

State of Colorado
Oil and Gas Conservation Commission

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Document Number:
401441888
Receive Date:
04/20/2018

Report taken by:
PETER GINTAUTAS

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: <u>KERR MCGEE OIL & GAS ONSHORE LP</u>	Operator No: <u>47120</u>	Phone Numbers
Address: <u>P O BOX 173779</u>		
City: <u>DENVER</u>	State: <u>CO</u>	Zip: <u>80217-3779</u>
Contact Person: <u>Phillip Hamlin</u>	Email: <u>Phil.Hamlin@anadarko.com</u>	Phone: <u>(970) 336-3500</u>
		Mobile: <u>(970) 515-1161</u>

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 9925 Initial Form 27 Document #: 200440599

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 Facilites (in accordance with Rule 909.c.)

Facility Type: <u>SPILL OR RELEASE</u>	Facility ID: <u>447087</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>SPILL/RELEASE POINT</u>	Latitude: <u>40.117509</u>	Longitude: <u>-104.669137</u>	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: <u>SESW</u>	Sec: <u>21</u>	Twp: <u>2N</u>	Range: <u>65W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>

SITE CONDITIONS

General soil type - USCS Classifications SM 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? No

Other Potential Receptors within 1/4 mile

An occupied building is located approximately 750 feet southeast 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 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	See Attached Data	Groundwater sampling and laboratory analysis
Yes	SOILS	79' (N-S) X 40' (E-W) X 32-35' 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 July 19, 2016, historical impacts were discovered during abandonment activities at the Ernie F Adamson Gas Unit-62N65W21SWSW production facility. The facility was shut in, associated infrastructure removed, and excavation activities were initiated. Groundwater was encountered during remediation activities at approximately 32 to 35 feet below ground surface (bgs). The COGCC has issued Spill/Release Point ID 447087 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):

Initial excavation, borehole, and exploratory excavation soil samples were collected as described in the Initial Form 27. Based on these results, impacted soil out of compliance with State standards remained in the excavation area, below approximately 20 feet bgs. To address this remaining impacted soil, additional remediation activities were subsequently conducted, as described in the Form 27-Supplemental Remediation Progress Update Letter Report, included as Attachment A.

Proposed Groundwater Sampling

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

On September 2, 2016, 3 temporary monitoring wells (BH01-BH03) were installed to assess the extent of groundwater impacts. Based on the sampling results for these wells, additional excavation and remediation activities were conducted, as described herein and in the attached Remediation Progress Update. During remediation activities, wells BH01-BH03 were removed and 8 groundwater samples (GWN-01 - GWN-04 and GWS-01 - GWS-04) were collected from the open excavation. Following the completion of soil remediation activities, 7 additional temporary monitoring wells (BH04-BH10) were installed and ongoing quarterly groundwater sampling was initiated on March 27, 2017. Groundwater samples are collected from the remaining 6 wells at the site (BH09 was reported destroyed on 12/5/17) and analyzed for BTEX by USEPA Method 8260. Groundwater analytical data is presented in Table 1 and groundwater sample locations are illustrated on Figure 1. Laboratory analytical reports are included as Attachment B.

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):

Additional assessment and remediation activities conducted at the Site to-date are described in the attached Form 27-Supplemental Remediation Progress Update Letter Report.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 64
Number of soil samples exceeding 910-1 9
Was the areal and vertical extent of soil contamination delineated? Yes
Approximate areal extent (square feet) 3160

NA / ND

-- Highest concentration of TPH (mg/kg) 5380
NA Highest concentration of SAR
BTEX > 910-1 Yes
Vertical Extent > 910-1 (in feet) 35

Groundwater

Number of groundwater samples collected 38
Was extent of groundwater contaminated delineated? Yes
Depth to groundwater (below ground surface, in feet) 33'
Number of groundwater monitoring wells installed 10
Number of groundwater samples exceeding 910-1 25

-- Highest concentration of Benzene (µg/l) 2610
-- Highest concentration of Toluene (µg/l) 2750
-- Highest concentration of Ethylbenzene (µg/l) 1540
-- Highest concentration of Xylene (µg/l) 21500
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?

Impacted groundwater has been detected in off-site temporary groundwater monitoring wells BH09 and BH10.

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 groundwater remains at the site. The 6 remaining temporary groundwater monitoring wells (BH04-BH08, and BH10) will continue to be sampled on a quarterly basis and submitted for laboratory analysis of BTEX until concentrations remain in full compliance with State standards for four consecutive quarters. Additional temporary groundwater monitoring wells will be installed to maintain point-of-compliance. Additional remediation, as described on the next page, may also be conducted to address remaining groundwater impacts.

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.

