

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.

**CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED**

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

OGCC Operator Number: 100185

Name of Operator: Encana Oil and Gas (USA) Inc

Address: 370 17th Street Ste 1700

City: Denver State: CO Zip: 80202

Contact Name and Telephone:

Blake Ford

No: 303-774-3980

Fax: \_\_\_\_\_

API Number: \_\_\_\_\_

County: Weld

Facility Name: Wandell C 1

Facility Number: 336439

Well Name: \_\_\_\_\_

Well Number: \_\_\_\_\_

Location: (QtrQtr, Sec, Twp, Rng, Meridian): NENE, Sec 7, T 2N, R 67W, 6 PM Latitude: 40.15784 Longitude: -104.926695

**TECHNICAL CONDITIONS**

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

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.): Residential

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.): Water well approximatley 1066 feet from site

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

Impacted Media (check):



Soils



Vegetation



Groundwater



Surface Water

Extent of Impact:

75' x 45' x 3'

To be determined

How Determined:

Excavation until tank stability an issue

Collect groundwater samples after wells are installed

**REMEDIALTION WORKPLAN**

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

See Form 19, Spill ID 439664.

Describe how source is to be removed:

See narrative.

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.:

See narrative.



Tracking Number: \_\_\_\_\_  
Name of Operator: \_\_\_\_\_  
OGCC Operator No: \_\_\_\_\_  
Received Date: \_\_\_\_\_  
Well Name & No: \_\_\_\_\_  
Facility Name & No: \_\_\_\_\_

Page 2

**REMEDIATION WORKPLAN (Cont.)**

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

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

See narrative.

**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 narrative.

**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 narrative.

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

See narrative.

**IMPLEMENTATION SCHEDULE**

Date Site Investigation Began: 10/20/2014 Date Site Investigation Completed: \_\_\_\_\_ 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: Blake Ford

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

Title: Environmental Field Coordinator

Date: 02/03/2015

OGCC Approved: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

# NARRATIVE ATTACHMENT

## FORM 27 (SITE INVESTIGATION AND REMEDIATION WORKPLAN)

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**Wandell**

Document Date – December 12, 2014

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### TECHNICAL CONDITIONS

#### **Is location within a sensitive area (according to Rule 901e)?**

This location is found in a sensitive area based on potential impacts to groundwater, potential impacts to surface water are not present. A Site Location Map is provided as Figure 1.

#### **Potential receptors (water wells within ¼ mi, surface waters, etc.):**

According to the COGCC GIS Online mapping service, no surface water bodies are located within ¼ mile of the site. A DWR drinking water well (Robert and Mary Steen- depth unknown) is approximately 1,066 feet to the east.

### REMEDIATION WORKPLAN

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

Approximately 20 barrels of condensate was spilled in the secondary containment area. All standing condensate was vacuumed from the containment area soon after the release was identified. Soils were excavated to a depth of approximately three feet below ground surface until tank stability became an issue. A composite soil sample was grabbed from the spill area (see Table 1 and Appendix A).

A description of initial actions taken is included in the Form 19.

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

Subsurface site assessment will be conducted to define the extent of potential impacts by collecting soil samples from soil borings and groundwater samples from newly installed monitoring wells. These results will define vertical and horizontal impacts. Remediation actions, if necessary, will be determined from these results.

#### **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.:**

Remediation activities will be detailed in subsequent reports.

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

A groundwater monitoring network of four (4) 2-inch monitoring wells will be installed. The location of the sampling points is shown on Figure 2. Additional wells and/or borings will be installed as needed to define the extent of impacts above the COGCC Table 910-1 limits. Quarterly groundwater monitoring of the monitoring wells will be conducted. Samples will be analyzed quarterly for BTEX and annually for inorganic parameters total dissolved solids (TDS), chlorides and sulfates (per COGCC Table 910-1) plus nitrates. Field measurements will be taken quarterly from groundwater samples for dissolved oxygen (DO) to evaluate natural attenuation effectiveness. An annual report will be provided to the COGCC. Monitoring will continue until 4 quarters of groundwater data show concentrations below the Table 910-1 levels.

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# NARRATIVE ATTACHMENT

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### Wandell

Document Date – December 12, 2014

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**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 Wandell pad is currently a working oil and gas site and any disturbance to the surface will be reclaimed to like grade and condition.

