

State of Colorado
Energy & Carbon Management Commission

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Receive Date:

Report taken by:

Site Investigation and Remediation Workplan (Supplemental Form)

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. However, this shall not preclude the Operator from taking immediate action to protect public health or safety, the environment, wildlife, or livestock.

This Form 27 describes site conditions as currently understood by the Operator; approval of this Form 27 by ECMC is based on the site conditions accurately described herein; any changes in site conditions identified during or subsequent to the performance of the approved workplan may necessitate additional investigation or remediation which shall be described on a supplemental Form 27.

This Form 27 is intended to provide basic information regarding the proposed site investigation and remediation actions, but the workplan may be more fully described in attached documentation.

Closure request is not available for an Initial Site Investigation and Remediation Workplan.

OPERATOR INFORMATION

Name of Operator: FOUNDATION ENERGY MANAGEMENT LLC	Operator No: 10112	Phone Numbers Phone: (972) 707-2523 Mobile: ()
Address: 5057 KELLER SPRINGS RD STE 650		
City: ADDISON	State: TX Zip: 75001	
Contact Person: Afton Iiams	Email: aiiams@foundationenergy.com	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 8549 Initial Form 27 Document #: 2614863

PURPOSE INFORMATION

- Rule 913.c.(1): Pit or Cuttings Trench closure.
- Rule 913.c.(2): Buried or partially buried vessel closure, which will be by removal.
- Rule 913.c.(3): Remediation of Spill and Releases pursuant to Rule 912.
- Rule 913.c.(4): Land treatment of Oily Waste pursuant to Rule 905.e.
- Rule 913.c.(5): Closure of Centralized E&P Waste Management Facilities pursuant to Rule 907.h.
- Rule 913.c.(6): Remediation of impacted Groundwater pursuant to Rule 915.e.(3).D, and the contaminant concentrations in Table 915-1.
- Rule 913.c.(7): Investigation and remediation of natural gas in soil or Groundwater.
- Rule 913.c.(8): When requested by the Director due to any potential risk to soil, Groundwater, or surface water.
- Rule 913.c.(9): Decommissioning of Oil and Gas Facilities.
- Rule 913.g: Changes of Operator.
- Rule 915.b: Request to leave elevated inorganics in situ.
- Other: 2Q24 Groundwater Monitoring and Remediation Summary

SITE INFORMATION

No Multiple Facilities

Facility Type: WELL	Facility ID:	API #: 123-13452	County Name: WELD
Facility Name: SOONER UNIT 13-16		Latitude: 40.656450	Longitude: -103.875257
		** correct Lat/Long if needed: Latitude: 40.656313	Longitude: -103.871122
QtrQtr: SWSW	Sec: 16	Twp: 8N	Range: 58W Meridian: 6 Sensitive Area? Yes

SITE CONDITIONS

General soil type - USCS Classifications SC Most Sensitive Adjacent Land Use RANGELAND

Is domestic water well within 1/4 mile? Yes Is surface water within 1/4 mile? Yes

Is groundwater less than 20 feet below ground surface? Yes

Other Potential Receptors within 1/4 mile

82' to stream (NE from tank battery and upgradient), revised coordinates reflect the approximate center of the remedial excavation. Site lies within the following Colorado Parks and Wildlife High Priority Habitats: Mule Deer Severe Winter Range and Mule Deer Winter Concentration Area.

SITE INVESTIGATION PLAN

TYPE OF WASTE:

- E&P Waste** **Other E&P Waste** **Non-E&P Waste**
- Produced Water Workover Fluids
- Oil** Tank Bottoms
- Condensate Pigging Waste
- Drilling Fluids Rig Wash
- Drill Cuttings Spent Filters
- Pit Bottoms
- Other (as described by EPA)

DESCRIPTION OF IMPACT

Impacted?	Impacted Media	Extent of Impact	How Determined
Yes	GROUNDWATER	2,500 sf	Groundwater monitoring

INITIAL ACTION SUMMARY

Description of initial action or emergency response measures take to abate, investigate, and/or remediate impacts associated with E&P Waste.

Please Reference Form 19 submitted on 1/8/2014. Soils exhibiting concentrations above the Colorado Energy and Carbon Management Commission (ECMC) standards were removed and disposed of at the North Weld Landfill, a licensed disposal facility.

