



**PDC Energy, Inc.**  
**Fourth Quarter 2013 Groundwater Monitoring Summary**

January 14, 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 December 30, 2013 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 third and fourth quarter 2013 analytical results are illustrated on Figure 1. Fourth quarter analytical results indicate that benzene concentrations are in exceedance of COGCC regulatory standards in wells BH02 and BH03. BTEX concentrations remained below standards in all other monitoring wells during the reporting period.

Tasman continued enhanced fluid recovery (EFR) and air sparge (AS) events at the site during the fourth quarter 2013. A summary of the EFR/AS operational data is provided in Table 2. EFR/AS activities will continue through the first quarter 2014.

The first quarter 2014 groundwater sampling event will be conducted during March 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	3,000	1.7	320	1,900	NM
BH01	9/24/2012	160	<1.0	40	<1.0	16.31
BH01	12/20/2012	5.0	<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
BH02	9/24/2012	1,300	<1.0	190	1,100	18.42
BH02	12/20/2012	24	<1.0	3.9	8.1	17.35
BH02	3/18/2013	18	<1.0	<1.0	<1.0	17.80
BH02	6/20/2013	15	<1.0	<1.0	<1.0	12.58
BH02	9/25/2013	8.6	<1.0	<1.0	<1.0	14.68
BH02	12/30/2013	16	<1.0	<1.0	<1.0	15.44
BH03	9/24/2012	350	<1.0	120	300	18.28
BH03	12/20/2012	15	<1.0	6.7	7.9	17.04
BH03	3/18/2013	14	<1.0	1.5	<1.0	17.46
BH03	6/20/2013	11	<1.0	2.1	<1.0	12.01
BH03	9/25/2013	39	<1.0	16	<1.0	14.26
BH03	12/30/2013	48	<1.0	3.6	<1.0	15.02
BH04	9/24/2012	150	<1.0	96	400	16.58
BH04	12/20/2012	38	<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
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	14.80
BH06	9/24/2012	6.7	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

Sample ID	Date Sampled	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	Depth to Water (feet)
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
COGCC standards for Groundwater (ug/L) <sup>(1)</sup>		5	560	700	1,400	

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**

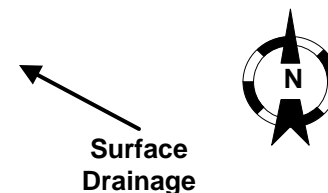
Date	EFR Wells	Total EFR/AS Duration (hours)	Approximate Gallons Extracted	AS Wells	Injection Pressure (psi)
First Quarter 2013					
1/4/2013	BH01, BH02, BH03, BH04	6.5	185	BH01, BH02, BH03, BH04	10
1/18/2013		6.25	272		10
2/2/2013		6	278		10
2/15/2013		7	180		10
3/5/2013		6.75	364		10
3/22/2013		4	90		10
Quarterly Totals		36.5	1369		-
Second Quarter 2013					
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
Quarterly Totals		34.5	1871		-
Third Quarter 2013					
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
Quarterly Totals		35	1396		-
Fourth Quarter 2013					
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
Quarterly Totals		30	531		-

Separator  
Secondary  
Containment

BH06		
Compound (ug/L)	9/25/2013	12/30/2013
Benzene	1.9	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH-07 ⊕

BH07		
Compound (ug/L)	9/25/2013	12/30/2013
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0



Private Land

Native  
Vegetation

⊕  
BH-06

BH01		
Compound (ug/L)	9/25/2013	12/30/2013
Benzene	<1.0	1.8
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

⊕  
BH-01

BH02		
Compound (ug/L)	9/25/2013	12/30/2013
Benzene	8.6	16
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

⊕  
BH-02

BH04		
Compound (ug/L)	9/25/2013	12/30/2013
Benzene	1.5	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	2.5	<1.0
Total Xylenes	<1.0	<1.0

Irrigation Canal

Flow

BH05		
Compound (ug/L)	9/25/2013	12/30/2013
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

⊗  
SW01

⊕  
BH-05

⊕  
BH-04

100 bbl  
PW Tank

300 bbl  
Condensate Tank

300 bbl  
Condensate Tank

⊗  
GW01

BH03		
Compound (ug/L)	9/25/2013	12/30/2013
Benzene	39	48
Toluene	<1.0	<1.0
Ethylbenzene	16	3.6
Total Xylenes	<1.0	<1.0

⊕  
BH-03

Access Road

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

DRAWN BY: ESS

DATE: 1/6/2014

**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

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741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

January 03, 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 12/30/13 16:45. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to be 'BS' or 'Shrewsbury', 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:**  
01/03/14 18:47

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH-01	R312190-01	Water	12/30/13 11:35	12/30/13 16:45
BH-02	R312190-02	Water	12/30/13 11:45	12/30/13 16:45
BH-03	R312190-03	Water	12/30/13 11:55	12/30/13 16:45
BH-04	R312190-04	Water	12/30/13 12:05	12/30/13 16:45
BH-05	R312190-05	Water	12/30/13 12:15	12/30/13 16:45
BH-06	R312190-06	Water	12/30/13 11:25	12/30/13 16:45
BH-07	R312190-07	Water	12/30/13 11:15	12/30/13 16:45

