



**PDC Energy, Inc.**  
First Quarter 2014 Groundwater Monitoring Summary

April 21, 2014

Cottonwood #1 Tank Battery  
NESE Section 13 T6N R66W  
Weld County, API # 05-123-11801

This groundwater summary has been prepared by Tasman Geosciences, LLC for the Cottonwood #1 tank battery. On March 28, 2014 groundwater sampling was conducted at seven 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 below and laboratory reports are included as Attachment A. Sample locations and corresponding fourth quarter 2013 and first quarter 2014 analytical results are illustrated on Figure 1. First quarter analytical results indicate that BTEX concentrations were below laboratory detection limits in all seven sample locations for the second consecutive quarter. Two additional quarters of constituent concentrations below COGCC regulatory standards are required for site closure.

Tasman continued enhanced fluid recovery (EFR) and air sparge (AS) events at the site during the first quarter 2014. A summary of the EFR/AS operational data is provided in Table 2. EFR/AS activities will continue through the second quarter 2014.

Second quarter 2014 groundwater sampling will be conducted during June 2014.

**TABLE 1**  
**COTTONWOOD 1**  
**GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE**

Sample ID	Date Sampled	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	Depth to Water (feet)
GW01	8/21/2012	<b>3,000</b>	1.7	320	<b>1,900</b>	NM
BH01	9/24/2012	<b>160</b>	<1.0	40	<1.0	16.31
BH01	12/20/2012	<b>5</b>	<1.0	<1.0	6.8	16.13
BH01	3/18/2013	<1.0	<1.0	<1.0	<1.0	16.58
BH01	6/20/2013	<1.0	<1.0	<1.0	<1.0	11.16
BH01	9/25/2013	<1.0	<1.0	<1.0	<1.0	13.61
BH01	12/30/2013	1.8	<1.0	<1.0	<1.0	14.38
BH01	3/28/2014	<1.0	<1.0	<1.0	<1.0	14.03
BH02	9/24/2012	<b>1,300</b>	<1.0	190	1,100	18.42
BH02	12/20/2012	<b>24</b>	<1.0	3.9	8.1	17.35
BH02	3/18/2013	<b>18</b>	<1.0	<1.0	<1.0	17.8
BH02	6/20/2013	<b>15</b>	<1.0	<1.0	<1.0	12.58
BH02	9/25/2013	<b>8.6</b>	<1.0	<1.0	<1.0	14.68
BH02	12/30/2013	<b>16</b>	<1.0	<1.0	<1.0	15.44
BH02	3/28/2014	<1.0	<1.0	<1.0	<1.0	15.15
BH03	9/24/2012	<b>350</b>	<1.0	120	300	18.28
BH03	12/20/2012	<b>15</b>	<1.0	6.7	7.9	17.04
BH03	3/18/2013	<b>14</b>	<1.0	1.5	<1.0	17.46
BH03	6/20/2013	<b>11</b>	<1.0	2.1	<1.0	12.01
BH03	9/25/2013	<b>39</b>	<1.0	16	<1.0	14.26
BH03	12/30/2013	<b>48</b>	<1.0	3.6	<1.0	15.02
BH03	3/28/2014	<1.0	<1.0	<1.0	<1.0	14.79
BH04	9/24/2012	<b>150</b>	<1.0	96	400	16.58
BH04	12/20/2012	<b>38</b>	<1.0	40	170	13.95
BH04	3/18/2013	2.6	<1.0	<1.0	<1.0	14.38
BH04	6/20/2013	1.3	<1.0	5.4	19	8.70
BH04	9/25/2013	1.5	<1.0	2.5	<1.0	11.32
BH04	12/30/2013	<1.0	<1.0	<1.0	<1.0	12.12
BH04	3/28/2014	<1.0	<1.0	<1.0	<1.0	11.8

