

State of Colorado  
**Oil and Gas Conservation Commission**

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 (303)894-2100 Fax:(303)894-2109



#7916

FOR OGCC USE ONLY

**RECEIVED**  
8/1/2013

OGCC Employee:

Spill Complaint  
Inspection NOAV

Tracking No: 2145622

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 Operator Number: _____	Contact Name and Telephone: _____
Name of Operator: _____	_____
Address: _____	No: _____
City: _____ State: _____ Zip: _____	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	_____	_____

**REMEDIALTION 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

State of Colorado  
Oil and Gas Conservation Commission  
1120 Lincoln Street, Suite 801, Denver, Colorado 80203  
(303)894-2100 Fax: (303)894-2109



Page 2  
REMEDATION WORKPLAN (Cont.)

Tracking Number: \_\_\_\_\_  
Name of Operator: ENCA NA  
OGCC Operator No: \_\_\_\_\_  
Received Date: \_\_\_\_\_  
Well Name & No: A33NW  
Facility Name & No: Location ID # 323850

OGCC Employee: \_\_\_\_\_

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

See Attached

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 Attached

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 Attached

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

See Attached

TBD - to be determined

### IMPLEMENTATION SCHEDULE

Date Site Investigation Began: 6/26/2013 Date Site Investigation Completed: 7/3/2013 Date Remediation Plan Submitted: 07-31-13  
Remediation Start Date: 07/03/2013 Anticipated Completion Date: Summer, 2014 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: Chris Hines

Signed: \_\_\_\_\_

Title: Environmental Field Coordinator

Date: 07-31-13

OGCC Approved: \_\_\_\_\_

Title: EPS NW Region

Date: 08/05/2013



**A33NW (Location #323850)  
Encana Oil & Gas (USA) Inc. (Operator – 100185)  
Form 27 (Site Investigation and Remediation Workplan)  
Narrative Attachment  
Document Date – 7/23/2013**

This Form 27 (Site Investigation and Remediation Workplan) was prepared for the purpose documenting site assessment findings and remediation system installation at the A33NW well pad in Encana Oil & Gas (USA) Inc. (Encana's) Mamm Creek area of operations. The site assessment and system installation was conducted in response to COGCC incident 2145622. A topographic Site Location Map illustrating the location of the A33NW well pad is provided as Figure 1.

**REMEDIATION WORKPLAN**

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

On June 26, and July 3, 2013, LTE advanced six soil borings to depths ranging from 12 to 27 feet (ft) below ground surface (bgs). Three of the borings were converted into passive soil vapor extraction (SVE) wells. LTE contracted Site Services Drilling Company of Golden, Colorado, to install the soil borings and wells using a CME-75 drill rig equipped with hollow-stem augers.

The soil borings were logged by a LTE geologist and were field screened for potential petroleum hydrocarbon impacts. The soil from each boring was field screened at five foot intervals with a photo-ionization device (PID) to monitor the soil headspace for the presence of volatile organic vapors. When field screened material indicated hydrocarbon impacts, soil samples were collected and submitted for laboratory analysis of the constituents and allowable levels identified in COGCC Table 910-1.

Laboratory analytical results indicate TPH-GRO concentrations of 720 milligrams per kilogram (mg/kg), 850 mg/kg, and 1,200 mg/kg in soil samples 070313 – A33NW (SPILLNW02), 070313 – A33NW (SPILLS01), and 062613 – A33NW (SPILLN01) respectively. Additionally, TPH-DRO concentrations of 600 milligrams per kilogram (mg/kg), 680 mg/kg, and 1,600 mg/kg were detected in soil samples 070313 – A33NW (SPILLNW02), 070313 – A33NW (SPILLS02), and 062613 – A33NW (SPILLN01) respectively. All other analytes were either at concentrations below the laboratory detection limit or were within COGCC allowable concentrations. Soil sample laboratory analytical results are summarized in Table 1. Copies of the laboratory analytical reports are included in the attachments.

**Describe how source is to be removed:**

This remediation plan has been prepared to describe an in-situ remediation approach, where impacted material will be remediated in place without removal. In-situ remediation will be utilized with material that exceeds the allowable concentration for the organic constituents of concern.

**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.:**

Three passive SVE wells were installed (SVENE01, SVENW02, and SVES02) for the purpose of in-situ remediation. Vent turbines were secured to the top of each passive SVE well in order to promote bioremediation of identified organic impacts. Operation and maintenance (O&M) on the remediation system will take place on a monthly schedule. O&M activities will consist of collecting field parameters of the headspace in each of the passive SVE wells. All O&M data will be reported upon successful completion of the remediation project with clearance samples in the Form 4 (Notification of Completion).



