



PDC Energy, Inc.
Second Quarter 2013 Groundwater Monitoring Summary

June 14, 2013

received 01/22/2016
Project 6926
Document 2144848

Seele 31, 41, 42-31 Tank Battery
NWNW Section 31 T4N R67W
Weld County, API # 05-123-20106

This groundwater monitoring summary has been prepared by Tasman Geosciences, LLC for the Seele 31, 41, 42-31 tank battery. On May 3, 2013, groundwater monitoring was conducted at three monitoring wells. BH02 and BH03 were not sampled due to insufficient water. The groundwater sample was submitted for laboratory analysis of BTEX constituents using USEPA Method 8260B. Analytical results are summarized in Table 1 and are illustrated on Figure 2. The laboratory analytical report is included as Attachment A. Benzene concentrations observed in BH01 are in exceedance of COGCC regulatory standards. Due to a decrease in groundwater elevation, BTEX concentrations have not been observed on site since October 2012. However, elevated benzene concentrations detected during the second quarter 2013 indicate there are residual petroleum hydrocarbon concentrations on site.

Bi-weekly enhanced fluid recovery (EFR) with air sparge (AS) was initiated on August 22, 2012. A summary of historic EFR/AS operational data is provided in Table 2. Bi-weekly EFR/AS events have been postponed until groundwater elevations increase at the site.

Third quarter 2013 groundwater sampling will be conducted during July 2013.

TABLE 1
SEELE 31, 41, 42-31
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)
BH01	1/27/2012	5,300	1,200	180	1,300	13.14
BH01	7/17/2012	900	2.2	10	78	12.60
BH01	10/1/2012	<1.0	<1.0	<1.0	<1.0	13.82
BH01	1/28/2013	DRY	DRY	DRY	DRY	DRY
BH01	5/3/2013	3,000	2.3	17	240	13.90
BH02	1/27/2012	7,500	680	240	1,400	11.93
BH02	7/17/2012	10,000	2,200	220	2,140	10.92
BH02	10/1/2012	DRY	DRY	DRY	DRY	DRY
BH02	1/28/2013	DRY	DRY	DRY	DRY	DRY
BH02	5/3/2013	DRY	DRY	DRY	DRY	DRY
BH03	1/27/2012	16,000	4,400	420	2,900	15.02
BH03	7/17/2012	18,000	2,700	15	3,590	12.56
BH03	10/1/2012	7,300	1,400	250	2,400	12.69
BH03	1/28/2013	DRY	DRY	DRY	DRY	DRY
BH03	5/3/2013	DRY	DRY	DRY	DRY	DRY
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.

Sample locations are shown on Figure 2.

ug/L= Micrograms per liter.

TABLE 2
SEELE 31, 41, 42-31
AIR SPARGE / EFR OPERATIONAL SUMMARY TABLE

Date	EFR Wells	Total EFR / AS Duration (hours)	Approximate Gallons Extracted	AS Wells	Injection Pressure (psi)
THIRD QUARTER 2012					
8/22/2012	BH-01, BH-02, BH-03	7	42	BH-01, BH-02, BH-03	8
9/5/2012		7	42		8
FOURTH QUARTER 2012					
10/2/2012	BH-01, BH-02, BH-03	7	42	BH-01, BH-02, BH-03	8
10/15/2012		7	42		8
10/29/2012		7	0		8
11/12/2012		6.25	0		8
11/26/2012		6	0		8
FIRST QUARTER 2013					
1/8/2013	BH-01, BH-02, BH-03	5	0	BH-01, BH-02, BH-03	8
1/21/2013		7	6.5		8