**TABLE 1**  
**COTTONWOOD 1**  
**GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE**

Sample ID	Date Sampled	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	Depth to Water (feet)
BH05	9/24/2012	<1.0	<1.0	<1.0	<1.0	15.42
BH05	12/20/2012	<1.0	<1.0	<1.0	<1.0	16.86
BH05	3/18/2013	<1.0	<1.0	<1.0	<1.0	17.31
BH05	6/20/2013	<1.0	<1.0	<1.0	<1.0	11.42
BH05	9/25/2013	<1.0	<1.0	<1.0	<1.0	14.02
BH05	12/30/2013	<1.0	<1.0	<1.0	<1.0	14.8
BH05	3/28/2014	<1.0	<1.0	<1.0	<1.0	14.45
BH06	9/24/2012	<b>6.7</b>	18	7.5	50	15.35
BH06	12/20/2012	<1.0	<1.0	<1.0	<1.0	16.79
BH06	3/18/2013	3.6	1.2	<1.0	<1.0	14.74
BH06	6/20/2013	<1.0	<1.0	<1.0	<1.0	11.72
BH06	9/25/2013	1.9	<1.0	<1.0	<1.0	14.05
BH06	12/30/2013	<1.0	<1.0	<1.0	<1.0	15.12
BH06	3/28/2014	<1.0	<1.0	<1.0	<1.0	14.78
BH07	9/24/2012	<1.0	<1.0	<1.0	<1.0	16.86
BH07	12/20/2012	<1.0	<1.0	<1.0	<1.0	18.32
BH07	3/18/2013	<1.0	<1.0	<1.0	<1.0	18.77
BH07	6/20/2013	1.6	<1.0	<1.0	<1.0	13.7
BH07	9/25/2013	<1.0	<1.0	<1.0	<1.0	15.95
BH07	12/30/2013	<1.0	<1.0	<1.0	<1.0	16.68
BH07	3/28/2014	<1.0	<1.0	<1.0	<1.0	16.39
<b>COGCC standards for groundwater (ug/L) <sup>(1)</sup></b>		<b>5</b>	<b>560</b>	<b>700</b>	<b>1,400</b>	

Notes:

1). The environmental cleanup standards for groundwater that are applicable to this site are the Colorado Oil and Gas Conservation Commission (COGCC) standards for contaminants in groundwater according to Table 910-1 of the COGCC 900 Series Rule for E&P Waste Management.

**Bold red** values indicate an exceedance of the COGCC groundwater standards for the site.

ug/L-Micrograms per liter

NR - Not Recorded

NM - Not Measured

**TABLE 2  
COTTONWOOD 1**

**AIR SPARGE / EFR OPERATIONAL SUMMARY TABLE**

<b>Date</b>	<b>EFR Wells</b>	<b>Total EFR/AS Duration (hours)</b>	<b>Approximate Gallons Extracted</b>	<b>AS Wells</b>	<b>Air Injection Pressure (psi)</b>	<b>Average Air Flow Rate (cfm)</b>
<b>Fourth Quarter 2012</b>						
11/2/2012	BH01, BH02, BH03, BH04	6.75	13.8	BH01, BH02, BH03, BH04	8	
11/14/2012		6	110		8	
12/12/2012		6	400		8	
<b>Quarterly Totals</b>		18.75	523.8		-	
<b>First Quarter 2013</b>						
1/4/2013	BH01, BH02, BH03, BH04	6.5	185	BH01, BH02, BH03, BH04	10	
1/18/2013		6.25	272		10	
2/2/2013		6	278		10	
2/15/2013		7	180		9	
3/5/2013		6.75	364		10	
3/22/2013		4	90		10	
<b>Quarterly Totals</b>		36.5	1369		-	
<b>Second Quarter 2013</b>						
4/3/2013	BH01, BH02, BH03, BH04	5	275	BH01, BH02, BH03, BH04	10	
4/19/2013		6.5	373		10	
5/13/2013		6	385		10	
5/23/2013		6	151		10	
6/6/2013		6	387		10	
6/17/2013		5	300		10	
<b>Quarterly Totals</b>		34.5	1871		-	
<b>Third Quarter 2013</b>						
7/16/2013	BH01, BH02, BH03, BH04, BH07	6	340	BH01, BH02, BH03, BH04, BH07	10	
7/30/2013		6	320		10	
8/13/2013		6	294		10	
8/30/2013		5.5	182		10	
9/12/2013		5.5	180		10	
9/27/2013		6	80		10	
<b>Quarterly Totals</b>		35	1396		-	
<b>Fourth Quarter 2013</b>						
10/10/2013	BH01, BH02, BH03, BH04, BH06, BH07	6	132	BH01, BH02, BH03, BH04, BH06, BH07	10	
10/22/2013		6	159		11	
11/12/2013		6	115		10	
11/25/2013		6	65		10	
12/13/2013		6	60		10	
<b>Quarterly Totals</b>		30	531		-	

