



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

July 3, 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 June 24, 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 the laboratory report is included as Attachment A. Sample locations and corresponding analytical results are illustrated on Figure 1. Second quarter analytical results indicate that benzene concentrations are above COGCC regulatory standards in wells BH02 and BH03. BTEX concentrations are below regulatory standards in the remaining five sample locations.

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

Third quarter 2014 groundwater sampling will be conducted during September 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
BH01	6/24/2014	<1.0	<1.0	<1.0	<1.0	11.79
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
BH02	6/24/2014	<b>14</b>	<1.0	1.6	<1.0	12.94
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
BH03	6/24/2014	<b>13</b>	<1.0	1.2	<1.0	12.43
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
BH04	6/24/2014	<1.0	<1.0	2.2	<1.0	9.43

**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
BH05	6/24/2014	<1.0	<1.0	<1.0	<1.0	12.00
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
BH06	6/24/2014	<1.0	<1.0	<1.0	<1.0	12.52
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	13.70
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
BH07	6/24/2014	<1.0	<1.0	<1.0	<1.0	14.30
<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

NM - Not Measured

**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)
<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**

<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>First Quarter 2014</b>						
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
<b>Quarterly Totals</b>		29.25	1000		-	
<b>Second Quarter 2014</b>						
4/3/2014	BH01, BH02, BH03, BH04	6	120	BH01, BH02, BH03, BH04	10	20
4/18/2014		6	360		20	33
5/7/2014		6	225		10	10
5/22/2014		6	400		20	30
6/7/2014		6	200		10	21.5
6/20/2014		6	300		20	30
<b>Quarterly Totals</b>		36	1605		-	



Surface  
Drainage

Private Land

BH07		
Compound (ug/L)	3/28/2014	6/24/2014
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)	3/28/2014	6/24/2014
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

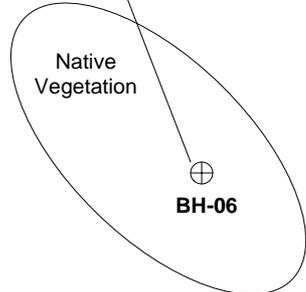
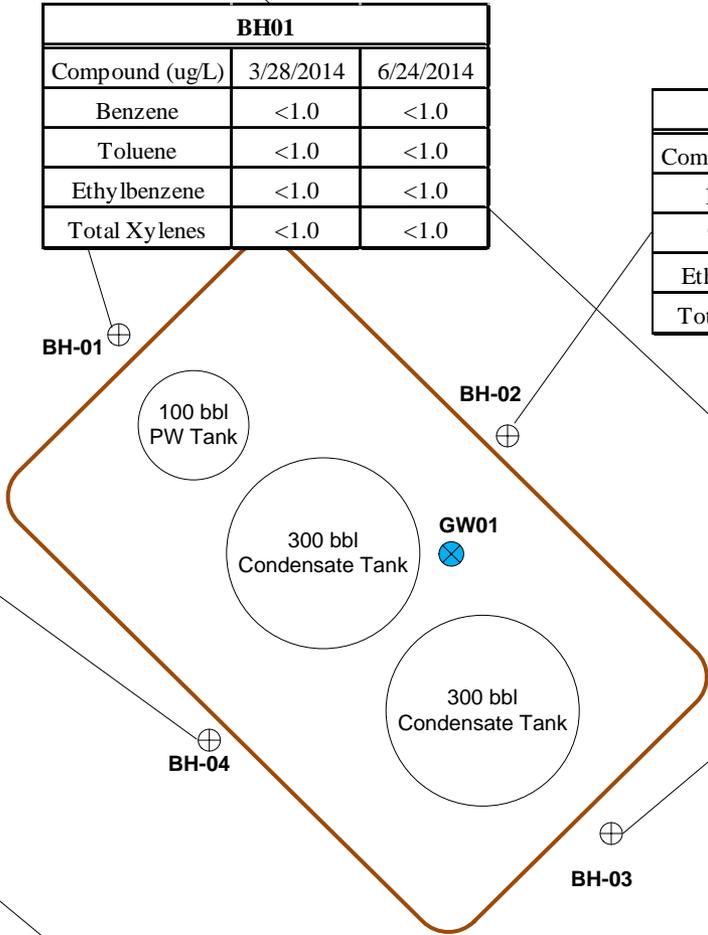
BH01		
Compound (ug/L)	3/28/2014	6/24/2014
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH02		
Compound (ug/L)	3/28/2014	6/24/2014
Benzene	<1.0	14
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	1.6
Total Xylenes	<1.0	<1.0

BH04		
Compound (ug/L)	3/28/2014	6/24/2014
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	2.2
Total Xylenes	<1.0	<1.0

BH03		
Compound (ug/L)	3/28/2014	6/24/2014
Benzene	<1.0	13
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	1.2
Total Xylenes	<1.0	<1.0

BH05		
Compound (ug/L)	3/28/2014	6/24/2014
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0



