

State of Colorado
Oil and Gas Conservation Commission

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REM 8966

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: <u>100185</u>	Contact Name and Telephone: <u>Blake Ford</u>
Name of Operator: <u>Encana Oil and Gas (USA) Inc</u>	No: <u>303-774-3980</u>
Address: <u>370 17th Street Ste 1700</u>	Fax: _____
City: <u>Denver</u> State: <u>CO</u> Zip: <u>80202</u>	
API Number: _____ County: <u>Weld</u>	
Facility Name: <u>Wandell C 1</u> Facility Number: <u>336439</u>	
Well Name: _____ Well Number: _____	
Location: (QtrQtr, Sec, Twp, Rng, Meridian): <u>NENE, Sec 7, T 2N, R 67W, 6 PM</u> Latitude: <u>40.15784</u> Longitude: <u>-104.926695</u>	

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):	Extent of Impact:	How Determined:
<input checked="" type="checkbox"/> Soils	<u>75' x 45' x 3'</u>	<u>Excavation until tank stability an issue</u>
<input type="checkbox"/> Vegetation	_____	_____
<input checked="" type="checkbox"/> Groundwater	<u>To be determined</u>	<u>Collect groundwater samples after wells are installed</u>
<input type="checkbox"/> Surface Water	_____	_____

REMEDIATION 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: _____

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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)

Wandell

Document Date – December 12, 2014

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.



NARRATIVE ATTACHMENT

FORM 27 (SITE INVESTIGATION AND REMEDIATION WORKPLAN)

Wandell

Document Date – December 12, 2014

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.

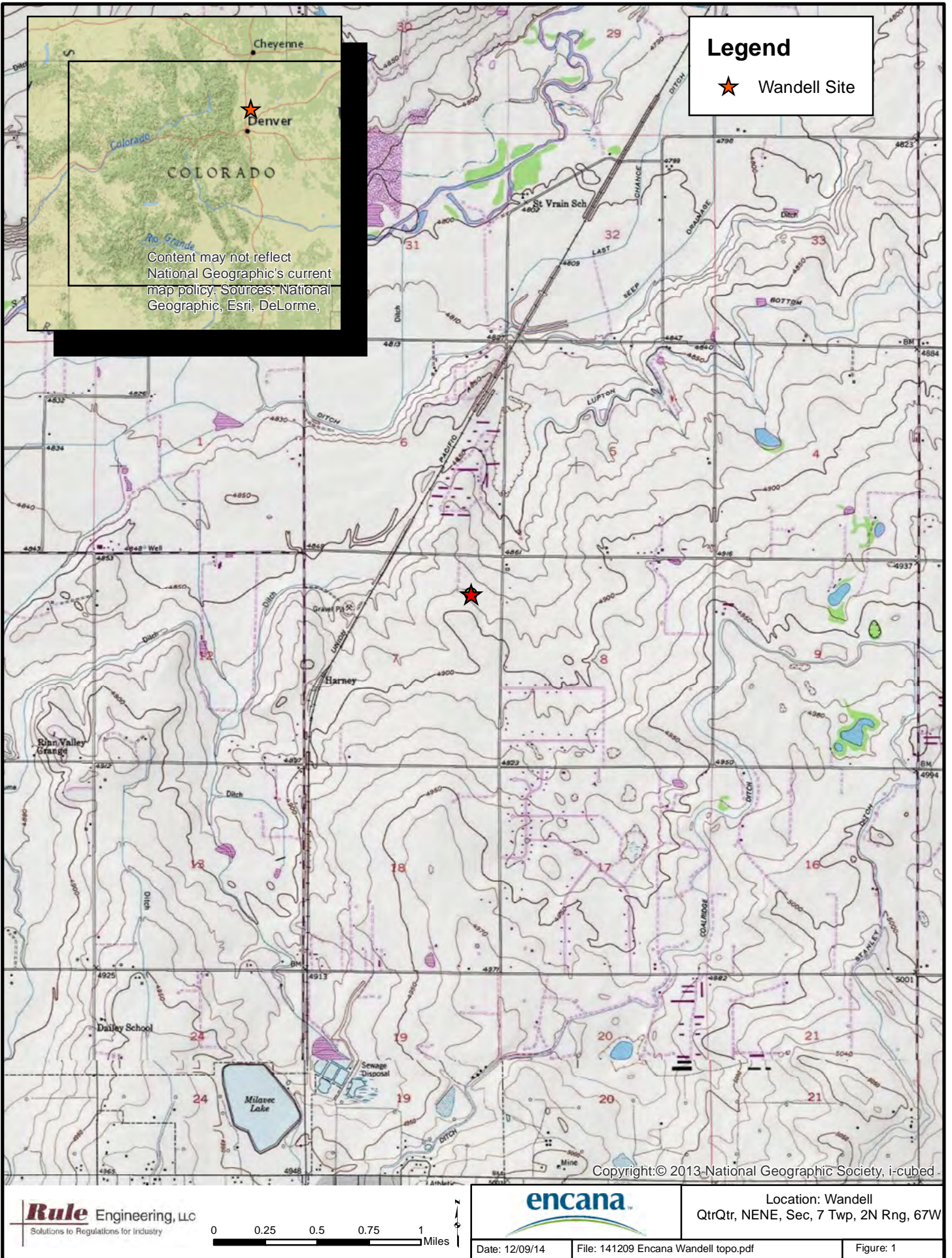
Attach samples and analytical results taken to verify remediation of impacts. Show locations of samples on an onsite schematic or drawing. Is further site investigation required? If yes, describe:

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 ^s	<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-Methylnaphthalene	2-Methylnaphthalene	2-Chloronaphthalene
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