

State of Colorado  
Oil and Gas Conservation Commission

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Report taken by:  
KRIS NEIDEL

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	Phone Numbers Phone: (405) 429-6470 Mobile: ( )
Address: 123 ROBERT S KERR AVE		
City: OKLAHOMA CITY State: OK Zip: 73102		
Contact Person: Dave Boyer Email: dboyer@sandridgeenergy.com		

PROJECT, PURPOSE & SITE INFORMATION

**PROJECT INFORMATION**  
Remediation Project #: 13743 Initial Form 27 Document #: 402073369

**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 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: SPILL OR RELEASE	Facility ID: 324757	API #:	County Name: JACKSON
Facility Name: Mutual Pad 01-17H	Latitude: 40.584359	Longitude: -106.404626	
** correct Lat/Long if needed: Latitude:		Longitude:	
QtrQtr: NWNW	Sec: 17	Twp: 7N	Range: 80W Meridian: 6 Sensitive Area? Yes

**SITE CONDITIONS**

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

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 adjacent to the west edge of the pad and is currently in use. The irrigation ditch is approximately 60 feet west of the spill, outside the well pad containment berm. Grizzly Creek is approximately 2,300 feet east of the spill location.

# SITE INVESTIGATION PLAN

## TYPE OF WASTE:

- |  |  |  |
|--|--|--|
| <input checked="" type="checkbox"/> <b>E&amp;P Waste</b> | <input type="checkbox"/> <b>Other E&amp;P Waste</b>  | <input checked="" type="checkbox"/> <b>Non-E&amp;P Waste</b> |
| <input type="checkbox"/> Produced Water                  | <input type="checkbox"/> Workover Fluids             | Contaminated groundwater                                     |
| <input checked="" type="checkbox"/> Oil                  | <input type="checkbox"/> Tank Bottoms                | _____  |
| <input 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
UNDETERMINED	GROUNDWATER	Approximately 48 inches bgs	Hand auger to depth and step out delineation
Yes	SOILS	Approximately 200 square feet	Hand auger and step out delineation

## INITIAL ACTION SUMMARY

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

A Form 27 Supplemental Report 402093377 closure requests was submitted on 10/11/2019. A summary of investigation and remediation actions performed is included in Attachment C of Form 27 Supplemental Report 402285583. The COGCC has requested further action of quarterly sampling of groundwater. In response, SandRidge has installed monitoring wells at the location for quarterly monitoring.

## 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 each boring location during the installation of monitoring wells. Grab samples were collected in 2 foot intervals (or less) and screened with a PID for VOC concentrations. Depending upon VOC detection and potential concentration a soil sample may be collected and submitted to the laboratory and analyzed for BTEX and TPH (DRO & GRO).

### Proposed Groundwater Sampling

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

A total of five 4 groundwater monitoring wells were installed as part of the site investigation plan. Groundwater samples were collected from each monitoring well following installation and sampled for BTEX, TPH (DRO&GRO), pH, and specific conductivity. Groundwater samples will be collected from monitoring wells on a quarterly basis for at least four (4) consecutive quarters.

### Proposed Surface Water Sampling

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

One (1) downstream surface water sample will be collected from the Mutual Ditch (located approximately 60 feet west of the spill area) on a quarterly basis when water is flowing, likely to occur in 2Q2020 and 3Q2020. Surface water will be analyzed for BTEX, TPH (DRO & GRO).

## 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 5  
Number of soil samples exceeding 910-1 0  
Was the areal and vertical extent of soil contamination delineated? Yes  
Approximate areal extent (square feet) 0

### NA / ND

-- Highest concentration of TPH (mg/kg) 0  
-- Highest concentration of SAR 2.01  
BTEX > 910-1 No  
Vertical Extent > 910-1 (in feet) 0

### Groundwater

Number of groundwater samples collected 4  
Was extent of groundwater contaminated delineated? No  
Depth to groundwater (below ground surface, in feet) 3'  
Number of groundwater monitoring wells installed 4  
Number of groundwater samples exceeding 910-1 1

-- Highest concentration of Benzene (µg/l) 18  
ND Highest concentration of Toluene (µg/l)             
-- Highest concentration of Ethylbenzene (µg/l) 39  
ND Highest concentration of Xylene (µg/l)             
NA Highest concentration of Methane (mg/l)           

### Surface Water

0 Number of surface water samples collected  
0 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) 1      Volume of liquid waste (barrels) 0

Is further site investigation required?