**TABLE 2**  
**COTTONWOOD 1**  
**AIR SPARGE / EFR OPERATIONAL SUMMARY TABLE**

Date	EFR Wells	Total EFR/AS Duration (hours)	Approximate Gallons Extracted	AS Wells	Air Injection Pressure (psi)	Average Air Flow Rate (cfm)
First Quarter 2014						
1/3/2014	BH01, BH02, BH03, BH04	6	10	BH01, BH02, BH03, BH04	10	
1/17/2014		6	240		10	
2/17/2014		6	180		10	42
3/5/2014		5.25	270		10	30.5
3/14/2014		6	300		10	34
4/3/2014		6	120		10	20
<b>Quarterly Totals</b>		35.25	1120		-	



Surface  
Drainage

Private Land

BH07		
Compound (ug/L)	12/30/2013	3/28/2014
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH06		
Compound (ug/L)	12/30/2013	3/28/2014
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

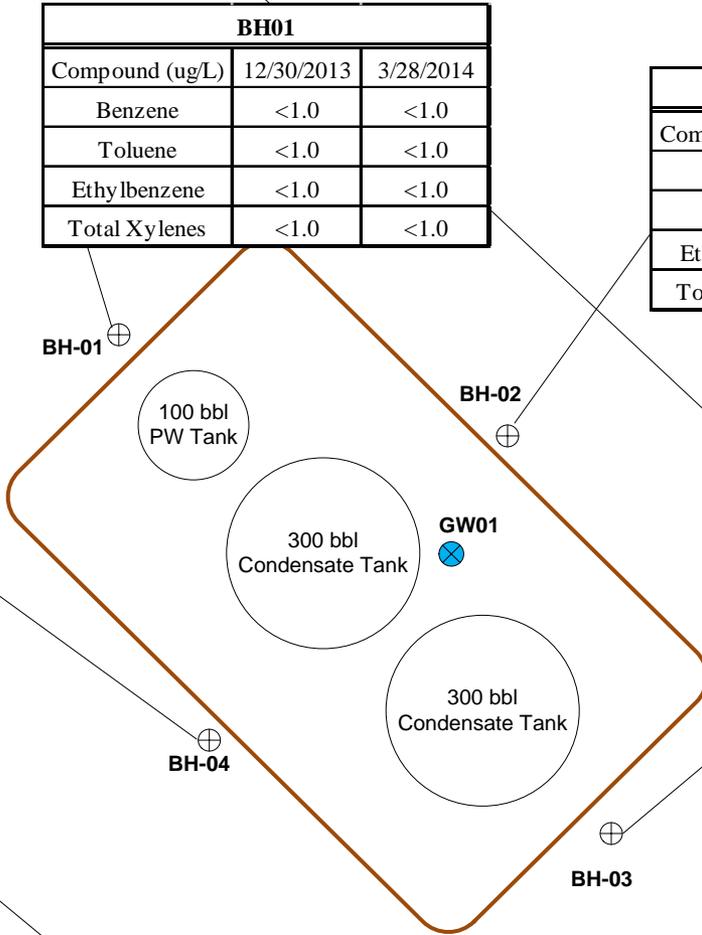
BH01		
Compound (ug/L)	12/30/2013	3/28/2014
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH02		
Compound (ug/L)	12/30/2013	3/28/2014
Benzene	16	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH04		
Compound (ug/L)	12/30/2013	3/28/2014
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH03		
Compound (ug/L)	12/30/2013	3/28/2014
Benzene	48	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	3.6	<1.0
Total Xylenes	<1.0	<1.0

BH05		
Compound (ug/L)	12/30/2013	3/28/2014
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0



Note: Surface drainage is approximated based on visual observation of the tank battery. It is not based on regional topography.

