

State of Colorado

Oil and Gas Conservation Commission



1120 Lincoln Street, Suite 801, Denver, Colorado 80203 (303)894-2100 Fax:(303)894-2109

FOR OGCC USE ONLY

SITE INVESTIGATION AND REMEDIATION WORKPLAN

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. Form 27 is intended to be used whenever possible. Additional documentation will be required when large volumes of soil and groundwater have been impacted or involve large facilities with multiple source areas. See Rule 910. Attach as many pages as needed to fully describe the proposed work.

OGCC Employee:

☐ Spill ☐ Complaint
☐ Inspection ☐ NOAV

Tracking No:

CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED

☐ Spill or Release ☐ Plug & Abandon ☐ Central Facility Closure ☒ Site/Facility Closure ☐ Other (describe):

OGCC Operator Number: 10255

Name of Operator: Quicksilver Resources Inc.

Address: 777 W Rosedale, Suite 300

City: Fort Worth State: TX Zip: 76104

Contact Name and Telephone:

Judy Raab - Director/Environmental Regulation

No: (817) 665-4933

Fax: (817) 665-5009

API Number: 05-081-07461

County: Moffat

Facility Name: Cherokee Ridge #14-34R Reserve Pit

Facility Number:

Well Name: Cherokee Ridge #14-34R

Well Number:

Location: (QtrQtr, Sec, Twp, Rng, Meridian): SW SE Section 14, T12N, R95W, 6th P.M. Latitude: 40.995017 Longitude: -108.025461

TECHNICAL CONDITIONS

Type of Waste Causing Impact (crude oil, condensate, produced water, etc): Drill cuttings - dried drilling mud located within lined pit

Site Conditions: Is location within a sensitive area (according to Rule 901e)? ☐ Y ☒ N If yes, attach evaluation.

Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.): BLM land - Rangeland

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: Tresano Sandy Loam 3 - 12% slopes (Unit 200)

Potential receptors (water wells within 1/4 mi, surface waters, etc.): 1,800 ft NE of a water well (DNR CSEO Permit# 194734)

> 2000 ft to unnamed intermittent drainage to the Little Snake River

Description of Impact (if previously provided, refer to that form or document):

Impacted Media (check):

- ☒ Soils
☐ Vegetation
☐ Groundwater
☐ Surface Water

Extent of Impact:

Contained within a lined drilling pit
 No
 No
 No

How Determined:

REMEDIALTION WORKPLAN

Describe initial action taken (if previously provided, refer to that form or document):

A composite sample of the mud was collected from 15 points around the perimeter of the pit and was analyzed for the Table 910-1 analytes. Concentrations of several PAHs were detected at concentrations above Table 910-1 levels. Slightly elevated arsenic concentrations appear to be related to natural background based on subsequent analysis of a background sample. Additionally, pH, specific conductance, and SAR also exceed Table 910-1 levels, but these drill cuttings will be buried several feet below ground surface.

Describe how source is to be removed:

Quicksilver Resources Inc. intends to close the drilling reserve pit at the Cherokee Ridge 14-34R pursuant to the COGCC 900 and 1000 series rules. The E&P wastes in the pit are sufficiently dry so that the solids will be confined to the pit and will not be squeezed out and incorporated into the surface material. The synthetic pit liner will be removed and disposed offsite at a commercial facility. The E&P wastes will be blended with stockpiled subsurface native materials excavated from the pit to meet the Table 910-1 standards for PAHs.

Describe how remediation of existing impacts is to be accomplished, including removal and disposal at an injection well or licensed facility, land treatment on site, removal of impacted groundwater, insitu bioremediation, burning of oily vegetation, etc.:

Once the E&P wastes are blended with the stockpiled native soils and concentrations of PAHs meet the Table 910-1 standards, the waste pile will be put back into the pit and covered with the remaining stockpiled soils. The wastes will be buried approximately 5 to 6 feet below ground surface to isolate the wastes from the root zone of plants used in reclamation. The pit will be covered with native top soil stockpiled from the pit excavation and re-seeded with a BLM approved seed mixture. The pit will be monitored for subsidence over the next two years with top soil added as necessary.



Tracking Number: _____
Name of Operator: _____
OGCC Operator No: _____
Received Date: _____
Well Name & No: _____
Facility Name & No: _____

Page 2
REMEDIATION WORKPLAN (Cont.)

