



**PDC Energy, Inc.**  
Third Quarter 2013 Groundwater Monitoring Summary

November 21, 2013

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 September 23, 2013 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 2. Third quarter 2013 analytical results indicate that benzene concentrations were in exceedance of COGCC regulatory standards at one monitoring location (BH02).

Tasman continued enhanced fluid recovery (EFR) and air sparge (AS) events at the site during the third quarter 2013. A summary of the EFR/AS operational data is provided in Table 2. EFR/AS activities will continue through the fourth quarter 2013.

Fourth quarter 2013 groundwater sampling will be conducted in December 2013.

**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	<b>3,100</b>	<b>610</b>	320	<b>3,700</b>	16
BH01	12/20/2012	<b>97</b>	<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	8.0	49	13.01
BH01	9/23/2013	<1.0	<1.0	<1.0	<1.0	12.52
BH02	12/20/2012	<b>170</b>	1.6	490	<b>1,700</b>	10.20
BH02	3/19/2013	<1.0	<1.0	<1.0	2.8	10.44
BH02	6/21/2013	<b>82</b>	<1.0	66	410	9.85
BH02	9/23/2013	<b>35</b>	<1.0	39	39	9.31
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	12.60
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
<b>COGCC standards for groundwater (ug/L) <sup>(1)</sup></b>		<b>5</b>	<b>560</b>	<b>700</b>	<b>1,400</b>	

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.

**TABLE 2  
BECKER 5-1, 2, 14, 15  
AIR SPARGE / EFR OPERATIONAL SUMMARY TABLE**

<b>Date</b>	<b>EFR Wells</b>	<b>Total EFR/AS Duration (hours)</b>	<b>Approximate Gallons Extracted</b>	<b>AS Wells</b>	<b>Injection Pressure (psi)</b>
<b>FIRST QUARTER 2013</b>					
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
<b>SECOND QUARTER 2013</b>					
4/15/2013	BH01, BH02	6	9	BH01, BH02	10
5/3/2013		4	0		10
5/20/2013		6	2		10
<b>THIRD QUARTER 2013</b>					
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		10
9/17/2013		6	0		12
9/24/2013		6	15		15

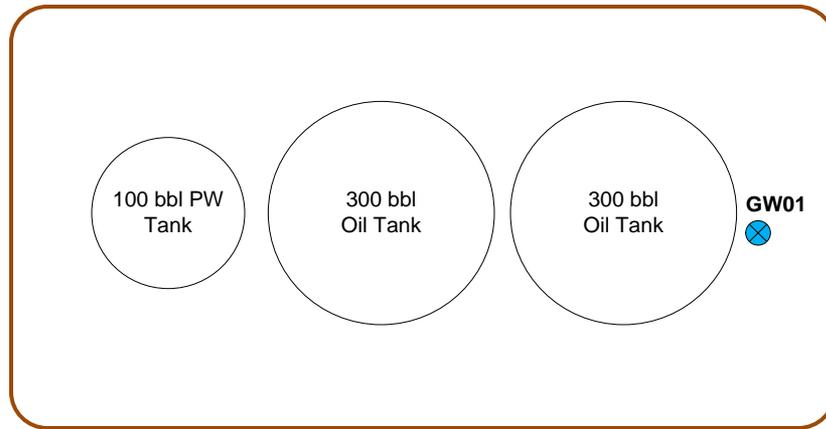
Notes:

psi = pounds per square inch



**DCP / PDC Tank Battery**

Property Fence



BH03



BH03		
Compound (ug/L)	6/21/2013	9/23/2013
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH01

BH01		
Compound (ug/L)	6/21/2013	9/23/2013
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	8.0	<1.0
Total Xylenes	49	<1.0

BH02

BH02		
Compound (ug/L)	6/21/2013	9/23/2013
Benzene	<b>82</b>	<b>35</b>
Toluene	<1.0	<1.0
Ethylbenzene	66	39
Total Xylenes	410	39

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

**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 2**  
**GROUNDWATER ANALYTICAL RESULTS**  
 Not to Scale

DATE: 10/7/2013

**ATTACHMENT A**

# Summit Scientific

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741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

