

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

received 10/06/2015  
Project 9281  
Document 200437695  
Spill/release point 441395

## 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.

OGCC Employee:

☐ Spill ☐ Complaint  
☐ Inspection ☐ NOAV

Tracking No:

(describe):

## CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED

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

## GENERAL INFORMATION

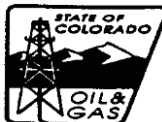
<b>OGCC Operator Number:</b> 69175		<b>Contact Name and Telephone</b>	
Name of Operator: PDC Energy, Inc.		Name: Charity Fleenor	
Address: 1775 Sherman Street, Suite 3000		No: (303) 860-5800	
City: Denver State: CO Zip: 80203		Fax: (303) 860-5838	
API/Facility No: 05-123-09920		County: Weld	
Facility Name: Ursula #2		Facility Number: 333219	
Well Name: Ursula #2		Well Number: Ursula #2	
Location (QtrQtr, Sec, Twp, Rng, Meridian): NENE S28 T2N R66W		Latitude: 40.112893 Longitude: -104.77705	

## TECHNICAL CONDITIONS

Type of Waste Causing Impact (crude oil, condensate, produced water, etc.):		Produced Water	
<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. ** Please see 'Potential Receptors' section below.	
Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.):		Cropland	
Soil type, if not previously identified on Form 2A or Federal Surface Use Plan:		Olney loamy sand, 1 to 3 percent slopes	
Potential receptors (water wells within 1/4 mi, surface waters, etc.):		A residence is located approximately 690' southeast of the location. The nearest surface water is 660' north and the nearest water well is 625' southeast of the site. 6 water wells are located within a 1/4-mile radius. Depth to shallow groundwater is about 6 feet.	
<b>Description of Impact</b> (if previously provided, refer to that form or document):			
Impacted Media (check):		Extent of Impact:	
<input checked="" type="checkbox"/> Soils		Refer to the attached Figure 4 and Table 1	
<input type="checkbox"/> Vegetation			
<input checked="" type="checkbox"/> Groundwater		Refer to the attached Figure 5 and Table 2	
<input type="checkbox"/> Surface water			
		How Determined:	
		Excavation and soil sampling	
		Excavation and groundwater sampling	

## REMEDIATION WORKPLAN

<b>Describe initial action taken</b> (if previously provided, refer to that form or document): On March 23, 2015, a historic release was discovered below the produced water vessel during plug and abandonment activities. Excavation activities were summarized in an Initial Form 19 submitted on March 24, 2015 (Document # 400813993) and in a Supplemental Form 19 submitted on April 9, 2015 (Document # 400819286). A topographic map of the site is included as Figure 1.
<b>Describe how source is to be removed:</b> Excavation activities were completed between March 19 and March 23, 2015. Approximately 130 cubic yards of impacted material were removed and transported to the Waste Management Facility in Ault, Colorado for disposal under PDC waste manifests. Groundwater was encountered in the excavation area at approximately 8 feet below ground surface (bgs). The groundwater sample (GW01) collected from the excavation area exhibited benzene and ethylbenzene concentrations in exceedance of COGCC Table 910-1 groundwater standards. The excavation extent and groundwater sample location are illustrated on Figure 2. Groundwater analytical data is summarized in Table 2 and the laboratory analytical report is included as Attachment A.
<b>Describe how remediation of existing impacts is to be accomplished</b> , 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.: Between April 6 and April 10, 2015, site investigation activities were completed to delineate the lateral extent of remaining hydrocarbon impacts in soil and groundwater. Fifteen (15) boreholes were advanced using direct push drilling methods to approximately 10 feet below ground surface (bgs). Soil encountered in the boreholes was field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). Soil samples were collected from eleven (11) boreholes at depths ranging between 2 feet and 7 feet bgs. Soil samples were not collected from the remaining four (4) boreholes as elevated VOC concentrations were not detected during field screening activities. Soil samples were submitted Summit Scientific Laboratories (Summit) in Golden, Colorado for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX), naphthalene, and total petroleum hydrocarbons (TPH) - gasoline range organics (GRO) by USEPA Method 8260, and TPH - diesel range organics (DRO) by USEPA Method 8015. Analytical results indicated TPH concentrations were in exceedance of COGCC Table 910-1 standards in the soil samples collected from three (3) borehole locations (BH07, BH10, and SB01). Groundwater was encountered in the boreholes between 5-6 feet bgs. Consequently, temporary monitoring wells were installed at fourteen borehole locations (BH01 - BH14). Groundwater samples were collected from the temporary wells and submitted to Summit for laboratory analysis of BTEX. Analytical results indicated BTEX concentrations were in exceedance of COGCC Table 910-1 groundwater standards at six (6) temporary well locations. Temporary monitoring wells were abandoned following site investigation and sampling activities. Soil analytical results are summarized in Table 1 and illustrated on Figure 4. Groundwater analytical results are summarized in Table 2 and illustrated on Figure 5. Laboratory analytical reports are included as Attachment A and boring logs are included as Attachment B.  Based on the analytical data collected during investigation activities, PDC selected excavation and chemical treatment to address remaining petroleum hydrocarbon impacts in soil and groundwater within the source area. Impacted material will be excavated and chemically treated on-site using hydrogen peroxide. The proposed excavation extent is illustrated on Figure 6. Confirmation soil samples will be collected for every 100 cubic yards of treated material to confirm constituent concentrations decreased below regulatory standards and material may be used for backfilling. Soil samples will be collected from the sidewalls of the final excavation extent to confirm remaining soil impacts were successfully removed. A summary of remediation and sampling activities will be provided in a supplemental report.