OGCC Employee: _____

If groundwater has been impacted, describe proposed monitoring plan (# of wells or sample points, sampling schedule, analytical methods, etc.):

The drill cuttings are dry and will be buried within the pit so that they do not pose a significant risk to human health or the environment. Based on a review of the Colorado Division of Water Resources - Office of the State Engineer online database, the nearest water well is owned by the BLM and is located approximately 1,300 feet away and is used to water livestock. The well has a static water level of 241 feet bgs and a total depth of 340 feet bgs. Groundwater resources are not expected to be adversely impacted.

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. Use additional sheet for description if required.

The E&P wastes and synthetic liner will be removed from the pit and the synthetic liner will be disposed offsite at a commercial facility. The drill cuttings will be blended with native soils excavated from the pit and the mixture will be buried and isolated from the surface. The pit will be reclaimed using stock piled top soil excavated from the pit and re-vegetated with a BLM approved seed mix. The site will mimic the surface topography prior to construction of the pit. The pit will be monitored for two years for subsidence and additional top soil will be added as necessary. Noxious weeds will be monitored and eradicated as required by the BLM.

Attach samples and analytical results taken to verify remediation of impacts. Show locations of samples on an onsite schematic or drawing.

Is further site investigation required? ☒ Y ☐ N If yes, describe:

Additional composite samples will be taken from the blended soils and drill cuttings and submitted for laboratory analysis of PAHs to determine if they meet the Table 910-1 standards and can be disposed onsite within the former pit.

Final disposition of E&P waste (landtreated and disposed onsite, name of licensed disposal facility, recycling, reuse, etc.):

The drill cuttings will be blended and disposed of onsite at a depth of approximately 6 feet below grade surface.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: 09/29/09 Date Site Investigation Completed: _____ Date Remediation Plan Submitted: _____
Remediation Start Date: _____ Anticipated Completion Date: _____ Actual Completion Date: _____

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

Print Name: Judith Raab Signed: Judith Raab
Title: Director, Environmental Regulation Date: 7-13-10

OGCC Approved: _____ Title: _____ Date: _____

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303)894-2100 Fax: (303)894-2108



SUNDRY NOTICE

Submit original plus one copy. This form is to be used for general, technical and environmental sundry information. For proposed or completed operations, describe in full on Technical Information Page (Page 2 of this form.) Identify well or other facility by API Number or by OGCC Facility ID. Operator shall send an informational copy of all sundry notices for wells located in High Density Areas to the Local Government Designee (Rule 603b.)

1. OGCC Operator Number: 10255	4. Contact Name Judy Raab - Director/Environmental	Complete the Attachment Checklist OP OGCC
2. Name of Operator: Quicksilver Resources Inc.	Phone: (817) 665-4933	
3. Address: 777 Rosedale, Suite 300 City: Fort Worth State: TX Zip: 76104	Fax: (817) 665-5009	
5. API Number 05-081-07461	OGCC Facility ID Number COC59359	Survey Plat
6. Well/Facility Name: Cherokee Ridge #14-34R	7. Well/Facility Number 20087719	Directional Survey
8. Location (Qtr/Sec, Twp, Rng, Meridian): SW SE 14 12N, 95W, 6 PM		Surface Eqmpt Diagram
9. County: Moffat	10. Field Name: Wildcat	Technical Info Page
11. Federal, Indian or State Lease Number: COC-59359		Other

