

PDC Energy, Inc.
Fourth Quarter 2015 Groundwater Monitoring Summary

January 20, 2016

Jacobucci 13-32, 23-32 Tank Battery
NWSW Section 32 T1N R67W
Weld County, API # 05-123-20024
Spill Tracking # 2232473
Remediation # 7952

This groundwater summary has been prepared by Tasman Geosciences, Inc. for the Jacobucci 13-32, 23-32 tank battery. On October 15, 2015, groundwater sampling was conducted at eight temporary monitoring well locations. Groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by USEPA Method 8260B. Analytical results are summarized in Table 1 and the laboratory report is included as Attachment A. Sample locations and corresponding analytical results are illustrated on Figure 1. Fourth quarter 2015 analytical results indicate that the BTEX concentrations are below applicable COGCC Table 910-1 regulatory standards at each of the eight monitoring well locations.

Tasman initiated enhanced fluid recovery (EFR) and air sparge (AS) events 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) will be implemented as the remediation strategy during the first quarter 2016, as BTEX concentrations have decreased below COGCC regulatory standards.

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, as they are not regulated in the COGCC 900 Series.

The first quarter 2016 groundwater sampling event will be conducted during January 2016.

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
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
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

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GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE

Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water ⁽²⁾ (feet)
COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400	
BH03	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
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
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
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

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	
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
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
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

Notes:

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

COGCC = Colorado Oil and Gas Conservation Commission

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

µg/L = Micrograms per liter

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

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 EFR/AS Duration (hours)	Approximate Gallons Extracted	AS Wells	Air Injection Pressure (psi)
Second Quarter 2013					
4/25/2013	BH02, BH05, BH06	6	130	BH02, BH05, BH06	10
4/26/2013		6.5	120		10
5/16/2013		6	90		10
5/28/2013		4	80		10
6/7/2013		6	183		10
6/19/2013		6.5	265		10
Quarterly Totals		35	868		-
Third Quarter 2013					
7/9/2013	BH02, BH03, BH05, BH06, BH07	6	142	BH02, BH03, BH05, BH06, BH07	10
7/23/2013		6	160		10
8/7/2013		7	290		10
8/23/2013		6.5	180		10
9/10/2013		6.5	210		10
9/23/2013		6	100		10
Quarterly Totals		38	1082		-
Fourth Quarter 2013					
10/8/2013	BH02, BH03, BH05, BH06	6	450	BH02, BH03, BH05, BH06	10
10/15/2013		6	180		15
11/5/2013		6	270		10
11/19/2013		6	120		10
12/3/2013		6	80		10
12/23/2013		6	50		10
Quarterly Totals		36	1150		-
First Quarter 2014					
1/16/2014	BH02, BH05, BH06	6	120	BH02, BH05, BH06	10
2/3/2014		5.5	114		10
2/10/2014		5	0		10
3/3/2014		6	115		10
3/12/2014		6	135		10
3/19/2014		6	135		10
Quarterly Totals		34.5	619		
Second Quarter 2014					
4/10/2014	BH02, BH04, BH06, BH07	7	165	BH02, BH06	15
4/22/2014		8	450		20
5/9/2014		6	220		20
5/22/2014		6	220		10
6/6/2014		6	180		10
6/30/2014		6	50		20
Quarterly Totals		39	1285		

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

Date	EFR Wells	Total EFR/AS Duration (hours)	Approximate Gallons Extracted	AS Wells	Air Injection Pressure (psi)
Third Quarter 2014					
7/17/2014	BH02, BH04, BH06, BH07, BH08	6	150	BH02, BH06, BH08	10
8/10/2014		6	450		10
8/26/2014		6	130		10
9/12/2014		6	500		20
9/24/2014		6	300		20
Quarterly Totals		30	1530		-
Fourth Quarter 2014					
10/21/2014	PIPE SW, PIPE SE	6	1890	BH06, BH07, BH08	10
11/4/2014		6	2520		10
11/18/2014		6	0		10
Quarterly Totals		18	4410		-
First Quarter 2015					
1/2/2015	PIPE SW, PIPE SE	6	1890	BH06, BH07, BH08	15
1/13/2015		6	2100		20
2/5/2015		6	1680		8
3/6/2015		6	2688	BH03, BH06, BH07, BH08	20
3/18/2015		6	1890		20
Quarterly Totals		30	10248		-
Second Quarter 2015					
4/8/2015	PIPE SW, PIPE SE	6	58	BH03, BH06, BH07, BH08	20
4/14/2015		6	1470		30
4/29/2015		6	2436		20
5/13/2015		6	80	BH03, BH06, BH07	20
5/27/2015	PIPE SW, PIPE SE, BH08	6	3318		20
6/10/2015		6	336		20
6/24/2015		6	3150		20
Quarterly Totals		42	10848		-
Third Quarter 2015					
7/8/2015	PIPE SW, PIPE SE, BH08	6	3360	BH03, BH06, BH07	30
7/22/2015		6	3192		20
8/5/2015		6	3780		20
8/19/2015		6	3360		20
9/2/2015		6	2940		20
9/18/2015		6	3360		20
Quarterly Totals		36	19992		-

