



PDC Energy, Inc.
First Quarter 2014 Groundwater Monitoring Summary

April 21, 2014

Becker 5-1, 2, 14, 15 Tank Battery
SE 1/4 Section 5 T3N R64W
Weld County, API # 05-123-12297

This groundwater summary has been prepared by Tasman Geosciences, LLC for the Becker 5-1, 2, 14, 15 tank battery. On March 28, 2014 groundwater sampling was conducted at three 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 a complete lab report is included as Attachment A. Sample locations and corresponding analytical results are illustrated on Figure 1. First quarter 2014 analytical results indicate that benzene concentrations in BH02 were in exceedance of COGCC regulatory standards. BTEX concentrations were below regulatory standards at the remaining two sample locations.

Tasman temporarily discontinued enhanced fluid recovery (EFR) and air sparge (AS) events at the site during the first quarter 2014 until additional remediation wells could be installed. EFR/AS activities will recommence in second quarter at the five new monitoring wells located adjacent to BH02. A summary of the EFR/AS operational data is provided in Table 2.

Second quarter 2014 groundwater sampling will be conducted in June 2014.

TABLE 1
BECKER 5-1, 2, 14, 15
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	11/29/2012	3,100	610	320	3,700	16
BH01	12/20/2012	97	<1.0	180	1,200	13.24
BH01	3/19/2013	1.7	<1.0	4.9	48	13.27
BH01	6/21/2013	<1.0	<1.0	8	49	13.01
BH01	9/23/2013	<1.0	<1.0	<1.0	<1.0	12.52
BH01	12/18/2013	1.5	<1.0	<1.0	<1.0	12.8
BH01	3/28/2014	<1.0	1.9	<1.0	2.2	12.81
BH02	12/20/2012	170	1.6	490	1,700	10.2
BH02	3/19/2013	<1.0	<1.0	<1.0	2.8	10.44
BH02	6/21/2013	82	<1.0	66	410	9.85
BH02	9/23/2013	35	<1.0	39	39	9.31
BH02	12/18/2013	550	<1.0	1.4	110	9.74
BH02	3/28/2014	660	150	1	280	9.78
BH03	12/20/2012	<1.0	<1.0	<1.0	<1.0	12.78
BH03	3/19/2013	<1.0	<1.0	<1.0	<1.0	12.6
BH03	6/21/2013	<1.0	<1.0	<1.0	<1.0	12.39
BH03	9/23/2013	<1.0	<1.0	<1.0	<1.0	12.18
BH03	12/18/2013	1.2	<1.0	<1.0	<1.0	12.09
BH03	3/28/2014	<1.0	<1.0	<1.0	<1.0	12.06
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
BECKER 5-1, 2, 14, 15
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	Injection Pressure (psi)
First Quarter 2013					
1/28/2013	BH01, BH02	6	4.5	BH01, BH02	10
2/16/2013		5.5	16		10
3/3/2013		6	0		10
3/18/2013		6	7		10
Quarterly Totals		23.5	27.5		-
Second Quarter 2013					
4/15/2013	BH01, BH02	6	9	BH01, BH02	10
5/3/2013		4	0		10
5/20/2013		6	2		10
Quarterly Totals		16	11		-
Third Quarter 2013					
7/8/2013	BH01, BH02	6	7	BH01, BH02	10
7/23/2013		6.25	0		10
8/9/2013		6.25	2		15
8/22/2013		6	0		not recorded
9/9/2013		6	13		10
9/17/2013		6	not recorded		12
9/24/2013		6	15		15
Quarterly Totals		42.5	37		-
Fourth Quarter 2013					
10/7/2013	BH01, BH02	6	1	BH01, BH02	10
10/15/2013		6.25	5		10
10/29/2013		6	0		10
11/13/2013		6	not recorded		10
11/25/2013		6	0.5		10
12/19/2013		6	0		10
Quarterly Totals		36.25	6.5		-



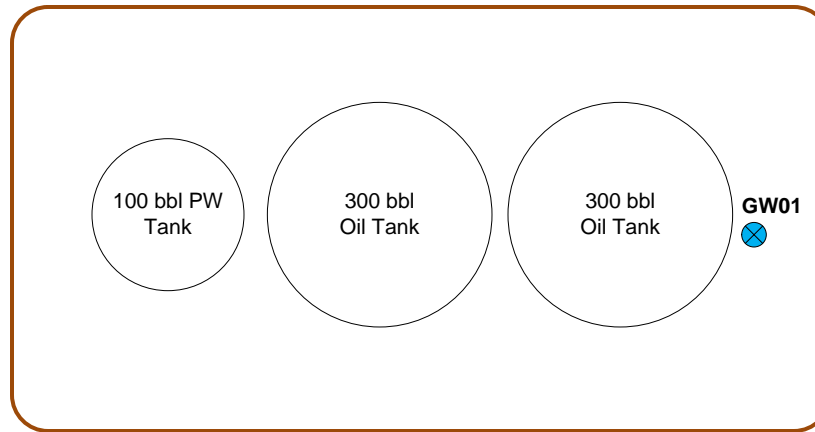
DCP / PDC Tank Battery

Property Fence

BH03



BH03		
Compound (ug/L)	12/18/2013	3/28/2014
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	1.9
Total Xylenes	1.2	2.2



