



PDC Energy, Inc.
Second Quarter 2013 Groundwater Monitoring Summary

August 14, 2013

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 20, 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 first and second quarter 2013 analytical results are illustrated on Figure 2. Second quarter analytical results indicate that benzene concentrations were in exceedance of COGCC regulatory standards in wells BH02 and BH03, although concentrations in these wells continue to decline. 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 second quarter 2013. A summary of the EFR/AS operational data is provided in Table 2. EFR/AS activities will continue through the third quarter 2013.

The third quarter 2013 groundwater sampling event will be conducted during September 2013.

**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	<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
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
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
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
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
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
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
COGCC standards for groundwater (ug/L) ⁽¹⁾		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**

Fourth Quarter 2012				
Date	Well ID	Extraction Duration (hours)	Volume Extracted (gallons)	AS Pressure (psi)
11/2/2012	BH01, BH02, BH03, BH04	6.75	13.8	10
11/14/2012		6	110	10
12/12/2012		6	400	10
Totals		18.75	523.8	-
First Quarter 2013				
Date	Well ID	Extraction Duration (hours)	Volume Extracted (gallons)	AS Pressure (psi)
1/4/2013	BH01, BH02, BH03, BH04	6.5	185	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
Totals		36.5	1369	-
Second Quarter 2013				
4/3/2013	BH01, BH02, BH03, BH04	5	275	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
Totals		34.5	1871	-

Notes:

psi = pounds per square inch



Surface
Drainage

Private Land

BH07		
Compound (ug/L)	3/18/2013	6/20/2013
Benzene	<1.0	1.6
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH06		
Compound (ug/L)	3/18/2013	6/20/2013
Benzene	3.6	<1.0
Toluene	1.2	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

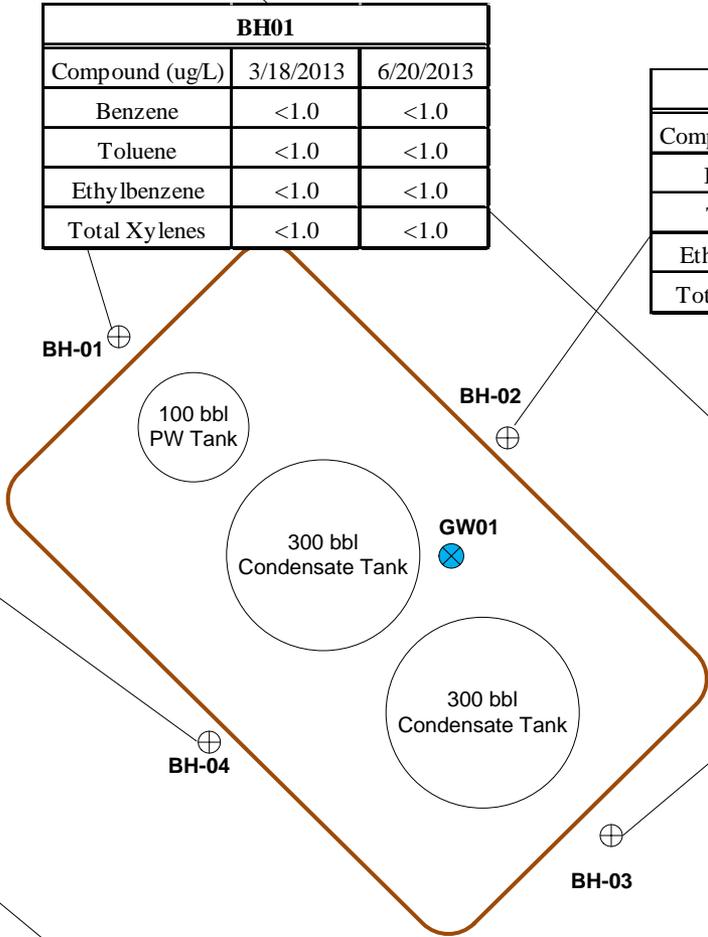
BH01		
Compound (ug/L)	3/18/2013	6/20/2013
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH02		
Compound (ug/L)	3/18/2013	6/20/2013
Benzene	18	15
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH04		
Compound (ug/L)	3/18/2013	6/20/2013
Benzene	2.6	1.3
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH03		
Compound (ug/L)	3/18/2013	6/20/2013
Benzene	14	11
Toluene	<1.0	<1.0
Ethylbenzene	1.5	2.1
Total Xylenes	<1.0	<1.0