PROPOSED SAMPLING PLAN

Proposed Soil Sampling

Will soil samples be collected as part of this investigation? (Number, type (grab/composite), analyses, and locations of samples):

A total of 25 monitoring wells have been installed and are illustrated in Figure 2. With ECMC approval (#402552422), four additional replacement monitoring wells (MW05R, MW06R, MW10R and MW19R) were installed in the first quarter 2021. During boring advancement, the soil borings were logged to evaluate geological conditions and identify any potential impacts to soil. The results were presented in the approved F27 document #402598459.

Proposed Groundwater Sampling

Will groundwater samples be collected as part of this investigation? (Number, analyses, and locations of samples):

A total of 25 monitoring wells have been installed and are illustrated in Figure 2. Groundwater samples were collected from 12 monitoring wells during the second quarter 2024 (2Q24) and analyzed for Table 915-1 organic constituents. Analytical results from the 2Q24 sampling event are presented in Table 2 and Figure 4. Ongoing quarterly groundwater monitoring of the site wells will continue, with sampled analyzed in accordance with the Site-Specific Sampling and Analysis Plan (SAP) in Table 4.

Proposed Surface Water Sampling

Will surface water samples be collected as part of this investigation? (Number, analyses, and locations of samples):

Additional Investigative Actions

Additional alternative investigative actions described in attached Site Investigation Plan (summary):

Foundation utilized a track hoe at Sooner 13-16 during flowline removal and excavated to groundwater level in July 2020. Soil in the smear zone that was visually impacted was removed and taken to Pawnee Waste Disposal Facility. The soil type at the Site is prone to slumping into the excavation. Foundation removed a total of 20.54 tons of material on 7/30/20 and assumes that approximately two-thirds of that was impacted material, with the remaining third being clean overburden sluff material. Heavy rains prevented further digging/running trucks that day , and the track hoe continued along the flowline. The disposal manifest was included with the 3Q20 F27S submittal.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 0
Number of soil samples exceeding 915-1 0
Was the areal and vertical extent of soil contamination delineated? Yes
Approximate areal extent (square feet) 500

NA / ND

NA Highest concentration of TPH (mg/kg) _____
NA Highest concentration of SAR _____
BTEX > 915-1 Yes
Vertical Extent > 915-1 (in feet) 19

Groundwater

Number of groundwater samples collected 12
Was extent of groundwater contaminated delineated? Yes
Depth to groundwater (below ground surface, in feet) 14
Number of groundwater monitoring wells installed 25
Number of groundwater samples exceeding 915-1 4

ND Highest concentration of Benzene (µg/l) _____
ND Highest concentration of Toluene (µg/l) _____
-- Highest concentration of Ethylbenzene (µg/l) 31
-- Highest concentration of Xylene (µg/l) 1500
NA Highest concentration of Methane (mg/l) _____

Surface Water

0 Number of surface water samples collected
0 Number of surface water samples exceeding 915-1
If surface water is impacted, other agency notification may be required.

OTHER INVESTIGATION INFORMATION

Were impacts to adjacent property or offsite impacts identified?

Were background samples collected as part of this site investigation?

Was investigation derived waste (IDW) generated as part of this investigation?

Volume of solid waste (cubic yards) _____ Volume of liquid waste (barrels) _____

Is further site investigation required?

REMEDIAL ACTION PLAN

Does this Supplemental Form 27A include changes to a previously approved Remedial Action Plan? No

SOURCE REMOVAL SUMMARY

Describe how source is to be removed.

Soils exhibiting concentrations above Table 910-1 standards (prior to 915-1 implementation) were previously removed and disposed of at North Weld County Landfill, a licensed disposal facility.

A description of initial source removal was provided in the previously submitted Form 27 (Document #2614863) and remediation objectives were approved by the ECMC, and the Site was assigned remediation #8549. The 2Q24 groundwater monitoring activities are further described in the following Groundwater Monitoring section. Additional source removal is not recommended at this time due to the limited area of impacted soils being located in and around the area where the flowline was removed in July 2020, and the area has initially been reclaimed per landowner approval. In addition, the Site is surrounded by natural grassland, does not pose a risk to any receptors or human health, and has shown evidence of natural attenuation trends.

REMEDICATION SUMMARY

Describe how remediation of existing impacts to soil and groundwater is to be accomplished (i.e. summarize remedial action plan). Provide a brief narrative description including: technical justification, schedule for implementation, estimated time to attain NFA status, plus plans and specifications for the selected remedial action technology.

