

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

Remediation #4470

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:

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: 05-123-20114		County: Weld	
Facility Name: Gardner 12-19		Facility Number:	
Well Name: Gardner		Well Number: 12-19	
Location (QtrQtr, Sec, Twp, Rng, Meridian): SWNW Sec 19 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)?		<input checked="" type="checkbox"/> Y <input type="checkbox"/> N If yes, attach evaluation. Groundwater < 20 feet bgs.	
Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.):		Irrigated cropland	
Soil type, if not previously identified on Form 2A or Federal Surface Use Plan:		Nunn Loam 1 to 3 percent slopes	
Potential receptors (water wells within 1/4 mi, surface waters, etc.):		Surface water and wetlands are located approximately 214' west of the site, a building is located 612' northwest of the site, a water well is located 612' northwest of the site, depth to groundwater is 6' 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	110' N-S x 40' E-W x 6' 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			

REMEDIATION WORKPLAN

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

Form 19 was submitted on 11/21/08 (spill # 1941263). An initial Form 27 was submitted on 3/3/09 (remediation # 4470).

Describe how source is to be removed:

See Attached Page for Summary Explanation.

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.:

A total of 530 cubic yards of impacted soil that exceeded the COGCC sensitive area standard (Table 910-1 prior to 4/1/09) were transported to the Buffalo Ridge Landfill in Keenesburg, Colorado for disposal.



REMEDIATION WORKPLAN (CONT.)

OGCC Employees:

Tracking Number: _____
Name of Operator: Petroleum Development Corporation
OGCC Operator No: 69175
Received Date: _____
Well Name & No: Gardner 12-19
Facility Name & No.: Gardner 12-19

Describe how source is to be removed (continued):

During November 2008, approximately 530 cubic yards of petroleum hydrocarbon impacted soil that exceeded the COGCC sensitive area standard (Table 910-1 prior to 4/1/09) were removed from an excavation in the vicinity of the tank battery. Soil samples were collected from the base and sidewalls of the excavation and were submitted for analysis of TPH by EPA Modified Method 8015. Laboratory results indicated that TPH concentrations (C6-C36) at the final extents of the excavation were below the COGCC 1,000 mg/kg sensitive area standard of 1,000 mg/kg, with the exception of E05@2.5' at 1,290 mg/kg TPH. Due to the proximity of a meter house and associated sales line, PDC could not remove additional soil. PDC determined the extent of impact east of the meter house and DCP Midstream gas sales line by pothole excavation, as shown on Figure 2. Analytical results from the samples collected downgradient of the DCP sales lines (B01@2.5') indicated soil is in compliance with the COGCC sensitive area standard for TPH.

Soil sample S01@2.5', collected from the original south wall of the excavation, exhibited TPH concentrations of 1,000 mg/kg, equal to the COGCC sensitive area standard (Table 910-1 prior to 4/1/09). PDC conducted over excavation of the south wall where S01@2.5' was located and collected an additional sample (S02@2.5'). Analytical results from S02@2.5' indicated soil in compliance with the COGCC sensitive area standard of 1,000 mg/kg.

Groundwater entering the excavation (GW01) was analyzed for BTEX by EPA Method 8260B. Laboratory results indicated benzene concentrations exceed the WQCC Reg. 41 standard of 5 µg/L. Before backfilling the excavation, activated carbon was applied to the groundwater and exposed smear zone soils. Post excavation monitoring wells were installed to monitor groundwater impact.

A topographic site location map is presented as Figure 1. The extent of the excavation, soil sample locations, and groundwater sample locations are presented as Figure 2. Soil and groundwater analytical results are provided in Tables 1 and 2, respectively.

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REMEDIAL WORKPLAN (CONT.)

OGCC Employee: _____

Tracking Number: _____
Name of Operator: Petroleum Development Corporation
OGCC Operator No.: 69175
Received Date: _____
Well Name & No.: Gardner 12-19
Facility Name & No.: Gardner 12-19

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

Four monitoring wells (MW01 through MW04) were installed at the site on December 30, 2008. Each well was developed and purged following installation. Groundwater samples were collected from each well and submitted for laboratory analysis of BTEX on 1/6/09, 4/23/09, 7/22/09, and 12/10/09. Groundwater analytical results indicate BTEX levels in groundwater samples collected from monitoring wells MW01 through MW04 have been in compliance with the CDPHE Water Quality Control Commission Regulation 41 (Reg. 41) for four consecutive quarters. Groundwater analytical results are attached as Table 2.

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

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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:

Impacted soils that exceeded the TPH sensitive area standard of 1,000 mg/kg (Table 910-1 prior to 4/1/09) were excavated with the exception of a limited area proximal to the meter house and a DCP Midstream gas pipeline. Groundwater samples collected from monitoring wells MW01 through MW04 have remained in compliance with Reg. 41 for four consecutive quarters. The groundwater analytical results indicate the former source area impacts have been remediated. Based on the analytical results, PDC is requesting No Further Action status for the site.

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

Impacted soils above COGCC sensitive area standard (Table 910-1 prior to 4/1/09) allowable levels were transported to the Buffalo Ridge Landfill in Keenesburg, Colorado for disposal.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began:	<u>11/25/08</u>	Date Site Investigation Completed:	<u>12/10/09</u>	Remediation Plan Submitted:	<u>3/3/10</u>
Remediation Start Date:	<u>11/25/08</u>	Anticipated Completion Date:	<u>1/6/10</u>	Actual Completion Date:	<u>1/6/10</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: 3/5/10

OGCC Approved: _____ Title: EPS Date: 3/5/2010