

State of Colorado
Oil and Gas Conservation Commission

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

OGCC Employee:

Spill Complaint
Inspection NOAV

Tracking No:

CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED

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

OGCC Operator Number: _____

Name of Operator: _____

Address: _____

City: _____ State: _____ Zip: _____

Contact Name and Telephone: _____

No: _____

Fax: _____

API Number: _____

County: _____

Facility Name: _____

Facility Number: _____

Well Name: _____

Well Number: _____

Location: (QtrQtr, Sec, Twp, Rng, Meridian): _____ Latitude: _____ Longitude: _____

TECHNICAL CONDITIONS

Type of Waste Causing Impact (crude oil, condensate, produced water, etc): _____

Site Conditions: Is location within a sensitive area (according to Rule 901e)? Y N If yes, attach evaluation.

Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.): _____

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: _____

Potential receptors (water wells within 1/4 mi, surface waters, etc.): _____

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

Impacted Media (check): Extent of Impact: How Determined:

Soils _____ _____

Vegetation _____ _____

Groundwater _____ _____

Surface Water _____ _____

REMEDIATION WORKPLAN

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

Describe how source is to be removed:

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.:

FORM
27
Rev 6/99

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REMEDIAL WORKPLAN (Cont.)

Tracking Number: Rem # 5631

Name of Operator: _____

OGCC Operator No: _____

Received Date: _____

Well Name & No: _____

Facility Name & No: _____

OGCC Employee: _____

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

See Attachment A

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.

See Attachment A

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:

See Attachment A

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

See Attachment A

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: August 2009

Date Site Investigation Completed: November 2009

Date Remediation Plan Submitted: _____

Remediation Start Date: _____

Anticipated Completion Date: _____

Actual Completion Date: _____

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

Print Name: Adell K. Heneghan

Signed: Adell K. Heneghan

Title: Environmental Field Coordinator

Date: Oct 26, 2010

OGCC Approved: Nancy Prince for Chris Careful

Title: EPS

Date: 5/24/2011

Attachment A

Describe initial action taken

Upon discovery of a release from the partially buried produced water tank during routine maintenance, the gas wells were shut in, and the dump lines were re-routed to frac tanks. The tanks, both produced water and oil, were removed from the current containment and boreholes were drilled to determine the lateral and vertical extent of potential hydrocarbon impact.

Describe how source is to be removed

The wells were shut in.

The tanks, both produced water and oil, were disconnected from the separator and dump lines. The tanks were removed from the existing containment.

Dump lines from the separator were temporarily piped to a frac tank.

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 oil vegetation, etc.:

The impacted area will be remediated in accordance with COGCC Rules 906e, 909, and 910. Specifically, Petroleum Development Corporation (PDC) will remediate the impacted area utilizing insitu bioremediation techniques as follows:

- Install slotted 1-inch PVC pipe in 5-6 locations to a depth of approximately 45-feet within the impacted area by using a drill rig with solid stem augers;
- Collect initial hydrocarbon concentrations utilizing field screen equipment;
- Treat the hydrocarbon impacted area with a 3% MicroBlaze® solution;
- Monitor and maintain appropriate moisture content within the treated area by dispatching a water truck to the site and applying water to the area;
- Monitoring hydrocarbon concentrations within the impacted area and potentially applying a second treatment of 3% MicroBlaze® to the area after one month of initial treatment if required;
- Collecting confirmation soil samples for the full Table 910-1 soil suite from the treated area once field screen results indicate hydrocarbon concentrations below COGCC allowable standards; and
- Providing a Notice of Completion report to the COGCC upon completion of remediation.

The impacted area as determined by a site investigation is estimated to be approximately 20-diameter and to a depth of approximately 45-feet. The impacted area encompasses the former location of the produced water tank.

Upon completion of treatment, a drill rig will be utilized to collect confirmation samples using a split spoon sampler. The split spoon sampler will ensure samples are collected at discrete sample intervals within the treated area. It is anticipated that samples will be collected at 10-foot intervals, composited and submitted to an accredited analytical laboratory for confirmation.

Although there is no case history of insitu remediation for the treatment of produced water impacted soil, PDC has been very successful treating produced water impacted soil in on-site treatment cells. PDC proposes insitu remediation as a treatment option for 2 reasons:

- 1: limited space on the location for excavation of impacted soil and construction of on-site treatment cells; and
- 2: the inability to dispose of E&P impacted soil at local disposal facilities.

If groundwater has been impacted, describe proposed monitoring plan

Groundwater has not been impacted as determined during the initial site investigation.

Describe reclamation plan

As this is a working well pad, there are currently no plans to perform reclamation on the proposed action described above.

Attach Samples and analytical results taken to verify remediation of impacts

Confirmation samples will be collected upon treatment of impacted area and will be provided with Notice of Completion-COGCC Form 4.

Final disposition of E&P waste

Not Applicable-impacted soil will be treated in place.