

State of Colorado Oil and Gas Conservation Commission

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ROB YOUNG

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>MAGPIE OPERATING INC</u>	Operator No: <u>52530</u>	Phone Numbers
Address: <u>2707 SOUTH COUNTY RD 11</u>		Phone: <u>(970) 669-6308</u>
City: <u>LOVELAND</u>	State: <u>CO</u>	Zip: <u>80537</u>
Contact Person: <u>Ryan Warner</u>	Email: <u>magpieoil@yahoo.com</u>	Mobile: <u>(720) 233-0875</u>

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 11196 Initial Form 27 Document #: 401585806

PURPOSE INFORMATION

- | | |
|--|--|
| <input checked="" 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>LOCATION</u>	Facility ID: <u>451505</u>	API #: _____	County Name: <u>WASHINGTON</u>
Facility Name: <u>Little Beaver Unit Injection Plant</u>		Latitude: <u>39.911967</u>	Longitude: <u>-103.686176</u>
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: <u>NWNW</u>	Sec: <u>5</u>	Twp: <u>2S</u>	Range: <u>56W</u>
Meridian: <u>6</u>		Sensitive Area? <u>Yes</u>	

SITE CONDITIONS

General soil type - USCS Classifications CL Most Sensitive Adjacent Land Use non-crop land

Is domestic water well within 1/4 mile? No 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

Unidentified aqueduct located ~630' east of produced water tank battery reports to Badger Creek.

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 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	80'x70'	Lab Analytical Results
Yes	SOILS	47'x140'x10'	Lab Analytical Results

INITIAL ACTION SUMMARY

Description of initial action or emergency response measures take to abate, investigate, and/or remediate impacts associated with E&P Waste.

Hub injection pump broke and pump failed. Produced water with some trace emulsion/bs&w overflowed from water tank and into berm. Field was immediately shut in. Free fluid was vacuumed and placed into tank. Impacted soil was dug out and placed on plastic and bermed. Hauled off location on 12/2/14. Pump was repaired. Another tank was placed on location to provide additional emergency capacity.

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):

Twenty-nine (29) soil samples were collected via direct push as part of monitoring well installation/soil boring assessment activities. Eleven (11) grab soil samples were collected via shovel. Forty-one (41) grab confirmation soil samples were collected during source excavation activities. Forty-four (44) composite samples were collected following soil treatment activities. All soil samples were analyzed for BTEX, naphthalene, TPH-GRO, and TPH-DRO following EPA Methods 8260c and 8015. In addition, select soil samples were analyzed for EC, SAR, and pH following UDSA Method 3, USDA Method 20B, and EPA Method 9045D, respectively.

Proposed Groundwater Sampling

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

Seventeen (17) groundwater samples (MW-01 through MW-17) were collected following monitoring well installation activities. All groundwater samples were/will be analyzed for BTEX following EPA Method 8260c. Additionally, seventeen (17) groundwater samples were collected from MW-01 through MW-17 for analysis of chloride and sulfate by EPA Method 300.0, and total dissolved solids by 160.1. Replacement monitoring wells were installed to replace wells destroyed during excavation activities. Groundwater samples will be collected from monitoring wells MW-01R, MW-02R, MW-05 through MW-11, MW-12R, MW-13, MW-14R, MW-15R, MW-16R, MW-17, MW-18R through MW-21R, and MW-22 through MW-27. Additional monitoring wells will be installed to obtain point of compliance, and will be added to the groundwater sampling plan, if necessary.

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 monitoring wells will be installed to ensure point of compliance is achieved downgradient of monitoring wells MW-26 and MW-27.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 81
Number of soil samples exceeding 910-1 14
Was the areal and vertical extent of soil contamination delineated? Yes
Approximate areal extent (square feet) 5640

NA / ND

-- Highest concentration of TPH (mg/kg) 10268
-- Highest concentration of SAR 20.37
BTEX > 910-1 Yes
Vertical Extent > 910-1 (in feet) 10

Groundwater

Number of groundwater samples collected 105
Was extent of groundwater contaminated delineated? No
Depth to groundwater (below ground surface, in feet) 13'
Number of groundwater monitoring wells installed 27
Number of groundwater samples exceeding 910-1 12

-- Highest concentration of Benzene (µg/l) 5030
-- Highest concentration of Toluene (µg/l) 47.1
-- Highest concentration of Ethylbenzene (µg/l) 472
-- Highest concentration of Xylene (µg/l) 435
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?

Soil sample SS-08 was collected for background inorganic soil analysis of EC, SAR, and pH. Monitoring well MW-17 was installed and soil/groundwater samples were collected for background BTEX, naphthalene, TPH-GRO, and TPH-DRO analysis.

☒ Was investigation derived waste (IDW) generated as part of this investigation?

Volume of solid waste (cubic yards) 17 Volume of liquid waste (barrels) 3

☒ Is further site investigation required?

Replacement wells MW-01R, MW-02R, MW-12R, MW-14R, MW-15R, MW-16R, and MW-18R through MW-21R were installed to replace those destroyed during excavation activities. Monitoring wells MW-22 and MW-23 were installed in June 2019. Monitoring wells MW-24 through MW-27 were installed in August. Quarterly groundwater sampling will be completed and additional monitoring wells will be installed, as needed, to obtain Point of Compliance.

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.

Free fluid was vacuumed and placed into onsite produced water tanks. Initial spill response impacted soil was dug out and placed on plastic and bermed. Soil was removed 12/2/14 for disposal at Buffalo Ridge Landfill. During source excavation activities from Septemebr 25, 2018 through October 4, 2018, approximately 4300 cubic yards of soil was removed and treated ex-situ with a soil shredder and hydrogen peroxide.

