



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	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
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	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	17.8
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
BH02	3/28/2014	<1.0	<1.0	<1.0	<1.0	15.15
BH02	6/24/2014	14	<1.0	1.6	<1.0	12.94
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
BH03	3/28/2014	<1.0	<1.0	<1.0	<1.0	14.79
BH03	6/24/2014	13	<1.0	1.2	<1.0	12.43
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
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	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
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
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

Date	EFR Wells	Total EFR/AS Duration (hours)	Approximate Gallons Extracted	AS Wells	Air Injection Pressure (psi)	Average Air Flow Rate (cfm)
Fourth Quarter 2012						
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	
Quarterly Totals		18.75	523.8		-	
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		9	
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		-	

TABLE 2
COTTONWOOD 1
AIR SPARGE / EFR OPERATIONAL SUMMARY TABLE

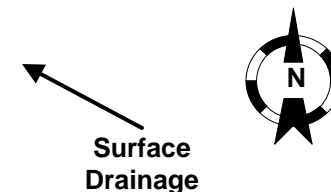
Date	EFR Wells	Total EFR/AS Duration (hours)	Approximate Gallons Extracted	AS Wells	Air Injection Pressure (psi)	Average Air Flow Rate (cfm)
First Quarter 2014						
1/3/2014	BH01, BH02, BH03, BH04	6	10	BH01, BH02, BH03, BH04	10	
1/17/2014		6	240		10	
2/17/2014		6	180		10	42
3/5/2014		5.25	270		10	30.5
3/14/2014		6	300		10	34
Quarterly Totals		29.25	1000		-	
Second Quarter 2014						
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
Quarterly Totals		36	1605		-	

Separator
Secondary
Containment

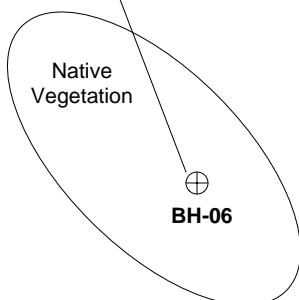
BH06		
Compound (ug/L)	3/28/2014	6/24/2014
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH-07 ⊕

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



Private Land



BH-06

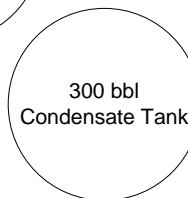
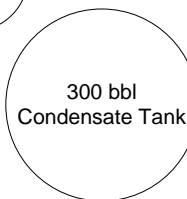
BH01		
Compound (ug/L)	3/28/2014	6/24/2014
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH-01 ⊕

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

BH-02 ⊕

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

BH-03 ⊕

Irrigation Canal

Flow

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

BH-04 ⊕

SW01 ⊗

BH-05 ⊕

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: 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 be '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

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:
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 Page 1 of 1
Address: _____
City/State/Zip: _____
Phone: _____
Sample Name: Eric Siegel
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 ₃	None	Other (Specify)	Soil	Air - Canister Serial #	Other (Specify)			
B401	6/24/14	950	3	X				X					
B402	6/24/14	955	1										
B403	6/24/14	1000	1										
B404	6/24/14	1005	1										
B405	6/24/14	1010	1										
B406	6/24/14	1015	1										
B407	6/24/14	1020	1										
Requisitioned by: <u>Eric Siegel</u> Date/Time: <u>6/24/14 17:30</u> Turn Around Time (Check) <input checked="" type="checkbox"/> 72 Hours <input type="checkbox"/> Standard													
Requisitioned by: _____ Date/Time: _____ Date/Time: _____													
Requisitioned by: _____ Date/Time: _____ Date/Time: _____													
Sample Integrity: <input checked="" type="checkbox"/> Temperature Upon Receipt: <u>60</u> <input type="checkbox"/> Inact: <u>Yes</u> <input type="checkbox"/> No													

www.summitscientific.com

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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

BH01
1406169-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

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

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
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		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		120 %		37-154		"	"	"	"	
Surrogate: Toluene-d8		96.8 %		45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %		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:
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		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	14	1.0		ug/l	1	1406229	06/28/14	06/28/14	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	1.6	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	1.0		"	"	"	"	"	"	

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

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		111 %		37-154		"	"	"	"	
Surrogate: Toluene-d8		97.6 %		45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %		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:
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		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	13	1.0		ug/l	1	1406229	06/28/14	06/28/14	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	1.2	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	1.0		"	"	"	"	"	"	

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

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		114 %		37-154		"	"	"	"	
Surrogate: Toluene-d8		99.5 %		45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		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		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1406229	06/28/14	06/28/14	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	2.2	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	1.0		"	"	"	"	"	"	

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

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		103 %		37-154		"	"	"	"	
Surrogate: Toluene-d8		97.6 %		45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		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		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
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		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		101 %		37-154		"	"	"	"	
Surrogate: Toluene-d8		95.7 %		45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %		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 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		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
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		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		104 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		97.4 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.9 %	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

BH07
1406169-07 (Water)

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Volatile Organic Compounds by EPA Method 8260B

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

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
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		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		110 %	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 Bruns

Reported:
07/01/14 13:09

Volatile Organic Compounds by EPA Method 8260B - Quality Control

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

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	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

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	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

Batch 1406229 - EPA 5030 Water MS

Matrix Spike Dup (1406229-MSD2)	Source: 1406169-02			Prepared & Analyzed: 06/27/14						
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	
Surrogate: 1,2-Dichloroethane-d4	15.0		"	13.2		113	37-154			
Surrogate: Toluene-d8	13.5		"	13.3		101	45-149			
Surrogate: 4-Bromofluorobenzene	12.8		"	13.3		96.4	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

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'.