GW01

BH01

BH01		
Compound (ug/L)	12/18/2013	3/28/2014
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	1.5	<1.0

BH02

BH02		
Compound (ug/L)	12/18/2013	3/28/2014
Benzene	550	660
Toluene	<1.0	1.0
Ethylbenzene	1.4	150
Total Xylenes	110	280

Separator 10 bbl

Separator 10 bbl

Note: Surface drainage is estimated based on site topography and is not related to regional topography.

DRAWN BY: ESS

DATE: 1/6/2014

Facility Diagram
PDC Energy – DJ Basin
Becker 5-1, 2, 14, 15
SE 1/4 S5 T3N R64W
Weld County, CO



6899 Pecos Street
Unit C
Denver, CO 80221

LEGEND

- Earthen Berm
- Temporary Monitoring Well
- 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

April 06, 2014

Brandon Bruns
PDC Energy
1775 Sherman St. STE. 3000
Denver, CO 80203
RE: Becker 5-1,2,14,15

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' or 'Shrewsbury', with a long, sweeping horizontal line extending to the right.

Ben Shrewsbury
President / Laboratory Manager



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

Project: Becker 5-1,2,14,15

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
04/06/14 17:36

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1403256-01	Water	03/28/14 15:30	03/28/14 17:00
BH02	1403256-02	Water	03/28/14 15:35	03/28/14 17:00
BH03	1403256-03	Water	03/28/14 15:40	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: Becker 5-1,2,14,15

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
04/06/14 17:36

Summit Scientific
1403250

141 Corporate Circle Suite 100 Golden, Colorado 80401
303.771.9110 • 303.774.9111 Fax

Client: PDC Energy
Address: _____
City/State/Zip: _____
Phone: _____
Sample Name: Eric Sigel
Project Name: Becker 5-1,2,14,15
Project Number: _____
Page: 1 of 1

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative	Matrix	Analyze For:	Special Instructions
B401	3/28/14	1530	3	X	Soil	X 8260 BTEX	
B402	1535			X	Groundwater		
B403	1540			X	Other (Specify)		
					At - Cationic Surfactant		
					None		
					H2O		
					Other (Specify)		
					Soil		
					Groundwater		
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					Soil		



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

Project: Becker 5-1,2,14,15

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
04/06/14 17:36

BH01
1403256-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **03/28/14 15:30**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1403269	03/31/14	04/01/14	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	1.9	1.0		"	"	"	"	"	"	
Xylenes (total)	2.2	1.0		"	"	"	"	"	"	

Date Sampled: **03/28/14 15:30**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		78.0 %		37-154		"	"	"	"	
Surrogate: Toluene-d8		99.3 %		45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		96.6 %		45-146		"	"	"	"	

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

Project: Becker 5-1,2,14,15

Project Number: [none]
Project Manager: Brandon Brunns

Reported:
04/06/14 17:36

BH02
1403256-02 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **03/28/14 15:35**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	660	10		ug/l	10	1403269	03/31/14	04/01/14	EPA 8260B	
Toluene	1.0	1.0		"	1	"	"	04/01/14	"	
Ethylbenzene	150	1.0		"	"	"	"	"	"	
Xylenes (total)	280	1.0		"	"	"	"	"	"	

Date Sampled: **03/28/14 15:35**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
<i>Surrogate: 1,2-Dichloroethane-d4</i>		79.3 %		37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		100 %		45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		93.3 %		45-146		"	"	"	"	

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

Project: Becker 5-1,2,14,15
Project Number: [none]
Project Manager: Brandon Brunns

Reported:
04/06/14 17:36

BH03
1403256-03 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **03/28/14 15:40**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	1.0	ug/l	1	1403269	03/31/14	04/01/14	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **03/28/14 15:40**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		77.2 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		97.1 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.3 %	45-146		"	"	"	"	

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

Project: Becker 5-1,2,14,15
Project Number: [none]
Project Manager: Brandon Bruns

Reported:
04/06/14 17:36

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 1403269 - EPA 5030 Water MS

