FORM 27 Rev 5/22

State of Colorado
Oil and Gas Conservation Commission

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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 COGCC 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 INFORMATON

Name of Operator: FOUNDATION ENERGY MANAGEMENT LLC Operator No: 10112

Phone Numbers

Address: 5057 KELLER SPRINGS RD STE 650 Phone: (972) 707-2523
City: ADDISON State: TX Zip: 75001 Mobile: ( )
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.
- [X] 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.
- [X] Other: 4Q22 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 INVESTIGATION PLAN

TYPE OF WASTE:

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

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 COGCC 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 on Figure 2. With COGCC 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

[X] 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 on Figure 2. Groundwater samples were collected from 11 monitoring wells during the fourth quarter 2022 (4Q22) and analyzed for Table 915-1 organic constituents. Additionally, based on a COGCC COA from the third quarter 2021 groundwater monitoring report (#402817459), well locations with sufficient groundwater volume were sampled for fluorene per COGCC request. Analytical results from the 4Q22 sampling event are presented herein. Ongoing quarterly groundwater monitoring of the site wells will continue as presented in the Site-Specific Sampling and Analysis Plan (SAP) in Table 4. Based on current and historical results at and downgradient of MW20 and 21, FEM proposes to remove those wells from the current groundwater sampling program. Additionally, due to the measurable LNAPL at MW10, FEM proposes adding MW17 and MW18 to the sampling plan if the wells are still in serviceable condition.

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 took advantage of the track hoe in 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. Unfortunately, heavy rains prevented further digging/running trucks that day, and the track hoe continued along the flowline to the surface owner (State of CO). 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 exceeeding 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: 11

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: 2

-- — Highest concentration of Benzene (µg/l): 72

ND — Highest concentration of Toluene (µg/l):

-- — Highest concentration of Ethylbenzene (µg/l): 190

-- — Highest concentration of Xylene (µg/l): 390

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 COGCC and the Site was assigned remediation #8549. Fourth quarter 2022 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 to, the Site being surrounded by natural grassland without posing a risk to any receptors or human health and has shown evidence of natural attenuation trends. The overall magnitude of dissolved phase concentrations, as well as the number of impacted wells, has shown a downward trend at the site since remediation activities in 2015.

REMEDIATION 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 the 2Q19. The Sooner 13-16 well 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 2Q and 3Q22, EFR was performed at MW05 and MW-12. Details of those events have been reported in previous Form 27 reports.
During the 4Q22 sampling event, LNAPL was observed at MW05R, MW06R, MW08, MW10R, and MW12 ranging from 0.34 feet (ft) at MW05R and MW10 to 1.28 ft at MW12. Four EFR events occurred at MW05R and MW12 during the 4Q22 resulting in a total extraction of 9 bbl of fluid, and a summary of the 4Q22 EFR activity is presented on Table 5. Based on observations of elevated volatile organic compound (VOC) concentrations as well as measurable LNAPL, FEM will evaluate alternative remediation technologies applicable to the Site, which may include, but are not limited to the potential use of additional EFR/AS or ChemOx treatment injection methods, if warranted, so that monitoring and reclamation can be performed in a timely manner.

Soil Remediation Summary

☐ **In Situ**

- _____ Bioremediation (or enhanced bioremediation)
- _____ Chemical oxidation
- _____ Air sparge / Soil vapor extraction
- _____ Natural Attenuation
- _____ Other _____

☐ **Ex Situ**

- _____ Excavate and offsite disposal
  - If Yes: Estimated Volume (Cubic Yards) _____
  - Name of Licensed Disposal Facility or COGCC Facility ID # _____
- _____ Excavate and onsite remediation
  - _____ 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 COGCC approved groundwater monitoring well locations illustrated on Figure 2. During the 4Q22 groundwater monitoring event, groundwater levels were measured at 15 site-wide locations and samples were collected from 11 well locations using standard sampling methods and submitted to Summit Scientific Laboratory for Table 915-1 VOC analysis using USEPA method 8260B. Two locations (MW01 and MW04) were either dry or contained insufficient sampling volumes during the 4Q22 sampling event, MW08 contained mostly LNAPL with minimal groundwater, and MW12 was not sampled due to a well obstruction that prevented a bailer from passing through the well casing.
Concentrations were reported below applicable COGCC standards and/or below laboratory detection limits at 9 out of 11 groundwater monitoring wells with the exceptions being wells with measurable LNAPL (MW05R and MW06R). MW08 and MW12 contained LNAPL but groundwater samples were not collected due to insufficient volume and a damaged well, respectively. Additionally, based on a COGCC COA from the 3Q21 Form 27-S (#402817459), well locations with sufficient groundwater volume were sampled for fluorene by USEPA method 8270 SIM. Four of five wells sampled for fluorene exhibited concentrations below the CDPHE Regulation 41 groundwater standard of 280 µg/L, with MW06R exhibiting a fluorene concentration of 1,640 micrograms per liter (µg/L).
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 COGCC or applicable CDPHE standards, at which time an NFA closure request will be submitted.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Approved Reporting Schedule:

[X] 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: [X] Groundwater Monitoring [ ] Land Treatment Progress Report [ ] O&M Report

[X] Other 4Q22 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 over that for a total of $11,000,000. 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

COGCC Disposal Facility ID #, if applicable:

Non-COGCC Disposal Facility:

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

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

COGCC Disposal Facility ID #, if applicable:

Non-COGCC 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 COGCC 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 COGCC 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. 07/01/2024

REMEDIAL ACTION DATES

Proposed start date of Remediation. 10/09/2015

Proposed date of completion of Remediation. 07/01/2024

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 COGCC approval, FEM proposes that the groundwater monitoring activities will continue sampling for the organic parameters listed in Table 915-1. Because fluorene has only been detected at well locations with measurable LNAPL since sampling was initiated in the 4Q21, FEM would like to propose removal of fluorene from the SAP until Table 915-1 dissolved concentrations are observed below COGCC 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 COGCC. Additionally, FEM proposes to remove MW20 and 21 from the quarterly monitoring plan and will attempt to gauge and sample MW17 and MW18 during the 1Q23. FEM will continue to comply with the SAP presented in Table 4 during each quarterly event until updates are approved.

Foundation will continue to perform quarterly groundwater monitoring and submit updates and quarterly reports to COGCC via Form 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 Technician

Submit Date: Email: regulatory@foundationenergy.com

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

COGCC Approved: Date:

Remediation Project Number: 8549

COA Type	Description
0 COA	

Attachment Check 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
403329661	OTHER

Total Attach: 1 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)