> 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"/>												<b>Notes:</b>  <u>on ice</u>						
Relinquished by: _____ Date/Time: _____				Received by: _____ Date/Time: _____				<b>Sample Integrity:</b> Temperature Upon Receipt: <u>4.8°C</u> Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																		
Relinquished by: _____ Date/Time: _____				Received in Lab by: _____ Date/Time: _____																						



1710004

## Sample Receipt Checklist

S2 Work Order: \_\_\_\_\_

Client: PDC Client Project ID: Jacobucci 13-32, 23-32Shipped 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)	4.8				

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C <sup>(1)</sup> ?	✓			
NOTE: If samples are delivered the same day of sampling, this requirement is met provided that there is evidence that cooling has begun.				
Were all samples received intact <sup>(1)</sup> ?	✓			
Was adequate sample volume provided <sup>(1)</sup> ?	✓			
If custody seals are present, are they intact <sup>(1)</sup> ?			✓	
Are short holding time analytes or samples with HTs due within 48 hours present?			✓	
Is a chain-of-custody (COC) form present and filled out completely <sup>(1)</sup> ?	✓			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	✓			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	✓			
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	✓			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.		✓		
Are samples preserved that require preservation (excluding cooling) <sup>(1)</sup> ?				
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect			✓	
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ?			✓	
Record the pH in Comments.			✓	
If dissolved metals are requested, were samples field filtered?			✓	
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

10/2/17 1745  
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:**  
10/05/17 18:10

**BH01**  
**1710004-01 (Water)**

**Summit Scientific**

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

Date Sampled: **10/02/17 10:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1710018	10/05/17	10/05/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **10/02/17 10:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		111 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		98.7 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		96.8 %	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:**  
10/05/17 18:10

**BH02**  
**1710004-02 (Water)**

**Summit Scientific**

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

Date Sampled: **10/02/17 10:39**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1710018	10/05/17	10/05/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **10/02/17 10:39**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		111 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		101 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.9 %	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:**  
10/05/17 18:10

**BH05**  
**1710004-03 (Water)**

**Summit Scientific**

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

Date Sampled: **10/02/17 10:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1710018	10/05/17	10/05/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **10/02/17 10:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		110 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		99.8 %	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:**  
10/05/17 18:10

**BH06**  
**1710004-04 (Water)**

**Summit Scientific**

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

Date Sampled: **10/02/17 10:21**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1710018	10/05/17	10/05/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **10/02/17 10:21**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		107 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		94.7 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		96.5 %	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:**  
10/05/17 18:10

**BH07**  
**1710004-05 (Water)**

**Summit Scientific**

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

Date Sampled: **10/02/17 10:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1710018	10/05/17	10/05/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **10/02/17 10:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		110 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		96.2 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		94.6 %	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:**  
10/05/17 18:10

**BH08**  
**1710004-06 (Water)**

**Summit Scientific**

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

Date Sampled: **10/02/17 10:46**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1710018	10/05/17	10/05/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **10/02/17 10:46**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		109 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		95.6 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		96.3 %	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:**  
10/05/17 18:10

## 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 1710018 - EPA 5030 Water MS

##### Blank (1710018-BLK1)

Prepared & Analyzed: 10/04/17

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	2.0	"							
Surrogate: 1,2-Dichloroethane-d4	12.7		"	13.3		95.6	37-154			
Surrogate: Toluene-d8	10.7		"	13.3		80.0	45-149			
Surrogate: 4-Bromofluorobenzene	13.0		"	13.3		97.4	45-146			

##### LCS (1710018-BS1)

Prepared & Analyzed: 10/04/17

Benzene	43.0	1.0	ug/l	33.3		129	51-132			
Toluene	32.2	1.0	"	33.3		96.6	51-138			
Ethylbenzene	36.4	1.0	"	33.1		110	58-146			
m,p-Xylene	66.9	2.0	"	66.5		101	57-144			
o-Xylene	33.2	1.0	"	32.7		102	53-146			
Surrogate: 1,2-Dichloroethane-d4	16.9		"	13.3		126	37-154			
Surrogate: Toluene-d8	12.6		"	13.3		94.1	45-149			
Surrogate: 4-Bromofluorobenzene	13.2		"	13.3		99.1	45-146			

##### Matrix Spike (1710018-MS1)

Source: 1710003-01

Prepared & Analyzed: 10/04/17

Benzene	39.3	1.0	ug/l	33.3	ND	118	34-141			
Toluene	31.7	1.0	"	33.3	ND	95.0	27-151			
Ethylbenzene	42.2	1.0	"	33.1	ND	128	29-160			
m,p-Xylene	77.5	2.0	"	66.5	ND	116	20-166			
o-Xylene	38.4	1.0	"	32.7	ND	117	33-159			
Surrogate: 1,2-Dichloroethane-d4	15.1		"	13.3		113	37-154			
Surrogate: Toluene-d8	13.5		"	13.3		101	45-149			
Surrogate: 4-Bromofluorobenzene	12.9		"	13.3		96.6	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:**  
10/05/17 18:10

**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 1710018 - EPA 5030 Water MS**

Matrix Spike Dup (1710018-MSD1)	Source: 1710003-01			Prepared & Analyzed: 10/04/17						
Benzene	37.0	1.0	ug/l	33.3	ND	111	34-141	5.97	32	
Toluene	29.5	1.0	"	33.3	ND	88.5	27-151	7.03	25	
Ethylbenzene	42.0	1.0	"	33.1	ND	127	29-160	0.452	50	
m,p-Xylene	76.5	2.0	"	66.5	ND	115	20-166	1.21	36	
o-Xylene	38.2	1.0	"	32.7	ND	117	33-159	0.340	26	
Surrogate: 1,2-Dichloroethane-d4	14.3		"	13.3		107	37-154			
Surrogate: Toluene-d8	10.3		"	13.3		77.6	45-149			
Surrogate: 4-Bromofluorobenzene	12.8		"	13.3		95.9	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:**  
10/05/17 18:10

### 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