



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	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
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
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
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

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	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
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
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

NR - Not Recorded

NM - Not Measured

**TABLE 2
COTTONWOOD 1**

AIR SPARGE / EFR OPERATIONAL SUMMARY TABLE

AIR STORAGE / 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

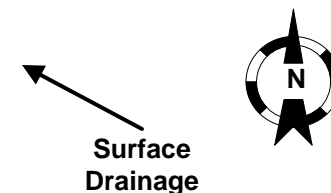
Date	EFR Wells	Total EFR/AS Duration (hours)	Approximate Gallons Extracted	AS Wells	Air Injection Pressure (psi)	Average Air Flow Rate (cfm)
First Quarter 2014						
1/3/2014	BH01, BH02, BH03, BH04	6	10	BH01, BH02, BH03, BH04	10	
1/17/2014		6	240		10	
2/17/2014		6	180		10	42
3/5/2014		5.25	270		10	30.5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

Separator
Secondary
Containment

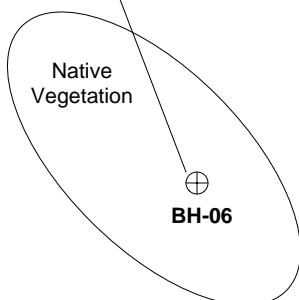
BH06		
Compound (ug/L)	12/30/2013	3/28/2014
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH-07 ⊕

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



Private Land



BH-06

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

BH-01 ⊕

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

BH-02 ⊕

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

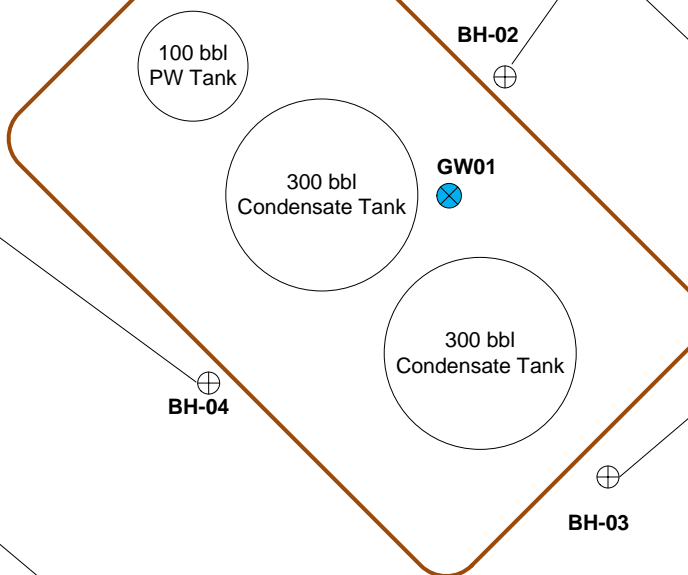
Irrigation Canal

Flow

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

SW01 ⊗

BH-05 ⊕



Access Road

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

BH-03 ⊕

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

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

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 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 Brunns

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

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:
04/06/14 17:55

1403261

Summit Scientific

741 Corporate Circle Suite 1 • Golden, Colorado 80401
303-277-9310 • 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: _____

Page 1 of 1

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix		Analyze For:	Special Instructions		
				HCl	HNO ₃	None	Other (Specify)	Groundwater	Soil				
BH01	3/28/14	0850	3										
BH02		0855											
BH03		0900											
BH04		0905											
BH05		0910											
BH06		0915											
BH07		0920											
Requisitioned by: Eric Siedel				Received by: [Signature]				Date/Time: 3/28/14 1700				Notes:	
Requisitioned by:				Received by:				Date/Time:				Sample Integrity:	
Requisitioned by:				Received by:				Date/Time:				Temperature Upon Receipt: 1°C	

www.summitscientific.com

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:
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		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
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		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		105 %		37-154		"	"	"	"	
Surrogate: Toluene-d8		100 %		45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %		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:
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		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
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		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		106 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		98.1 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		106 %	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:
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		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
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		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		105 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		97.8 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	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:
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		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
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		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		105 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		99.3 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		107 %	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:
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		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
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		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		105 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		99.8 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		100 %	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:
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		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
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		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		105 %		37-154		"	"	"	"	
Surrogate: Toluene-d8		98.1 %		45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %		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:
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		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
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		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		107 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		100 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	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:
04/06/14 17:55

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 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				

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:
04/06/14 17:55

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 1404023 - EPA 5030 Water MS

Matrix Spike (1404023-MS1)		Source: 1403259-01			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			

Matrix Spike (1404023-MS2)		Source: 1403259-02			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			

Matrix Spike Dup (1404023-MSD1)		Source: 1403259-01			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			

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:
04/06/14 17:55

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 1404023 - EPA 5030 Water MS

Matrix Spike Dup (1404023-MSD2)		Source: 1403259-02			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	
Surrogate: 1,2-Dichloroethane-d4	11.3		"	13.2		85.3	37-154			
Surrogate: Toluene-d8	13.3		"	13.3		99.8	45-149			
Surrogate: 4-Bromofluorobenzene	13.0		"	13.3		97.3	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:
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

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