



PDC Energy, Inc.
First Quarter 2015 Groundwater Monitoring Summary

May 4, 2015

Cottonwood #1 Tank Battery
NESE Section 13 T6N R66W
Weld County, API # 05-123-11801

This groundwater summary has been prepared by Tasman Geosciences for the Cottonwood #1 tank battery. On March 26, 2015 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. First quarter analytical results indicated that benzene concentrations were above COGCC regulatory standards in monitoring wells BH02 and BH03. BTEX concentrations were 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 first quarter 2015. A summary of the EFR/AS operational data is provided in Table 2. EFR/AS activities will continue through the second quarter 2015.

Second quarter 2015 groundwater sampling will be conducted during June 2015.

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
BH01	9/24/2014	<1.0	<1.0	<1.0	<1.0	12.48
BH01	12/17/2014	<1.0	<1.0	<1.0	<1.0	13.16
BH01	3/26/2015	<1.0	<1.0	<1.0	<1.0	12.60
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
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
BH02	9/24/2014	59	<1.0	2.5	2.7	13.28
BH02	12/17/2014	29	<1.0	<1.0	<1.0	14.19
BH02	3/26/2015	47	<1.0	2.5	<1.0	13.65
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
BH03	9/24/2014	45	<1.0	1.8	3.0	12.91
BH03	12/17/2014	<1.0	<1.0	<1.0	<1.0	13.72
BH03	3/26/2015	8.0	<1.0	<1.0	<1.0	13.24
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

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)
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	11.80
BH04	6/24/2014	<1.0	<1.0	2.2	<1.0	9.43
BH04	9/24/2014	<1.0	<1.0	1.2	3.1	10.22
BH04	12/17/2014	<1.0	<1.0	<1.0	<1.0	10.96
BH04	3/26/2015	<1.0	<1.0	<1.0	<1.0	10.40
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
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
BH05	9/24/2014	<1.0	<1.0	<1.0	<1.0	12.93
BH05	12/17/2014	<1.0	<1.0	<1.0	<1.0	13.69
BH05	3/26/2015	<1.0	<1.0	<1.0	<1.0	13.30
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
BH06	9/24/2014	<1.0	<1.0	<1.0	<1.0	13.26
BH06	12/17/2014	<1.0	<1.0	<1.0	<1.0	13.94
BH06	3/26/2015	<1.0	<1.0	<1.0	<1.0	13.45
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
BH07	9/24/2014	<1.0	<1.0	<1.0	<1.0	14.84
BH07	12/17/2014	<1.0	<1.0	<1.0	<1.0	15.46
BH07	3/26/2015	<1.0	1.2	<1.0	<1.0	14.93
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**

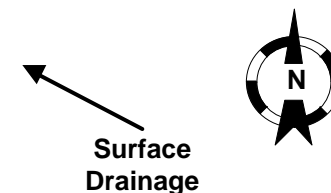
AIR STORAGE/ EFR OPERATIONS SUMMARY TABLE						
Date	EFR Wells	Total EFR/AS Duration (hours)	Approximate Gallons Extracted	AS Wells	Air Injection Pressure (psi)	Average Air Flow Rate (cfm)
First Quarter 2014						
1/3/2014	BH01, BH02, BH03, BH04	6	10	BH01, BH02, BH03, BH04	10	
1/17/2014		6	240		10	
2/17/2014		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		-	
Third Quarter 2014						
7/10/2014	BH02, BH03	6	250	BH02, BH03	10	12.5
7/25/2014		6	220		10	27.5
8/16/2014		6	120		10	25
9/8/2014		6	450		20	41.6
9/19/2014		6	150		20	40
Quarterly Totals		30	1190		-	
Fourth Quarter 2014						
10/8/2014	BH02, BH03	6	100	BH02, BH03	20	20
10/25/2014		6	260		20	33.5
11/7/2014		6	112		20	20
12/2/2014		6	250		20	37.5
12/15/2014		6	270		20	20
Quarterly Totals		30	992			
First Quarter 2015						
1/5/2015	BH02, BH03	6	0	BH02, BH03	20	35
1/16/2015		6	315		20	35
2/7/2015		6	410		20	32.5
3/2/2015		6	0		20	27.5
3/19/2015		6	0		20	30
Quarterly Totals		30	725			

Separator
Secondary
Containment

BH06		
Compound (ug/L)	12/17/2014	3/26/2015
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)	12/17/2014	3/26/2015
Benzene	<1.0	<1.0
Toluene	<1.0	1.2
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0



Private Land

Native
Vegetation

⊕
BH-06

BH01		
Compound (ug/L)	12/17/2014	3/26/2015
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)	12/17/2014	3/26/2015
Benzene	29	47
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	2.5
Total Xylenes	<1.0	<1.0

⊕
BH-02

BH04		
Compound (ug/L)	12/17/2014	3/26/2015
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)	12/17/2014	3/26/2015
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)	12/17/2014	3/26/2015
Benzene	<1.0	8.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
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

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: 3/31/2015

ATTACHMENT A

Summit Scientific

741 Corporate Circle – Suite J ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.374.5933 - fax

March 30, 2015

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 03/26/15 17:40. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Joseph J Egry IV". The signature is fluid and cursive, with a small "IV" superscripted at the end.