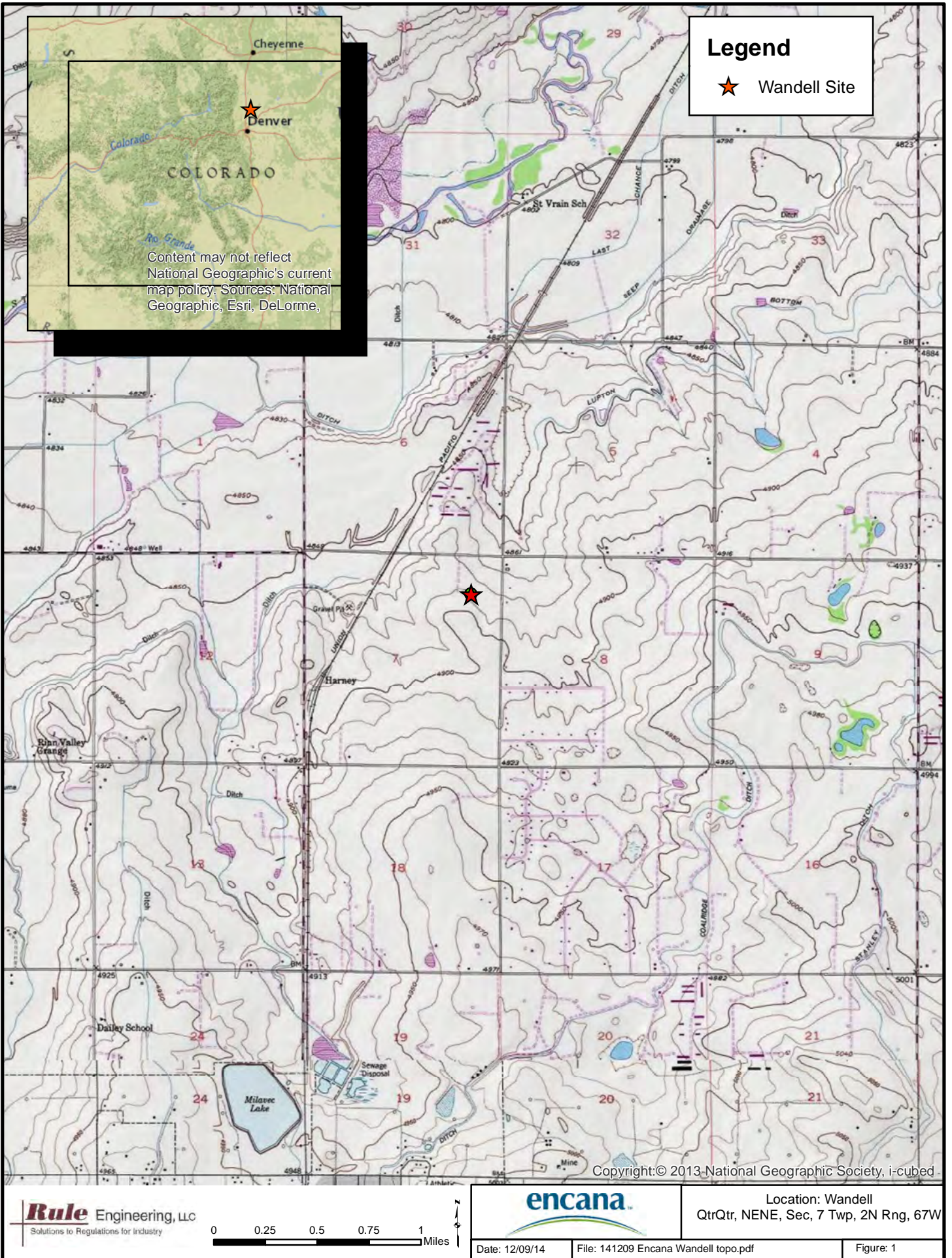
**Attach samples and analytical results taken to verify remediation of impacts. Show locations of samples on an onsite schematic or drawing. Is further site investigation required? If yes, describe:**

Further site investigation will be conducted to define the soil and groundwater impacts above COGCC Table 910-1 levels.

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





The progress of remediation and any modifications will be provided to the COGCC in the annual monitoring and remediation reports for this site. Completion of the remediation will be detailed in the Notification of Completion, and if necessary in a Form 4 (Sundry Notice).







**Legend**

-  AST
-  Meter House
-  Proposed Monitoring Well
-  Separator

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



**TABLE 1 - SOIL ANALYTICAL RESULTS**  
**WANDELL C1 TANK BATTERY**  
**WELD COUNTY, COLORADO**  
**ENCANA OIL & GAS (USA) INC.**

BTX/TPH										
Sample ID	Date	Depth (Feet)	PID (ppm)	Benzene	Toluene	Ethylbenzene	Total Xylene	TPH-GRO	TPH-DRO	TPH
COGCC Table 910-1 Limit				0.17	85	100	175			500
Wandell C1	10/20/2014	NA	NA	<0.0025	<0.025	<0.0025	<0.0075	<0.5	7900	7900

Inorganics																	
Sample ID	Date	Chromium, Hexavalent	ORP (mV)	pH (su)	Sodium Adsorption Ratio (calc)	Electrical Conductance (umhos/cm)	Mercury	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Nickel	Selenium	Silver	Zinc
COGCC Table 910-1 Limit		23		6-9	<12 <sup>s</sup>	<4000	23	0.39	15000	70	120000	3100	400	1600	390	390	23000
Wandell C1	10/20/2014	<2.0	140	6.3	1.3	180	0.033	<2.0	74	<0.5	7.4	8.5	7.2	4.3	<2.0	<1.0	32

PAHs																				
Sample ID	Date	Anthracene	Acenaphthene	Acenaphthylene	Benzo(A)anthracene	Benzo(A)pyrene	Benzo(B)fluoranthene	Benzo(g,h,i)perylene	Benzo(K)fluoranthene	Chrysene	Dibenzo(A,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3,C,D)pyrene	Naphthalene	Phenanthrene	Pyrene	1- Methyl naphthalene	2- Methyl naphthalene	2-Chloro naphthalene
COGCC Table 910-1 Limit		1000	1000		0.22	0.022	0.22		2.2	22	0.022	1000	1000	0.22	23		1000			
Wandell C1	10/20/2014	0.89	0.76	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	0.16	<0.12	0.12	1.9	<0.12	4.4	2.5	<0.12	10	20	<0.4

Note:  
 COGCC = Colorado Oil and Gas Conservation Commission  
 All units in mg/kg unless otherwise noted  
 TPH-GRO = Total Petroleum Hydrocarbons - Gasoline Range Organics  
 TPH-DRO = Total Petroleum Hydrocarbons - Diesel Range Organics  
 Values presented in bold typeface exceed their respective COGCC Table 910-1 Regulatory Limits.  
 < = indicates result is less than the stated laboratory reporting limit