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Page 2

## REMEDIAL WORKPLAN (CONT.)

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

Tracking Number: \_\_\_\_\_

Name of Operator: PDC Energy, Inc.

OGCC Operator No: 69175

Received Date: \_\_\_\_\_

Well Name &amp; No: Ursula #2

Facility Name &amp; No.: Ursula #2

If groundwater has been impacted, describe proposed monitoring plan (# of wells or sample points, sampling schedule, analytical methods, etc.):

Groundwater was encountered during excavation and investigation activities between 5-8 feet below ground surface (bgs). Groundwater samples were collected from fourteen (14) temporary monitoring well locations (BH01 - BH14) and submitted to Summit Scientific Laboratories for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by USEPA Method 8260. Analytical results indicated BTEX concentrations were in exceedance of COGCC Table 910-1 groundwater standards at six (6) temporary well locations. PDC will complete open excavation chemical treatment of impacted groundwater in the source area using hydrogen peroxide. A groundwater monitoring plan and final remedial strategy to address remaining off-site dissolved phase hydrocarbon impacts will be provided in a supplemental report.

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 excavation will be backfilled and compacted with clean material and the ground surface will be re-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:

Petroleum hydrocarbon impacts in soil and groundwater remain on site, as determined during site investigation activities. Based on general groundwater flow to the west, point of compliance (POC) for remaining dissolved phase hydrocarbon impacts has not been established off-site. Consequently, additional drilling and site investigation will be completed following excavation and chemical treatment activities. A groundwater elevation contour map is included as Figure 3. Soil analytical results are summarized in Table 1 and groundwater analytical results are summarized on Table 2. The laboratory analytical reports are included as Attachment A.

Final disposition of E&amp;P waste (landtreated and disposed onsite, name of licensed disposal facility, recycling, reuse, etc.):

Soil removed during initial excavation activities was disposed of at the Waste Management Facility in Ault, Colorado under PDC waste manifests.

## IMPLEMENTATION SCHEDULE

Date Site Investigation Began: 3/19/2015

Date Site Investigation Completed: NA

Remediation Plan Submitted: \_\_\_\_\_


Remediation Start Date: 10/1/2015

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: Charity Fleenor

Signed:  Charity B. Fleenor  
Digitally signed by Charity B. Fleenor  
DN: dc=local, dc=pdc, ou=PDC, ou=Denver, ou=Users,  
cn=Charity B. Fleenor  
Date: 2015.10.05 19:20:55 -06'00'

Title: EHS Director

Date: \_\_\_\_\_

OGCC Approved: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_