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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:  
01/03/14 18:47

Summit Scientific

741 Corporate Circle Suite 1 • Golden, Colorado 80401  
303-277-9310 • 303-374-9933 Fax

Client: PDC Energy  
Address: 1775 Sherman St  
City/State/Zip: Denver CO 80203  
Phone: (303) 431-3471 Fax:   
Sample Name: Don Bruns / Cottonwood  
Project Manager: Brandon Bruns  
E-Mail: BRUNSDON@PDC.ORG  
Project Name: Cottonwood  
Project Number:

Page 1 of 1

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative	Matrix	Analyze For:	Special Instructions
BH-01	12/30/13	1135	3	X	Soil	BrX (52607)	
BH-02	1/1/14	1145	1		Soil		
BH-03	1/1/14	1155	1		Soil		
BH-04	1/2/14	1205	1		Soil		
BH-05	1/2/14	1215	1		Soil		
BH-06	1/2/14	1225	1		Soil		
BH-07	1/2/14	1235	1		Soil		
Relinquished by: <u>D. Bruns</u> Date/Time: <u>12/30/13 1145</u>				Turn Around Time (Check): <input checked="" type="checkbox"/> 72 Hours <input type="checkbox"/> Standard			
Relinquished by: <u>D. Bruns</u> Date/Time: <u>12/30/13 1145</u>				Sample Integrity: <input checked="" type="checkbox"/> Temperature Upon Receipt: <u>3-9</u>			
Relinquished by: <u></u> Date/Time: <u></u>				Inact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			

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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:**  
01/03/14 18:47

**BH-01**  
**R312190-01 (Water)**

**Summit Scientific**

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

Date Sampled: 12/30/13 11:35

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
<b>Benzene</b>	<b>1.8</b>	1.0		ug/l	1	3123104	01/03/14	01/03/14	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	1.0		"	"	"	"	"	"	

Date Sampled: 12/30/13 11:35

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		107 %		37-154		"	"	"	"	
Surrogate: Toluene-d8		96.7 %		45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		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:**  
01/03/14 18:47

**BH-02**  
**R312190-02 (Water)**

**Summit Scientific**

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

Date Sampled: 12/30/13 11:45

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
<b>Benzene</b>	<b>16</b>	1.0		ug/l	1	3123104	01/03/14	01/03/14	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	1.0		"	"	"	"	"	"	

Date Sampled: 12/30/13 11:45

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		102 %		37-154		"	"	"	"	
Surrogate: Toluene-d8		94.4 %		45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.1 %		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:**  
01/03/14 18:47

**BH-03**  
**R312190-03 (Water)**

**Summit Scientific**

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

Date Sampled: 12/30/13 11:55

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
<b>Benzene</b>	<b>48</b>	1.0		ug/l	1	3123104	01/03/14	01/03/14	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>3.6</b>	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	1.0		"	"	"	"	"	"	

Date Sampled: 12/30/13 11:55

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		107 %		37-154		"	"	"	"	
Surrogate: Toluene-d8		95.9 %		45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		96.5 %		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:**  
01/03/14 18:47

**BH-04**  
**R312190-04 (Water)**

**Summit Scientific**

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

Date Sampled: **12/30/13 12:05**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	3123104	01/03/14	01/03/14	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	1.0		"	"	"	"	"	"	

Date Sampled: **12/30/13 12:05**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		105 %		37-154		"	"	"	"	
Surrogate: Toluene-d8		95.6 %		45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.0 %		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:**  
01/03/14 18:47

**BH-05**  
**R312190-05 (Water)**

**Summit Scientific**

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

Date Sampled: **12/30/13 12:15**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	3123104	01/03/14	01/03/14	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	1.0		"	"	"	"	"	"	

Date Sampled: **12/30/13 12:15**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		103 %		37-154		"	"	"	"	
Surrogate: Toluene-d8		92.8 %		45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.9 %		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:**  
01/03/14 18:47

**BH-06**  
**R312190-06 (Water)**

**Summit Scientific**

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

Date Sampled: 12/30/13 11:25

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	3123104	01/03/14	01/03/14	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	1.0		"	"	"	"	"	"	

Date Sampled: 12/30/13 11:25

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		101 %		37-154		"	"	"	"	
Surrogate: Toluene-d8		97.1 %		45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.8 %		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 Brunns

**Reported:**  
01/03/14 18:47

**BH-07**  
**R312190-07 (Water)**

**Summit Scientific**

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

Date Sampled: **12/30/13 11:15**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	1.0	ug/l	1	3123104	01/03/14	01/03/14	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **12/30/13 11:15**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		103 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		92.4 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	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:  
01/03/14 18:47

## 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 3123104 - EPA 5030 Water MS

##### Blank (3123104-BLK1)

Prepared & Analyzed: 01/01/14

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	12.7		"	13.3	95.0	45-149				
Surrogate: 4-Bromofluorobenzene	13.2		"	13.3	99.1	45-146				

