

**State of Colorado
Oil and Gas Conservation Commission**



FOR OGCC USE ONLY

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

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: <u>10255</u>	Contact Name and Telephone: <u>Judy Raab - Director/Environmental Regulation</u>
Name of Operator: <u>Quicksilver Resources Inc.</u>	No: <u>(817) 665-4933</u>
Address: <u>777 W Rosedale, Suite 300</u>	Fax: <u>(817) 665-5009</u>
City: <u>Fort Worth</u> State: <u>TX</u> Zip: <u>76104</u>	
API Number: <u>05-081-07461</u> County: <u>Moffat</u>	
Facility Name: <u>Cherokee Ridge #14-34R Reserve Pit</u> Facility Number: _____	
Well Name: <u>Cherokee Ridge #14-34R</u> Well Number: _____	
Location: (QtrQtr, Sec, Twp, Rng, Meridian): <u>SW SE Section 14, T12N, R95W, 6th P.M.</u> Latitude: <u>40.995017</u> Longitude: <u>-108.025461</u>	

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):	Extent of Impact:	How Determined:
<input checked="" type="checkbox"/> Soils	<u>Contained within a lined drilling pit</u>	_____
<input type="checkbox"/> Vegetation	<u>No</u>	_____
<input type="checkbox"/> Groundwater	<u>No</u>	_____
<input type="checkbox"/> Surface Water	<u>No</u>	_____

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

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Table with 4 columns (DE, ET, CE, ES) and 1 row.

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.)

Form with 11 numbered fields for operator, contact, location, and facility information. Includes checkboxes for survey types and technical info.

General Notice

Large form section containing checkboxes for location changes, spacing units, operator changes, well name changes, abandoned locations, and subsequent reports.

Technical Engineering/Environmental Notice

Form section for technical notices, including checkboxes for intent to recomplete, change drilling plans, and request for vent or flare.

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

Signed: Judith Raab, Date: 7-13-10, Email: jraab@o.g.c.com, Title: Director, O&G 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.