

FORM
27
Rev 6/99

State of Colorado
Oil and Gas Conservation Commission



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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): Lined Earthen Pit Closure

OGCC Employee:

☐ Spill ☐ Complaint
☐ Inspection ☐ NOAV

Tracking No: 301016

OGCC Operator Number: 100185

Name of Operator: EnCana Oil & Gas (USA) Inc.

Address: 2717 County Road 215, Suite 100

City: Parachute State: CO Zip: 81635

Contact Name and Telephone:

Kathy Friesen

No: 970.285.2665

Fax: 970.285.2705

API Number: Multiple - see attached

County: Garfield

Facility Name: NA

Facility Number: 301016 - provided on Form 15

Well Name: Multiple - see attached

Well Number: Multiple - see attached

Location: (QtrQtr, Sec, Twp, Rng, Meridian): SENW, Section 11, T7S-R92W, 6th Principle Latitude: see attached Longitude: see attached

TECHNICAL CONDITIONS

Type of Waste Causing Impact (crude oil, condensate, produced water, etc.): No impact discovered - produced water was stored in lined pit

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.): pastureland

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: Potts loam, 6 to 12 percent slopes

Potential receptors (water wells within 1/4 mi, surface waters, etc.): According to the GIS dataset provided to EnCana by the CO state engineers office in 2007, there are 7 permitted water wells within 1/4 mile of the well pad.

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

Impacted Media (check):

- ☒ Soils
☒ Vegetation
☒ Groundwater
☒ Surface Water

Extent of Impact:

no impact discovered
no impact discovered
no impact discovered
no impact discovered

How Determined:

site investigation and laboratory results
pit was constructed within existing pad boundary
groundwater was not encountered during construction
no surface waters occur within 1/4 mile of the location

REMEDIALTION WORKPLAN

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

On January 22, 2009, COGCC approved EnCana's application (Form 15 - Earthen Pit/Report Permit) for the construction and use of the lined earthen pit on the F11E well pad under facility number 301016. The pit was constructed prior to April 1, 2009. Following drilling and well completion activity, EnCana drained the pit of produced water and disposed of the liner at the West Garfield County landfill.

This Form 27 complies with COGCC Rules 905 and 909 for conducting a site investigation in support of the closure of the lined earthen pit on the F11E well pad. Soil samples of the pit bottom and of background were collected. A summary of those results is provided as an attachment to this Form 27.

Describe how source is to be removed:

EnCana's site investigation indicates arsenic values in soils below the pit liner, as well as background soil samples, that exceed the concentration level in Table 910-1 (see attached summary of results). The range of arsenic in the pit bottom samples is similar to the range of arsenic concentrations found in the background samples. EnCana is requesting approval to close the F11E pit consistent with standard pit closure procedures, which includes mixing of the pit bottom with adjacent surrounding soils, to meet background concentration levels for arsenic.

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.:

No remediation of material is recommended, beyond mixing the pit bottom with adjacent surrounding soils.



REMEDIATION WORKPLAN (Cont.)

Tracking Number: Pit # 301016

Name of Operator: ECA

OGCC Operator No: 100185

Received Date:

Well Name & No:

Facility Name & No: 301016

OGCC Employee:

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

There is no indication of impact to groundwater.

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.

Based on the similarity in results for arsenic from pit bottom samples and background samples, EnCana will follow standard pit closure procedures of backfilling and mixing pit contents with adjacent surrounding soils. Any potential variation in arsenic values between pit contents and background will be eliminated with this additional mixing. Based on soil sample results of background arsenic concentrations, no remediation plan is needed.

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:

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

Produced water used during hydraulic fracturing operations was removed to the Hunter Mesa Water Treatment Facility. The remaining pit bottom contents will be backfilled and mixed with adjacent surrounding soils.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: 05/18/09 Date Site Investigation Completed: 07/24/09 Date Remediation Plan Submitted: NA
Remediation Start Date: NA Anticipated Completion Date: NA Actual Completion Date: NA

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

Print Name: Kathy Friesen

Signed:

Title: Environmental Coordinator

Date: 9/1/09

OGCC Approved: Title: EPA Date: 9/1/09

Well Information for the F11E Well Pad

Data Provided by the Colorado Oil & Gas Conservation Commission

Well Number and Name	API Number	lat	long	ground_ele	utm_x	utm_y
11-2C (F11E) BROWN	05-045-09787	39.464291	-107.637772	6400.00	273075	4371623
11-3B2 (F11E) ENCANA	05-045-14999	39.464294	-107.637853	6125.00	273068	4371623
11-4C(F11E) ENCANA	05-045-15579	39.464186	-107.637867	6125.00	273067	4371611
11-12A (F11E) ENCANA	05-045-15580	39.464078	-107.637881	6125.00	273065	4371600
11-5(F11E) ENCANA	05-045-15578	39.464131	-107.637872	6125.00	273066	4371605
11-4D (F11E) ENCANA	05-045-15581	39.464242	-107.637858	6125.00	273068	4371618
11-6(F11E) ENCANA	05-045-17698	39.464111	-107.637625	6125.00	273087	4371603
11-3D(F11E) ENCANA	05-045-17700	39.464220	-107.637611	6125.00	273089	4371615
11-6A(F11E) ENCANA	05-045-17699	39.464167	-107.637619	6125.00	273088	4371609
11-11A (F11E) ENCANA FEDERAL	05-045-17627	39.464058	-107.637633	6125.00	273087	4371597

Arsenic Results in Soil Samples, F11E Well Pad					Allowable Concentration of 0.39 mg/kg (per COGCC Table 910-1)		
Location	Field	Lab	Sampler:	Sample Date:	Sample Media	Sample Results (mg/kg)	Comments
F11E	Mamm	ESC	BM	5/18/09	Pit Bottom	2.1	Represents first sample collected from below the pit liner. ESC could not provide required Table 910-1 methodology on Boron results.
F11E	Mamm	Accutest	BM	5/18/09	Pit Bottom	5.2	Original samples were forwarded from ESC to Accutest to resolve Boron methodology. Arsenic was also re-run as a duplicate/quality control, due to Table 910-1 exceedence.
F11E	Mamm	Accutest	BK	6/1/09	Background	3.5	Collected background sample for comparison to arsenic results in pit bottom sample.
F11E	Mamm	Accutest	BM	7/21/09	Background	5.1	Due to variability in sample results for arsenic from ESC and Accutest, additional background and pit bottom samples were collected for confirmation of arsenic results.
F11E	Mamm	Accutest	BM	7/21/09	Pit Bottom	4.8	

- Notes:
1. According to the Quality Assurance Operator for Accutest Laboratories, the measurement of uncertainty for the sample arsenic results, analyzed by SW 846 6010, is +/- 36.8%. This value was determined from the performance limits established for this method with samples of similar matrices.
 2. June 2009 water samples collected from the Hunter Mesa Water Treatment Facility (same or similar to water used in the F11E frac pit) indicate arsenic results of 0.005 mg/l, a concentration unlikely to affect pit bottom soil results.