BH05		
Compound (ug/L)	3/18/2013	6/20/2013
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

PROJECT NO:
DRAWN BY: ESS
DATE: 7/11/2013

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 2
GROUNDWATER ANALYTICAL RESULTS

ATTACHMENT A

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

June 26, 2013

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 06/20/13 18:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Joseph J Egry IV
Laboratory Director

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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:
06/26/13 15:41

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	R306165-01	Water	06/20/13 10:15	06/20/13 18:00
BH02	R306165-02	Water	06/20/13 10:20	06/20/13 18:00
BH03	R306165-03	Water	06/20/13 10:25	06/20/13 18:00
BH04	R306165-04	Water	06/20/13 10:30	06/20/13 18:00
BH05	R306165-05	Water	06/20/13 10:35	06/20/13 18:00
BH06	R306165-06	Water	06/20/13 10:40	06/20/13 18:00
BH07	R306165-07	Water	06/20/13 10:45	06/20/13 18:00

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:
06/26/13 15:41

R300165

Summit Scientific

741 Corporate Circle, Suite 1 • Golden, Colorado 80401
303-774-9100 • 303-374-9333 Fax

Client: PDC Energy Page 1 of 1
Address: _____
City/State/Zip: _____
Phone: _____
Project Manager: Brandon Bruns
E-Mail: _____
Project Name: Cottonwood #1
Project Number: _____
Sampler Name: Eric Siegel
Fax: _____

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix			Analyze For:	Special Instructions	Notes	
				HCl	HNO ₃	None	Other (Specify)	Soil	Air - Canister Serial #	Other (Specify)				
B401	6/20/13	10:15	3	✓										
B402		10:20												
B403		10:25												
B404		10:30												
B405		10:35												
B406		10:40												
B407		10:45												
Retinquished by: <u>Eric Siegel</u> Date/Time: <u>6/20/13</u> 10:15 Retinquished by: <u>Eric Siegel</u> Date/Time: <u>6/20/13</u> 10:20 Retinquished by: <u>Eric Siegel</u> Date/Time: <u>6/20/13</u> 10:25 Retinquished by: <u>Eric Siegel</u> Date/Time: <u>6/20/13</u> 10:30 Retinquished by: <u>Eric Siegel</u> Date/Time: <u>6/20/13</u> 10:35 Retinquished by: <u>Eric Siegel</u> Date/Time: <u>6/20/13</u> 10:40 Retinquished by: <u>Eric Siegel</u> Date/Time: <u>6/20/13</u> 10:45														
Turn Around Time (Check) <input type="checkbox"/> 72 hours <input checked="" type="checkbox"/> Standard Name Day <input type="checkbox"/> 24 hours <input type="checkbox"/> 48 hours Sample Integrity: <input checked="" type="checkbox"/> temperature (Y/N) Receipt <input checked="" type="checkbox"/> <u>10/1</u> In tact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>														

www.summitscientific.com





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

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

Reported:
 06/26/13 15:41

BH01
R306165-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **06/20/13 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	3062506	06/26/13	06/26/13	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **06/20/13 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		96.8 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		98.9 %	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:
 06/26/13 15:41

BH02
R306165-02 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **06/20/13 10:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	15	1.0	ug/l	1	3062506	06/26/13	06/26/13	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **06/20/13 10:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		97.0 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		97.7 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		98.6 %	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:
 06/26/13 15:41

BH03
R306165-03 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **06/20/13 10:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	11	1.0	ug/l	1	3062506	06/26/13	06/26/13	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	2.1	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **06/20/13 10:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		100 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		98.4 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.6 %	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:
 06/26/13 15:41