Notes:

psi = pounds per square
 inch

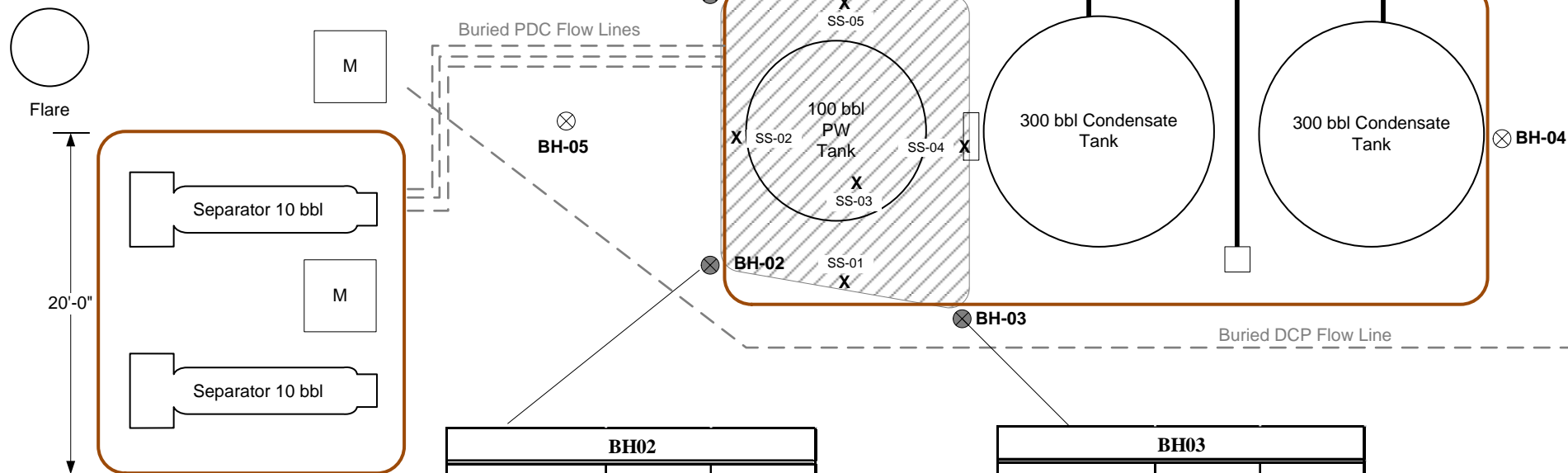


Surface
Drainage

BH01		
Compound (ug/L)	1/28/2013	5/3/2013
Benzene	DRY	3,000
Toluene	DRY	2.3
Ethylbenzene	DRY	17
Total Xylenes	DRY	240

County Road 40

BH-01



BH02		
Compound (ug/L)	1/28/2013	5/3/2013
Benzene	DRY	DRY
Toluene	DRY	DRY
Ethylbenzene	DRY	DRY
Total Xylenes	DRY	DRY

BH03		
Compound (ug/L)	1/28/2013	5/3/2013
Benzene	DRY	DRY
Toluene	DRY	DRY
Ethylbenzene	DRY	DRY
Total Xylenes	DRY	DRY

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

PROJECT
NO:

DRAWN BY: ESS

DATE: 5/17/2013

Facility Diagram
PDC Energy – DJ Basin
Seele 31, 41, 42-31
T4N R67W S31
Weld County, CO



6899 Pecos St., Unit C
Denver CO 80221

LEGEND

- Earthen Berm
- Bore Hole Location
- Bore Hole Location With Temporary Well Installed
- Approximate Extent of Excavation
- Excavation Soil Sample

M Meter Shed

FIGURE 2
GROUNDWATER
ANALYTICAL
RESULTS

ATTACHMENT A

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

May 13, 2013

Brandon Bruns
PDC Energy
1775 Sherman St. STE. 3000
Denver, CO 80203
RE: Seele 31, 41, 42-31

Enclosed are the results of analyses for samples received by Summit Scientific on 05/06/13 19:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Joseph J Egry IV
Laboratory Director

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: Seele 31, 41, 42-31

Project Number: [none]
Project Manager: Brandon Brunns

Reported:
05/13/13 12:57

BH01
R305056-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **05/03/13 10:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	3000	100	ug/l	100	3051108	05/11/13	05/12/13	EPA 8260B	
Toluene	2.3	1.0	"	1	"	"	05/12/13	"	
Ethylbenzene	17	1.0	"	"	"	"	"	"	
Xylenes (total)	240	1.0	"	"	"	"	"	"	

