

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
Address: 123 ROBERT S KERR AVE		Phone: (405) 429-5745
City: OKLAHOMA CITY State: OK Zip: 73102		Mobile: (405) 651-6853
Contact Person: Matt Church	Email: mchurch@sandridgeenergy.com	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION
Remediation Project #: 10183 Initial Form 27 Document #: 401271073

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 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: 449099	API #:	County Name: JACKSON
Facility Name: Hebron 02-07H	Latitude: 40.598306	Longitude: -106.415469	
** correct Lat/Long if needed: Latitude:		Longitude:	
QtrQtr: NWNE	Sec: 7	Twp: 7N	Range: 80W Meridian: 6 Sensitive Area? Yes

SITE CONDITIONS

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

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

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	10 foot radius around wellhead	Site Delineation
Yes	SOILS	10 foot radius around wellhead	Site 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.

On January 19, 2017, historical impacts were observed during hydrovac activities around the wellhead. The extent of the hydrovac excavation was approximately 6' by 3' to 1' bgs. One discrete soil sample (H 2-07H@1') was collected for laboratory analysis of BTEX, TPH-GRO, and TPH-DRO. Laboratory analytical results indicated soil sample H 2-07H@1' exceeded the applicable COGCC Table 910-1 standards for benzene and TPH. On April 27, 2017, additional hydrovac activity was conducted in the source area with an approximate excavation extent of 3' radius to 5.5' bgs. Four soil samples were collected from the sidewalls of the excavation and one soil sample was collected from the floor at the locations exhibiting the greatest evidence of hydrocarbon impact. Laboratory analytical results indicated the floor soil sample and two sidewall soil samples exceeded the applicable COGCC Table 910-1 standards for benzene and/or TPH, and three of the sidewall soil samples exceeded COGCC Table 910-1 standards for EC or pH. Groundwater was encountered at 5.5' bgs. One groundwater sample was collected and laboratory analytical results indicated that it exceeded the COGCC Table 910-1 standard for benzene.

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):

On June 29, 2017, a site investigation was conducted to delineate the lateral and vertical extent of hydrocarbon impact. Four soil borings were advanced in cardinal directions approximately 10' out from the source area. One discrete soil sample was collected from each soil boring from the vertical interval demonstrating the greatest evidence of impact (staining, odor, PID readings). If no impacts were observed in the soil boring, a discrete soil sample was collected from within 1 foot above the water table. Soil samples were submitted for laboratory analysis of BTEX, TPH-GRO, and TPH-DRO. All soil boring analytical results were in compliance with COGCC Table 910-1 standards.

Proposed Groundwater Sampling

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

The soil borings were completed as 1" groundwater monitoring wells. The wells were developed by removing 10-times the calculated well volume. Groundwater samples were collected from the monitoring wells using a peristaltic pump on September 13, 2017, and were submitted for laboratory analysis of BTEX. All groundwater analytical results were in compliance with COGCC Table 910-1 standards which indicates the extent of hydrocarbon impact to groundwater at the site has been delineated.

Proposed Surface Water Sampling

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

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 10
Number of soil samples exceeding 910-1 6
Was the areal and vertical extent of soil contamination delineated? Yes
Approximate areal extent (square feet) 314

NA / ND

-- Highest concentration of TPH (mg/kg) 7600
-- Highest concentration of SAR 3.42
BTEX > 910-1 Yes
Vertical Extent > 910-1 (in feet) 5

Groundwater

Number of groundwater samples collected 5
Was extent of groundwater contaminated delineated? Yes
Depth to groundwater (below ground surface, in feet) 5'
Number of groundwater monitoring wells installed 4
Number of groundwater samples exceeding 910-1 1

-- Highest concentration of Benzene (µg/l) 39
-- Highest concentration of Toluene (µg/l) 34
-- Highest concentration of Ethylbenzene (µg/l) 5.8
-- Highest concentration of Xylene (µg/l) 45
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?

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? Yes _____

SOURCE REMOVAL SUMMARY

Describe how source is to be removed.

Contamination around the wellhead was removed by using a hydro vac to uncover the flowlines and pipe. A trackhoe was used to excavate around the wellhead and remove source material.

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.

The site investigation delineated the remaining hydrocarbon impact to soil and groundwater to within 10' of the wellhead. Excavation and hydrovac activities will be conducted to remove the remaining soil impact. One discrete sidewall confirmation soil sample will be collected from each sidewall following source removal activities. The confirmation soil samples will be submitted for laboratory analysis of BTEX, TPH-GRO, and TPH-DRO. The confirmation soil sample with the greatest evidence of hydrocarbon impact will also be submitted for analysis of EC and pH.

Prior to backfilling the excavation, a carbon based groundwater amendment (BOS 200) will be applied to the base of the excavation to accelerate groundwater remediation. One additional groundwater monitoring well will be installed in the center of the former excavation extent to monitor groundwater conditions at the location of the source of the release. Quarterly groundwater monitoring will be conducted in the five groundwater wells at the Site for analysis of BTEX. Quarterly groundwater monitoring will continue until four consecutive quarters are achieved with analytical results in compliance with applicable COGCC Table 910-1 standards.