##### LCS (3123104-BS1)

Prepared & Analyzed: 01/01/14

Benzene	29.3	1.0	ug/l	33.3	87.9	51-132				
Toluene	30.6	1.0	"	33.3	91.7	51-138				
Ethylbenzene	32.9	1.0	"	33.3	98.7	58-146				
m,p-Xylene	64.4	2.0	"	66.7	96.6	57-144				
o-Xylene	31.1	1.0	"	33.3	93.2	53-146				
Surrogate: 1,2-Dichloroethane-d4	13.7		"	13.2	104	37-154				
Surrogate: Toluene-d8	12.5		"	13.3	93.8	45-149				
Surrogate: 4-Bromofluorobenzene	12.9		"	13.3	97.0	45-146				

##### LCS (3123104-BS2)

Prepared & Analyzed: 01/01/14

Benzene	30.4	1.0	ug/l	33.3	91.2	51-132				
Toluene	31.9	1.0	"	33.3	95.6	51-138				
Ethylbenzene	33.8	1.0	"	33.3	101	58-146				
m,p-Xylene	66.6	2.0	"	66.7	99.8	57-144				
o-Xylene	32.3	1.0	"	33.3	96.9	53-146				
Surrogate: 1,2-Dichloroethane-d4	14.8		"	13.2	112	37-154				
Surrogate: Toluene-d8	13.1		"	13.3	98.6	45-149				
Surrogate: 4-Bromofluorobenzene	12.8		"	13.3	96.3	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: Cottonwood #1  
Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
01/03/14 18:47

**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 3123104 - EPA 5030 Water MS**

Matrix Spike (3123104-MS1)		Source: R312189-01			Prepared & Analyzed: 01/01/14					
Benzene	29.9	1.0	ug/l	33.3	ND	89.6	34-141			
Toluene	31.6	1.0	"	33.3	ND	94.7	27-151			
Ethylbenzene	33.5	1.0	"	33.3	ND	100	29-160			
m,p-Xylene	66.7	2.0	"	66.7	ND	100	20-166			
o-Xylene	32.0	1.0	"	33.3	ND	96.0	33-159			
Surrogate: 1,2-Dichloroethane-d4	14.8		"	13.2		112	37-154			
Surrogate: Toluene-d8	13.0		"	13.3		97.1	45-149			
Surrogate: 4-Bromofluorobenzene	13.2		"	13.3		99.0	45-146			
Matrix Spike (3123104-MS2)		Source: R312189-02			Prepared & Analyzed: 01/01/14					
Benzene	29.9	1.0	ug/l	33.3	ND	89.8	34-141			
Toluene	31.1	1.0	"	33.3	ND	93.3	27-151			
Ethylbenzene	33.4	1.0	"	33.3	ND	100	29-160			
m,p-Xylene	66.3	2.0	"	66.7	ND	99.4	20-166			
o-Xylene	32.2	1.0	"	33.3	ND	96.5	33-159			
Surrogate: 1,2-Dichloroethane-d4	14.6		"	13.2		110	37-154			
Surrogate: Toluene-d8	12.6		"	13.3		94.7	45-149			
Surrogate: 4-Bromofluorobenzene	13.3		"	13.3		99.9	45-146			
Matrix Spike Dup (3123104-MSD1)		Source: R312189-01			Prepared & Analyzed: 01/01/14					
Benzene	29.7	1.0	ug/l	33.3	ND	89.2	34-141	0.470	32	
Toluene	31.0	1.0	"	33.3	ND	93.1	27-151	1.79	25	
Ethylbenzene	34.2	1.0	"	33.3	ND	103	29-160	2.13	50	
m,p-Xylene	66.7	2.0	"	66.7	ND	100	20-166	0.00	36	
o-Xylene	32.5	1.0	"	33.3	ND	97.6	33-159	1.67	26	
Surrogate: 1,2-Dichloroethane-d4	15.6		"	13.2		118	37-154			
Surrogate: Toluene-d8	12.8		"	13.3		95.9	45-149			
Surrogate: 4-Bromofluorobenzene	13.2		"	13.3		98.9	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:  
01/03/14 18:47

**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 3123104 - EPA 5030 Water MS**

Matrix Spike Dup (3123104-MSD2)		Source: R312189-02			Prepared & Analyzed: 01/01/14					
Benzene	29.5	1.0	ug/l	33.3	ND	88.6	34-141	1.41	32	
Toluene	31.4	1.0	"	33.3	ND	94.1	27-151	0.800	25	
Ethylbenzene	33.4	1.0	"	33.3	ND	100	29-160	0.0599	50	
m,p-Xylene	66.5	2.0	"	66.7	ND	99.8	20-166	0.376	36	
o-Xylene	31.8	1.0	"	33.3	ND	95.3	33-159	1.35	26	
Surrogate: 1,2-Dichloroethane-d4	14.6		"	13.2		111	37-154			
Surrogate: Toluene-d8	12.8		"	13.3		95.9	45-149			
Surrogate: 4-Bromofluorobenzene	12.9		"	13.3		96.8	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 Bruns

**Reported:**  
01/03/14 18:47

### 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

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