

State of Colorado
Oil and Gas Conservation Commission

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Document Number:
401548865
Receive Date:
04/20/2018

Report taken by:
BOB CHESSON

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>KERR MCGEE GATHERING LLC</u>	Operator No: <u>47121</u>	Phone Numbers
Address: <u>PO BOX 173779</u>		
City: <u>DENVER</u>	State: <u>CO</u>	Zip: <u>80217</u>
Contact Person: <u>Charles Chase</u>	Email: <u>Charles.Chase@anadarko.com</u>	Phone: <u>(720) 929-6000</u>
		Mobile: <u>(720) 929-3721</u>

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION
Remediation Project #: 9813 Initial Form 27 Document #: 200440140

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: <u>SPILL OR RELEASE</u>	Facility ID: <u>446222</u>	API #: _____	County Name: <u>ARAPAHOE</u>
Facility Name: <u>SPILL/RELEASE POINT</u>	Latitude: <u>39.665314</u>	Longitude: <u>-104.453886</u>	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: <u>NENE</u>	Sec: <u>32</u>	Twp: <u>4S</u>	Range: <u>63W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>

SITE CONDITIONS

General soil type - USCS Classifications SM Most Sensitive Adjacent Land Use Crop 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? No

Other Potential Receptors within 1/4 mile

A livestock grazing area is located approximately 255 feet north of the release location. An occupied building is located approximately 1,185 feet northeast of the release location.

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 type="checkbox"/> Produced Water | <input type="checkbox"/> Workover Fluids | _____ |
| <input 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	125' (N-S) x 70' (E-W) x 35' bgs	Excavation, soil boring, 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.

On June 13, 2016, a release from a condensate dump line was discovered during routine operations at the Mitchell Compressor Station. The facility was shut-in, associated infrastructure repaired, and excavation activities were initiated. Groundwater was not encountered during excavation activities. The COGCC has issued Spill/Release Point ID 446222 for this release.

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 the excavation areas and from eight (8) exploratory soil borings, as described in the Initial Form 27. Following dump line repairs and excavation activities, impacted soil remained in place adjacent to operational equipment. This impacted material is currently inaccessible due to existing facility infrastructure necessary for compressor operations.

Proposed Groundwater Sampling

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

Between June 20 and July 1, 2016, eight (8) temporary monitoring wells (BH02-16 through BH09-16) were installed to further assess the extent of groundwater impacts. One groundwater monitoring event was conducted on August 9, 2016. During this event, LNAPL was detected in wells BH02-16 through BH06-16, and groundwater samples were collected from wells BH07-16 through BH09-16. Groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by USEPA Method 8260. Groundwater analytical data is presented in Table 1, and the groundwater sample locations are illustrated on Figure 1. The laboratory analytical report is included as Attachment A.

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 27
Number of soil samples exceeding 910-1 14
Was the areal and vertical extent of soil contamination delineated? No
Approximate areal extent (square feet) 6300

NA / ND

-- Highest concentration of TPH (mg/kg) 3168
NA Highest concentration of SAR
BTEX > 910-1 Yes
Vertical Extent > 910-1 (in feet) 35

Groundwater

Number of groundwater samples collected 3
Was extent of groundwater contaminated delineated? No
Depth to groundwater (below ground surface, in feet) 33'
Number of groundwater monitoring wells installed 8
Number of groundwater samples exceeding 910-1 3

-- Highest concentration of Benzene (µg/l) 26700
-- Highest concentration of Toluene (µg/l) 9380
-- Highest concentration of Ethylbenzene (µg/l) 190
-- Highest concentration of Xylene (µg/l) 1500
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) Volume of liquid waste (barrels)

Is further site investigation required?

Hydrocarbon impacted soil and groundwater remain at the site. The 8 temporary groundwater monitoring wells will continue to be gauged to monitor light non-aqueous phase liquid (LNAPL) thickness, and scheduled groundwater monitoring will be initiated, pending completion of ongoing LNAPL removal activities. Additional delineation activities at the Site are temporarily paused so that Kerr-McGee Gathering LLC may use subsurface modeling to better understand the plume at this Site and the relationship between it and COGCC Remediation Project No. 31.

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.

On June 13, 2016, approximately 170 cubic yards of impacted soil were excavated and transported to the Republic Services Landfill in Commerce City, Colorado for disposal. Hydrocarbon impacted soil remains at the site, but is currently inaccessible due to existing facility infrastructure necessary for compressor operations.

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.

Laboratory data indicate that hydrocarbon impacted soil and groundwater remain at the site. Following the first groundwater monitoring event on August 9, 2016, bi-weekly LNAPL gauging and recovery events were initiated, and are ongoing. To-date, approximately 85.2 gallons of LNAPL have been removed from wells BH02-16 through BH06-16. Additional remedial activities to address remaining soil and groundwater impacts, including in-situ and ex-situ technologies, are currently under evaluation. Estimated time to attain NFA is TBD based on the extent of remaining soil and groundwater impacts 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

Yes Excavate and offsite disposal
_____ If Yes: Estimated Volume (Cubic Yards) _____ 170
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

No _____ Bioremediation (or enhanced bioremediation)
No _____ Chemical oxidation
No _____ Air sparge / Soil vapor extraction
Yes _____ Natural Attenuation
Yes _____ Other _____ LNAPL Recovery _____

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 June 20 and July 1, 2016, 8 temporary monitoring wells (BH02-16 through BH09-16) were installed to further assess the extent of groundwater impacts. The wells will continue to be gauged to monitor LNAPL thickness, and scheduled groundwater monitoring will be initiated, pending completion of ongoing LNAPL removal activities. Future groundwater monitoring will be continued until concentrations remain in full compliance with State standards for four consecutive quarters. Additional temporary groundwater monitoring wells may be installed, as necessary, to maintain point-of-compliance. Groundwater sample locations are illustrated on Figure 1, and a potentiometric surface contour map for August 9, 2016, is presented as Figure 2. Monitoring well locations for COGCC Remediation Project No. 31 have also been added to Figures 1 and 2. Well completion logs for the temporary monitoring wells are included as Attachment B.

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:

NA

Volume of E&P Waste (solid) in cubic yards 170

E&P waste (solid) description Hydrocarbon impacted soil

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: Republic Services Landfill -
Commerce City, Colorado

Volume of E&P Waste (liquid) in barrels 2

E&P waste (liquid) description LNAPL

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: Licensed 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 site has been restored to its pre-release grade. Kerr-McGee's compressor infrastructure remains on-site.

Is the described reclamation complete? No

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). 06/13/2016

Date of commencement of Site Investigation. 06/13/2016

Date of completion of Site Investigation. _____

REMEDIAL ACTION DATES

Date of commencement of Remediation. 06/13/2016

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: Charles Chase

Title: Staff HSE Representative

Submit Date: 04/20/2018

Email: Charles.Chase@anadarko.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: BOB CHESSON

Date: 04/20/2018

Remediation Project Number: 9813

COA Type

Description

<u>COA Type</u>	<u>Description</u>

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

401548865	FORM 27-SUPPLEMENTAL-SUBMITTED
401549221	ANALYTICAL RESULTS
401549222	ANALYTICAL RESULTS
401549223	LOGS
401615751	GROUND WATER SAMPLE LOCATION
401615752	GROUND WATER ELEVATION MAP

Total Attach: 6 Files

General Comments

User Group

Comment

Comment Date

		Stamp Upon Approval
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Total: 0 comment(s)