BH04
R306165-04 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **06/20/13 10:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	1.3	1.0	ug/l	1	3062506	06/26/13	06/26/13	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	5.4	1.0	"	"	"	"	"	"	
Xylenes (total)	19	1.0	"	"	"	"	"	"	

Date Sampled: **06/20/13 10:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		104 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		99.5 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		97.8 %	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:
 06/26/13 15:41

BH05
R306165-05 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **06/20/13 10:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	3062506	06/26/13	06/26/13	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **06/20/13 10:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		98.3 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		98.4 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		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:
 06/26/13 15:41

BH06
R306165-06 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **06/20/13 10:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	3062506	06/26/13	06/26/13	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **06/20/13 10:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		99.5 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		97.4 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.8 %	45-146		"	"	"	"	

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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 Brunns

Reported:
 06/26/13 15:41

BH07
R306165-07 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **06/20/13 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	1.6	1.0	ug/l	1	3062506	06/26/13	06/26/13	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **06/20/13 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		94.9 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		98.0 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		99.5 %	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:
06/26/13 15:41

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 3062506 - EPA 5030 Water MS

Blank (3062506-BLK1)

Prepared & Analyzed: 06/25/13

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>13.4</i>		<i>"</i>	<i>13.2</i>		<i>101</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>13.3</i>		<i>"</i>	<i>13.3</i>		<i>99.5</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>13.3</i>		<i>"</i>	<i>13.3</i>		<i>99.8</i>	<i>45-146</i>			

Blank (3062506-BLK2)

Prepared & Analyzed: 06/25/13

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>14.1</i>		<i>"</i>	<i>13.2</i>		<i>106</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>13.2</i>		<i>"</i>	<i>13.3</i>		<i>99.3</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>13.3</i>		<i>"</i>	<i>13.3</i>		<i>99.5</i>	<i>45-146</i>			

LCS (3062506-BS1)

Prepared & Analyzed: 06/25/13

Benzene	26.2	1.0	ug/l	33.3		78.5	51-132			
Toluene	26.5	1.0	"	33.3		79.5	51-138			
Ethylbenzene	27.0	1.0	"	33.3		80.9	58-146			
m,p-Xylene	55.3	2.0	"	66.7		82.9	57-144			
o-Xylene	26.6	1.0	"	33.3		79.9	53-146			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>14.4</i>		<i>"</i>	<i>13.2</i>		<i>109</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>13.2</i>		<i>"</i>	<i>13.3</i>		<i>98.8</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>13.4</i>		<i>"</i>	<i>13.3</i>		<i>101</i>	<i>45-146</i>			

LCS (3062506-BS2)

Prepared & Analyzed: 06/25/13

Benzene	28.8	1.0	ug/l	33.3		86.6	51-132			
Toluene	29.2	1.0	"	33.3		87.7	51-138			
Ethylbenzene	30.3	1.0	"	33.3		90.9	58-146			
m,p-Xylene	61.3	2.0	"	66.7		92.0	57-144			
o-Xylene	30.3	1.0	"	33.3		90.9	53-146			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>14.4</i>		<i>"</i>	<i>13.2</i>		<i>109</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>13.0</i>		<i>"</i>	<i>13.3</i>		<i>97.7</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>13.0</i>		<i>"</i>	<i>13.3</i>		<i>97.7</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:
06/26/13 15:41

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 3062506 - EPA 5030 Water MS

LCS Dup (3062506-BSD1)

Prepared & Analyzed: 06/25/13

Benzene	29.3	1.0	ug/l	33.3	87.8	51-132	11.3	17	
Toluene	29.9	1.0	"	33.3	89.6	51-138	12.0	17	
Ethylbenzene	28.9	1.0	"	33.3	86.7	58-146	6.84	16	
m,p-Xylene	59.7	2.0	"	66.7	89.6	57-144	7.79	16	
o-Xylene	29.1	1.0	"	33.3	87.3	53-146	8.83	15	
Surrogate: 1,2-Dichloroethane-d4	15.0		"	13.2	113	37-154			
Surrogate: Toluene-d8	13.8		"	13.3	103	45-149			
Surrogate: 4-Bromofluorobenzene	13.2		"	13.3	99.2	45-146			

