



PDC Energy, Inc.
Second Quarter 2014 Groundwater Monitoring Summary

May 28, 2014

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

received 01/22/2016
Project 6926
Document 2144852

This groundwater monitoring summary has been prepared by Tasman Geosciences, LLC for the Seele 31, 41, 42-31 tank battery. On April 28, 2014, groundwater sampling was attempted at the three temporary monitoring well locations. However, all three well locations contained insufficient water for sampling or were dry. Historic analytical results are summarized in Table 1 and illustrated on Figure 1. The historic data indicate that concentrations of BTEX constituents in groundwater were in exceedance of COGCC regulatory standards at two of the three monitoring locations (BH02 and BH03).

Bi-weekly enhanced fluid recovery (EFR) with air sparge (AS) events were initiated on August 22, 2012. A summary of historic EFR/AS operational data is provided in Table 2. EFR/AS events were discontinued in the second quarter of 2013 due to a site-wide decrease in groundwater elevation.

Additional site characterization and well installation is scheduled for May 2014 to delineate petroleum hydrocarbon impacts in groundwater.

Third quarter 2014 groundwater sampling will be conducted during July 2014.

TABLE 1
SEELE 31, 41, 42-31 TANK BATTERY
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	12.6
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
BH01	7/25/2013	DRY	DRY	DRY	DRY	DRY
BH01	11/1/2013	<1.0	<1.0	4.2	28	13.09
BH01 ²	1/29/2014	NS	NS	NS	NS	13.94
BH01 ²	4/28/2014	NS	NS	NS	NS	14.26
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
BH02	7/25/2013	DRY	DRY	DRY	DRY	DRY
BH02	10/31/2013	DRY	DRY	DRY	DRY	DRY
BH02	1/29/2014	DRY	DRY	DRY	DRY	DRY
BH02	4/28/2014	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
BH03	7/25/2013	DRY	DRY	DRY	DRY	DRY
BH03	10/31/2013	DRY	DRY	DRY	DRY	DRY
BH03	1/29/2014	DRY	DRY	DRY	DRY	DRY
BH03	4/28/2014	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.

2). Not enough water present to collect a sample.

Bold red values indicate an exceedance of the COGCC groundwater standards for the site.

ug/L= Micrograms per liter

NS - Not Sampled

NM - Not Measured

TABLE 2
SEELE 31, 41, 42-31 TANK BATTERY
AS / EFR OPERATIONAL DATA SUMMARY TABLE

Third Quarter 2012					
Date	EFR Wells	Total EFR/AS Duration (hours)	Approximate Fluid Volume Extracted (gallons)	AS Wells	Injection Pressure (psi)
8/22/2012	BH-01, BH-02, BH-03	7	42	BH-01, BH-02, BH-03	8
9/5/2012		7	42		8
Quarterly Totals		14	84		-
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
Quarterly Totals		33.25	84		-
First Quarter 2013					
1/8/2013	BH01, BH02, BH03	5	0	BH01, BH02, BH03	10
1/21/2013		7	6.5		10
2/8/2013		6.5	6		10
3/14/2013		6	3		10
Quarterly Totals		24.5	15.5		-
Second Quarter 2013					
4/2/2013	BH01, BH02, BH03	4.25	6	BH01, BH02, BH03	10
Quarterly Totals		4.25	6		-

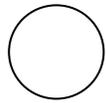


↑
**Surface
Drainage**

BH01		
Compound (ug/L)	11/1/2013	4/28/2014
Benzene	<1.0	NS
Toluene	<1.0	NS
Ethylbenzene	4.2	NS
Total Xylenes	28	NS

County Road 40

BH-01



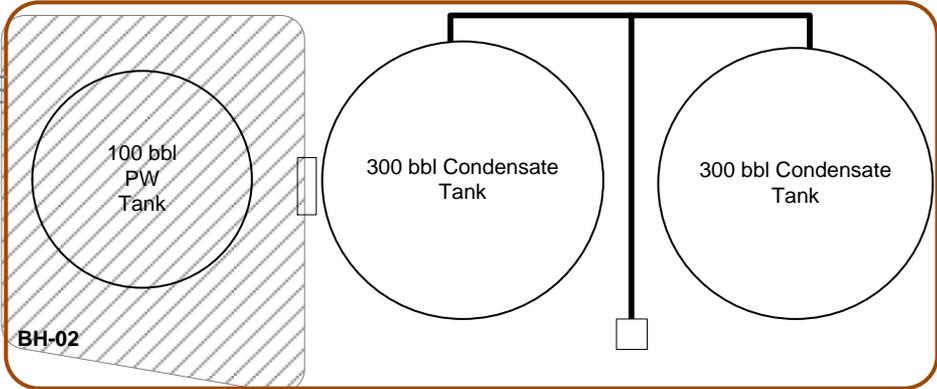
Flare



M

Buried PDC Flow Lines

BH-05

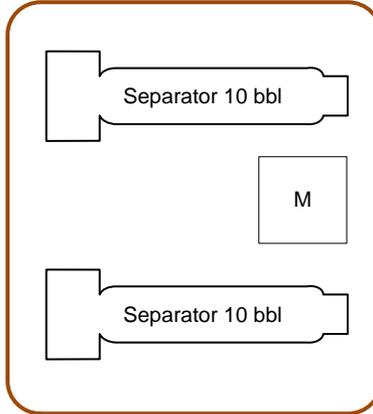


BH-02

BH-03

BH-04

Buried DCP Flow Line



Separator 10 bbl



M

Separator 10 bbl

BH02		
Compound (ug/L)	11/1/2013	4/28/2014
Benzene	DRY	DRY
Toluene	DRY	DRY
Ethylbenzene	DRY	DRY
Total Xylenes	DRY	DRY

BH03		
Compound (ug/L)	11/1/2013	4/28/2014
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.

DRAWN BY: ESS
DATE: 5/8/2014

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

TASMAN GEOSCIENCES
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
- Meter Shed

FIGURE 1
GROUNDWATER ANALYTICAL RESULTS
Not to Scale