Joseph J Egry IV For Paul Shrewsbury
President

This report shall not be reproduced, except in its entirety, without the written approval of Summit Scientific. Test results relate only to samples analyzed.

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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:
03/30/15 15:22

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1503228-01	Water	03/26/15 13:45	03/26/15 17:40
BH02	1503228-02	Water	03/26/15 13:57	03/26/15 17:40
BH03	1503228-03	Water	03/26/15 14:10	03/26/15 17:40
BH04	1503228-04	Water	03/26/15 14:13	03/26/15 17:40
BH05	1503228-05	Water	03/26/15 14:18	03/26/15 17:40
BH06	1503228-06	Water	03/26/15 13:58	03/26/15 17:40
BH07	1503228-07	Water	03/26/15 13:48	03/26/15 17:40

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.

Joseph J Egry IV For Paul Shrewsbury, President

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

Project: Cottonwood #1

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
03/30/15 15:22

Summit Scientific

741 Corporate Circle Suite I • Golden, Colorado 80401
303-277-9310 • 303-374-5933 Fax

Page 1 of 1

Client: PDC Energy
Address:
City/State/Zip:
Phone: Fax:
Sampler Name: Kate Foxmark

Project Manager: Brandon Bruns
E-Mail: brandon.bruns@pdce.com
Project Name: Cottonwood 1
Project Number:

[illegible]

www.s2scient.com

Soil samples reported on a wet-weight basis unless otherwise indicated on results page.

Summit Scientific

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Carol J. Gray ¹⁰

Joseph J Egry IV For Paul Shrewsbury, President



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

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

Reported:
03/30/15 15:22

Sample Receipt Checklist

S2 Work Order: 1503228
Client: PDC Client Project ID: Cottonwood 1
Shipped Via: PLU (UPS, FedEx, Hand Delivered, Pick-up, etc.) Airbill #: _____
Matrix (check all that apply): ☐ Air ☐ Soil/Solid ☒ Water ☐ Other: _____ (Describe)

Cooler ID	<u>1</u>				
Temp (°C)	<u>8.1</u>				

Thermometer ID: T006

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature just above 0°C to ≤ 6°C ⁽¹⁾ ?	<input checked="" type="checkbox"/>			<u>on ice</u>
NOTE: If samples are delivered the same day of sampling, this requirement is waived provided that there is evidence that cooling has begun.				
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
If custody seals are present, are they intact ⁽¹⁾ ?			<input checked="" type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present?		<input checked="" type="checkbox"/>		
Is a chain-of-custody (COC) form present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client w/ date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.		<input checked="" type="checkbox"/>		
Are samples preserved that require preservation (excluding cooling) ⁽¹⁾ ?	<input checked="" type="checkbox"/>			<u>HCl</u>
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, etc.				
If samples are acid preserved for metals, is the pH ≤ 2 ⁽¹⁾ ?			<input checked="" type="checkbox"/>	
Record the pH in Comments.				
If dissolved metals are requested, were samples field filtered?			<input checked="" type="checkbox"/>	
Additional Comments (if any):				
⁽¹⁾ If NO, then contact the client before proceeding with analysis and note in case narrative.				

Aisha Oludham
Custodian Printed Name

AD
Signature or Initials of Custodian

3/27/15 1200
Date/Time

Soil samples reported on a wet-weight basis unless otherwise indicated on results page.

Summit Scientific

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Joseph J Egry IV For Paul Shrewsbury, President



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

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

Reported:
03/30/15 15:22

BH01
1503228-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **03/26/15 13:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1503323	03/27/15	03/27/15 20:19	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **03/26/15 13:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4	104 %	37-154			"	"	"	"	
Surrogate: Toluene-d8	99.2 %	45-149			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	104 %	45-146			"	"	"	"	

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Joseph J Egry IV For Paul Shrewsbury, President



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

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

Reported:
03/30/15 15:22

BH02
1503228-02 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **03/26/15 13:57**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	47	1.0	ug/l	1	1503323	03/27/15	03/27/15 20:43	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	2.5	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **03/26/15 13:57**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4	104 %	37-154			"	"	"	"	
Surrogate: Toluene-d8	99.5 %	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.

