

State of Colorado Oil and Gas Conservation 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 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.

Refer to Rules 340, 905, 906, 907, 908, 909, and 910

OPERATOR INFORMATION

Name of Operator: FOUNDATION ENERGY MANAGEMENT LLC	Operator No: 10112	Phone Numbers Phone: (303) 2448114 Mobile: (720) 2572302
Address: 5057 KELLER SPRINGS RD STE 650		
City: ADDISON	State: TX Zip: 75001	
Contact Person: Alyssa Beard	Email: abeard@foundationenergy.com	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 17342 Initial Form 27 Document #: 402565168

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: Remediation Workplan

SITE INFORMATION

No Multiple Facilities

Facility Type: LOCATION	Facility ID: 324639	API #:	County Name: JACKSON
Facility Name: ALLARD-610N79W 30SENE		Latitude: 40.812241	Longitude: -106.301789
		** correct Lat/Long if needed: Latitude:	Longitude:
QtrQtr: SENE	Sec: 30	Twp: 10N	Range: 79W Meridian: 6 Sensitive Area? Yes

SITE CONDITIONS

General soil type - USCS Classifications GW

Most Sensitive Adjacent Land Use Non-Crop Land - Silver Spur Land and Cattle

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

The Allard location was constructed in alluvial material associated with the Michigan River.

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	Unknown	Laboratory analysis
Yes	SOILS	150 square feet	Laboratory analysis

INITIAL ACTION SUMMARY

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

Initial actions and completed remedial measures have previously been submitted to the COGCC in the Form 19I (Document #402528181), in the Form 19S (Doc #402545454), and in the Form 27I (Doc #402565168). A remediation work plan was submitted in a Form 27S (Doc #402669575). The COGCC assigned spill tracking facility ID #324639 and remediation number #17342 for the Site. The impacts were initially discovered in late September 2020 and believed from a historical spill of unknown origins. The Allard well was plugged and decommissioned in November 2020, and impacted material was discovered in two separate areas of the Site at the former wellhead and near the treater. Following the well plugging activities, initial delineation activities were completed on December 1, 2020, and included test pitting and sampling activities. Impacted material was hauled offsite, and clean backfill material was used to fill the test pits until further delineation and a remediation workplan could be prepared. Lab results confirmed groundwater was above COGCC standards for benzene, and that further investigation was required. During May 2021, additional soil impacts were removed by excavation and nine groundwater monitoring wells were installed, and details of those activities are provided herein.

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):

Previous soil results were presented in the F27I (#402565168). One excavation at the Allard North Former Well Jack Area (WJA) and two at the Allard South Former Treater and Battery Area (FTBA), were proposed in the approved F27S (#402669575) to remove impacted soil. However, due to the onsite soil and groundwater conditions at the FTBA during the May 2021 activities, delineation of the horizontal extents and the removal of impacted soil was not completed. During the investigation, 2 soil samples were collected at each of the 9 well locations, except for MW06 since it was installed in an open pit, backfilled and sampling was not possible at the time of well construction. Six soil samples were also collected from the excavation extents at the WJA for and the laboratory results are presented in Tables 1 – 3 and on Figures 3 and 5. If warranted, an alternative method to dig and haul will be proposed in a separate Form 27S for COGCC approval and confirmation samples will be collected.

Proposed Groundwater Sampling

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

Nine monitoring wells, five in the WJA and four in the FTBA, were installed and sampled during the May 2021 investigation and illustrated on Figures 3 through 6. Groundwater samples were collected following well development activities and submitted for Table 915 laboratory analysis. The wells were gauged for prior to sample collection, however, the well top of casings was not surveyed during the initial activities and groundwater elevations could not be calculated. The groundwater data is presented on Tables 4 and 5 and illustrated on Figures 4 and 6. Based on sitewide conditions, the groundwater is anticipated to flow towards the surface water. Boring and well construction logs are included as Attachment B, and FEM plans to survey the wells in a subsequent monitoring event and perform regular gauging and quarterly monitoring at the Site to determine any fluctuations in the onsite groundwater conditions. Potentiometric surface maps will be presented to the COGCC in F27S reports.

Proposed Surface Water Sampling

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

During the May investigation, one surface water sample was collected for Table 915 groundwater parameters from the canal on the west side of the FTBA. Results are presented on Table 5 and illustrated on Figure 6. Based on the investigative results, continued monitoring of this location is not currently scheduled, however, if site conditions change, the need for future monitoring at this surface water location will be evaluated.