Additional source removal activities will be completed adjacent to soil impacts observed during point of compliance monitoring well installation activities.

REMEDATION 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.

Seven grab soil samples was collected in areas of previously observed stained soil. Monitoring wells (MW-01 through MW-16) were installed to assess potential soil and groundwater impacts associated with a pump failure and other identified surface impacts identified in Doc. No. 681700672. Additional monitoring wells (MW-17 through MW-21) were installed to define dissolved impacts in MW-05 and MW-14. Additional monitoring wells (MW-22 and MW-23) were installed to define dissolved impacts in MW-19R. Additional monitoring wells (MW-24 through MW-27) were installed to define adsorbed and dissolved impacts in MW-22. Soil borings SB-01 and SB-02 were installed to delineate adsorbed impacts observed in MW-23, MW-24, and MW-26. Based on results of soil and groundwater sampling activities, in-situ excavation/treatment activities were performed 09/25/18 through 10/4/18 to remove adsorbed petroleum hydrocarbon impacts observed during initial assessment activities.

Additional source removal activities will be completed to remove any residual adsorbed petroleum hydrocarbon impacts. Following additional source removal, replacement/point of compliance monitoring wells will be installed. Additional source removal activities are tentatively scheduled for the end of 1Q2020.

Groundwater samples will be collected from monitoring wells onsite on a quarterly basis and analyzed for BTEX following EPA Method 8260.

Based on additional groundwater analytical results, remedial options will be evaluated to address residual BTEX concentrations. If all samples are below COGCC Table 910-1, groundwater will be monitored for natural attenuation until no further action can be recommended.

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) 17

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

☐ Bioremediation (or enhanced bioremediation)

☐ Chemical oxidation

☐ Air sparge / Soil vapor extraction

☒ Yes 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.

Twenty-seven (27) monitoring wells (MW-01 through MW-27) were installed around the entire facility. Groundwater samples were collected from the monitoring wells following installation activities. Groundwater samples were/will be analyzed for BTEX following EPA Method 8260. Additional monitoring wells will be installed to achieve point of compliance if necessary. Replacement wells were installed for monitoring wells MW-01, MW-02, MW-12, MW-14, MW-15, MW-16, and MW-18 through MW-21, destroyed during excavation activities.

Additional groundwater samples were collected for chloride and sulfate analysis by EPA Method 300.0 and total dissolved solids by EPA Method 160.1.

Additional inorganic groundwater samples will be collected from monitoring wells MW-01R, MW-02R, MW-05 through MW-11, MW-12R, MW-13, MW-14R, MW-15R, MW-16R, MW-17, and MW-18R through MW-21R, MW-22 and MW-23 and any additional point of compliance monitoring wells to monitor/compare inorganic concentrations.

Quarterly BTEX groundwater monitoring will be continue to be completed on monitoring wells:

MW-01R, MW-02R, MW-05, MW-06, MW-12R, MW-14R, MW-15R, MW-16R, MW-18R, MW-19R, MW-20R, MW-21R, and MW-22 through MW-27 and additional point of compliance wells/replacement wells (to be installed and sampled starting 2Q20 - following additional source excavation activities).

The following monitoring wells would be removed from the quarterly BTEX monitoring plan:

MW-03(destroyed), MW-04 (destroyed), MW-07 through MW-12, MW-13, and MW-17. Wells will be added back to the monitoring plan as necessary.

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? Yes _____

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

No beneficial use.

Volume of E&P Waste (solid) in cubic yards _____ 17

E&P waste (solid) description impacted soil above COGCC Table 910-1 _____

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: Waste Management Buffalo Ridge _____

Volume of E&P Waste (liquid) in barrels _____ 3

E&P waste (liquid) description Produced water _____

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: Magpie produced water tank _____

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? No _____

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? No _____

Does Groundwater meet Table 910-1 standards? No _____

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.

The site is currently an active facility. Reclamation is not needed at this time.

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. 10/26/2014

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 10/26/2014

Date of commencement of Site Investigation. 04/05/2018

Date of completion of Site Investigation. _____

REMEDIAL ACTION DATES

Date of commencement of Remediation. 10/26/2014

Date of completion of Remediation. _____

SITE RECLAMATION DATES

Date of commencement of Reclamation. _____

Date of completion of Reclamation. _____

OPERATOR COMMENT

The next quarterly sampling event will be completed 1Q2020 (January). Additional source excavation activities adjacent to residual adsorbed petroleum hydrocarbon impacts observed in MW-23, MW-24, and MW-26 are tentatively scheduled for the end of 1Q2020 (~March). Replacement and point of compliance monitoring wells will be installed 2Q2020 (April), following source excavation activities.

Per previous COA, depth to water (bgs) has been included.

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

Signed: Ryan Warner

Title: Vice President

Submit Date: 11/22/2019

Email: magpieoil@yahoo.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: ROB YOUNG

Date: 12/09/2019

Remediation Project Number: 11196

COA Type

Description

	Work with the operator to pressure test equipment and associated piping that may be contributing to the persistent groundwater mound in the vicinity of the injection plant.
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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

402247170	FORM 27-SUPPLEMENTAL-SUBMITTED
402247212	MONITORING REPORT

Total Attach: 2 Files

General Comments

User Group

Comment

Comment Date

		Stamp Upon Approval
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Total: 0 comment(s)