General Notice

<input type="checkbox"/> CHANGE OF LOCATION: Attach New Survey Plat (a change of surface qtr/qtr is substantive and requires a new permit)	
Change of Surface Footage from Exterior Section Lines:	<input type="checkbox"/> FNL/FSL <input type="checkbox"/> FEL/FWL
Change of Surface Footage to Exterior Section Lines:	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Change of Bottomhole Footage from Exterior Section Lines:	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Change of Bottomhole Footage to Exterior Section Lines:	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> attach directional survey
Bottomhole location Qtr/Sec, Twp, Rng, Mer	
Latitude	Distance to nearest property line
Longitude	Distance to nearest bldg, public rd, utility or RR
Ground Elevation	Distance to nearest lease line
	Is location in a High Density Area (rule 603b)? Yes/No
	Distance to nearest well same formation
	Surface owner consultation date:
GPS DATA:	
Date of Measurement	PDOP Reading
	Instrument Operator's Name
<input type="checkbox"/> CHANGE SPACING UNIT	
Formation	Formation Code
Spacing order number	Unit Acreage
	Unit configuration
<input type="checkbox"/> Remove from surface bond	
Signed surface use agreement attached	
<input type="checkbox"/> CHANGE OF OPERATOR (prior to drilling):	
Effective Date:	NUMBER
Plugging Bond: <input type="checkbox"/> Blanket <input type="checkbox"/> Individual	From:
	To:
	Effective Date:
<input type="checkbox"/> ABANDONED LOCATION:	
Was location ever built? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Is site ready for inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Date Ready for Inspection:	
<input type="checkbox"/> NOTICE OF CONTINUED SHUT IN STATUS	
Date well shut in or temporarily abandoned:	
Has Production Equipment been removed from site? <input type="checkbox"/> Yes <input type="checkbox"/> No	
MIT required if shut in longer than two years. Date of last MIT:	
<input type="checkbox"/> SPUD DATE:	
<input type="checkbox"/> REQUEST FOR CONFIDENTIAL STATUS (6 mos from date casing set)	
<input type="checkbox"/> SUBSEQUENT REPORT OF STAGE, SQUEEZE OR REMEDIAL CEMENT WORK	
*submit cbl and cement job summaries	
Method used	Cementing tool setting/perf depth
Cement volume	Cement top
Cement bottom	Date
<input type="checkbox"/> RECLAMATION: Attach technical page describing final reclamation procedures per Rule 1004.	
Final reclamation will commence on approximately	
<input type="checkbox"/> Final reclamation is completed and site is ready for inspection.	

Technical Engineering/Environmental Notice

<input type="checkbox"/> Notice of Intent		<input type="checkbox"/> Report of Work Done
Approximate Start Date:		Date Work Completed:
Details of work must be described in full on Technical Information Page (Page 2 must be submitted.)		
<input type="checkbox"/> Intent to Recomplete (submit form 2)	<input type="checkbox"/> Request to Vent or Flare	<input checked="" type="checkbox"/> E&P Waste Disposal
<input type="checkbox"/> Change Drilling Plans	<input type="checkbox"/> Repair Well	<input type="checkbox"/> Beneficial Reuse of E&P Waste
<input type="checkbox"/> Gross Interval Changed?	<input type="checkbox"/> Rule 502 variance requested	<input type="checkbox"/> Status Update/Change of Remediation Plans
<input type="checkbox"/> Casing/Cementing Program Change	<input type="checkbox"/> Other:	for Spills and Releases

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

Signed: Judith Raab
Print Name: Judith Raab

Date: 7-13-10 Email: iraab@q.rinc.com
Title: Director, Env. Regulation

COGCC Approved:

Title:

Date:

CONDITIONS OF APPROVAL, IF ANY:



TECHNICAL INFORMATION PAGE



FOR OGCC USE ONLY

- | | |
|--|-----------------------------|
| 1. OGCC Operator Number: 10255 | API Number: 05-081-07461 |
| 2. Name of Operator: Quicksilver Resources, Inc. | OGCC Facility ID # COC59359 |
| 3. Well/Facility Name: Cherokee Ridge #14-34R | Well/Facility Number: |
| 4. Location (QtrQtr, Sec, Twp, Rng, Meridian): SW SE Section 14 T12N, R95W, 6 PM | |

This form is to be completed whenever a Sundry Notice is submitted requiring detailed report of work to be performed or completed. This form shall be transmitted within 30 days of work completed as a "subsequent" report and must accompany Form 4, page 1.

5. DESCRIBE PROPOSED OR COMPLETED OPERATIONS

Quicksilver Resources Inc. intends to close the drilling reserve pit located at the Cherokee Ridge 14-34R well site pursuant to the COGCC 900 and 1000 Series rules. The E&P wastes and the synthetic pit liner will be removed and the synthetic liner will be disposed offsite at a commercial facility. The pit is sufficiently dry so that solids will be confined to the pit and will not be squeezed out and incorporated into the surface material. The E&P wastes will be blended with the stockpiled native subsurface soils to reduce concentrations of poly aromatic hydrocarbons (PAHs) to meet Table 910-1 standards. Once the E&P wastes meet Table 910-1 standards, the wastes will be placed back into the pit and buried three to four feet below surface with the remaining stockpiled excavated soils. The former pit will be covered with the stockpiled top soil and be re-seeded to promote the successful closure, reclamation, and re-vegetation of the drilling reserve pit. The pit will be reclaimed so that the soils mimic the slope and character of the natural surroundings. The pit will be monitored for a two year period following closure to check for subsidence. Additional applications of top soil will be added as needed during this time to keep the pit level. Please refer to the attached Form 27 Remediation Workplan for additional details pertaining to the proposed pit closure.