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

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

Notes:

EFR = Enhanced fluid recovery

AS = Air sparge

psi = Pounds per square inch

TABLE 3
JACOBUCCI 13-32, 23-32 TANK BATTERY
GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE

Sample ID	Date Sampled	Naphthalene (µg/L)	TPH-GRO (µg/L)
CDPHE WQCC Groundwater Standard ⁽¹⁾		140	NS
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

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



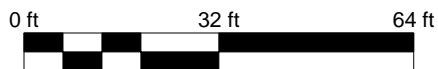
BH02		
Compound (µg/L)	7/20/2015	10/15/2015
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH01		
Compound (µg/L)	7/20/2015	10/15/2015
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH04		
Compound (µg/L)	7/20/2015	10/15/2015
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH03		
Compound (µg/L)	7/20/2015	10/15/2015
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH07		
Compound (µg/L)	7/20/2015	10/15/2015
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0



BH05		
Compound (µg/L)	7/20/2015	10/15/2015
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH08		
Compound (µg/L)	7/20/2015	10/15/2015
Benzene	3.3	1.3
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	9.5

BH06		
Compound (µg/L)	7/20/2015	10/15/2015
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

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

Weld County Road 15

Private Property

Surface Drainage

LEGEND

- Excavation Extent
- Excavation Groundwater Sample Location
- Monitoring Well Location
- Horizontal Remediation Well Location
- Point of Release

All locations are approximate unless otherwise noted

FIGURE 1
GROUNDWATER ANALYTICAL RESULTS MAP

DRAWN BY: ESS

DATE: 11/12/2015

Facility Diagram
PDC Energy – DJ Basin
Jacobucci 13-32, 23-32 Tank Battery
NWSW S32 T1N R67W
Weld County, CO



6899 Pecos Street
Unit C
Denver, CO 80221

ATTACHMENT A

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

October 22, 2015

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

Enclosed are the results of analyses for samples received by Summit Scientific on 10/15/15 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, 23-32

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/22/15 10:59

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1510093-01	Water	10/15/15 13:19	10/15/15 17:00
BH02	1510093-02	Water	10/15/15 13:24	10/15/15 17:00
BH03	1510093-03	Water	10/15/15 13:29	10/15/15 17:00
BH04	1510093-04	Water	10/15/15 13:34	10/15/15 17:00
BH05	1510093-05	Water	10/15/15 13:40	10/15/15 17:00
BH06	1510093-06	Water	10/15/15 13:46	10/15/15 17:00
BH07	1510093-07	Water	10/15/15 13:52	10/15/15 17:00
BH08	1510093-08	Water	10/15/15 13:59	10/15/15 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, 23-32

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/22/15 10:59

Summit Scientific

1510093

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

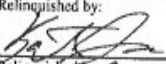
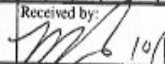

Client: PDC Energy

Page 1 of 1

Address: _____
City/State/Zip: _____
Phone: _____ Fax: _____
Sampler Name: Kate Fairmark

Project Manager: Mark Longhurst
E-Mail: Mark.Longhurst@PDCE.com
Project Name: Jacobucci 13-23-32
Project Number: _____

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative			Matrix		Analyze For:										Special Instructions				
				HCl	HNO ₃	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	BTEX B260											
BH01	10/15/15	1319	3	X				X				X											
BH02		1324																					
BH03		1329																					
BH04		1334																					
BH05		1340																					
BH06		1346																					
BH07		1352																					
BH08	✓	1359	✓	✓				✓				✓											

Relinquished by: 	Date/Time: 10/15/15 1300	Received by: 	Date/Time: 10/15/15 1700	Turn Around Time (Check)	Notes:
Relinquished by: 	Date/Time: 10/15/15 1725	Received by:	Date/Time:	Same Day <input type="checkbox"/>	72 Hours <input type="checkbox"/> Standard <input checked="" type="checkbox"/>
Relinquished by:	Date/Time:	Received in Lab by:	Date/Time:	24 Hours <input type="checkbox"/>	
				48 Hours <input type="checkbox"/>	
				Sample Integrity:	
				Temperature Upon Receipt: 0.8°C	07 ICE
				Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

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

Reported:
10/22/15 10:59

BH01
1510093-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/15/15 13:19

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1510156	10/20/15	10/20/15	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: 10/15/15 13:19

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		119 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		96.2 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.3 %	45-146		"	"	"	"	

Summit Scientific

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

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

Reported:
10/22/15 10:59

BH02
1510093-02 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/15/15 13:24

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	1.0	ug/l	1	1510156	10/19/15	10/19/15	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: 10/15/15 13:24

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		120 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		97.1 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.6 %	45-146		"	"	"	"	

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

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

Reported:
10/22/15 10:59

BH03
1510093-03 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/15/15 13:29