Joseph J Egry IV For Paul Shrewsbury, President



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

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

Reported:
03/30/15 15:22

BH03
1503228-03 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **03/26/15 14:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	8.0	1.0	ug/l	1	1503323	03/27/15	03/27/15 21:08	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **03/26/15 14:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4	104 %	37-154			"	"	"	"	
Surrogate: Toluene-d8	98.4 %	45-149			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	102 %	45-146			"	"	"	"	

Summit Scientific

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Joseph J Egry IV For Paul Shrewsbury, President



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

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

Reported:
03/30/15 15:22

BH04
1503228-04 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **03/26/15 14:13**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1503323	03/27/15	03/27/15 21:32	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **03/26/15 14:13**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4	101 %	37-154			"	"	"	"	
Surrogate: Toluene-d8	98.5 %	45-149			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	99.6 %	45-146			"	"	"	"	

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Joseph J Egry IV For Paul Shrewsbury, President



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

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

Reported:
03/30/15 15:22

BH05
1503228-05 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **03/26/15 14:18**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1503323	03/27/15	03/27/15 21:57	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **03/26/15 14:18**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4	102 %	37-154			"	"	"	"	
Surrogate: Toluene-d8	97.4 %	45-149			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	105 %	45-146			"	"	"	"	

Summit Scientific

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Joseph J Egry IV For Paul Shrewsbury, President



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

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

Reported:
03/30/15 15:22

BH06
1503228-06 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **03/26/15 13:58**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1503323	03/27/15	03/27/15 22:22	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **03/26/15 13:58**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4	104 %	37-154			"	"	"	"	
Surrogate: Toluene-d8	101 %	45-149			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	102 %	45-146			"	"	"	"	

Summit Scientific

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Joseph J Egry IV For Paul Shrewsbury, President



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

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

Reported:
03/30/15 15:22

BH07
1503228-07 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 03/26/15 13:48

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1503323	03/27/15	03/27/15 18:22	EPA 8260B	
Toluene	1.2	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: 03/26/15 13:48

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4	102 %	37-154			"	"	"	"	
Surrogate: Toluene-d8	98.7 %	45-149			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	101 %	45-146			"	"	"	"	

Summit Scientific

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Joseph J Egry IV For Paul Shrewsbury, President



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

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

Reported:
03/30/15 15:22

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 1503323 - EPA 5030 Water MS

Blank (1503323-BLK1)

Prepared & Analyzed: 03/27/15

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	13.0		"	13.2		98.3	37-154			
Surrogate: Toluene-d8	13.1		"	13.3		98.3	45-149			
Surrogate: 4-Bromofluorobenzene	13.4		"	13.3		101	45-146			

LCS (1503323-BS1)

Prepared & Analyzed: 03/27/15

Benzene	30.2	1.0	ug/l	33.3		90.7	51-132			
Toluene	33.1	1.0	"	33.3		99.2	51-138			
Ethylbenzene	29.7	1.0	"	33.1		89.7	58-146			
m,p-Xylene	60.5	2.0	"	66.5		90.9	57-144			
o-Xylene	30.6	1.0	"	32.8		93.4	53-146			
Surrogate: 1,2-Dichloroethane-d4	13.1		"	13.2		99.3	37-154			
Surrogate: Toluene-d8	13.4		"	13.3		101	45-149			
Surrogate: 4-Bromofluorobenzene	13.6		"	13.3		102	45-146			

Matrix Spike (1503323-MS1)

Source: 1503228-07

Prepared & Analyzed: 03/27/15

Benzene	30.6	1.0	ug/l	33.3	ND	91.9	34-141			
Toluene	33.1	1.0	"	33.3	1.15	96.0	27-151			
Ethylbenzene	30.2	1.0	"	33.1	ND	91.4	29-160			
m,p-Xylene	61.6	2.0	"	66.5	ND	92.7	20-166			
o-Xylene	31.6	1.0	"	32.8	ND	96.4	33-159			
Surrogate: 1,2-Dichloroethane-d4	13.5		"	13.2		102	37-154			
Surrogate: Toluene-d8	13.5		"	13.3		101	45-149			
Surrogate: 4-Bromofluorobenzene	13.6		"	13.3		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 Brunns

Reported:
03/30/15 15:22

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 1503323 - EPA 5030 Water MS

Matrix Spike Dup (1503323-MSD1)	Source: 1503228-07			Prepared & Analyzed: 03/27/15						
Benzene	29.7	1.0	ug/l	33.3	ND	89.1	34-141	3.15	32	
Toluene	32.5	1.0	"	33.3	1.15	93.9	27-151	2.07	25	
Ethylbenzene	29.8	1.0	"	33.1	ND	90.2	29-160	1.30	50	
m,p-Xylene	60.7	2.0	"	66.5	ND	91.3	20-166	1.49	36	
o-Xylene	31.2	1.0	"	32.8	ND	95.0	33-159	1.53	26	
Surrogate: 1,2-Dichloroethane-d4	13.3		"	13.2		101	37-154			
Surrogate: Toluene-d8	13.2		"	13.3		98.9	45-149			
Surrogate: 4-Bromofluorobenzene	13.5		"	13.3		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:
03/30/15 15:22

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

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A handwritten signature in black ink, appearing to read 'Joseph J Egry IV'.

Joseph J Egry IV For Paul Shrewsbury, President