

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.

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

OPERATOR INFORMATION

Name of Operator: FOUNDATION ENERGY MANAGEMENT LLC	Operator No: 10112	<b>Phone Numbers</b>	
Address: 16000 DALLAS PARKWAY #875			
City: DALLAS	State: TX		Phone: (918) 526-5592
Contact Person: Rachel Grant	Email: rgrant@foundationenergy.com		Mobile: (918) 638-1153

PROJECT, PURPOSE & SITE INFORMATION

**PROJECT INFORMATION**

Remediation Project #: 9864 Initial Form 27 Document #: 2526999

**PURPOSE INFORMATION**

<input type="checkbox"/> 901.e. Sensitive Area Determination	<input checked="" type="checkbox"/> 909.c.(5), Rule 910.b.(4): Remediation of impacted ground water
<input checked="" type="checkbox"/> 909.c.(1), Rule 905: Pit or PW vessel closure	<input type="checkbox"/> Rule 909.e.(2)A.: Notice completion of remediation in accordance with Rule 909.b.
<input checked="" type="checkbox"/> 909.c.(2), Rule 906: Spill/Release Remediation	<input type="checkbox"/> Rule 909.e.(2)B.: Closure of remediation project
<input type="checkbox"/> 909.c.(3), Rule 907.e.: Land treatment of oily waste	<input type="checkbox"/> Rule 906.c.: Director request
<input type="checkbox"/> 909.c.(4), Rule 908.g.: Centralized E&P Waste Management Facility closure	<input type="checkbox"/> Other

**SITE INFORMATION**      N Multiple Facilities ( in accordance with Rule 909.c. )

Facility Type: PIT	Facility ID: 119496	API #: _____	County Name: GARFIELD
Facility Name: FEDERAL 3-11		Latitude: 39.380805	Longitude: -108.954361
		** correct Lat/Long if needed: Latitude: _____	Longitude: _____
QtrQtr: NWSE	Sec: 11	Twp: 8S	Range: 104W    Meridian: 6    Sensitive Area? Yes

**SITE CONDITIONS**

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

Is domestic water well within 1/4 mile? No      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**

No additional receptors have been identified within 1/4-mile of the subject facility.

# SITE INVESTIGATION PLAN

## TYPE OF WASTE:

- |  |  |  |
|--|--|--|
| <input checked="" type="checkbox"/> E&P Waste      | <input type="checkbox"/> Other E&P Waste             | <input type="checkbox"/> Non-E&P Waste |
| <input checked="" type="checkbox"/> Produced Water | <input type="checkbox"/> Workover Fluids             |  |
| <input checked="" type="checkbox"/> Oil            | <input type="checkbox"/> Tank Bottoms                |  |
| <input checked="" type="checkbox"/> Condensate     | <input type="checkbox"/> Pigging Waste               |  |
| <input type="checkbox"/> Drilling Fluids           | <input type="checkbox"/> Rig Wash                    |  |
| <input type="checkbox"/> Drill Cuttings            | <input type="checkbox"/> Spent Filters               |  |
|  | <input type="checkbox"/> Pit Bottoms                 |  |
|  | <input type="checkbox"/> Other (as described by EPA) |  |

## DESCRIPTION OF IMPACT

Impacted?	Impacted Media	Extent of Impact	How Determined
Yes	GROUNDWATER	See attached data	Groundwater sampling and laboratory analysis
Yes	SOILS	16' (N-S) x 16' (E-W) x 17' bgs	Excavation, soil sampling, and 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.

In September 2016, Foundation Energy Management, LLC (Foundation) completed the transfer of multiple assets from National Fuel Corporation to Foundation. This asset transfer included ten locations with inactive pits, which were determined to serve no current or future purpose related to the operation of the associated wells. The subject pit Facility IDs, associated wells and associated well API numbers were provided in Exhibit E of the Form 10.

Site inspections were conducted by the COGCC in June 2016. Foundation conducted pit assessment activities in December 2016 and selected six of the pits for remediation and closure (Figure 1). Two of the pits can be closed with no further activities, and two require additional assessment activities. Proposed remediation activities are described in the following sections.

