

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

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: REMED #4484

GENERAL INFORMATION

OGCC Operator Number: 69175		Contact Name and Telephone	
Name of Operator: Petroleum Development Corporation		Name: Randall Ferguson	
Address: 1775 Sherman Street, Suite 3000		No: 303-860-5800	
City: Denver State: CO Zip: 80203		Fax: 303-860-5838	
API/Facility No: 05-123-20228		County: Weld	
Facility Name: Dunham 41-5		Facility Number:	
Well Name: Dunham		Well Number: 41-5	
Location (QtrQtr, Sec, Twp, Rng, Meridian): NENE Sec 5 T1N R63W 6th PM		Latitude: Longitude:	

TECHNICAL CONDITIONS

Type of Waste Causing Impact (crude oil, condensate, produced water, etc.): Condensate and Produced Water

Site Conditions: Is location within a sensitive area (according to Rule 901e)? ☒ Y ☐ N If yes, attach evaluation. Groundwater < 20 feet bgs.

Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.): Irrigated cropland, lake

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: Nunn clay loam, 0 to 1 percent slopes

Potential receptors (water wells within 1/4 mi, surface waters, etc.): An irrigation ditch is located 62' south of the site; a water well is located 1,253' southwest; a building is located 1,068' southeast; Lord Reservoir is located 1,159' southeast; depth to groundwater is 6.5 ft below ground surface (bgs)

Description of Impact (if previously provided, refer to that form or document):

Impacted Media (check):	Extent of Impact:	How Determined:
<input checked="" type="checkbox"/> Soils	80' E-W x 10' N-S x 6.5' bgs	Field screening and laboratory analysis of soil samples
<input type="checkbox"/> Vegetation		
<input checked="" type="checkbox"/> Groundwater	See attached data	Laboratory analysis of groundwater samples
<input type="checkbox"/> Surface water		

REMEDIAL WORKPLAN

Describe initial action taken (if previously provided, refer to that form or document):

Form 19 submitted on 9/25/08 (Spill# 1943869). An initial Form 27 was submitted on 6/12/09 (Remediation# 4484).

Describe how source is to be removed:

During routine tank battery upgrade activities, PDC discovered a leak in the dump line from the production tank to the separator. The dump lines were removed and impacted soil above the COGCC allowable level was excavated during September 2008. Soil samples were collected from the base and sidewalls of the excavation and submitted for analysis of TPH by EPA Modified Method 8015. Laboratory results indicated TPH concentrations (C6-C36) in samples collected along the excavation perimeter were in compliance with the COGCC sensitive area standard of 1,000 mg/kg (Table 910-1 prior to 4/1/09). A groundwater sample was collected from the open excavation and was submitted for analysis of BTEX by EPA Method 8260B. Laboratory results indicated benzene concentrations exceeded the CDPHE Water Quality Control Commission Regulation 41 Basic Standards for Ground Water standards. Before backfilling the excavation, activated carbon was applied to the groundwater and exposed smear zone soils. A topographic site location map and site map are provided as Figures 1 and 2. Soil and groundwater analytical results are summarized in Tables 1 and 2.

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.:

Approximately 50 cubic yards of impacted soil above the COGCC sensitive area standard (Table 910-1 prior to 4/1/09) were excavated and transported to the Waste Management Landfill in Keenesburg, Colorado for disposal.

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REMEDIATION WORKPLAN (CONT.)

OGCC Employee: _____

Tracking Number: _____
Name of Operator: Petroleum Development Corporation
OGCC Operator No: 69175
Received Date: _____
Well Name & No: Dunham 41-5
Facility Name & No.: Dunham 41-5

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

Monitoring wells MW01 through MW03 were installed on 10/20/08. These wells were later removed as groundwater flow direction was determined to be to the northeast.

Three additional monitoring wells (MW04 through MW06) were installed at the site on 3/2/09. Groundwater samples were collected from the wells and submitted for laboratory analysis of BTEX by EPA Method 8260B on 3/4/09. Analytical results indicated BTEX concentrations in groundwater samples collected from monitoring wells MW04 and MW06 were in compliance with Table 910-1 standards. The benzene concentration in the groundwater sample collected from monitoring well MW05 exceeded the Table 910-1 standards. As a result, monitoring well MW07 was installed as a downgradient Point-of-Compliance (POC) on 4/22/09. Analytical results for groundwater samples collected from well MW07 indicated the BTEX concentrations were in compliance with Table 910-1 standards. Following the initial sampling events, monitoring wells MW04 through MW07 were sampled from 6/22/09 to 12/10/09. Monitoring well MW05 was destroyed after the 6/22/09 sampling event. Monitoring well MW06 was also destroyed after the 9/17/09 sampling event. However, analytical results indicated non-detectable BTEX concentrations in MW04 and MW07 for four consecutive quarters sampling events.

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 site was restored to pre-release grade. PDC's production facility remains at the site.

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:

Monitoring well MW05 was destroyed following the 6/22/09 sampling event which indicated non-detectable BTEX concentrations. Monitoring well MW06 was destroyed following the 9/17/09 sampling event. MW06 exhibited non-detectable BTEX concentrations for three consecutive quarters prior to being destroyed. Although monitoring wells MW05 and MW06 were not sampled for four consecutive quarters, analytical results indicate the former groundwater impacts at these well locations have been remediated. Monitoring wells MW04 and MW07 exhibited non-detectable BTEX concentrations for four consecutive quarters. Based on the laboratory results, PDC is requesting a No Further Action determination for this site.

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

Approximately 50 cubic yards of impacted soil above the COGCC sensitive area standards (Table 910-1 prior to 4/1/09) were transported to the Waste Management Landfill in Keenesburg, Colorado for disposal.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: <u>9/16/08</u>	Date Site Investigation Completed: <u>12/10/09</u>	Remediation Plan Submitted: <u>6/4/10</u>
Remediation Start Date: <u>9/16/08</u>	Anticipated Completion Date: <u>9/16/09</u>	Actual Completion Date: <u>12/17/10</u>

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

Print Name: Randall Ferguson

Signed: 

Title: Environmental Supervisor

Date: 6/4/10

OGCC Approved: _____

Title: EPS

Date: 6/4/10