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

No groundwater was encountered during the site assessment and passive SVE well installation. Auger refusal was encountered between 12 and 27 ft below ground surface (bgs) where dense sandstone was observed. Groundwater is estimated to be approximately 115 ft bgs.

**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 impacted material and in situ remediation system installation occurred on the well pad working surface. No reclamation activities will be undertaken as part of this remediation project. Following COGCC approval of the Notification of Completion, the SVE wells will be removed and the disturbed surface will be returned to working grade.

**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? If yes, describe:**

Laboratory analytical reports are included as an attachment and summarized in Table 1. A site diagram illustrating soil boring and passive SVE well locations is attached as Figure 2.

O&M readings from the installed wells will be collected on a monthly basis. When a remediation endpoint is indicated by the O&M readings, confirmation samples will be collected. O&M results and clearance sample data will be provided in the Form 4 (Notification of Completion) at project completion.

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

Final onsite disposition of E&P waste will be identified in the Form 4 (Notification of Completion) submitted to the COGCC following receipt of clearance samples demonstrating remediation success. No offsite disposal of E&P waste is anticipated for this project.

**SUMMARY TABLE**  
**SOIL ANALYTICAL RESULTS**  
**A33NW**  
**RIFLE, COLORADO**  
**ENCANA OIL GAS (USA) INC.**

PARAMETER	COGCC CONCENTRATION LEVELS	UNITS	062613-A33NW (SPILLNW01) 9-11 FT	062613-A33NW (SPILLSE01) 14-14.5 FT	062613-A33NW (SPILLN01) 16.5-18.5 FT	070313-A33NW (SPILLNE01) 15-17 FT	070313-A33NW (SPILLNE01) 17-19 FT	070313-A33NW (SPILLNW02) 16.5-18.5 FT	070313-A33NW (SPILLS01) 24-26 FT
Sample Date			6/26/2013	6/26/2013	6/26/2013	7/3/2013	7/3/2013	7/3/2013	7/3/2013
Arsenic	0.39	mg/kg	NA	NA	NA	NA	NA	NA	NA
Barium	15,000	mg/kg	NA	NA	NA	NA	NA	NA	NA
Cadmium	70	mg/kg	NA	NA	NA	NA	NA	NA	NA
Chromium (III)	120,000	mg/kg	NA	NA	NA	NA	NA	NA	NA
Chromium (VI)	23	mg/kg	NA	NA	NA	NA	NA	NA	NA
Copper	3,100	mg/kg	NA	NA	NA	NA	NA	NA	NA
Lead	400	mg/kg	NA	NA	NA	NA	NA	NA	NA
Mercury	23	mg/kg	NA	NA	NA	NA	NA	NA	NA
Nickel	1,600	mg/kg	NA	NA	NA	NA	NA	NA	NA
Selenium	390	mg/kg	NA	NA	NA	NA	NA	NA	NA
Silver	390	mg/kg	NA	NA	NA	NA	NA	NA	NA
Zinc	23,000	mg/kg	NA	NA	NA	NA	NA	NA	NA
EC	4.0	mmhos/cm	NA	NA	NA	NA	NA	NA	NA
pH	6 - 9	SU	NA	NA	NA	NA	NA	NA	NA
SAR	12	unitless	NA	NA	NA	NA	NA	NA	NA
TPH-GRO		mg/kg	<0.50	<0.50	<b>1,200</b>	<0.50	<0.50	<b>720</b>	<b>850</b>
TPH-DRO		mg/kg	25	<4.0	<b>1,600</b>	<4.0	<4.0	<b>600</b>	<b>680</b>
TPH	500	mg/kg	25	<4.5	<b>2,800</b>	<4.5	<4.5	<b>1,320</b>	<b>1,530</b>
Benzene	0.17	mg/kg	<0.0025	<0.0025	<0.25	<0.0025	<0.0025	<0.25	<0.25
Toluene	85	mg/kg	<0.025	<0.025	8.1	<0.025	<0.025	<2.5	<2.5
Ethylbenzene	100	mg/kg	<0.0025	<0.0025	4.6	<0.0025	<0.0025	1.6	1.3
Total Xylenes	175	mg/kg	0.024	<0.0075	70	<0.0075	<0.0075	40	39
Acenaphthene	1000	mg/kg	NA	NA	NA	NA	NA	NA	NA
Anthracene	1000	mg/kg	NA	NA	NA	NA	NA	NA	NA
Benzo(A)anthracene	0.22	mg/kg	NA	NA	NA	NA	NA	NA	NA
Benzo(B)fluoranthene	0.22	mg/kg	NA	NA	NA	NA	NA	NA	NA
Benzo(K)fluoranthene	2.2	mg/kg	NA	NA	NA	NA	NA	NA	NA
Benzo(A)pyrene	0.022	mg/kg	NA	NA	NA	NA	NA	NA	NA
Chrysene	22	mg/kg	NA	NA	NA	NA	NA	NA	NA
Dibenzo(A,H)anthracene	0.022	mg/kg	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	1000	mg/kg	NA	NA	NA	NA	NA	NA	NA
Fluorene	1000	mg/kg	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3,C,D)pyrene	0.22	mg/kg	NA	NA	NA	NA	NA	NA	NA
Naphthalene	23	mg/kg	NA	NA	NA	NA	NA	NA	NA
Pyrene	1000	mg/kg	NA	NA	NA	NA	NA	NA	NA