September 26, 2013

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 09/23/13 18:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Joseph J Egry IV For Ben Shrewsbury  
President / Laboratory Manager

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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:**  
09/26/13 13:46

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	R309168-01	Water	09/23/13 10:00	09/23/13 18:00
BH02	R309168-02	Water	09/23/13 10:00	09/23/13 18:00
BH03	R309168-03	Water	09/23/13 10:00	09/23/13 18:00

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 Brunns

**Reported:**  
 09/26/13 13:46

**BH01**  
**R309168-01 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **09/23/13 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	3092411	09/25/13	09/25/13	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **09/23/13 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		101 %	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:**  
 09/26/13 13:46

**BH02**  
**R309168-02 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **09/23/13 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>35</b>	1.0	ug/l	1	3092411	09/25/13	09/25/13	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>39</b>	1.0	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>39</b>	1.0	"	"	"	"	"	"	

Date Sampled: **09/23/13 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		103 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		100 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		96.2 %	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:**  
 09/26/13 13:46

**BH03**  
**R309168-03 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **09/23/13 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	3092411	09/25/13	09/25/13	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **09/23/13 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		105 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		101 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.0 %	45-146		"	"	"	"	

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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:  
09/26/13 13:46

**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 3092411 - EPA 5030 Water MS**

**Blank (3092411-BLK1)**

Prepared & Analyzed: 09/25/13

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>12.0</i>		<i>"</i>	<i>13.2</i>		<i>91.1</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 (3092411-BLK2)**

Prepared & Analyzed: 09/25/13

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>12.4</i>		<i>"</i>	<i>13.2</i>		<i>93.9</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>13.6</i>		<i>"</i>	<i>13.3</i>		<i>102</i>	<i>45-146</i>			

**LCS (3092411-BS1)**

Prepared & Analyzed: 09/25/13

Benzene	37.4	1.0	ug/l	33.3		112	51-132			
Toluene	36.0	1.0	"	33.3		108	51-138			
Ethylbenzene	33.0	1.0	"	33.3		98.9	58-146			
m,p-Xylene	70.4	2.0	"	66.7		106	57-144			
o-Xylene	33.7	1.0	"	33.3		101	53-146			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>12.7</i>		<i>"</i>	<i>13.2</i>		<i>95.9</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>13.5</i>		<i>"</i>	<i>13.3</i>		<i>101</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>			

**LCS (3092411-BS2)**

Prepared & Analyzed: 09/25/13

Benzene	37.6	1.0	ug/l	33.3		113	51-132			
Toluene	36.4	1.0	"	33.3		109	51-138			
Ethylbenzene	33.7	1.0	"	33.3		101	58-146			
m,p-Xylene	72.1	2.0	"	66.7		108	57-144			
o-Xylene	34.0	1.0	"	33.3		102	53-146			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>12.6</i>		<i>"</i>	<i>13.2</i>		<i>94.9</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>13.5</i>		<i>"</i>	<i>13.3</i>		<i>101</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>13.5</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: Becker 5-1,2,14,15

Project Number: [none]  
Project Manager: Brandon Brunns

Reported:  
09/26/13 13:46

**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 3092411 - EPA 5030 Water MS**

**LCS Dup (3092411-BSD1)**

Prepared & Analyzed: 09/25/13

Benzene	37.0	1.0	ug/l	33.3	111	51-132	0.994	17	
Toluene	35.8	1.0	"	33.3	107	51-138	0.696	17	
Ethylbenzene	33.3	1.0	"	33.3	99.9	58-146	0.996	16	
m,p-Xylene	71.1	2.0	"	66.7	107	57-144	0.876	16	
o-Xylene	33.8	1.0	"	33.3	101	53-146	0.237	15	
Surrogate: 1,2-Dichloroethane-d4	12.3		"	13.2	93.2	37-154			
Surrogate: Toluene-d8	13.3		"	13.3	99.9	45-149			
Surrogate: 4-Bromofluorobenzene	13.1		"	13.3	98.3	45-146			