Due to seasonal conditions, the source removal activities, BOS 200 application, and additional groundwater monitoring well installation will take place during the spring/summer of 2018, and will be completed by August 31, 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) _____ 100

Name of Licensed Disposal Facility or COGCC Facility ID # _____

No _____ Excavate and onsite remediation

_____ Land Treatment

_____ Bioremediation (or enhanced bioremediation)

_____ Chemical oxidation

_____ Other _____

Groundwater Remediation Summary

Yes _____ 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.

Four groundwater monitoring wells currently exist at the Site in cardinal directions from the source of the release. Groundwater analytical results indicate these monitoring wells are points of compliance that delineate the extent of hydrocarbon impact to groundwater at the Site. A fifth monitoring well was installed at the wellhead at the time of excavation following source removal activities to monitor groundwater conditions at the source. Quarterly groundwater monitoring is currently being conducted in the five wells with the goal of achieving four consecutive quarters with analytical results of BTEX in compliance with applicable COGCC Table 910-1 standards.

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? Yes _____

Describe beneficial use, if any, of E&P Waste derived from this remediation project:

On July 17, 2018 remediation project initiated the removal of contaminated soil around the Hebron 2-7 wellhead. Contamination around the wellhead was removed by using a hydro vac to uncover the flowlines and pipe. A trackhoe was used to excavate around the wellhead and remove source material. Waste was transported for disposal to Twin Enviro located in Milner, CO. Approximately 100 total yards of contaminant were removed from the location. The waste was mistakenly labeled with another Remediation project located at the Peterson Ridge 1-20H site occurring at the same time; therefore, waste manifests labeled for this site are not available. Groundwater was observed at approximately 7 feet bgs and open excavation went to approximately 9 feet bgs. Following excavation and prior to backfill, activated carbon was placed into the groundwater to remediate any potential contaminants within the water table. A new monitoring well piezometer was installed at the wellhead following excavation.

Volume of E&P Waste (solid) in cubic yards _____ 100
E&P waste (solid) description Contaminated soils _____
COGCC Disposal Facility ID #, if applicable: _____ 1
Non-COGCC Disposal Facility: _____
Volume of E&P Waste (liquid) in barrels _____ 0
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? Yes _____
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.

Site reclamation will be completed upon abandonment of the well.

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). 01/19/2017

Date of commencement of Site Investigation. 05/19/2017

Date of completion of Site Investigation. 06/29/2017

REMEDIAL ACTION DATES

Date of commencement of Remediation. 04/27/2017

Date of completion of Remediation. 07/17/2018

SITE RECLAMATION DATES

Date of commencement of Reclamation. _____

Date of completion of Reclamation. _____

OPERATOR COMMENT

On July 17, 2018 SD initiated the removal of contaminated soil around the Hebron 2-7 wellhead. Contamination around the wellhead was removed by using a hydro vac to uncover the flowlines and pipe. A trackhoe was used to excavate around the wellhead and remove source material. Waste was transported for disposal to Twin Enviro located in Milner, CO. Approximately 100 total yards of contaminant were removed from the location. The waste was mistakenly labeled with another Remediation project located at the Peterson Ridge 1-20H site occurring at the same time; therefore, waste manifests labeled for this site are not available. Groundwater was observed at approximately 7 feet bgs and open excavation went to approximately 9 feet bgs. Following excavation and prior to backfill, activated carbon was placed into the groundwater to remediate any potential contaminants within the water table. A new monitoring well piezometer was installed at the wellhead following excavation. Soil samples and groundwater samples from the excavation show that the source material of the contamination has been removed; no samples exceed Table 910 concentration levels. Quarterly groundwater monitoring will continue until closure can be requested.

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

Signed: ` Matt Church _____

Title: EH&S Specialist _____

Submit Date: ` 03/04/2019 _____

Email: mchurch@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: KRIS NEIDEL _____

Date: 03/12/2019 _____

Remediation Project Number: 10183 _____

COA Type**Description**

	Sandridge should ensure that the groundwater wells are properly capped to prevent any surface water from entering the boarhole or well.
	Sandridge should sample the groundwater wells quarterly and submit the results quarterly. The first report should be first quarter of 2019.

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**

401959458	FORM 27-SUPPLEMENTAL-SUBMITTED
401959462	ANALYTICAL RESULTS
401959464	ANALYTICAL RESULTS
401959467	SOIL SAMPLE LOCATION MAP
401959471	GROUND WATER SAMPLE LOCATION
401959477	ANALYTICAL RESULTS
401959482	ANALYTICAL RESULTS

Total Attach: 7 Files

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

Environmental	Bore Logs can be found in document number 401465144.	03/12/2019
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Total: 1 comment(s)