Date Sampled: **05/03/13 10:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		99.4 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		101 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		94.7 %	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: Seele 31, 41, 42-31
Project Number: [none]
Project Manager: Brandon Brunns

Reported:
05/13/13 12:57

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 3051108 - EPA 5030 Water MS

Blank (3051108-BLK1)

Prepared & Analyzed: 05/12/13

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	10.9		"	13.2		82.1	37-154			
Surrogate: Toluene-d8	13.0		"	13.3		97.5	45-149			
Surrogate: 4-Bromofluorobenzene	12.2		"	13.3		91.5	45-146			

Blank (3051108-BLK2)

Prepared & Analyzed: 05/12/13

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	10.7		"	13.2		80.7	37-154			
Surrogate: Toluene-d8	12.5		"	13.3		94.0	45-149			
Surrogate: 4-Bromofluorobenzene	12.5		"	13.3		93.9	45-146			

LCS (3051108-BS1)

Prepared & Analyzed: 05/12/13

Benzene	23.0	1.0	ug/l	26.7		86.4	51-132			
Toluene	28.3	1.0	"	26.7		106	51-138			
Ethylbenzene	27.7	1.0	"	26.7		104	58-146			
m,p-Xylene	56.3	2.0	"	53.3		106	57-144			
o-Xylene	26.9	1.0	"	26.7		101	53-146			
Surrogate: 1,2-Dichloroethane-d4	11.0		"	13.2		83.4	37-154			
Surrogate: Toluene-d8	12.4		"	13.3		93.3	45-149			
Surrogate: 4-Bromofluorobenzene	11.9		"	13.3		89.3	45-146			

LCS (3051108-BS2)

Prepared & Analyzed: 05/12/13

Benzene	24.7	1.0	ug/l	26.7		92.6	51-132			
Toluene	30.1	1.0	"	26.7		113	51-138			
Ethylbenzene	29.4	1.0	"	26.7		110	58-146			
m,p-Xylene	60.1	2.0	"	53.3		113	57-144			
o-Xylene	28.3	1.0	"	26.7		106	53-146			
Surrogate: 1,2-Dichloroethane-d4	10.9		"	13.2		82.2	37-154			
Surrogate: Toluene-d8	12.6		"	13.3		94.4	45-149			
Surrogate: 4-Bromofluorobenzene	12.2		"	13.3		91.3	45-146			

Summit Scientific

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

Project: Seele 31, 41, 42-31
Project Number: [none]
Project Manager: Brandon Bruns

Reported:
05/13/13 12:57

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 3051108 - EPA 5030 Water MS

LCS Dup (3051108-BSD1)

Prepared & Analyzed: 05/12/13

Benzene	25.6	1.0	ug/l	26.7	96.1	51-132	10.7	17	
Toluene	26.5	1.0	"	26.7	99.3	51-138	6.57	17	
Ethylbenzene	26.6	1.0	"	26.7	99.9	58-146	3.90	16	
m,p-Xylene	53.8	2.0	"	53.3	101	57-144	4.58	16	
o-Xylene	26.4	1.0	"	26.7	99.0	53-146	1.80	15	
Surrogate: 1,2-Dichloroethane-d4	16.1		"	13.2	122	37-154			
Surrogate: Toluene-d8	13.2		"	13.3	99.4	45-149			
Surrogate: 4-Bromofluorobenzene	13.5		"	13.3	101	45-146			

LCS Dup (3051108-BSD2)

Prepared & Analyzed: 05/12/13

Benzene	27.2	1.0	ug/l	26.7	102	51-132	9.63	17	
Toluene	28.2	1.0	"	26.7	106	51-138	6.52	17	
Ethylbenzene	28.0	1.0	"	26.7	105	58-146	4.87	16	
m,p-Xylene	56.9	2.0	"	53.3	107	57-144	5.54	16	
o-Xylene	28.0	1.0	"	26.7	105	53-146	1.24	15	
Surrogate: 1,2-Dichloroethane-d4	16.0		"	13.2	121	37-154			
Surrogate: Toluene-d8	13.5		"	13.3	101	45-149			
Surrogate: 4-Bromofluorobenzene	13.5		"	13.3	101	45-146			