## 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 ):

Soil samples were collected from the final lateral extent of the excavation area at approximately 15 feet bgs. The soil samples were submitted to Summit Scientific for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), and total petroleum hydrocarbons (TPH) - gasoline range organics (GRO) by USEPA Method 8260C, TPH - diesel range organics (DRO) by USEPA Method 8015, electrical conductivity (EC), and pH. Laboratory analytical results indicated that constituent concentrations in the soil samples collected from the final lateral extent of the excavation area were below the applicable COGCC Table 910-1 soil standards. Soils were excavated into the phreatic zone to address potential hydrocarbon impacts that may have been present below the current groundwater table due to seasonal fluctuations. Soil sample analytical data is presented in Table 1, and the soil sample locations are illustrated on Figure 2. Laboratory analytical reports are included as Attachment A.

### Proposed Groundwater Sampling

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

Groundwater was unexpectedly encountered in the excavation at approximately 18' bgs, and subsequently infiltrated to approximately 17' bgs. A groundwater sample (GW01) was collected on July 19, 2017, and submitted for analysis of BTEX. Laboratory analytical results indicated that the benzene concentration in sample GW01 was above the applicable COGCC Table 910-1 groundwater standard. Subsequent to leaving the excavation open for 48 hours, a second groundwater sample (GW02) was collected on July 21, 2017. Laboratory analytical results indicated that BTEX concentrations in sample GW02 were below the applicable COGCC Table 910-1 groundwater standards. Groundwater sample analytical data is presented in Table 2, and the groundwater sample locations are illustrated on Figure 2. Laboratory analytical reports are included as Attachment A.

### Proposed Surface Water Sampling

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

The arroyo located southeast of the former pit location was dry during initial assessment activities in December 2016. During the July 2017 remediation activities, there was no flowing water in the arroyo, only several stagnant puddles. As such, no samples were collected from this apparently intermittent surface water feature.

## 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 9  
Number of soil samples exceeding 910-1 3  
Was the areal and vertical extent of soil contamination delineated? Yes  
Approximate areal extent (square feet) 256

### NA / ND

-- Highest concentration of TPH (mg/kg) 10100  
-- Highest concentration of SAR 26.6  
BTEX > 910-1 Yes  
Vertical Extent > 910-1 (in feet) 17

### Groundwater

Number of groundwater samples collected 2  
Was extent of groundwater contaminated delineated? Yes  
Depth to groundwater (below ground surface, in feet) 17'  
Number of groundwater monitoring wells installed 0  
Number of groundwater samples exceeding 910-1 1

-- Highest concentration of Benzene (µg/l) 160  
-- Highest concentration of Toluene (µg/l) 1.4  
-- Highest concentration of Ethylbenzene (µg/l) 5.7  
-- Highest concentration of Xylene (µg/l) 46  
NA Highest concentration of Methane (mg/l)

### Surface Water

0 Number of surface water samples collected  
 Number of surface water samples exceeding 910-1  
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?

Three composite samples were collected and analyzed for arsenic during the December 2016 site assessment activities. The background arsenic sample results ranged from 5.60 milligrams per kilogram (mg/kg) to 9.58 mg/kg.

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?

Hydrocarbon impacted groundwater may potentially remain at the site. Temporary groundwater monitoring wells will be installed at the site to further assess the potential extent of groundwater impacts. The temporary groundwater monitoring wells will be sampled and submitted for laboratory analysis of BTEX to verify that groundwater impacts have been mitigated. Should groundwater impacts remain, the temporary monitoring wells will be sampled and submitted for laboratory analysis of BTEX on a quarterly basis until concentrations remain below COGCC groundwater standards for four consecutive quarters.

# REMEDIAL ACTION PLAN

Does this Supplemental Form 27A include changes to a previously approved Remedial Action Plan? Yes \_\_\_\_\_

## SOURCE REMOVAL SUMMARY

Describe how source is to be removed.

Impacted soil was remediated as described in the following section. Potential groundwater impacts will be addressed as described below.

## 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.

Approximately 170 cubic yards in impacted soil were excavated and treated on-site with a dilute solution of hydrogen peroxide to mitigate hydrocarbon impacts. Laboratory analysis of excavation sidewall samples verified that soil impacts were fully addressed. Post-remediation soil confirmation composite samples were collected from the treated material at a frequency of 1 per 50 yards of treated material. Laboratory analysis of the treated soil confirmation samples indicated that hydrocarbon impacts were successfully mitigated. Confirmed successfully treated material was backfilled within the excavation area; soil above pH and/or EC standards was placed greater than 3' bgs and will be covered with imported soil as part of final site reclamation activities. Temporary monitoring wells are proposed to further assess the potential extent of groundwater impacts and/or for remediation purposes. Temporary groundwater monitoring wells will be sampled and submitted for laboratory analysis of BTEX to verify that groundwater impacts have been mitigated. Should groundwater impacts remain, the temporary monitoring wells will be sampled and submitted for laboratory analysis of BTEX on a quarterly basis until concentrations remain below COGCC groundwater standards for four consecutive quarters. Installation of temporary groundwater monitoring wells will be initiated following approval of the remediation plan by the COGCC. Estimated time to attain NFA is TBD based on the review of groundwater concentrations, the extent of impacted groundwater, and the efficacy of selected remedial technologies, if needed.

