

State of Colorado Oil and Gas Conservation Commission

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Report taken by:

RICK ALLISON

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: SYNERGY RESOURCES CORPORATION	Operator No: 10311	Phone Numbers Phone: (720) 616-4341 Mobile: (720) 772-0700
Address: 1675 BROADWAY SUITE 2600		
City: DENVER	State: CO Zip: 80202	
Contact Person: Brian Macke	Email: bmacke@srcenergy.com	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 9951 Initial Form 27 Document #: 200440746

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 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 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: 113418	API #: _____	County Name: WELD
Facility Name: TOEDTLI		Latitude: 40.851038	Longitude: -103.739836
		** correct Lat/Long if needed: Latitude: _____	Longitude: _____
QtrQtr: NESW	Sec: 10	Twp: 10N	Range: 57W Meridian: 6 Sensitive Area? No

SITE CONDITIONS

General soil type - USCS Classifications CL 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? No

Other Potential Receptors within 1/4 mile

Intermittent tributary to Spring Creek approximately 1,115 feet to the south.

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	Elevated pH, EC and SAR	Site investigation soil samples

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 October 28, 2016, site investigation activities were conducted to assess the potential presence of hydrocarbon impact associated with one of the historical produced water overflow evaporation pits. Please refer to the LTE Site Investigation and Closure Request, dated December 7, 2016 for additional details.

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):

A total of 15 locations were sampled during site investigation activities. On October 28, 2016, five soil samples ranging from 0.75 feet bgs to 4 feet bgs were collected from within the pit and analyzed for BTEX and TPH to assess potential petroleum hydrocarbon impacts in the produced water pit. One of the soil samples was also analyzed for pH, EC, and SAR to assess the potential presence of inorganic impacts near the surface within the typical vegetative root zone. On January 13, 2017, four soil samples surrounding the pit and two background soil samples were collected from 1 foot bgs and analyzed for pH, EC, and SAR. On February 3, 2017, six additional locations were sampled, and four discrete soil samples were collected from each location, at depths of 1 foot, 3 feet, 5 feet, and 10 feet bgs. The samples were analyzed for pH, EC, and SAR.

Proposed Groundwater Sampling

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

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 36

Number of soil samples exceeding 910-1 8

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

Approximate areal extent (square feet) 2000

NA / ND

-- Highest concentration of TPH (mg/kg) 57.6

-- Highest concentration of SAR 95.9

BTEX > 910-1 No

Vertical Extent > 910-1 (in feet) 5

Groundwater

Number of groundwater samples collected 0

Was extent of groundwater contaminated delineated? No

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

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?

Two background samples were collected from 1 foot bgs during the site investigation and analyzed for pH, EC, and SAR. One background sample exceeded COGCC Table 910-1 standards for EC and SAR with results of 18.2 mmhos/cm and 18.8, respectively.

☐ 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.

The Toedtli 1-10 wellhead is scheduled to be plugged and abandoned and final closure activities conducted at the location. No additional fluids are currently, nor will be directed into the pit.

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.

SRC proposes re-assessing and taking remedial action if inorganic impacts (pH, EC, and SAR) in soil exceed COGCC Table 910-1 standards upon commencement of final site closure activities. Final site closure activities and reclamation will occur following the plugging and abandoning of the wellheads in the area (Toedtli 1-10, Toedtli 22-2, and Toedtli 22-3), which is anticipated to commence no later than April 2019. If the P&A work is not commenced by April 1, 2019, SRC Energy will contact the COGCC. Specific remedial actions, if necessary, will be proposed in a future supplemental Form 27.

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

☐ _____ 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.

REMEDATION 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: _____

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.

Upon closure of the facility, the pit will be backfilled to re-establish the pre-existing grade or to match the surrounding topography as much as practical. Final reclamation will be completed in accordance with COGCC Rule 1004.

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). 10/28/2016

Date of commencement of Site Investigation. 10/28/2016

Date of completion of Site Investigation. 02/03/2017

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

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

Signed: Allison White

Title: Project Engineer

Submit Date: 04/25/2017

Email: awhite@ltenv.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: RICK ALLISON

Date: 05/04/2017

Remediation Project Number: 9951

COA Type

Description

	Provide Annual Status Updates to COGCC regarding current and future plans for plugging of the well, pit closure and reclamation of the site. If plugging of the Toedtli 1-10 well is postponed beyond April 2019 COGCC may require remedial actions and pit closure at that time. The location must remain in compliance with Rule 1003.
	Inorganic impacts (EC and SAR in excess of the Table 910-1 levels) to soil are present at shallow depths on the pad and off the pad. Consistent with its prior practice and Rule 1003, the COGCC will generally apply the Table 910-1 concentration levels for pH, SAR, and EC to soils that are within three (3) feet of the ground surface because elevated levels of pH, SAR, and EC in deeper soils should not adversely affect the successful reclamation of the site, which is the objective of these concentration levels. In addition, the COGCC requires that materials with elevated pH, SAR, or EC be buried under a minimum of three (3) feet of backfill cover and soil that satisfies either the Table 910-1 levels for pH, SAR, and EC or the background levels for such contaminants within three (3) feet of the ground surface at the site. In addition, the soil horizons must be replaced in their original relative position and reclaimed in accordance with 1000 Series Rules, including the establishment of vegetative cover on non-cropland and successful crop growth on cropland.
	Prior to closure of the skim pit, the pit must be assessed for hydrocarbon impacts. Soil samples must be collected and analyzed for BTEX, TPH-GRO and TPH-DRO. Results must be submitted to COGCC for review.

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.

<u>Att Doc Num</u>	<u>Name</u>
401219644	FORM 27-SUPPLEMENTAL-SUBMITTED
401219774	MAP
401220080	SOIL SAMPLE LOCATION MAP
401220087	SOIL SAMPLE LOCATION MAP
401220090	ANALYTICAL RESULTS
401220098	ANALYTICAL RESULTS
401220099	ANALYTICAL RESULTS
401220102	ANALYTICAL RESULTS

Total Attach: 8 Files

General Comments

<u>User Group</u>	<u>Comment</u>	<u>Comment Date</u>
Environmental	Returned to Draft per telephone conversation with Operator. Operator will clarify plan regarding the unlined skim pit and the larger produced water pit and include timing for planned well plugging and ultimate site remediation and reclamation.	03/24/2017
Environmental	COGCC emailed Operator on 3/21/2017 requesting the following information: 1. The horizontal extent of SAR impact downgradient of SB09 needs to be defined. 2. Provide justification for the amount of gypsum applied to remediation the SAR impacts plus a plan for how the exchange of calcium and sodium in the soil will be facilitated given the lack of precipitation and shallow depth to bedrock in this area. 3. Provide an expected timeframe to accomplish the remediation and include additional monitoring to ensure the SAR impacts do not spread horizontally during remediation. 4. The Form 27 Supplemental Report also proposes closure of the former skim pit. The skim pit was not assessed for hydrocarbon impacts. Please provide an assessment of hydrocarbon impacts at the former skim pit including analysis for TPH-GRO, TPH-DRO and BTEX.	03/21/2017

Total: 2 comment(s)