Separator  
Secondary  
Containment

Irrigation Canal

Flow

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

DRAWN BY: ESS  
DATE: 7/3/2014

**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

**ATTACHMENT A**

# Summit Scientific

---

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

July 01, 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 06/24/14 17:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read '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:**  
07/01/14 13:09

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1406169-01	Water	06/24/14 09:50	06/24/14 17:30
BH02	1406169-02	Water	06/24/14 09:55	06/24/14 17:30
BH03	1406169-03	Water	06/24/14 10:00	06/24/14 17:30
BH04	1406169-04	Water	06/24/14 10:05	06/24/14 17:30
BH05	1406169-05	Water	06/24/14 10:10	06/24/14 17:30
BH06	1406169-06	Water	06/24/14 10:15	06/24/14 17:30
BH07	1406169-07	Water	06/24/14 10:20	06/24/14 17:30

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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:  
 07/01/14 13:09

1406669

# Summit Scientific

741 Corporate Circle Suite 1 • Golden, Colorado 80401  
 303-277-9310 • 303-374-9333 Fax

Client: PDC/Tasman Project Manager: Brandon Bruns  
 Address: \_\_\_\_\_ E-Mail: \_\_\_\_\_  
 City/State/Zip: \_\_\_\_\_ Project Name: Cottonwood #1  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Project Number: \_\_\_\_\_  
 Sampler Name: Eric Siegel

Page 1 of 1

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix			Analyze For	Special Instructions	
				HCl	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)			
B401	6/24/14	950	2	X			X						
B402	1	955											
B403		1000											
B404		1005											
B405		1010											
B406		1015											
B407		1020											
Requisitioned by: <u>Eric Siegel</u> Date/Time: <u>6/24/14 17:30</u> Received by: <u>[Signature]</u> Date/Time: <u>6/24/14 17:30</u>												Notes:	
Requisitioned by: _____ Date/Time: _____ Received by: _____ Date/Time: _____												Turn Around Time (Check) <input type="checkbox"/> Same Day <input type="checkbox"/> 72 Hours <input checked="" type="checkbox"/> Standard <input type="checkbox"/> 24 Hours <input type="checkbox"/> 48 Hours	
Requisitioned by: _____ Date/Time: _____ Received in Lab by: _____ Date/Time: _____												Sample Integrity: Temperature Upon Receipt: <u>60</u> Inact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

www.summitscientific.com



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

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

**Reported:**  
 07/01/14 13:09

**BH01**  
**1406169-01 (Water)**

**Summit Scientific**

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

Date Sampled: **06/24/14 09:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1406229	06/27/14	06/27/14	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **06/24/14 09:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		<i>120 %</i>	<i>37-154</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: Toluene-d8</i>		<i>96.8 %</i>	<i>45-149</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>		<i>102 %</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:**  
 07/01/14 13:09

**BH02**  
**1406169-02 (Water)**

**Summit Scientific**

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

Date Sampled: **06/24/14 09:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>14</b>	1.0	ug/l	1	1406229	06/28/14	06/28/14	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>1.6</b>	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **06/24/14 09:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		111 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		97.6 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		101 %	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:**  
 07/01/14 13:09

**BH03**  
**1406169-03 (Water)**

**Summit Scientific**

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

Date Sampled: **06/24/14 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>13</b>	1.0	ug/l	1	1406229	06/28/14	06/28/14	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>1.2</b>	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **06/24/14 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		114 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		99.5 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		99.2 %	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:**  
 07/01/14 13:09

**BH04**  
**1406169-04 (Water)**

**Summit Scientific**

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

Date Sampled: **06/24/14 10:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1406229	06/28/14	06/28/14	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>2.2</b>	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **06/24/14 10:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		103 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		97.6 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		97.8 %	45-146		"	"	"	"	

Summit Scientific

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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:**  
 07/01/14 13:09

**BH05**  
**1406169-05 (Water)**

**Summit Scientific**

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

Date Sampled: **06/24/14 10:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1406229	06/28/14	06/28/14	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **06/24/14 10:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		<i>101 %</i>	<i>37-154</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: Toluene-d8</i>		<i>95.7 %</i>	<i>45-149</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>		<i>101 %</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:**  
 07/01/14 13:09

**BH06**  
**1406169-06 (Water)**

**Summit Scientific**

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

Date Sampled: **06/24/14 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1406229	06/28/14	06/28/14	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **06/24/14 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		<i>104 %</i>	<i>37-154</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: Toluene-d8</i>		<i>97.4 %</i>	<i>45-149</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>		<i>99.9 %</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:**  
 07/01/14 13:09

**BH07**  
**1406169-07 (Water)**

**Summit Scientific**

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

Date Sampled: **06/24/14 10:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1406229	06/28/14	06/28/14	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **06/24/14 10:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		<i>110 %</i>	<i>37-154</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: Toluene-d8</i>		<i>96.7 %</i>	<i>45-149</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>		<i>101 %</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:  
07/01/14 13:09

**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 1406229 - EPA 5030 Water MS**

**Blank (1406229-BLK1)**

Prepared & Analyzed: 06/27/14

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	13.9		"	13.2	105	37-154				
Surrogate: Toluene-d8	13.0		"	13.3	97.1	45-149				
Surrogate: 4-Bromofluorobenzene	13.5		"	13.3	101	45-146				

