

# State of Colorado Oil and Gas Conservation Commission

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Report taken by:

Stan Spencer

## 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: <u>FOUNDATION ENERGY MANAGEMENT LLC</u>	Operator No: <u>10112</u>	<b>Phone Numbers</b>
Address: <u>5057 KELLER SPRINGS RD STE 650</u>		Phone: <u>(303) 244-8114</u>
City: <u>ADDISON</u>	State: <u>TX</u>	Zip: <u>75001</u>
Contact Person: <u>ALYSSA BEARD</u>	Email: <u>abeard@foundationenergy.com</u>	Mobile: <u>(720) 257-2302</u>

### 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 checked="" type="checkbox"/> Other <u>Correction of related pit ID from 119496 to 115193 to reflect accurate location of remediation.</u> |

#### SITE INFORMATION

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

Facility Type: <u>PIT</u>	Facility ID: <u>115193</u>	API #: <u></u>	County Name: <u>GARFIELD</u>
Facility Name: <u>Federal #3-11-8-104 115193</u>		Latitude: <u>39.381393</u>	Longitude: <u>-108.963816</u>
** correct Lat/Long if needed: Latitude: <u></u>		Longitude: <u></u>	
QtrQtr: <u>NWSW</u>	Sec: <u>11</u>	Twp: <u>8S</u>	Range: <u>104W</u>
Meridian: <u>6</u>		Sensitive Area? <u>Yes</u>	

#### 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.

Foundation conducted pit assessment activities at the Federal 3-11 site, pit ID 115193, in December 2016. Investigative and remediation activities were described in the Supplemental Form 27 documents Submitted August 3, 2017 (document 401361618 and resubmittal document 401548951) and October 23, 2017 (document 401436717).

### 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 sampling activities were described in the Supplemental Form 27 documents Submitted August 3, 2017 (document 401361618 and resubmittal document 401548951) and October 23, 2017 (document 401436717).

#### Proposed Groundwater Sampling

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

Initial groundwater samples were collected from the excavation on July 19, 2017 and July 21, 2017 and submitted for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX). Initial groundwater sampling during remediation activities was described in the Supplemental Form 27 documents Submitted August 3, 2017 (document 401361618 and resubmittal document 401548951) and October 23, 2017 (document 401436717) and the sample results are included in Table 1.

Temporary groundwater monitoring well locations were proposed in the October 23, 2017 Supplemental Form 27 and approved by COGCC on October 24, 2017. Five temporary monitoring wells (BH01-BH05) were installed at the site between 12/5/2017 and 12/6/2017 to further assess the extent of groundwater impacts. Quarterly groundwater sampling was initiated on 12/13/2017, and is ongoing.

#### 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 2017. 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 0  
Number of soil samples exceeding 910-1             
Was the areal and vertical extent of soil contamination delineated? Yes  
Approximate areal extent (square feet)           

### NA / ND

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

### Groundwater

Number of groundwater samples collected 4  
Was extent of groundwater contaminated delineated? No  
Depth to groundwater (below ground surface, in feet) 17'  
Number of groundwater monitoring wells installed 5  
Number of groundwater samples exceeding 910-1 4

-- Highest concentration of Benzene (µg/l) 120  
-- Highest concentration of Toluene (µg/l) 3.8  
-- Highest concentration of Ethylbenzene (µg/l) 1.1  
-- Highest concentration of Xylene (µg/l) 5.3  
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?

Background soil sampling activities were described in the Supplemental Form 27 documents Submitted August 3, 2017 (document 401361618 and resubmittal document 401548951) and October 23, 2017 (document 401436717).

☐ 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?

Fourth quarter 2017 groundwater sampling results indicate that hydrocarbon impacted groundwater remains at the site. Additional temporary monitoring wells may be installed in the future, if necessary, to maintain POC. The temporary groundwater monitoring well network will be sampled on a quarterly basis and submitted for laboratory analysis of BTEX 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 Supplemental Form 27 documents Submitted August 3, 2017 (document 401361618 and resubmittal document 401548951) and October 23, 2017 (document 401436717).

## **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.

Remediation activities were described in the Supplemental Form 27 documents Submitted August 3, 2017 (document 401361618 and resubmittal document 401548951) and October 23, 2017 (document 401436717).

Quarterly groundwater monitoring is ongoing and will be continued until concentrations remain in full compliance with State standards for four consecutive quarters. Estimated time to attain No Further Action (NFA) is to be determined (TBD) based on the review of groundwater concentrations, the extent of impacted groundwater, and the efficacy of selected remedial technologies.

## **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.

Between December 5, 2017, and December 6, 2017, a total of 5 temporary monitoring wells were installed at the site to assess the extent of groundwater impacts. The temporary monitoring wells will continue to be sampled on a quarterly basis and submitted for laboratory analysis of BTEX until concentrations remain in full compliance with State standards for four consecutive quarters. Step-out temporary monitoring wells will be installed to gain point of compliance (POC); additional temporary monitoring wells may be installed in the future, if necessary, to maintain POC. A potentiometric surface contour map for the Fourth Quarter 2017 is presented as Figure 2 and Groundwater sample results are illustrated on Figure 3. Well completion logs for the temporary monitoring at the site are included as Attachment A.

## REMEDATION PROGRESS UPDATE

### PERIODIC REPORTING

**Frequency:** ☒ Quarterly ☐ Semi-Annually ☐ Annually ☐ Other \_\_\_\_\_

**Report Type:** ☒ Groundwater Monitoring ☐ Land Treatment Progress Report ☐ O&M Report

☒ Other Proposed monitoring well location figure. \_\_\_\_\_

### 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

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

Signed: Brent Everett

Title: Sr. Hydrogeologist

Submit Date: 05/03/2018

Email: beverett@tasman-geo.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: Stan Spencer

Date: 05/07/2018

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

401548514	FORM 27-SUPPLEMENTAL-SUBMITTED
401629388	MAP
401629391	GROUND WATER ELEVATION MAP
401629394	GROUND WATER SAMPLE LOCATION
401629398	LOGS
401629399	ANALYTICAL RESULTS
401629403	ANALYTICAL RESULTS

Total Attach: 7 Files

## General Comments

### User Group

### Comment

### Comment Date

Agency	Continue MNA groundwater sampling and analyses of any/all constituents exceeding Table 910-1 concentrations until four consecutive 1/4ly samples compliant with Table 910-1 for one year.	05/07/2018
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Total: 1 comment(s)