Separator  
Secondary  
Containment

Native  
Vegetation

Irrigation Canal

Flow

Access Road

DRAWN BY: CAW

**Facility Diagram**  
PDC Energy – DJ Basin  
Cottonwood #1  
NESE S13 T6N R66W  
Weld County, CO



6899 Pecos Street  
Unit C  
Denver, CO 80221

LEGEND

- Earthen Berm
- Temporary Monitoring Well
- Surface Water Sample Location Collected During Excavation Activities
- Groundwater Sample Location Collected During Excavation Activities

FIGURE 1  
GROUNDWATER  
ANALYTICAL RESULTS

Not to Scale

DATE: 4/21/2014

**ATTACHMENT A**

# Summit Scientific

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741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

April 06, 2014

Brandon Bruns  
PDC Energy  
1775 Sherman St. STE. 3000  
Denver, CO 80203  
RE: Cottonwood #1

Enclosed are the results of analyses for samples received by Summit Scientific on 03/28/14 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 'BS', with a long, sweeping horizontal line extending to the right.

Ben Shrewsbury  
President / Laboratory Manager



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

Project: Cottonwood #1

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
04/06/14 17:55

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1403261-01	Water	03/28/14 08:50	03/28/14 17:00
BH02	1403261-02	Water	03/28/14 08:55	03/28/14 17:00
BH03	1403261-03	Water	03/28/14 09:00	03/28/14 17:00
BH04	1403261-04	Water	03/28/14 09:05	03/28/14 17:00
BH05	1403261-05	Water	03/28/14 09:10	03/28/14 17:00
BH06	1403261-06	Water	03/28/14 09:15	03/28/14 17:00
BH07	1403261-07	Water	03/28/14 09:20	03/28/14 17:00

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

Project: Cottonwood #1

Project Number: [none]  
 Project Manager: Brandon Bruns

Reported:  
 04/06/14 17:55

1403261

Page 1 of 1

**Summit Scientific**

741 Corporate Creek Suite 1 • Golden, Colorado 80401  
 303-777-9310 • 303-374-9333 Fax

Client: PDC Energy  
 Address: \_\_\_\_\_  
 City/State/Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Project Manager: Brandon Bruns  
 E-Mail: \_\_\_\_\_  
 Project Name: Cottonwood #1  
 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)			
B401	3/28/14	0850	3	X	X							X	8260 & 87X	
B402		0855												
B403		0900												
B404		0905												
B405		0910												
B406		0915												
B407		0920												

Acquisition by: Eric Siegel Date/Time: 3/28/14  
 Received by: MB Date/Time: 3/28/14 1700  
 Retained by: \_\_\_\_\_ Date/Time: \_\_\_\_\_  
 Received in Lab by: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Turn Around Time (Check):  
 72 Hours  
 Standard  
 24 Hours  
 48 Hours

Sample Integrity:  
 Temperature Upon Receipt: 1°C  
 Intact:  Yes  No

Notes: \_\_\_\_\_

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

Project: Cottonwood #1

Project Number: [none]  
 Project Manager: Brandon Bruns

**Reported:**  
 04/06/14 17:55

**BH01**  
**1403261-01 (Water)**

**Summit Scientific**

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

Date Sampled: **03/28/14 08:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1404023	04/05/14	04/05/14	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **03/28/14 08:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		<i>105 %</i>	<i>37-154</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: Toluene-d8</i>		<i>100 %</i>	<i>45-149</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>		<i>104 %</i>	<i>45-146</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	

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

Project: Cottonwood #1  
 Project Number: [none]  
 Project Manager: Brandon Brunns

**Reported:**  
 04/06/14 17:55

**BH02**  
**1403261-02 (Water)**

**Summit Scientific**

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

Date Sampled: **03/28/14 08:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1404023	04/05/14	04/05/14	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **03/28/14 08:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		106 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		98.1 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		106 %	45-146		"	"	"	"	

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

Project: Cottonwood #1  
 Project Number: [none]  
 Project Manager: Brandon Brunns

**Reported:**  
 04/06/14 17:55

**BH03**  
**1403261-03 (Water)**

**Summit Scientific**

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

Date Sampled: **03/28/14 09:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1404023	04/05/14	04/05/14	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **03/28/14 09:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		<i>105 %</i>	<i>37-154</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: Toluene-d8</i>		<i>97.8 %</i>	<i>45-149</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>		<i>104 %</i>	<i>45-146</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	