**LCS (1406229-BS1)**

Prepared & Analyzed: 06/27/14

Benzene	40.0	1.0	ug/l	33.3	120	51-132				
Toluene	38.2	1.0	"	33.3	115	51-138				
Ethylbenzene	39.8	1.0	"	33.1	120	58-146				
m,p-Xylene	77.4	2.0	"	66.5	116	57-144				
o-Xylene	38.6	1.0	"	32.8	118	53-146				
Surrogate: 1,2-Dichloroethane-d4	15.1		"	13.2	114	37-154				
Surrogate: Toluene-d8	13.5		"	13.3	101	45-149				
Surrogate: 4-Bromofluorobenzene	12.8		"	13.3	95.9	45-146				

**LCS (1406229-BS2)**

Prepared & Analyzed: 06/27/14

Benzene	40.2	1.0	ug/l	33.3	121	51-132				
Toluene	38.3	1.0	"	33.3	115	51-138				
Ethylbenzene	40.5	1.0	"	33.1	122	58-146				
m,p-Xylene	78.7	2.0	"	66.5	118	57-144				
o-Xylene	39.0	1.0	"	32.8	119	53-146				
Surrogate: 1,2-Dichloroethane-d4	14.6		"	13.2	110	37-154				
Surrogate: Toluene-d8	13.3		"	13.3	99.7	45-149				
Surrogate: 4-Bromofluorobenzene	12.9		"	13.3	96.8	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:  
07/01/14 13:09

**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 1406229 - EPA 5030 Water MS**

**Matrix Spike (1406229-MS1)**

**Source: 1406169-01**

Prepared & Analyzed: 06/27/14

Benzene	41.2	1.0	ug/l	33.3	ND	124	34-141		
Toluene	39.5	1.0	"	33.3	ND	118	27-151		
Ethylbenzene	41.9	1.0	"	33.1	ND	127	29-160		
m,p-Xylene	80.5	2.0	"	66.5	ND	121	20-166		
o-Xylene	39.7	1.0	"	32.8	ND	121	33-159		
Surrogate: 1,2-Dichloroethane-d4	15.4		"	13.2		117	37-154		
Surrogate: Toluene-d8	13.4		"	13.3		100	45-149		
Surrogate: 4-Bromofluorobenzene	13.2		"	13.3		98.9	45-146		

**Matrix Spike (1406229-MS2)**

**Source: 1406169-02**

Prepared & Analyzed: 06/27/14

Benzene	50.6	1.0	ug/l	33.3	14.4	109	34-141		
Toluene	38.8	1.0	"	33.3	ND	116	27-151		
Ethylbenzene	42.0	1.0	"	33.1	1.56	122	29-160		
m,p-Xylene	80.4	2.0	"	66.5	1.71	118	20-166		
o-Xylene	39.4	1.0	"	32.8	ND	120	33-159		
Surrogate: 1,2-Dichloroethane-d4	14.7		"	13.2		111	37-154		
Surrogate: Toluene-d8	13.2		"	13.3		99.3	45-149		
Surrogate: 4-Bromofluorobenzene	12.9		"	13.3		96.6	45-146		

**Matrix Spike Dup (1406229-MSD1)**

**Source: 1406169-01**

Prepared & Analyzed: 06/27/14

Benzene	41.0	1.0	ug/l	33.3	ND	123	34-141	0.414	32
Toluene	39.3	1.0	"	33.3	ND	118	27-151	0.559	25
Ethylbenzene	41.2	1.0	"	33.1	ND	124	29-160	1.85	50
m,p-Xylene	79.7	2.0	"	66.5	ND	120	20-166	0.974	36
o-Xylene	39.2	1.0	"	32.8	ND	120	33-159	1.22	26
Surrogate: 1,2-Dichloroethane-d4	14.9		"	13.2		113	37-154		
Surrogate: Toluene-d8	13.4		"	13.3		101	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:**  
 07/01/14 13:09

**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 1406229 - EPA 5030 Water MS**

<b>Matrix Spike Dup (1406229-MSD2)</b>	<b>Source: 1406169-02</b>			<b>Prepared &amp; Analyzed: 06/27/14</b>						
Benzene	50.7	1.0	ug/l	33.3	14.4	109	34-141	0.0789	32	
Toluene	39.5	1.0	"	33.3	ND	118	27-151	1.61	25	
Ethylbenzene	41.6	1.0	"	33.1	1.56	121	29-160	1.15	50	
m,p-Xylene	79.9	2.0	"	66.5	1.71	117	20-166	0.686	36	
o-Xylene	38.9	1.0	"	32.8	ND	119	33-159	1.35	26	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>15.0</i>		<i>"</i>	<i>13.2</i>		<i>113</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>13.5</i>		<i>"</i>	<i>13.3</i>		<i>101</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>12.8</i>		<i>"</i>	<i>13.3</i>		<i>96.4</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:**  
07/01/14 13:09

### 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