**LCS Dup (3092411-BSD2)**

Prepared & Analyzed: 09/25/13

Benzene	37.2	1.0	ug/l	33.3	112	51-132	1.04	17	
Toluene	36.1	1.0	"	33.3	108	51-138	0.965	17	
Ethylbenzene	33.8	1.0	"	33.3	101	58-146	0.0889	16	
m,p-Xylene	71.9	2.0	"	66.7	108	57-144	0.194	16	
o-Xylene	34.4	1.0	"	33.3	103	53-146	1.14	15	
Surrogate: 1,2-Dichloroethane-d4	12.5		"	13.2	94.2	37-154			
Surrogate: Toluene-d8	13.2		"	13.3	99.2	45-149			
Surrogate: 4-Bromofluorobenzene	13.3		"	13.3	99.8	45-146			

**Matrix Spike (3092411-MS1)**

Source: R309155-01

Prepared & Analyzed: 09/25/13

Benzene	37.1	1.0	ug/l	33.3	ND	111	34-141		
Toluene	35.9	1.0	"	33.3	ND	108	27-151		
Ethylbenzene	33.6	1.0	"	33.3	ND	101	29-160		
m,p-Xylene	71.9	2.0	"	66.7	ND	108	20-166		
o-Xylene	34.1	1.0	"	33.3	ND	102	33-159		
Surrogate: 1,2-Dichloroethane-d4	12.3		"	13.2	92.9	37-154			
Surrogate: Toluene-d8	13.2		"	13.3	98.8	45-149			
Surrogate: 4-Bromofluorobenzene	13.3		"	13.3	99.5	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:  
09/26/13 13:46

**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 3092411 - EPA 5030 Water MS**

<b>Matrix Spike (3092411-MS2)</b>	<b>Source: R309155-02</b>			<b>Prepared &amp; Analyzed: 09/25/13</b>							
Benzene	37.6	1.0	ug/l	33.3	ND	113	34-141				
Toluene	37.0	1.0	"	33.3	ND	111	27-151				
Ethylbenzene	33.9	1.0	"	33.3	ND	102	29-160				
m,p-Xylene	72.4	2.0	"	66.7	ND	109	20-166				
o-Xylene	34.4	1.0	"	33.3	ND	103	33-159				
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>12.4</i>		<i>"</i>	<i>13.2</i>		<i>93.5</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>13.3</i>		<i>"</i>	<i>13.3</i>		<i>99.9</i>	<i>45-146</i>				

<b>Matrix Spike Dup (3092411-MSD1)</b>	<b>Source: R309155-01</b>			<b>Prepared &amp; Analyzed: 09/25/13</b>							
Benzene	37.3	1.0	ug/l	33.3	ND	112	34-141	0.753	32		
Toluene	36.1	1.0	"	33.3	ND	108	27-151	0.722	25		
Ethylbenzene	33.7	1.0	"	33.3	ND	101	29-160	0.178	50		
m,p-Xylene	71.4	2.0	"	66.7	ND	107	20-166	0.725	36		
o-Xylene	34.2	1.0	"	33.3	ND	103	33-159	0.468	26		
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>12.5</i>		<i>"</i>	<i>13.2</i>		<i>94.5</i>	<i>37-154</i>				
<i>Surrogate: Toluene-d8</i>	<i>13.3</i>		<i>"</i>	<i>13.3</i>		<i>99.6</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>				

<b>Matrix Spike Dup (3092411-MSD2)</b>	<b>Source: R309155-02</b>			<b>Prepared &amp; Analyzed: 09/25/13</b>							
Benzene	37.3	1.0	ug/l	33.3	ND	112	34-141	0.774	32		
Toluene	36.0	1.0	"	33.3	ND	108	27-151	2.66	25		
Ethylbenzene	33.6	1.0	"	33.3	ND	101	29-160	0.918	50		
m,p-Xylene	71.2	2.0	"	66.7	ND	107	20-166	1.56	36		
o-Xylene	33.8	1.0	"	33.3	ND	102	33-159	1.70	26		
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>12.4</i>		<i>"</i>	<i>13.2</i>		<i>93.5</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>13.4</i>		<i>"</i>	<i>13.3</i>		<i>101</i>	<i>45-146</i>				

Summit Scientific

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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:**  
09/26/13 13:46

### 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