Excavation activities to remove impacted soils at the Site have previously been reported in a Form 19 submitted January 8, 2014. Foundation Energy Management LLC (FEM) performed EFR/AS events at the site between October 2015 and February 2018, at which time EFR/AS activities were discontinued to evaluate groundwater trends without the influence of active remediation. However, due to continued elevated benzene concentrations, EFR/AS activities were again performed during 2Q19. The Sooner 13-16 well head was plugged in May 2020, and Foundation subsequently removed the off-location flowline on State of Colorado land that ran through the Site in July 2020. During the 2Q22 and 3Q22, EFR was performed at MW05 and MW12. Details of those events have been reported in previous Form 27 reports. During the 2Q24 sampling event, LNAPL (light nonaqueous phase liquid) was not observed at a measurable thickness at the monitoring wells; however, traces/sheens were observed at MW05R, MW06R, and MW12 during field activities. Based on observations of elevated groundwater concentrations, if warranted, FEM would consider evaluating further investigation and alternative remediation approaches applicable to the Site with landowner and ECMC approval, which may include, but not limited to the potential use of EFR/AS remediation or other treatment.

Soil Remediation Summary

In Situ

Ex Situ

_____ Bioremediation (or enhanced bioremediation)

_____ Excavate and offsite disposal

_____ Chemical oxidation

_____ If Yes: Estimated Volume (Cubic Yards) _____

_____ Air sparge / Soil vapor extraction

_____ Name of Licensed Disposal Facility or ECMC Facility ID # _____

_____ Natural Attenuation

_____ Excavate and onsite remediation

_____ Other _____

_____ Land Treatment

_____ Bioremediation (or enhanced bioremediation)

_____ Chemical oxidation

_____ Other _____

Groundwater Remediation Summary

_____ Bioremediation (or enhanced bioremediation)

_____ Chemical oxidation

Yes _____ Air sparge / Soil vapor extraction

Yes _____ Natural Attenuation

Yes _____ Other Vacuum enhanced fluid recovery _____

GROUNDWATER MONITORING

If groundwater has been impacted, describe proposed monitoring plan, including # of wells or sample points, monitoring schedule, analytical methods, points of compliance. Attach a groundwater monitoring location diagram.

Ongoing quarterly groundwater monitoring is being performed at the Site at the ECMC approved groundwater monitoring well locations illustrated on Figure 2. During the 2Q24 groundwater monitoring event, groundwater levels were measured at 17 site-wide locations and samples were collected from 12 well locations using standard sampling methods and submitted to Summit Scientific Laboratory for Table 915-1 VOC analysis using USEPA method 8260B. MW01 and MW04 had insufficient volume and were not sampled, and wells MW20 and MW21 have been removed from the SAP. Concentrations were reported below applicable ECMC standards and/or laboratory detection limits at 8 of 12 groundwater monitoring wells. Groundwater elevations and flow trends are presented on Table 1 and on Figure 3. Analytical data are summarized on Table 2 and Figure 4, and the laboratory report is provided as Attachment A. Ongoing quarterly monitoring and groundwater data analysis will be conducted in accordance with the SAP in Table 4 until a period of four consecutive quarters indicate that there are no impacts above ECMC or applicable CDPHE standards, at which time a no further action (NFA) closure request will be submitted.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Approved Reporting Schedule:

Quarterly Semi-Annually Annually Other

Request Alternative Reporting Schedule:

Semi-Annually Annually Other

Rule 913.e:

After initial approval of a Form 27, the Operator will provide quarterly update reports in a Supplemental Form 27 to document progress of site investigation and remediation, unless an alternative reporting schedule has been requested by the Operator and approved by the Director. The Director may request a more frequent reporting schedule based on site-specific conditions.

Report Type: Groundwater Monitoring Land Treatment Progress Report O&M Report
 Other 2Q24 Groundwater Monitoring and Remediation Summary Report

Adequacy of Operator's General Liability Insurance and Financial Assurance

Describe the adequacy of the Operator's general liability insurance and Financial Assurance to fully address the anticipated costs of Remediation, including the estimated remaining cost for this project (below).

If this information has been provided on a Form 27 within the last 12 months, provide the Document Number of that form.

Foundation carries both pollution liability insurance and an umbrella policy for a total of \$11,000,000. The cost provided below is an estimate and may be adjusted based on site observations.

Operator anticipates the remaining cost for this project to be: \$ 50000

WASTE DISPOSAL INFORMATION

Was E&P waste generated as part of this remediation? Yes

Describe beneficial use, if any, of E&P Waste derived from this remediation project:

None.