LCS Dup (3062506-BSD2)

Prepared & Analyzed: 06/25/13

Benzene	26.2	1.0	ug/l	33.3	78.7	51-132	9.48	17	
Toluene	25.6	1.0	"	33.3	76.9	51-138	13.1	17	
Ethylbenzene	26.4	1.0	"	33.3	79.1	58-146	13.8	16	
m,p-Xylene	59.6	2.0	"	66.7	89.5	57-144	2.78	16	
o-Xylene	26.1	1.0	"	33.3	78.3	53-146	14.9	15	
Surrogate: 1,2-Dichloroethane-d4	14.1		"	13.2	106	37-154			
Surrogate: Toluene-d8	13.2		"	13.3	98.7	45-149			
Surrogate: 4-Bromofluorobenzene	13.3		"	13.3	99.8	45-146			

Matrix Spike (3062506-MS1)

Source: R306163-01

Prepared & Analyzed: 06/25/13

Benzene	24.0	1.0	ug/l	33.3	ND	72.2	34-141		
Toluene	24.7	1.0	"	33.3	ND	74.0	27-151		
Ethylbenzene	25.1	1.0	"	33.3	ND	75.4	29-160		
m,p-Xylene	51.0	2.0	"	66.7	ND	76.5	20-166		
o-Xylene	25.4	1.0	"	33.3	ND	76.4	33-159		
Surrogate: 1,2-Dichloroethane-d4	14.5		"	13.2	109	37-154			
Surrogate: Toluene-d8	13.1		"	13.3	98.5	45-149			
Surrogate: 4-Bromofluorobenzene	13.4		"	13.3	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:
06/26/13 15:41

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		

Batch 3062506 - EPA 5030 Water MS

Matrix Spike (3062506-MS2)	Source: R306163-04			Prepared: 06/25/13		Analyzed: 06/26/13	
Benzene	28.4	1.0	ug/l	33.3	ND	85.1	34-141
Toluene	29.0	1.0	"	33.3	ND	87.2	27-151
Ethylbenzene	29.5	1.0	"	33.3	ND	88.5	29-160
m,p-Xylene	60.1	2.0	"	66.7	ND	90.1	20-166
o-Xylene	29.5	1.0	"	33.3	ND	88.6	33-159
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>14.6</i>		<i>"</i>	<i>13.2</i>		<i>111</i>	<i>37-154</i>
<i>Surrogate: Toluene-d8</i>	<i>13.4</i>		<i>"</i>	<i>13.3</i>		<i>100</i>	<i>45-149</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>13.4</i>		<i>"</i>	<i>13.3</i>		<i>100</i>	<i>45-146</i>

Matrix Spike Dup (3062506-MSD1)	Source: R306163-01			Prepared: 06/25/13		Analyzed: 06/26/13			
Benzene	26.4	1.0	ug/l	33.3	ND	79.1	34-141	9.16	32
Toluene	27.0	1.0	"	33.3	ND	81.0	27-151	9.10	25
Ethylbenzene	27.6	1.0	"	33.3	ND	82.7	29-160	9.30	50
m,p-Xylene	56.8	2.0	"	66.7	ND	85.1	20-166	10.6	36
o-Xylene	27.5	1.0	"	33.3	ND	82.6	33-159	7.82	26
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>14.8</i>		<i>"</i>	<i>13.2</i>		<i>112</i>	<i>37-154</i>		
<i>Surrogate: Toluene-d8</i>	<i>13.4</i>		<i>"</i>	<i>13.3</i>		<i>100</i>	<i>45-149</i>		
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>13.4</i>		<i>"</i>	<i>13.3</i>		<i>101</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:
06/26/13 15:41

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