Blank (1403269-BLK1)

Prepared: 03/31/14 Analyzed: 04/01/14

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	9.73		"	13.2		73.5	37-154			
Surrogate: Toluene-d8	12.9		"	13.3		96.8	45-149			
Surrogate: 4-Bromofluorobenzene	13.1		"	13.3		98.3	45-146			

LCS (1403269-BS1)

Prepared: 03/31/14 Analyzed: 04/01/14

Benzene	34.4	1.0	ug/l	33.2		103	51-132			
Toluene	35.9	1.0	"	33.3		108	51-138			
Ethylbenzene	33.4	1.0	"	33.1		101	58-146			
m,p-Xylene	66.7	2.0	"	66.7		100	57-144			
o-Xylene	32.9	1.0	"	32.9		100	53-146			
Surrogate: 1,2-Dichloroethane-d4	9.93		"	13.2		75.0	37-154			
Surrogate: Toluene-d8	13.0		"	13.3		97.7	45-149			
Surrogate: 4-Bromofluorobenzene	12.7		"	13.3		95.2	45-146			

LCS (1403269-BS2)

Prepared: 03/31/14 Analyzed: 04/01/14

Benzene	34.9	1.0	ug/l	33.2		105	51-132			
Toluene	37.0	1.0	"	33.3		111	51-138			
Ethylbenzene	33.8	1.0	"	33.1		102	58-146			
m,p-Xylene	67.4	2.0	"	66.7		101	57-144			
o-Xylene	32.8	1.0	"	32.9		99.6	53-146			
Surrogate: 1,2-Dichloroethane-d4	9.72		"	13.2		73.5	37-154			
Surrogate: Toluene-d8	13.1		"	13.3		98.0	45-149			
Surrogate: 4-Bromofluorobenzene	12.6		"	13.3		94.9	45-146			

Summit Scientific

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1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Becker 5-1,2,14,15
Project Number: [none]
Project Manager: Brandon Brunns

Reported:
04/06/14 17:36

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 1403269 - EPA 5030 Water MS

Matrix Spike (1403269-MS1)		Source: 1403252-01			Prepared: 03/31/14		Analyzed: 04/01/14			
Benzene	35.2	1.0	ug/l	33.2	ND	106	34-141			
Toluene	36.9	1.0	"	33.3	ND	111	27-151			
Ethylbenzene	33.1	1.0	"	33.1	ND	100	29-160			
m,p-Xylene	66.5	2.0	"	66.7	ND	99.7	20-166			
o-Xylene	32.8	1.0	"	32.9	ND	99.5	33-159			
Surrogate: 1,2-Dichloroethane-d4	10.5		"	13.2		79.1	37-154			
Surrogate: Toluene-d8	13.3		"	13.3		99.7	45-149			
Surrogate: 4-Bromofluorobenzene	12.7		"	13.3		95.0	45-146			

Matrix Spike (1403269-MS2)		Source: 1403252-02			Prepared: 03/31/14		Analyzed: 04/01/14			
Benzene	35.3	1.0	ug/l	33.2	ND	106	34-141			
Toluene	37.4	1.0	"	33.3	ND	112	27-151			
Ethylbenzene	33.3	1.0	"	33.1	ND	101	29-160			
m,p-Xylene	66.8	2.0	"	66.7	ND	100	20-166			
o-Xylene	32.7	1.0	"	32.9	ND	99.2	33-159			
Surrogate: 1,2-Dichloroethane-d4	10.4		"	13.2		78.3	37-154			
Surrogate: Toluene-d8	13.1		"	13.3		98.0	45-149			
Surrogate: 4-Bromofluorobenzene	12.5		"	13.3		93.5	45-146			

Matrix Spike Dup (1403269-MSD1)		Source: 1403252-01			Prepared: 03/31/14		Analyzed: 04/01/14			
Benzene	35.1	1.0	ug/l	33.2	ND	105	34-141	0.342	32	
Toluene	36.9	1.0	"	33.3	ND	111	27-151	0.136	25	
Ethylbenzene	34.0	1.0	"	33.1	ND	103	29-160	2.77	50	
m,p-Xylene	68.0	2.0	"	66.7	ND	102	20-166	2.32	36	
o-Xylene	33.5	1.0	"	32.9	ND	102	33-159	2.23	26	
Surrogate: 1,2-Dichloroethane-d4	10.6		"	13.2		79.9	37-154			
Surrogate: Toluene-d8	13.0		"	13.3		97.9	45-149			
Surrogate: 4-Bromofluorobenzene	12.8		"	13.3		96.2	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: Becker 5-1,2,14,15

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
04/06/14 17:36

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'.