

State of Colorado  
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 (303) 894-2100 Fax 894-2109



FOR OGCC USE ONLY

#7693

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3/26/2013

## SITE INVESTIGATION AND REMEDIATION WORKPLAN

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. Form 27 is intended to be used whenever possible. Additional documentation will be required when large volumes of soil and groundwater have been impacted or involve large facilities with multiple source areas. See Rule 910. Attach as many pages as needed to fully describe the proposed work.

## CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED

☒ Spill or Release ☐ Plug & Abandon ☐ Central Facility Closure ☐ Site/Facility Closure ☐ Other (describe): \_\_\_\_\_

OGCC Employee: \_\_\_\_\_

☒ Spill ☐ Complaint  
☐ Inspection ☐ NOAV

Tracking No: 2231641

## GENERAL INFORMATION

<b>OGCC Operator Number:</b> 69175		<b>Contact Name and Telephone</b>	
<b>Name of Operator:</b> PDC Energy, Inc.		<b>Name:</b> Brandon Bruns	
<b>Address:</b> 1775 Sherman Street, Suite 3000		<b>No:</b> (303) 831-3971	
<b>City:</b> Denver <b>State:</b> CO <b>Zip:</b> 80203		<b>Fax:</b> (303) 860-5838	
<b>API/Facility No:</b> 05-123-12297		<b>County:</b> Weld	
<b>Facility Name:</b> Becker 5-1, 2, 14, 15		<b>Facility Number:</b> 244502	
<b>Well Name:</b> Becker 5-1, 2, 14, 15		<b>Well Number:</b> Becker 5-1, 2, 14, 15	
<b>Location (Qtr, Sec, Twp, Rng, Meridian):</b> SE 1/4 S5 T3N R64W		<b>Latitude:</b> 40.247358 <b>Longitude:</b> -104.573303	

## TECHNICAL CONDITIONS

<b>Type of Waste Causing Impact (crude oil, condensate, produced water, etc.):</b> _____		<b>Condensate</b>	
<b>Site Conditions:</b> Is location within a sensitive area (according to Rule 901e)? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N If yes, attach evaluation.			
<b>Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.):</b> _____		<b>Oil and gas production, Agriculture</b>	
<b>Soil type, if not previously identified on Form 2A or Federal Surface Use Plan:</b> _____		<b>Vona loamy sand, 0 to 3 percent slopes</b>	
<b>Potential receptors (water wells within 1/4 mi, surface waters, etc.):</b> _____		<b>Surface water is located approximately 2,700' west of the Tank Battery, a residence is approximately 475' north, a water well is approximately 685' northwest, and depth to shallowest groundwater is approximately 16 ft bgs.</b>	
<b>Description of Impact (if previously provided, refer to that form or document):</b>			
<b>Impacted Media (check):</b>	<b>Extent of Impact:</b>	<b>How Determined:</b>	
<input checked="" type="checkbox"/> Soils	Refer to the attached Figure 2 and Table 1	Excavation, direct push drilling, and soil sampling	
<input type="checkbox"/> Vegetation			
<input checked="" type="checkbox"/> Groundwater	Refer to the attached Figure 3 and Table 2	Groundwater sampling	
<input type="checkbox"/> Surface water			

## REMEDATION WORKPLAN

<b>Describe initial action taken (if previously provided, refer to that form or document):</b>  A Form 19 was submitted on January 14, 2013 and the COGCC issued spill # 2231641 for this project. A topographic map of the site is included on Figure 1.
<b>Describe how source is to be removed:</b>  The source area was previously excavated and impacted material was transported and disposed of as described in the Form 19.
<b>Describe how remediation of existing impacts is to be accomplished, including removal and disposal at an injection well or licensed facility, land treatment on site, removal of impacted groundwater, insitu bioremediation, burning of oily vegetation, etc.:</b>  On December 13, 2012, three temporary monitoring wells were installed using direct push drilling, as illustrated on Figure 3. Soil samples were collected using continuous sampling techniques to determine the lateral and vertical extents of petroleum hydrocarbon impacts in the subsurface. Soil samples were collected and submitted for laboratory analysis from two borehole locations that exhibited elevated field screened volatile organic compound (VOC) concentrations measured by a photoionization detector (PID). The soil samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX), total petroleum hydrocarbons - gasoline range organics (TPH-GRO), total petroleum hydrocarbons - diesel range organics (TPH-DRO), and naphthalene by applicable USEPA methods. Analytical results and PID readings are summarized in Table 1. On December 20, 2012, groundwater sampling was conducted at the three monitoring locations. Each The groundwater analytical results are summarized in Table 2 and illustrated on Figure 3. Each of the groundwater samples were analyzed for BTEX using USEPA Method 8260. The soil and groundwater analytical results are included as Attachment A. PDC was not able to obtain access to install additional monitoring wells adjacent to the site. Due to elevated constituent concentrations in soil and groundwater, PDC plans to initiate bi-weekly, 8-hour vacuum enhanced fluid recovery (EFR) and air sparge (AS) events to address residual petroleum hydrocarbon impacts. In addition to completing EFR and AS, PDC will conduct quarterly groundwater monitoring at the three temporary well locations until BTEX concentrations meet COGCC groundwater standards for four consecutive quarters.

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Tracking Number:	
Name of Operator:	PDC Energy, Inc.
OGCC Operator No:	69175
Received Date:	
Well Name & No:	Becker 5-1, 2, 14, 15
Facility Name & No.:	Becker 5-1, 2, 14, 15

REMEDIATION WORKPLAN (CONT.)

OGCC Employee:

If groundwater has been impacted, describe proposed monitoring plan (# of wells or sample points, sampling schedule, analytical methods, etc.):  
PDC will continue to sample the three monitoring wells on a quarterly basis to assess the dissolved phase petroleum hydrocarbon impacts in groundwater using USEPA Method 8260. Groundwater sampling will continue until four consecutive quarters of groundwater monitoring data indicate that BTEX concentrations are in compliance with the COGCC Table 910-1 groundwater standards.

Describe reclamation plan. Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeding program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing. Use additional sheet for description if required.  
The area where the excavation is located is used as an equipment access area to the tank battery location and consists of road base. The excavation has been backfilled and compacted with clean material and the ground surface was contoured to match pre-existing conditions.

Attach samples and analytical results taken to verify remediation of impacts. Show locations of samples on an onsite schematic or drawing.  
Is further site investigation required? ☐ Y ☒ N If yes, describe:  
PDC feels that no further Site investigation is required at this time. The excavation extent and soil and groundwater sample locations are illustrated on Figure 2. Soil analytical results are summarized in Table 1 and groundwater analytical results are summarized in Table 2 and illustrated on Figure 3.

Monitoring phase.

Final disposition of E&P waste (landtreated and disposed onsite, name of licensed disposal facility, recycling, reuse, etc.):  
impacted soil was transported to the Waste Management Facility in Ault, CO for disposal.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began:	11/27/2012	Date Site Investigation Completed:	11/29/2012	Remediation Plan Submitted:	3/26/13
Remediation Start Date:	12/13/2012	Anticipated Completion Date:	NA	Actual Completion Date:	TBD

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct, and complete.

Print Name: Brandon Bruns

Signed:  Title: EHS Professional Date: 3/26/13

OGCC Approved: \_\_\_\_\_ Title: EPS Date: 4/1/2013