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1510156	10/20/15	10/20/15	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	1.0		"	"	"	"	"	"	

Date Sampled: 10/15/15 13:29

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		119 %		37-154		"	"	"	"	
Surrogate: Toluene-d8		97.7 %		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, 23-32
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/22/15 10:59

BH04
1510093-04 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/15/15 13:34

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	1.0	ug/l	1	1510156	10/20/15	10/20/15	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: 10/15/15 13:34

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		122 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		96.2 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.4 %	45-146		"	"	"	"	

Summit Scientific

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

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

Reported:
10/22/15 10:59

BH05
1510093-05 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/15/15 13:40

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	1.0	ug/l	1	1510156	10/20/15	10/20/15	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: 10/15/15 13:40

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		122 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		96.6 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.5 %	45-146		"	"	"	"	

Summit Scientific

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

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

Reported:
10/22/15 10:59

BH06
1510093-06 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/15/15 13:46

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1510156	10/20/15	10/20/15	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	1.0		"	"	"	"	"	"	

Date Sampled: 10/15/15 13:46

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		121 %		37-154		"	"	"	"	
Surrogate: Toluene-d8		97.4 %		45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		94.4 %		45-146		"	"	"	"	

Summit Scientific

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

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

Reported:
10/22/15 10:59

BH07
1510093-07 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/15/15 13:52

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1510156	10/20/15	10/20/15	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	1.0		"	"	"	"	"	"	

Date Sampled: 10/15/15 13:52

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		123 %		37-154		"	"	"	"	
Surrogate: Toluene-d8		97.4 %		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, 23-32
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/22/15 10:59

BH08
1510093-08 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/15/15 13:59

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	1.3	1.0		ug/l	1	1510156	10/20/15	10/20/15	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	9.5	1.0		"	"	"	"	"	"	

Date Sampled: 10/15/15 13:59

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		120 %		37-154		"	"	"	"	
Surrogate: Toluene-d8		95.6 %		45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		92.4 %		45-146		"	"	"	"	

Summit Scientific

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

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

Reported:
10/22/15 10:59

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 1510156 - EPA 5030 Water MS

Blank (1510156-BLK1)

Prepared & Analyzed: 10/19/15

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	15.4		"	13.2		116	37-154			
Surrogate: Toluene-d8	13.0		"	13.3		97.9	45-149			
Surrogate: 4-Bromofluorobenzene	12.9		"	13.3		96.5	45-146			

LCS (1510156-BS1)

Prepared & Analyzed: 10/19/15

Benzene	27.6	1.0	ug/l	33.3		82.7	51-132			
Toluene	27.2	1.0	"	33.3		81.5	51-138			
Ethylbenzene	35.4	1.0	"	33.1		107	58-146			
m,p-Xylene	67.3	2.0	"	66.5		101	57-144			
o-Xylene	31.8	1.0	"	32.8		97.0	53-146			
Surrogate: 1,2-Dichloroethane-d4	15.1		"	13.2		114	37-154			
Surrogate: Toluene-d8	12.9		"	13.3		96.7	45-149			
Surrogate: 4-Bromofluorobenzene	12.4		"	13.3		93.3	45-146			

Matrix Spike (1510156-MS1)

Source: 1510093-02

Prepared & Analyzed: 10/19/15

Benzene	29.0	1.0	ug/l	33.3	ND	86.9	34-141			
Toluene	28.4	1.0	"	33.3	ND	85.4	27-151			
Ethylbenzene	36.8	1.0	"	33.1	ND	111	29-160			
m,p-Xylene	69.9	2.0	"	66.5	ND	105	20-166			
o-Xylene	33.3	1.0	"	32.8	ND	101	33-159			
Surrogate: 1,2-Dichloroethane-d4	15.7		"	13.2		119	37-154			
Surrogate: Toluene-d8	13.2		"	13.3		98.8	45-149			
Surrogate: 4-Bromofluorobenzene	12.4		"	13.3		92.9	45-146			

Summit Scientific

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

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

Reported:
10/22/15 10:59

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 1510156 - EPA 5030 Water MS

Matrix Spike Dup (1510156-MSD1)	Source: 1510093-02			Prepared & Analyzed: 10/19/15						
Benzene	28.9	1.0	ug/l	33.3	ND	86.7	34-141	0.242	32	
Toluene	28.4	1.0	"	33.3	ND	85.3	27-151	0.0352	25	
Ethylbenzene	37.3	1.0	"	33.1	ND	113	29-160	1.27	50	
m,p-Xylene	70.7	2.0	"	66.5	ND	106	20-166	1.12	36	
o-Xylene	33.3	1.0	"	32.8	ND	101	33-159	0.0300	26	
Surrogate: 1,2-Dichloroethane-d4	16.7		"	13.2		126	37-154			
Surrogate: Toluene-d8	13.0		"	13.3		97.6	45-149			
Surrogate: 4-Bromofluorobenzene	12.9		"	13.3		96.7	45-146			

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

Project: Jacobucci 13, 23-32

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/22/15 10:59

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

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