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

Project: Cottonwood #1  
 Project Number: [none]  
 Project Manager: Brandon Brunns

**Reported:**  
 04/06/14 17:55

**BH04**  
**1403261-04 (Water)**

**Summit Scientific**

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

Date Sampled: **03/28/14 09:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1404023	04/05/14	04/05/14	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **03/28/14 09:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		<i>105 %</i>	<i>37-154</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: Toluene-d8</i>		<i>99.3 %</i>	<i>45-149</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>		<i>107 %</i>	<i>45-146</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	

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

Project: Cottonwood #1  
 Project Number: [none]  
 Project Manager: Brandon Brunns

**Reported:**  
 04/06/14 17:55

**BH05**  
**1403261-05 (Water)**

**Summit Scientific**

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

Date Sampled: **03/28/14 09:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1404023	04/05/14	04/05/14	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **03/28/14 09:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		105 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		99.8 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		100 %	45-146		"	"	"	"	

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

Project: Cottonwood #1  
 Project Number: [none]  
 Project Manager: Brandon Brunns

**Reported:**  
 04/06/14 17:55

**BH06**  
**1403261-06 (Water)**

**Summit Scientific**

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

Date Sampled: **03/28/14 09:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1404023	04/05/14	04/05/14	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **03/28/14 09:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		<i>105 %</i>	<i>37-154</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: Toluene-d8</i>		<i>98.1 %</i>	<i>45-149</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>		<i>104 %</i>	<i>45-146</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	

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

Project: Cottonwood #1

Project Number: [none]  
 Project Manager: Brandon Brunns

**Reported:**  
 04/06/14 17:55

**BH07**  
**1403261-07 (Water)**

**Summit Scientific**

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

Date Sampled: **03/28/14 09:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1404023	04/05/14	04/05/14	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **03/28/14 09:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		<i>107 %</i>	<i>37-154</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: Toluene-d8</i>		<i>100 %</i>	<i>45-149</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>		<i>104 %</i>	<i>45-146</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	

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

Project: Cottonwood #1  
Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
04/06/14 17:55

**Volatile Organic Compounds by EPA Method 8260B - Quality Control**  
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Analyte	Reporting			Spike Level	Source		%REC		RPD		Notes
	Result	Limit	Units		Result	%REC	Limits	RPD	Limit		

**Batch 1404023 - EPA 5030 Water MS**

**Blank (1404023-BLK1)**

Prepared & Analyzed: 04/03/14

Benzene	ND	1.0	ug/l								
Toluene	ND	1.0	"								
Ethylbenzene	ND	1.0	"								
Xylenes (total)	ND	1.0	"								
Surrogate: 1,2-Dichloroethane-d4	10.2		"	13.2	77.3	37-154					
Surrogate: Toluene-d8	13.3		"	13.3	99.8	45-149					
Surrogate: 4-Bromofluorobenzene	12.8		"	13.3	96.0	45-146					

**LCS (1404023-BS1)**

Prepared: 04/03/14 Analyzed: 04/04/14

Benzene	35.8	1.0	ug/l	33.2	108	51-132					
Toluene	38.4	1.0	"	33.3	115	51-138					
Ethylbenzene	33.8	1.0	"	33.1	102	58-146					
m,p-Xylene	68.6	2.0	"	66.7	103	57-144					
o-Xylene	33.6	1.0	"	32.9	102	53-146					
Surrogate: 1,2-Dichloroethane-d4	10.2		"	13.2	77.1	37-154					
Surrogate: Toluene-d8	13.4		"	13.3	101	45-149					
Surrogate: 4-Bromofluorobenzene	12.9		"	13.3	96.5	45-146					

**LCS (1404023-BS2)**

Prepared: 04/03/14 Analyzed: 04/04/14

Benzene	35.8	1.0	ug/l	33.2	108	51-132					
Toluene	37.8	1.0	"	33.3	114	51-138					
Ethylbenzene	33.8	1.0	"	33.1	102	58-146					
m,p-Xylene	68.5	2.0	"	66.7	103	57-144					
o-Xylene	33.4	1.0	"	32.9	101	53-146					
Surrogate: 1,2-Dichloroethane-d4	9.93		"	13.2	75.0	37-154					
Surrogate: Toluene-d8	13.2		"	13.3	99.1	45-149					
Surrogate: 4-Bromofluorobenzene	12.5		"	13.3	93.9	45-146					