Matrix Spike (3051108-MS1)

Source: R305053-01

Prepared & Analyzed: 05/12/13

Benzene	18.9	1.0	ug/l	26.7	1.23	66.3	34-141		
Toluene	23.0	1.0	"	26.7	ND	86.2	27-151		
Ethylbenzene	23.3	1.0	"	26.7	ND	87.2	29-160		
m,p-Xylene	47.7	2.0	"	53.3	ND	89.4	20-166		
o-Xylene	22.6	1.0	"	26.7	ND	84.6	33-159		
Surrogate: 1,2-Dichloroethane-d4	8.80		"	13.2	66.5	37-154			
Surrogate: Toluene-d8	12.4		"	13.3	92.8	45-149			
Surrogate: 4-Bromofluorobenzene	12.2		"	13.3	91.8	45-146			

Summit Scientific

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1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Seele 31, 41, 42-31

Project Number: [none]
Project Manager: Brandon Brunns

Reported:
05/13/13 12:57

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 3051108 - EPA 5030 Water MS

Matrix Spike (3051108-MS2)		Source: R305053-01			Prepared & Analyzed: 05/12/13					
Benzene	18.5	1.0	ug/l	26.7	1.23	64.7	34-141			
Toluene	22.5	1.0	"	26.7	ND	84.3	27-151			
Ethylbenzene	22.4	1.0	"	26.7	ND	84.0	29-160			
m,p-Xylene	46.1	2.0	"	53.3	ND	86.5	20-166			
o-Xylene	21.9	1.0	"	26.7	ND	82.0	33-159			
Surrogate: 1,2-Dichloroethane-d4	8.91		"	13.2		67.3	37-154			
Surrogate: Toluene-d8	12.3		"	13.3		92.6	45-149			
Surrogate: 4-Bromofluorobenzene	12.2		"	13.3		91.9	45-146			

Matrix Spike Dup (3051108-MSD1)		Source: R305053-01			Prepared & Analyzed: 05/12/13					
Benzene	18.9	1.0	ug/l	26.7	1.23	66.2	34-141	0.106	32	
Toluene	23.0	1.0	"	26.7	ND	86.2	27-151	0.0435	25	
Ethylbenzene	22.9	1.0	"	26.7	ND	86.0	29-160	1.43	50	
m,p-Xylene	47.1	2.0	"	53.3	ND	88.2	20-166	1.29	36	
o-Xylene	22.2	1.0	"	26.7	ND	83.4	33-159	1.47	26	
Surrogate: 1,2-Dichloroethane-d4	8.97		"	13.2		67.8	37-154			
Surrogate: Toluene-d8	12.7		"	13.3		95.1	45-149			
Surrogate: 4-Bromofluorobenzene	12.2		"	13.3		91.1	45-146			

Matrix Spike Dup (3051108-MSD2)		Source: R305053-01			Prepared & Analyzed: 05/12/13					
Benzene	19.0	1.0	ug/l	26.7	1.23	66.7	34-141	2.93	32	
Toluene	23.0	1.0	"	26.7	ND	86.4	27-151	2.42	25	
Ethylbenzene	23.3	1.0	"	26.7	ND	87.3	29-160	3.85	50	
m,p-Xylene	47.5	2.0	"	53.3	ND	89.0	20-166	2.89	36	
o-Xylene	22.5	1.0	"	26.7	ND	84.3	33-159	2.80	26	
Surrogate: 1,2-Dichloroethane-d4	8.93		"	13.2		67.5	37-154			
Surrogate: Toluene-d8	12.4		"	13.3		93.3	45-149			
Surrogate: 4-Bromofluorobenzene	12.3		"	13.3		92.2	45-146			

Summit Scientific

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

Project: Seele 31, 41, 42-31

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
05/13/13 12:57

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 read 'Daniel A. Bruns IV'.