FORM 27 Rev 3/16

State of Colorado
Oil and Gas Conservation Commission

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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 INFORMATON

Name of Operator: KERR MCGEE GATHERING LLC Operator No: 47121
Address: PO BOX 173779
City: DENVER State: CO Zip: 80217
Contact Person: Charles Chase

Phone Numbers
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PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 9277 Initial Form 27 Document #: 2315597

PURPOSE INFORMATION

- [ ] 901.e. Sensitive Area Determination
- [ ] 909.c.(1), Rule 905: Pit or PW vessel closure
- [ ] 909.c.(2), Rule 906: Spill/Release Remediation
- [ ] 909.c.(3), Rule 907.e.: Land treatment of oily waste
- [ ] 909.c.(4), Rule 908.g.: Centralized E&P Waste Management Facility closure
- [ ] 909.c.(5), Rule 910.b.(4): Remediation of impacted ground water
- [ ] Rule 909.e.(2)A.: Notice completion of remediation in accordance with Rule 909.b.
- [x] Rule 909.e.(2)B.: Closure of remediation project
- [ ] Rule 906.c.: Director request
- [ ] Other

SITE INFORMATION

N Multiple Facilites (in accordance with Rule 909.c.)

Facility Type: SPILL OR RELEASE Facility ID: 442569 API #: County Name: ARAPAHOE
Facility Name: SPILL/RELEASE POINT Latitude: 39.579620 Longitude: -104.603214
** correct Lat/Long if needed: Latitude: Longitude:
QtrQtr: NWNW Sec: 31 Twp: 5S Range: 64W Meridian: 6 Sensitive Area? Yes

SITE CONDITIONS

General soil type - USCS Classifications: CL
Most Sensitive Adjacent Land Use: NON CROP LAND
Is domestic water well within 1/4 mile? Yes
Is surface water within 1/4 mile? No
Is groundwater less than 20 feet below ground surface? Yes

Other Potential Receptors within 1/4 mile

SITE INVESTIGATION PLAN

TYPE OF WASTE:

- [x] **E&P Waste**
  - [ ] Produced Water
  - [x] Oil
  - [ ] Condensate
  - [ ] Drilling Fluids
  - [ ] Drill Cuttings
- [ ] **Other E&P Waste**
  - [ ] Workover Fluids
  - [ ] Tank Bottoms
  - [ ] Pigging Waste
  - [ ] Rig Wash
  - [ ] Spent Filters
  - [ ] Pit Bottoms
  - [ ] Other (as described by EPA) _____
- [ ] **Non-E&P Waste** _____

DESCRIPTION OF IMPACT

Impacted?	Impacted Media	Extent of Impact	How Determined
	GROUNDWATER	See attached data	Groundwater sampling & lab analysis
	SOILS	124' (E-W) x 20' (N-S) x 13.5' bgs	Excavation, drilling, soil sampling & lab 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 July 16, 2015, a line failure was discovered on the 16-0000-6069-6" pipeline. The pipeline was isolated, blown down, and excavation activities commenced. Groundwater was encountered in the excavation at approximately 13 feet below ground surface (bgs). An Initial Form 19 was submitted to the COGCC on July 18, 2015 (COGCC Document No. 400870745), and a Supplemental Form 19 was submitted on July 24, 2015 (COGCC Document No. 400873203). The COGCC has issued Spill Tracking number 442569 for this release.

PROPOSED SAMPLING PLAN

Proposed Soil Sampling

- [x] Will soil samples be collected as part of this investigation? (Number, type (grab/composite), analyses, and locations of samples):

Soil samples were collected as described in the initial Form 27. Based on the data presented, impacted soils in the excavation were remediated to below COGCC Table 910-1 standards.

Proposed Groundwater Sampling

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

Groundwater samples were collected as described herein. Based on the data presented, groundwater concentrations were below the applicable COGCC Table 910-1 groundwater standards for four consecutive quarters.

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: 17

Number of soil samples exceeeding 910-1: 0

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

Approximate areal extent (square feet): 2480

NA / ND

-- Highest concentration of TPH (mg/kg): 0.229

NA Highest concentration of SAR:

BTEX > 910-1: No

Vertical Extent > 910-1 (in feet): 13

Groundwater

Number of groundwater samples collected: 32

Was extent of groundwater contaminated delineated? Yes

Depth to groundwater (below ground surface, in feet): 13`

Number of groundwater monitoring wells installed: 5

Number of groundwater samples exceeding 910-1: 3

-- Highest concentration of Benzene (µg/l): 227

-- Highest concentration of Toluene (µg/l): 206

-- Highest concentration of Ethylbenzene (µg/l): 3.1

-- Highest concentration of Xylene (µg/l): 100

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?

In the 4th quarter of 2015, the groundwater benzene concentration in off-site temporary monitoring well BH03 was above the COGCC Table 910-1 standard. All constituent concentrations were below the applicable standards at this location during the four subsequent consecutive quarters.

☐ 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.