Additional Investigative Actions

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

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 22

Number of soil samples exceeding 915-1 17

Was the areal and vertical extent of soil contamination delineated? Yes

Approximate areal extent (square feet) 250

NA / ND

-- Highest concentration of TPH (mg/kg) 1700

-- Highest concentration of SAR 8.13

BTEX > 915-1 Yes

Vertical Extent > 915-1 (in feet) 8

Groundwater

Number of groundwater samples collected 9

Was extent of groundwater contaminated delineated? Yes

Depth to groundwater (below ground surface, in feet) 4'

Number of groundwater monitoring wells installed 9

Number of groundwater samples exceeding 915-1 0

-- Highest concentration of Benzene (µg/l) 1.5

ND Highest concentration of Toluene (µg/l)

ND Highest concentration of Ethylbenzene (µg/l)

-- Highest concentration of Xylene (µg/l) 27

NA Highest concentration of Methane (mg/l)

Surface Water

1 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) 492

Volume of liquid waste (barrels) 80

☒ Is further site investigation required?

Based on the results of this investigation, further investigation may be required at both the WJA and FBTA. Due to the large quantities of cobbles and shallow groundwater at 3 feet below ground surface (bgs) in the FBTA, excavation was limited to ~55 tons of material removed. However, one soil sample collected from MW03 that was installed in the FBTA was above the COGCC Table 915-1 standards while the other wells in this area were below the standards. Groundwater collected from the wells were not impacted based on the initial FBTA investigation.

Soil impacts were observed at the base, the western and southern walls of the WJA excavation. The western extent was expanded, and a confirmation sample was collected which complied with COGCC standards. The south wall sample (WJA-S@4.5') was above the COGCC standard for 1-methylnaphthalene and the base sample at 5' (saturated by groundwater), was also above for multiple Table 915-1 organic constituents. However, with the site conditions, FEM attempted to remove as much source material as possible from the WJA and FBTA during this phase of the investigation, and it may be difficult to remove additional soils from these areas depending on groundwater levels. Since the impacted soils are below the water table and groundwater does not appear to be impacted in either the WJA or FBTA area, FEM proposes to leave the soil impacts in place and continue groundwater monitoring on a quarterly basis until confirmation soil samples can be collected following additional remedial efforts and or an alternative method is approved by COGCC to address the remaining soil impacts at MW03 and the WJA.

Table 915-1 soil suitability and inorganics were above the standards in both areas; however, FEM believes that the results are within the range for naturally occurring soils in the Rocky Mountain region, and not associated with the hydrocarbon impacts onsite and requests that these parameters are removed from future soil samples.

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.

Approximately 437 cubic yards of soil were excavated from the WJA during the May 2021 activities and transported to the Pawnee Waste Facility in Grover, CO. Soil analytical results indicate that the lateral extent of the excavation was removed in three directions, but additional material will on the south side of the excavation pit needs to be removed. Due to shallow groundwater, the pit could not be excavated any further vertically. In addition, approximately 80 barrels of water was removed from the open excavation with a hydro-vacuum truck and transported to Pawnee Waste Facility in Grover, CO.

Complete source removal at the FBTA could not be completed during the May 2021 activities due to shallow groundwater and significant alluvial materials present in the Soils. Approximately 55 tons of soil was removed from this area. However, the data from the five monitoring wells installed in the area did not indicate groundwater was impacted at this Site and minimal soil impacts were present in the vicinity of MW03 at 8 feet bgs.

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.

Following the excavation of impacted soil at the WJA, monitoring wells were installed to delineate the extent of groundwater contamination. Monitoring wells were also installed at the FBTA and groundwater impacts were not observed at either of the two investigative areas. If required, a separate remediation workplan will be presented to COGCC for approval in a subsequent form 27 progress report. In response to a COGCC COA on the remediation work plan (Document #40266975), monthly gauging of the monitoring wells will be completed. Quarterly groundwater monitoring will be performed at the Site until a period of four consecutive monitoring events have demonstrated that groundwater impacts are below COGCC Table 915-1 standards. At that time, a no further action (NFA) determination for the Site will be requested from the COGCC.

Soil Remediation Summary

☐ In Situ

_____ Bioremediation (or enhanced bioremediation)

_____ Chemical oxidation

_____ Air sparge / Soil vapor extraction

_____ Natural Attenuation

_____ Other _____

☒ Ex Situ

Yes _____ Excavate and offsite disposal

If Yes: Estimated Volume (Cubic Yards) _____ 492

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

☐ _____ Air sparge / Soil vapor extraction

☐ _____ Natural Attenuation

☐ _____ Other _____

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.

