



PDC Energy, Inc.
Third Quarter 2013 Groundwater Monitoring Summary

November 21, 2013

received 01/22/2016
Project 6926
Document 2144849

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 July 25, 2013, groundwater monitoring was conducted at three temporary monitoring well locations. However, BH01 through BH03 contained insufficient water for sampling. Historical analytical results are summarized in Table 1 and illustrated on Figure 2. Historical analytical results indicate constituent concentrations were in exceedance of COGCC regulatory standards at all three monitoring locations.

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. EFR/AS events were discontinued in first quarter 2013 due to a site-wide decrease in groundwater elevation.

Fourth quarter 2013 groundwater sampling will be conducted during October 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
BH01	7/25/2013	DRY	DRY	DRY	DRY	DRY
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
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
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)	5/3/2013	7/25/2013
Benzene	3,000	DRY
Toluene	2.3	DRY
Ethylbenzene	17	DRY
Total Xylenes	240	DRY

County Road 40

BH-01

Buried PDC Flow Lines

BH-05

BH-02

BH-03

BH-04

300 bbl Condensate
Tank

300 bbl Condensate
Tank

100 bbl
PW
Tank

Separator 10 bbl

Separator 10 bbl

Buried DCP Flow Line

BH02

Compound (ug/L)	5/3/2013	7/25/2013
Benzene	DRY	DRY
Toluene	DRY	DRY
Ethylbenzene	DRY	DRY
Total Xylenes	DRY	DRY

BH03

Compound (ug/L)	5/3/2013	7/25/2013
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.

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

M Meter Shed

FIGURE 2
GROUNDWATER
ANALYTICAL RESULTS
Not to Scale

DRAWN BY: ESS

DATE: 8/14/2013