On July 16, 2015, excavation activities commenced and approximately 960 cubic yards of impacted material were excavated and transported to the Republic Services Tower Landfill in Commerce City, Colorado for disposal. Laboratory analytical results indicated that constituent concentrations in the soil samples collected from the final lateral extent of the excavation area were below the applicable COGCC Table 910-1 standards. Soils were excavated into the phreatic zone, where applicable, to address potential hydrocarbon impacts that may have been present below the current groundwater table due to seasonal fluctuations. Groundwater was encountered in the northwest portion of the excavation at approximately 13.5 feet bgs. A groundwater sample (GW01) was collected and submitted for laboratory analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX). Analytical results received on July 21, 2015 indicated that the benzene concentration in sample GW01 was above the applicable COGCC Table 910-1 groundwater standard. Approximately one (1) barrel of impacted groundwater was removed from the excavation via hydroexcavator and transported to the Republic Services Tower Landfill in Commerce City, Colorado for disposal. A second groundwater sample (GW02) was subsequently collected from the excavation area and submitted for laboratory analysis of BTEX. Analytical results received on July 23, 2015, indicated that the benzene concentration in sample GW02 remained above the applicable COGCC Table 910-1 groundwater standard.

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.

Prior to backfilling the excavation, 105 pounds of activated carbon were added to the groundwater within the excavation to mitigate remaining hydrocarbon impacts to groundwater. Based on the analytical data presented herein, remediation is complete at this site and Kerr-McGee is requesting a No Further Action (NFA) determination for this release.

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) 960
  - 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 Activated carbon adsorption

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 July 29, and August 3, 2015, five (5) temporary groundwater monitoring wells (BH01-BH05) were installed at the site to assess the extent of groundwater impacts. These wells were sampled on a quarterly basis and submitted for laboratory analysis of BTEX. Analytical results for the groundwater samples collected from the temporary monitoring wells confirmed that constituent concentrations were below the applicable COGCC Table 910-1 groundwater standards for four consecutive quarters.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Frequency: ☐ Quarterly ☐ Semi-Annually ☐ Annually ☒ Other Final Report

Report Type: ☐ Groundwater Monitoring ☐ Land Treatment Progress Report ☐ O&M Report

☒ Other NFA Request

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 960

E&P waste (solid) description Hydrocarbon impacted soil

COGCC Disposal Facility ID #, if applicable:

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

Volume of E&P Waste (liquid) in barrels 1

E&P waste (liquid) description Hydrocarbon impacted groundwater

COGCC Disposal Facility ID #, if applicable:

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

REMEDIATION COMPLETION REPORT

REMEDIATION COMPLETION SUMMARY

Is this a Final Closure Request for this Remediation Project? Yes

Do all soils meet Table 910-1 standards? Yes

Does the previous reply indicate consideration of background concentrations? No

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? No

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 will consult with the Surface Owner to determine reclamation specifics to properly conduct reclamation activities in accordance with COGCC 1000 Series Rules.

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. 07/16/2015

Actual Spill or Release date, if known.

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 07/16/2015

Date of commencement of Site Investigation. 07/16/2015

Date of completion of Site Investigation. 08/03/2015

REMEDIAL ACTION DATES

Date of commencement of Remediation. 07/16/2015

Date of completion of Remediation. 11/11/2016

SITE RECLAMATION DATES

Date of commencement of Reclamation.

Date of completion of Reclamation.

OPERATOR COMMENT

As described, laboratory analytical data for the soil samples collected from the final lateral extent of the excavation were below applicable COGCC Table 910-1 soil standards. Laboratory analytical data for the groundwater samples collected from the temporary monitoring wells confirmed that constituent concentrations were below the applicable COGCC Table 910-1 groundwater standards for four consecutive quarters. Groundwater analytical results are summarized in Table 1. Temporary monitoring well locations are illustrated in Figure 1, and quarterly groundwater contour maps are presented in Figures 2, 3, 4, and 5. The groundwater laboratory analytical reports and temporary monitoring well completion diagrams are included as Attachments A and B, respectively. Based on the remediation activities completed at the site and the analytical results presented herein, Kerr-McGee is requesting a No Further Action (NFA) determination for this release.

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:` 04/19/2017 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: 04/19/2017

Remediation Project Number: 9277

COA Type	Description

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
401234711	FORM 27-SUPPLEMENTAL-SUBMITTED
401235618	ANALYTICAL RESULTS
401250485	ANALYTICAL RESULTS
401250562	LOGS
401250812	GROUND WATER SAMPLE LOCATION
401251284	GROUND WATER ELEVATION MAP

Total Attach: 6 Files

General Comments

User Group	Comment	Comment Date
Environmental	The COGCC has reviewed the NFA request for Project/Remediation #9277. Based on the information presented no further action is necessary at this time. However, should future conditions at the site indicate contaminant concentrations in soils exceeding COGCC standards then further investigation and/or remediation activities may be required at the site. For locations with active ongoing oil and gas operations, comply with Rule 1003 interim reclamation requirements and for locations that will no longer have active oil and gas operations, comply with Rule 1004 Final Reclamation requirements.	04/19/2017

Total: 1 comment(s)