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

Project: Cottonwood #1  
Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
04/06/14 17:55

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

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

**Batch 1404023 - EPA 5030 Water MS**

<b>Matrix Spike (1404023-MS1)</b>		<b>Source: 1403259-01</b>			Prepared: 04/03/14		Analyzed: 04/04/14			
Benzene	34.8	1.0	ug/l	33.2	ND	105	34-141			
Toluene	37.6	1.0	"	33.3	ND	113	27-151			
Ethylbenzene	33.5	1.0	"	33.1	ND	101	29-160			
m,p-Xylene	67.2	2.0	"	66.7	ND	101	20-166			
o-Xylene	33.1	1.0	"	32.9	ND	101	33-159			
Surrogate: 1,2-Dichloroethane-d4	10.2		"	13.2		76.7	37-154			
Surrogate: Toluene-d8	13.1		"	13.3		98.4	45-149			
Surrogate: 4-Bromofluorobenzene	12.7		"	13.3		95.1	45-146			

<b>Matrix Spike (1404023-MS2)</b>		<b>Source: 1403259-02</b>			Prepared: 04/03/14		Analyzed: 04/04/14			
Benzene	35.5	1.0	ug/l	33.2	ND	107	34-141			
Toluene	37.4	1.0	"	33.3	ND	112	27-151			
Ethylbenzene	34.1	1.0	"	33.1	ND	103	29-160			
m,p-Xylene	68.8	2.0	"	66.7	ND	103	20-166			
o-Xylene	34.1	1.0	"	32.9	ND	103	33-159			
Surrogate: 1,2-Dichloroethane-d4	10.0		"	13.2		75.6	37-154			
Surrogate: Toluene-d8	13.0		"	13.3		97.4	45-149			
Surrogate: 4-Bromofluorobenzene	12.6		"	13.3		94.4	45-146			

<b>Matrix Spike Dup (1404023-MSD1)</b>		<b>Source: 1403259-01</b>			Prepared: 04/03/14		Analyzed: 04/04/14			
Benzene	35.7	1.0	ug/l	33.2	ND	107	34-141	2.56	32	
Toluene	38.3	1.0	"	33.3	ND	115	27-151	1.82	25	
Ethylbenzene	34.0	1.0	"	33.1	ND	103	29-160	1.39	50	
m,p-Xylene	68.2	2.0	"	66.7	ND	102	20-166	1.48	36	
o-Xylene	33.3	1.0	"	32.9	ND	101	33-159	0.662	26	
Surrogate: 1,2-Dichloroethane-d4	10.9		"	13.2		82.4	37-154			
Surrogate: Toluene-d8	13.1		"	13.3		98.4	45-149			
Surrogate: 4-Bromofluorobenzene	12.8		"	13.3		95.9	45-146			

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

Project: Cottonwood #1  
 Project Number: [none]  
 Project Manager: Brandon Brunns

**Reported:**  
 04/06/14 17:55

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

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

**Batch 1404023 - EPA 5030 Water MS**

<b>Matrix Spike Dup (1404023-MSD2)</b>	<b>Source: 1403259-02</b>			Prepared: 04/03/14		Analyzed: 04/04/14				
Benzene	36.0	1.0	ug/l	33.2	ND	108	34-141	1.31	32	
Toluene	38.3	1.0	"	33.3	ND	115	27-151	2.43	25	
Ethylbenzene	34.3	1.0	"	33.1	ND	104	29-160	0.497	50	
m,p-Xylene	69.9	2.0	"	66.7	ND	105	20-166	1.63	36	
o-Xylene	34.6	1.0	"	32.9	ND	105	33-159	1.57	26	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>11.3</i>		<i>"</i>	<i>13.2</i>		<i>85.3</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>13.3</i>		<i>"</i>	<i>13.3</i>		<i>99.8</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>13.0</i>		<i>"</i>	<i>13.3</i>		<i>97.3</i>	<i>45-146</i>			

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

Project: Cottonwood #1

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
04/06/14 17:55

### 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

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