FORM 27 Rev 6/99

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

Document 2315753
Received 11/12/2012
REM 9319

OGCC Employee:

[X] Spill [ ] Complaint
[ ] Inspection [ ] NOAV

Tracking No: 2315752

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

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

GENERAL INFORMATION

OGCC Operator Number: 69175
Name of Operator: PDC Energy, Inc.
Address: 1775 Sherman Street, Suite 3000
City: Denver State: CO Zip: 80203

Contact Name and Telephone
Name: Brandon Bruns
No: (303) 860-5800
Fax: (303) 860-5838

API/Facility No: 05-123-11801
Facility Name: Cottonwood #1
Well Name: Cottonwood #1
Location (QtrQtr, Sec, Twp, Rng, Meridian): NESE S13 T6N R66W

County: Weld
Facility Number: 05-123-11801
Well Number: Cottonwood #1
Latitude: 40.4886444 Longitude: -104.7174861

TECHNICAL CONDITIONS

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

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

Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.): Oil and gas production, cultivated, and residential

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: Silty clay and medium to fine grained sand

Potential receptors (water wells within 1/4 mi, surface waters, etc.): Surface water is located approximately 43' south of the Tank Battery, a residential building is located approximately 283' southeast, a water well is approximately 750' southwest, and Depth to shallowest groundwater is approximately 13 ft bgs.

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

Impacted Media (check):	Extent of Impact:	How Determined:
[X] Soils	Form 19 submitted on August 27, 2012	Excavation and soil sampling
[ ] Vegetation		
[X] Groundwater	Form 19 submitted on August 27, 2012	Groundwater sampling
[ ] Surface water		

REMEDIATION WORKPLAN

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

A Form 19 was submitted on August 27, 2012. An aerial map of the site is included on Figure 1.

Describe how source is to be removed:

The source area was previously excavated and impacted material was transported and disposed of as described in the Form 19 submitted on August 27, 2012.

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.:

On September 18, 2012, seven temporary monitoring/remediation wells were installed at the locations illustrated in the attached Figure 2 using direct push drilling with continuous core sampling methods. Soil samples, as noted in Table 1, were collected from each borehole location to determine the lateral and vertical extents of petroleum hydrocarbon impacts. The sample cores and subsequent analytical soil samples were field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). The analytical soil sample and PID results are summarized in the attached Table 1 and the laboroatory analytical reports are included in Attachment A. On September 24, 2012, groundwater analytical samples were collected from the seven temporary monitoring wells. The groundwater analytical results are summarized in the attached Table 2 and the laboratory analytical report is included in Attachment A. Based on the soil sample and groundwater sample analytical results, PDC plans to conduct 8-hour enhanced vacuum recovery (EFR) and air sparge (AS) events every two weeks to address residual hydrocarbon impacts at the Site. PDC will conduct quarterly groundwater sampling events at the well locations to monitor dissolved phase petroleum hydrocarbon concentration trends. Additionally, should petroleum hydrocarbon concentrations degrade substantially using EFR and AS remediation techniques, persulfate chemical oxidant injections may be implemented as a final "polishing" technique. Once groundwater samples indicate that hydrocarbon impacts degrade to below the COGCC Table 910-1 limits over four quarters of monitoring, PDC will submit a request for Site closure. Should groundwater concentrations remain above COGCC standards subsequent to a six month remediaton and monitoring period, additional remediation options will be evaluated.

FORM 27 Rev 6/99

Page 2

State of Colorado
Oil and Gas Conservation Commission

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

REMEDIATION WORKPLAN (CONT.)

OGCC Employee:

Tracking Number:
Name of Operator: PDC Energy, Inc.
OGCC Operator No: 69175
Received Date:
Well Name & No: Cottonwood #1
Facility Name & No.: Cottonwood #1

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 seven 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 VOC concentrations are below the Colorado Oil and Gas Conservation Commission (COGCC) Table 910-1 limits for Waste Management.

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 [x] N If yes, describe:

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, groundwater analytical results are summarized in Table 2, and surface water analytical results are summarized on Table 3.

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

Waste was disposed of at the Waste Management Facility in Ault, CO.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began:	8/17/2012	Date Site Investigation Completed:	8/21/2012	Remediation Plan Submitted:	
Remediation Start Date:	9/15/2012	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: Brandon Bruns Title: **EHS Professional** Date: 11/12/2012

OGCC Approved: J. Hussey for John Axelson Title: → East Environmental Supervisor Date: 10/29/2012