

# 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: SANDRIDGE EXPLORATION & PRODUCTION LLC	Operator No: 10598	<b>Phone Numbers</b>
Address: 123 ROBERT S KERR AVE		Phone: (405) 590-7483
City: OKLAHOMA CITY State: OK Zip: 73102		Mobile: (405) 590-7483
Contact Person: Clay Harwell	Email: charwell@sandridgeenergy.com	

### PROJECT, PURPOSE & SITE INFORMATION

#### PROJECT INFORMATION

Remediation Project #: 9816

Initial Form 27 Document #: 2452575

#### PURPOSE INFORMATION

- |  |  |
|--|--|
| <input type="checkbox"/> 901.e. Sensitive Area Determination                                       | <input type="checkbox"/> 909.c.(5), Rule 910.b.(4): Remediation of impacted ground water                   |
| <input 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 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 checked="" 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: WELL	Facility ID:	API #: 057-06488	County Name: JACKSON
Facility Name: MUTUAL 4-30H	Latitude: 40.541767	Longitude: -106.414411	
** correct Lat/Long if needed: Latitude:		Longitude:	
QtrQtr: SWSE	Sec: 30	Twp: 7N	Range: 80W Meridian: 6 Sensitive Area? Yes

#### SITE CONDITIONS

General soil type - USCS Classifications SC

Most Sensitive Adjacent Land Use DRY LAND

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

The Mutual Ditch is located within 0.25 miles. Groundwater is approximately 15 feet bgs.

# 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	SOILS	325 feet x 90 feet	SOIL 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.

Site impact delineation activities were conducted in September 2016 to determine the lateral and vertical extent of the impacted soils. Groundwater was encountered at 15 feet bgs, but was not sampled because groundwater was encountered at depths greater than 5 feet below any observed environmental impacts.

## 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 ):

The environmental site investigation was conducted in September 2016. This form is an update for those activities.

### Proposed Groundwater Sampling

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

Groundwater was encountered at 15 feet bgs during the environmental site investigation conducted in September 2016, but was not sampled because groundwater was encountered at depths greater than 5 feet below any observed environmental impacts.

### Proposed Surface Water Sampling

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

Surface water samples were not collected during the environmental site investigation conducted in September 2016.

## Additional Investigative Actions

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

No additional investigative actions were conducted during the environmental site investigation conducted in September 2016.

# SITE INVESTIGATION REPORT

## SAMPLE SUMMARY

### Soil

Number of soil samples collected 20

Number of soil samples exceeding 910-1 7

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

Approximate areal extent (square feet) 29250

### NA / ND

-- Highest concentration of TPH (mg/kg) 1580

NA Highest concentration of SAR

BTEX > 910-1 No

Vertical Extent > 910-1 (in feet) 3

### Groundwater

Number of groundwater samples collected 0

Was extent of groundwater contaminated delineated? No

Depth to groundwater (below ground surface, in feet) 15

Number of groundwater monitoring wells installed 0

Number of groundwater samples exceeding 910-1

Highest concentration of Benzene (µg/l)

Highest concentration of Toluene (µg/l)

Highest concentration of Ethylbenzene (µg/l)

Highest concentration of Xylene (µg/l)

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?

☐ 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.

SandRidge has elected to conduct source removal of the impacted drill cuttings via dig and haul activities, scheduled to be done by August 31, 2018.

## 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.

SandRidge conducted a bench scale test to determine if soil shredding via chemical oxidation (H<sub>2</sub>O<sub>2</sub>) technology would be successful for the remediation of the impacted buried drill cuttings. After conducting several bench scale tests at different dilution percentages and multiple loading volumes, SandRidge has concluded that soil shredding via chemical oxidation (H<sub>2</sub>O<sub>2</sub>) would not be a successful remediation approach for this project. We believe that the introduction of a woody fibrous material is skewing successful remediation as the chemical (H<sub>2</sub>O<sub>2</sub>) is not selective, and therefore the increase of organics via the woody fibrous material is impairing the success of this technology. Therefore, SandRidge has elected to conduct source removal of the impacted drill cuttings via dig and haul activities. Due to the timing of the year, and unpredictable weather conditions expected through the fall and winter months, the dig and haul activities are scheduled to be conducted in the late spring or summer of 2018. During dig and haul activities, soils from the floor and sidewalls of the excavation will be screened for the presence of hydrocarbons with a photoionization detector (PID). Confirmation soil samples will be collected on the floor and sidewalls of the excavation where the highest PID reading was detected (if applicable) at 30 foot intervals for BTEX, TPH-GRO, and TPH-DRO to determine that all impacted material have been properly removed. Impacted materials will be disposed of at a properly licensed disposal facility. Clean backfill material will be imported when confirmation soil samples confirm all impacted materials have been removed. No further action (NFA) is expected to be achieved late summer or fall of 2018.

## 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) \_\_\_\_\_ 3000

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 was encountered at 15 feet bgs during the environmental site investigation conducted in September 2016, but was not sampled because groundwater was encountered at depths greater than 5 feet below any observed environmental impacts. No additional monitoring is planned.

## REMEDIATION PROGRESS UPDATE

### PERIODIC REPORTING

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

**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? \_\_\_\_\_

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 \_\_\_\_\_

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 facility is presently in use. Reclamation activities are not warranted at this time.

Is the described reclamation complete? \_\_\_\_\_

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). 09/06/2016

Date of commencement of Site Investigation. 09/07/2016

Date of completion of Site Investigation. 11/12/2016

### REMEDIAL ACTION DATES

Date of commencement of Remediation. \_\_\_\_\_

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: Clay Harwell

Title: EH&S Supervisor

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

Email: charwell@sandridgeenergy.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: 9816

### 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)