Groundwater monitoring wells will be sampled on a quarterly basis in 2020. If analytical results indicate groundwater constituents are below COGCC Table 910-1 acceptable concentrations for all 2020 quarterly samples then the wells will be plugged and abandoned per State of Colorado requirements and upon COGCC approval. If groundwater impacts are consistently observed, a remedial action plan will be developed and submitted to the COGCC.

# 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 removed impacted material via dig and haul operations. During remedial excavation the failed flowline causing spilled oil was pressure tested, flushed and removed to the extent of the excavation eastern wall where no impacted soil remained and the flowline was capped. Work was completed by Session & Sons, LLC on June 24, 2019. All impacted soil waste was hauled via truck to Twin Enviro Landfill for disposal, located in Milner, Colorado. Water removed from the excavation was collected in frac tanks and hauled to NGL Water Solutions for disposal, located in Greely, Colorado. Manifests are provided in Attachment O and P of Form 27 Supplemental Report 402093377.

## 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.

All post-remediation groundwater and soil sample results collected from the excavation were below Table 910-1 acceptable concentrations for organic constituents. Groundwater samples collected outside and surrounding the excavation were also below Table 910-1 acceptable concentrations for organic constituents. The COGCC has requested further groundwater monitoring as a COA for Form 27 Supplement Report 402093377. Installation of monitoring wells were installed 2/27/2020 and will be monitored quarterly during 2020.

## 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

- No \_\_\_\_\_ Bioremediation ( or enhanced bioremediation )
- No \_\_\_\_\_ Chemical oxidation
- No \_\_\_\_\_ Air sparge / Soil vapor extraction
- No \_\_\_\_\_ Natural Attenuation
- No \_\_\_\_\_ 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.

Monitoring wells within the spill location (MW-2, MW-3 and MW-4) and upgradient from the spill (MW-1) have been monitored for the past 3 quarters of 2020. MW-2, MW-4 remain consistent with no detections for contaminants of concern. MW-3 had detections of benzene, ethylbenzene and xylenes with Benzene concentrations above Table 910-1 acceptable concentrations. Benzene concentrations in MW-3 have also increased slightly each quarter. SandRidge is recommending increased monitoring and an enhanced natural attenuation remediation approach described in Attachment A of this Form 27 Supplemental Report.

# 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? 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: \_\_\_\_\_

## 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? Yes \_\_\_\_\_

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

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? No \_\_\_\_\_

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

## 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 and reclamation activities are not warranted at this time onsite.

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. 06/11/2019

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

## **SITE INVESTIGATION DATES**

Date of Initial Actions described in Site Investigation Plan (start date). 06/11/2019

Date of commencement of Site Investigation. 06/11/2019

Date of completion of Site Investigation. \_\_\_\_\_

## **REMEDIAL ACTION DATES**

Date of commencement of Remediation. 06/17/2019

Date of completion of Remediation. 06/26/2019

## **SITE RECLAMATION DATES**

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

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

**OPERATOR COMMENT**

A narrative is provided describing third quarter groundwater monitoring for 2020 and also proposed recommendations moving forward (Attachment A).

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

Signed: Joel Mason \_\_\_\_\_

Title: Project Manager \_\_\_\_\_

Submit Date: 10/16/2020 \_\_\_\_\_

Email: joel.mason@absarokasolutions.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: KRIS NEIDEL \_\_\_\_\_

Date: 10/21/2020 \_\_\_\_\_

Remediation Project Number: 13743 \_\_\_\_\_

**COA Type****Description**

	It is stated that the filter sock will be removed prior to quarterly sampling of MW-3, how will the radius of influence be determined?
	COGCC approves the addition of ORC filter sock.

**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**

402506929	FORM 27-SUPPLEMENTAL-SUBMITTED
402510980	REMEDATION PROGRESS REPORT
402510981	MAP
402510982	SITE MAP
402510984	MAP
402510986	ANALYTICAL RESULTS
402510987	OTHER
402511672	GROUND WATER ELEVATION MAP
402511683	ANALYTICAL RESULTS

Total Attach: 9 Files

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

		Stamp Upon Approval
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Total: 0 comment(s)