Between July 29 and August 4, 2016, approximately 540 cubic yards of impacted material were excavated and transported to the Buffalo Ridge Landfill in Keenesburg, Colorado for disposal. Additional remediation activities, as described in the attached Form 27-Supplemental Remediation Progress Update Letter Report, were implemented at the site between December 13, 2016 and February 20, 2017, to address remaining soil impacts left in place below 20 feet bgs, and to mitigate groundwater impacts. During these remediation activities, approximately 300 cubic yards of additional impacted material were transported to the Buffalo Ridge Landfill in Keenesburg, Colorado, and approximately 620 barrels of impacted groundwater were removed from the excavation via vacuum truck and transported to a licensed disposal facility.

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 impacted soils in the excavation area have been remediated to be in full compliance with State standards. Details regarding the soil and groundwater remediation activities conducted between December 13, 2016 and February 20, 2017, are provided in the attached Form 27 Supplemental Remediation Progress Update Letter Report. Remediation soil and groundwater sample locations, results, and analytical reports are provided as attachments to this Letter Report. Prior to backfilling, approximately 385 pounds of granular activated carbon were added to the groundwater within the soil mixing excavation area to mitigate remaining groundwater impacts. Quarterly groundwater monitoring is ongoing and will be continued until concentrations remain in full compliance with State standards for four consecutive quarters. Additional remediation measures, including in-situ chemical oxidation and air sparging, are currently under evaluation to address remaining groundwater impacts. Estimated time to attain NFA is TBD based on the review of groundwater concentrations, the extent of impacted groundwater, 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) _____ 840

Name of Licensed Disposal Facility or COGCC Facility ID # _____

Yes _____ Excavate and onsite remediation

No _____ Land Treatment

No _____ Bioremediation (or enhanced bioremediation)

Yes _____ Chemical oxidation

No _____ Other _____

Groundwater Remediation Summary

No _____ Bioremediation (or enhanced bioremediation)

Yes _____ Chemical oxidation

No _____ Air sparge / Soil vapor extraction

Yes _____ Natural Attenuation

Yes _____ Other _____
Vacuum truck groundwater
removal, 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 September 2, 2016 and March 9, 2017, a total of ten (10) temporary groundwater monitoring wells were installed at the site to assess the extent of groundwater impacts. Temporary monitoring wells BH01-BH03 were removed during subsequent excavation and remediation activities, and well BH09 was reported destroyed on December 5, 2017. The remaining six (6) temporary monitoring wells (BH04-BH08, and BH10) will continue to be sampled on a quarterly basis and submitted for laboratory analysis of BTEX until concentrations remain in full compliance with State standards for four consecutive quarters. Additional temporary groundwater monitoring wells will be installed to maintain point-of-compliance. Additional remediation, as described above, may also be conducted to address remaining groundwater impacts. Groundwater sample locations are illustrated on Figure 1, and a potentiometric surface contour map for the Fourth Quarter 2017 is presented as Figure 2. Well completion logs for the temporary monitoring wells are included as Attachment C.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Frequency: Quarterly Semi-Annually Annually Other _____

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

Other Remediation progress update _____

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 _____ 840

E&P waste (solid) description Hydrocarbon impacted soil _____

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: Buffalo Ridge Landfill - Keenesburg, Colorado _____

Volume of E&P Waste (liquid) in barrels _____ 620

E&P waste (liquid) description Hydrocarbon impacted groundwater _____

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 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. 07/30/2016

Actual Spill or Release date, if known. _____

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 07/19/2016

Date of commencement of Site Investigation. 07/19/2016

Date of completion of Site Investigation. _____

REMEDIAL ACTION DATES

Date of commencement of Remediation. 07/29/2016

Date of completion of Remediation. _____

SITE RECLAMATION DATES

Date of commencement of Reclamation. _____

Date of completion of Reclamation. _____

OPERATOR COMMENT

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

Signed: Phillip Hamlin _____

Title: Senior HSE Representative _____

Submit Date: 04/20/2018 _____

Email: Phil.Hamlin@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: PETER GINTAUTAS _____

Date: 04/22/2018 _____

Remediation Project Number: 9925 _____

COA Type	Description
	Establish downgradient points of compliance beyond BH-08, BH-09 and BH-10 in the next year and provide updates on that in the next summary report. Submit reports of site investigation and progress of remediation including results of sampling and analysis on an annual basis or more often until remediation is closed.

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
401441888	FORM 27-SUPPLEMENTAL-SUBMITTED
401526368	ANALYTICAL RESULTS
401542752	LOGS
401564383	GROUND WATER SAMPLE LOCATION
401564392	GROUND WATER ELEVATION MAP
401615798	REMEDIATION PROGRESS REPORT
401615803	ANALYTICAL RESULTS

Total Attach: 7 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)