Groundwater samples were collected from all nine one-inch monitoring wells that were installed during this investigation. Laboratory analysis was conducted by Summit Scientific in Golden, CO for Table 915-1, and organic impacts were not observed above the standards. Laboratory results are presented on Table 5 and illustrated on Figures 4 and 6. Further, as part of the ongoing investigation, monthly monitoring well gauging will be performed, and a potentiometric surface map will be presented in future reports after a top of casing elevation survey has been completed. Monitoring well construction logs are presented as Attachment B to this report.

In addition, groundwater samples were collected from all nine wells located onsite for comparison of the Table 915-constituents of total dissolved solids (TDS), chloride and sulfate to determine background levels. Concentrations ranged from 206 to 727 mg/L for TDS, 2.0 to 64.2 mg/L for chloride and 23.5 mg/L to 208 mg/L for sulfate and should be considered representative of the local groundwater conditions.

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

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:

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

E&P waste (solid) description

COGCC Disposal Facility ID #, if applicable:

Non-COGCC Disposal Facility:

Volume of E&P Waste (liquid) in barrels

E&P waste (liquid) description

COGCC Disposal Facility ID #, if applicable:

Non-COGCC Disposal Facility:

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?

Is additional groundwater monitoring to be conducted?

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.

The WJA excavation has been backfilled with clean fill and compacted to existing grade due to cows grazing in the area. Both the former wellhead and former battery locations will be reclaimed at the earliest opportunity following the conclusion of remediation activities and removal of the monitoring wells. Foundation proposes to reseed the locations with a seed mix approved by the landowner during the next favorable season after approval and weed spraying will be utilized for weed prevention until final reclamation has been achieved. Final reclamation will be performed in accordance with 1000 series rules.

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. _____

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). 12/01/2020

Proposed site investigation commencement. 05/11/2021

Proposed completion of site investigation. _____

REMEDIAL ACTION DATES

Proposed start date of Remediation. 05/11/2021

Proposed date of completion of Remediation. _____

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

This supplemental Form 27 has been provided as a follow-up status update to the remediation work plan (Document #40266975) that was approved with COAs, and all COAs have been adhered to during the execution of the remediation work plan.

Excavation of all impacted soils at the Allard FBTA area could not be completed in May 2021 due to the shallow groundwater and the high hydraulic conductivity of the gravel soil, although 492 tons of soil in total were removed from the battery and former wellhead locations for disposal. However, groundwater impacts were not discovered at either the FBTA or the WJA during this remediation investigation. Soil impacts above the Table 915-1 COGCC standards were at both the Allard North WJA and Allard South FBTA areas and will likely require additional excavation and confirmation sampling. However, based on the initial investigative groundwater results, it does not appear that these impacts are migrating or pose an immediate risk to potential receptors and FEM requests to leave the minimal impacted soil in place until additional soil remediation efforts are reevaluated and presented to the COGCC for approval.

As described above, groundwater samples were collected for comparison of the Table 915-1 constituents of total dissolved solids (TDS), chloride, and sulfate and appear to be representative of the natural groundwater conditions beneath the site and/or are not considered indicative of petroleum hydrocarbon impacts associated with the release.

With COGCC approval, FEM proposes that the groundwater monitoring activities will continue sampling for the organic parameters listed in Table 915-1 on a quarterly basis. However, based on the initial results for the inorganic constituents, FEM does not believe the inorganic parameters listed in Table 915 should be considered as constituents of concern for this Site and proposes to discontinue sampling of these analytes for all future quarterly monitoring events. Regarding the initial soil results, FEM requests that future soil sampling includes only the organic parameters listed in Table 915 that were above the laboratory detection limit during the initial investigation and removal of the soil suitability and inorganic parameters since the results appear to be natural fluctuations in the native soils and do not appear to be associated with the historical hydrocarbon release. If warranted, Foundation will collect background samples to determine if soil results above the Table 915-1 soil suitability and inorganics parameters are within the naturally occurring range for this region and can be removed from the sampling plan. The results of that background study will be submitted in a subsequent Form 27S.

FEM will comply with this interim Site-Specific Soil and Groundwater Sampling and Analysis Plan during each quarterly event with COGCC approval. Information within this Supplemental Form 27 is associated with REM# 17342 in conjunction with the Allard 30-8-5 wellhead (Facility ID 324639) historical release that was discovered during the initial well decommissioning activities.

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

Signed: Alyssa Beard

Title: EHS Manager

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: 17342

COA Type**Description**

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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**

402737148	DISPOSAL MANIFESTS
402737158	DISPOSAL MANIFESTS
402737238	REMEDATION PROGRESS REPORT

Total Attach: 3 Files

General Comments**User Group****Comment****Comment Date**

		Stamp Upon Approval
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Total: 0 comment(s)