## 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 # \_\_\_\_\_

Yes \_\_\_\_\_ Excavate and onsite remediation

No \_\_\_\_\_ Land Treatment

No \_\_\_\_\_ Bioremediation (or enhanced bioremediation)

Yes \_\_\_\_\_ Chemical oxidation

No \_\_\_\_\_ Other \_\_\_\_\_

## Groundwater Remediation Summary

No \_\_\_\_\_ Bioremediation ( or enhanced bioremediation )

No \_\_\_\_\_ Chemical oxidation

No \_\_\_\_\_ Air sparge / Soil vapor extraction

Yes \_\_\_\_\_ Natural Attenuation

Yes \_\_\_\_\_ Other \_\_\_\_\_ Under evaluation

## 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.

Temporary groundwater monitoring wells will be installed to further assess the extent of groundwater impacts and/or for remediation purposes. The temporary groundwater monitoring wells will be sampled and submitted for laboratory analysis of BTEX on a quarterly basis to verify that groundwater impacts have been mitigated. Should groundwater impacts remain, the temporary monitoring wells will be sampled and submitted for laboratory analysis of BTEX until concentrations remain below COGCC groundwater standards for four consecutive quarters. Point of compliance will be monitored through an analytical data review and the evaluation of potentiometric flow direction. A groundwater monitoring location figure illustrating the locations of the surveyed temporary monitoring wells will be provided in the eForm 27-Supplemental annual update.

# REMEDATION PROGRESS UPDATE

## PERIODIC REPORTING

Frequency:  Quarterly  Semi-Annually  Annually  Other Remediation work plan update

Report Type:  Groundwater Monitoring  Land Treatment Progress Report  O&M Report

Other Remediation work plan update

## WASTE DISPOSAL INFORMATION

Was E&P waste generated as part of this remediation? No

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: \_\_\_\_\_

## REMEDATION COMPLETION REPORT

### REMEDATION COMPLETION SUMMARY

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

Do all soils meet Table 910-1 standards? \_\_\_\_\_

Does the previous reply indicate consideration of background concentrations? \_\_\_\_\_

Are the only residual soil impacts pH, SAR, or EC at depths greater than 3 feet below ground surface? \_\_\_\_\_

Does Groundwater meet Table 910-1 standards? \_\_\_\_\_

Is additional groundwater monitoring to be conducted? \_\_\_\_\_

## 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 former pit excavation area was backfilled to approximately 3' bgs. Future post-remediation reclamation activities at the site will be compliant with applicable COGCC and BLM regulations.

Is the described reclamation complete? Yes

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

Interim?  Final?

Did the Surface Owner approve the seed mix? \_\_\_\_\_

If NO, does the seed mix comply with local soil conservation district recommendations? \_\_\_\_\_

# IMPLEMENTATION SCHEDULE

## PRIOR DATES

Date of Surface Owner notification/consultation, if required. \_\_\_\_\_

Actual Spill or Release date, if known. \_\_\_\_\_

## SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 12/01/2016

Date of commencement of Site Investigation. 12/01/2016

Date of completion of Site Investigation. 12/03/2016

## REMEDIAL ACTION DATES

Date of commencement of Remediation. 07/17/2017

Date of completion of Remediation. \_\_\_\_\_

## SITE RECLAMATION DATES

Date of commencement of Reclamation. \_\_\_\_\_

Date of completion of Reclamation. \_\_\_\_\_

## OPERATOR COMMENT

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

Signed: Rachel Grant \_\_\_\_\_

Title: Senior HSE / Regulatory \_\_\_\_\_

Submit Date: \_\_\_\_\_

Email: rgrant@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: 9864 \_\_\_\_\_

## 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

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Total Attach: 0 Files

## General Comments

### User Group

### Comment

### Comment Date

		Stamp Upon Approval
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Total: 0 comment(s)