**NOTES:**

< - less than the stated reporting limit

**BOLD** - indicates result exceeds the COGCC concentration level

COGCC - Colorado Oil and Gas Conservation Commission

EC- electrical conductivity

SAR - sodium adsorption ratio

mg/kg - milligrams per kilogram

mmhos/cm - millimhos per centimeter

NA - not analyzed

SU - standard unit

TPH-GRO - total petroleum hydrocarbons-gasoline range organics

TPH-DRO - total petroleum hydrocarbons-diesel range organics

TPH - combination of TPH-GRO and TPH-DRO

FT - feet



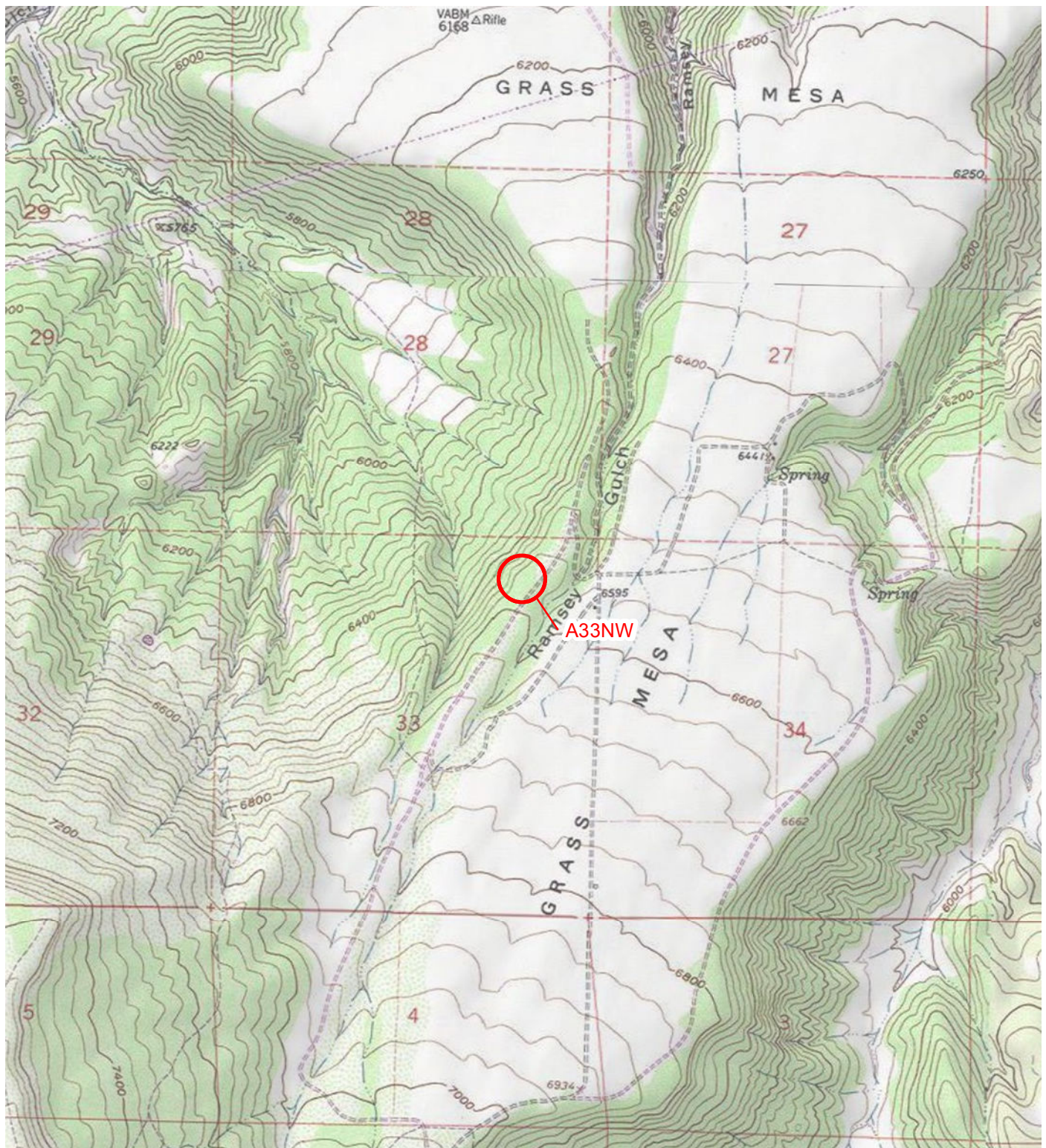


IMAGE COURTESY OF ESRI/USGS

# LEGEND

○ SITE LOCATION

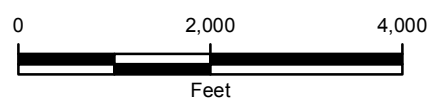
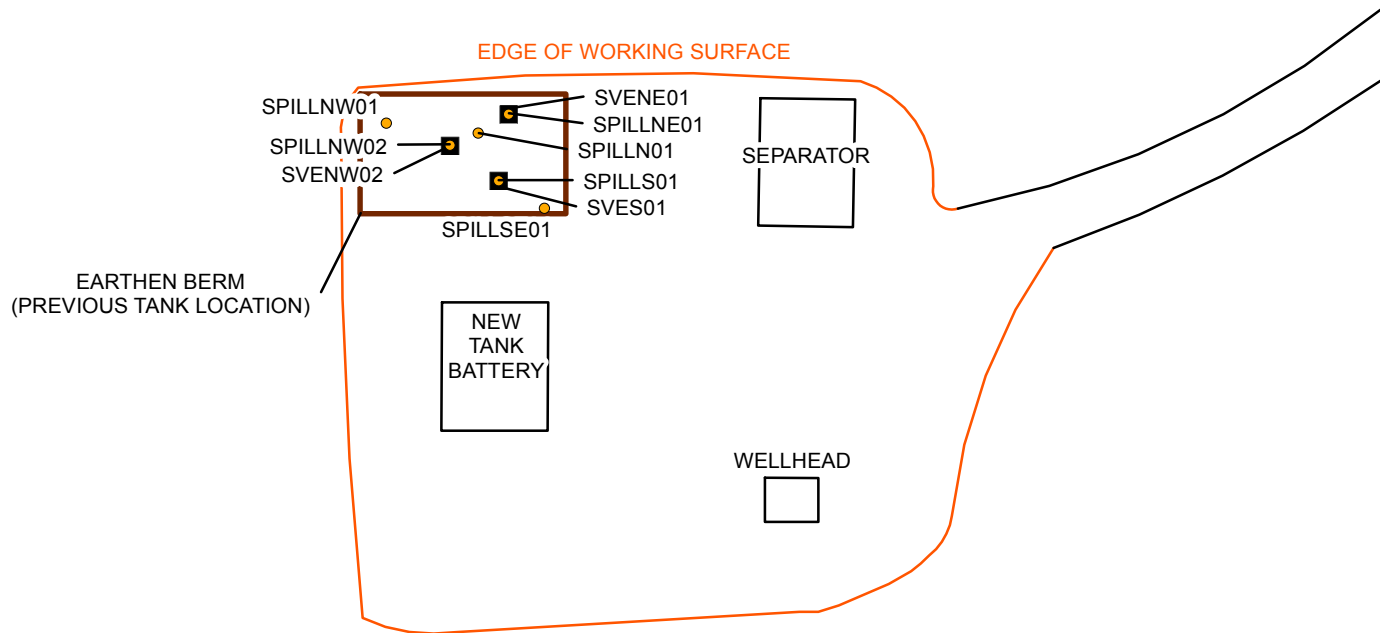


FIGURE 1  
SITE LOCATION MAP  
A33NW  
GARFIELD COUNTY, COLORADO

ENCANA OIL & GAS (USA) INC.





# LEGEND

- SOIL BORING
- SVE WELL

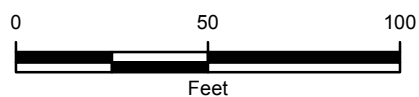


FIGURE 2  
SITE DIAGRAM  
A33NW  
GARFIELD COUNTY, COLORADO

ENCANA OIL & GAS (USA) INC.