Volume of E&P Waste (solid) in cubic yards 0

E&P waste (solid) description _____

ECMC Disposal Facility ID #, if applicable: _____

Non-ECMC Disposal Facility: _____

Volume of E&P Waste (liquid) in barrels 10

E&P waste (liquid) description Groundwater impacted by dissolved phase E&P waste

ECMC Disposal Facility ID #, if applicable: _____

Non-ECMC Disposal Facility: Pawnee Waste

REMEDIATION COMPLETION REPORT

REMEDIATION COMPLETION SUMMARY

Is this a Final Closure Request for this Remediation Project? No

If YES:

Compliant with Rule 913.h.(1).

Compliant with Rule 913.h.(2).

Compliant with Rule 913.h.(3).

Do all soils meet Table 915-1 standards? _____

Does the previous reply indicate consideration of background concentrations? _____

Does Groundwater meet Table 915-1 standards? No

Is additional groundwater monitoring to be conducted? Yes

Operator shall comply with the ECMC 1000-Series Reclamation Requirements for all impacted and disturbed areas.

RECLAMATION PLAN

RECLAMATION PLANNING

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.

Previous reclamation activities subsequent to the initial excavation have been completed as discussed in previously submitted Form 27 reports. Once four consecutive quarters of analytical data confirm that groundwater concentrations are below ECMC standards, the monitoring wells will be decommissioned in accordance with state regulations and the area will be returned to its original condition by reseeding with an approved seed mix, if necessary.

Is the described reclamation complete? No

Does the reclamation described herein constitute interim or final reclamation of the Oil and Gas Location?

Interim Final

Did the Surface Owner provide the seed mix? _____

If YES, does the seed mix comply with local soil conservation district recommendations? _____

Did the local soil conservation district provide the seed mix? _____

SITE RECLAMATION DATES

Proposed date of commencement of Reclamation. 10/09/2015

Proposed date of completion of Reclamation. _____

IMPLEMENTATION SCHEDULE

Per Rule 913.d.(2): Any change from the approved implementation schedule will be requested at least 14 days in advance, and the Operator may not make the change without the Director's approval.

PRIOR DATES

Date of Surface Owner notification/consultation, if required. _____

Actual Spill or Release date, or date of discovery. _____

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). _____

Proposed site investigation commencement. 01/15/2015

Proposed completion of site investigation. 08/01/2025

REMEDIAL ACTION DATES

Proposed start date of Remediation. 10/09/2015

Proposed date of completion of Remediation. 08/01/2025

Per Rule 913.d.(2): Any change from the approved implementation schedule will be requested at least 14 days in advance, and the Operator may not make the change without the Director's approval.

Change from approved implementation schedule per Rule 913.d.(2).

Basis for change in implementation schedule:

OPERATOR COMMENT

With ECMC approval, FEM proposes that the groundwater monitoring activities continue, with samples analyzed for the organic parameters listed in the SAP in Table 4. In the 4Q22 Form 27 report (#403316233), the ECMC approved the removal of fluorene analysis from the SAP until Table 915-1 dissolved concentrations are observed below ECMC standards and at least one quarter of data indicate that criteria for site closure sampling have been met. At that time, fluorene sampling will be re-initiated prior to site closure at the request of ECMC. Additionally, the 4Q22 Form 27 report approved the removal of MW20 and MW21 from the monitoring plan and added MW17 and MW18. However, MW17 is damaged near the surface and cannot be gauged or sampled. FEM will continue to comply with the SAP presented in Table 4 during each quarterly event. Based on ECMC comments in the 3Q23 approved F-27 report (#403573083), to elaborate more on potential alternative technologies at the site, FEM has determined that the current site conditions and groundwater concentrations onsite, being within the same order of magnitude as the Table 915 standards, do not pose a risk to downgradient or offsite receptors and an alternative technology would not be feasible at this time. Based on a stable plume and no receptors in close proximity to the Site, monitored natural attenuation (MNA) is the preferred remedial strategy. Foundation will continue to perform quarterly groundwater monitoring and submit updates and quarterly reports to ECMC via eForm 27.

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

Signed: Afton Iiams

Title: HSE/Regulatory Specialist

Submit Date: _____

Email: regulatory@foundationenergy.com

Based on the information provided herein, this Application for Site Investigation and Remediation Workplan complies with ECMC Rules and applicable orders and is hereby approved.

ECMC Approved: _____

Date: _____

Remediation Project Number: 8549

COA Type

Description

COA Type	Description
0 COA	

ATTACHMENT LIST

Upon approval, the approved Form 27 and all listed attachments will be indexed to the Remediation Project file. Only the approved Form 27 will also be indexed to the related Facilities.

Att Doc Num

Name

403888450	MONITORING REPORT
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Total Attach: 1 Files

General Comments

User Group

Comment

Comment Date

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)