

CONFIDENTIAL TIGHT-HOLE

ONSHORE OIL & GAS ORDER NO. 1

Approval of Operations on Onshore
Federal and Indian Oil & Gas Leases

Horse Gulch Federal 13-12

2012' FSL and 700' FWL
NW SW Section 12, T6N - R93W
Moffat County, Colorado

Prepared For:

Quicksilver Resources, Inc.

By:

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Copies Sent To:

- 1 - Bureau of Land Management - Craig, CO (E-File)
- 1 - Colorado Oil & Gas Commission - Denver, CO (E-File)
- 5 - Quicksilver Resources Inc. - Fort Worth, TX

ONSHORE OIL & GAS ORDER NO. 1
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All lease and/or unit operations are to be conducted in such a manner that full compliance is made with the applicable laws, regulations (CFR 43, Part 3160) and the approved Application for Permit to Drill. The operator is considered fully responsible for the actions of his subcontractors. A copy of the approved APD must be on location during construction, drilling and completion operations.

Approval of this application does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

1. FORMATION TOPS:

The estimated tops of important geologic markers are as follows:

<i>Formation</i>	<i>Depth</i>	<i>Subsea</i>
Lewis Shale	Surface	6244'
Mesaverde	400'	5,844'
Mancos	2250'	3994'
Niobrara	5750'	500'
Buck Peak Bench	5,770'	520'
Tow Creek Bench	6,120'	124'
Wolf Mountain Bench	6370'	-126'
Carlisle Shale	7270'	-1026'
TD	7400'	-1156'

2. ESTIMATED DEPTH OF WATER, OIL, GAS & OTHER MINERAL BEARING FORMATIONS:

The estimated depths at which the top and bottom of the anticipated water, oil, gas or other mineral bearing formations are expected to be encountered are as follows:

<i>Substance</i>	<i>Formation</i>	<i>Depth</i>	<i>Thickness</i>
Gas / Water/Coal	Mesa Verde	400'-2250'	1,850'
Oil/Gas	Niobrara	5,750'-7270'	1,520'

All shows of fresh water and minerals will be reported and protected.

3. BOP EQUIPMENT:

Quicksilver Resources, Inc.'s minimum specifications for pressure control equipment are as follows:

Ram Type: 5,000# W.P. Double Ram

Ram type preventers and associated equipment shall be tested to approved stack working pressure if isolated by test plug or to 70 percent of internal yield pressure of casing. Pressure shall be maintained for at least 10 minutes or until requirements of test are met, whichever is longer. If a test plug is utilized, no bleed-off pressure is acceptable. For a test not utilizing a test plug, if a decline in pressure of more than 10 percent in 30 minutes occurs, the test shall be considered to have failed. Valve on casing head below test plug shall be open during test of BOP stack.

Annular type preventers shall be tested to 50 percent of rated working pressure. Pressure shall be maintained at least 10 minutes or until provisions of test are met, whichever is longer.

As a minimum, the above test shall be performed:

- a. when initially installed;
- b. whenever any seal subject to test pressure is broken
- c. following related repairs; and
- d. at 30-day intervals

Pressure tests are required before drilling out from under all casing strings set and cemented in place. Blowout preventer controls must be installed prior to drilling the surface casing plug and will remain in use until the well is completed or abandoned.

Preventers will be inspected and operated at least daily to insure good mechanical working order, and this inspection recorded on the daily drilling report. Preventers will be pressure tested before drilling casing cement plugs. All BOP pressure tests must be recorded on the daily drilling report.
NOTIFY THE RESOURCE AREA PETROLEUM ENGINEER AT LEAST 24 HOURS IN ADVANCE OF PRESSURE TESTS.

Valves shall be tested from working pressure side during BOPE tests with all down stream valves open.

When testing the kill line valve(s) the check valve shall be held open or the ball removed.

Annular preventers shall be functionally operated at least weekly.

Pipe and blind rams shall be activated each trip, however, this function need not be performed more than once a day.

A BOPE pit level drill shall be conducted weekly for each drilling crew.

Pressure tests shall apply to all related well control equipment.

All of the above described tests and/or drills shall be recorded in the drilling log. Test charts, with individual test results identified, shall be maintained on location while drilling and shall be made available to a BLM representative upon request.

The choke manifold, BOP extension rods and hand wheels will be located outside the substructure. The hydraulic BOP closing unit will be located at least 100 feet from the well head, with the remote control unit on the rig floor. The casing head and BOP will be flanged 13-5/8" 5,000 psi w.p. Kill line will be 2" i.d. with burst pressure rating of at least 5,000 psi. These items will be pressure tested concurrently with BOP's. The BOP will be tested when the stack is first installed on the well. It will also be tested at each casing shoe and at least every 30 days. BOP and choke manifold sizes will be in accordance with API-RP-53 as per the attached. See attached schematic of choke manifold.

- a. The size and rating of the BOP stack is shown on the attached diagram.
- b. A choke line and a kill line are to be properly installed. The kill line is not to be used as a fill-up line.
- c. The accumulator system shall have a pressure capacity to provide for repeated operation of hydraulic preventers.
- d. Drill string safety valve(s), to fit all tools in the drill string, are to be maintained on the rig floor while drilling operations are in progress.

4. CASING AND CEMENTING PROGRAM:

- a. The proposed casing and cementing program shall be conducted as approved to protect and/or isolate all usable water zones, potentially productive zones, lost circulation zones, abnormally pressured zones, and any prospectively valuable deposits of minerals. Any isolating medium other than cement shall receive approval prior to use. The casing setting depth shall be calculated to position the casing seat opposite a competent formation which will contain the maximum pressure to which it will be exposed during normal drilling operations. Determination of casing setting depth shall be based on all relevant factors, including; presence/absence of hydrocarbons; fracture gradients; usable water zones; formation pressures; lost circulation zones; other minerals; or other unusual characteristics. All indications of usable water shall be reported.
- b. Casing design shall assume formation pressure gradients of 0.44 to 0.50 psi per foot for exploratory wells (lacking better data).
- c. Casing design shall assume fracture gradients from 0.70 to 1.00 psi per foot for exploratory wells (lacking better data).
- d. Casing collars shall have a minimum clearance of 0.422 inches of all sides in the hole/casing annulus, with recognition that variances can be granted for justified exceptions.
- e. All waiting on cement times shall be adequate to achieve a minimum of 500 psi compressive strength at the casing shoe prior to drilling out.
- f. All indications of usable water shall be reported to the authorized officer prior to running the next string of casing or before plugging orders are requested, whichever occurs first.
- g. Top plugs shall be used to reduce contamination of cement by displacement fluid. A bottom plug or other acceptable technique, such as a suitable preflush fluid, inner string cement method, etc. shall be utilized to help isolate the cement from contamination by the mud fluid being displaced ahead of the cement slurry.
- h. All casing strings below the conductor shall be pressure tested to 0.22 psi per foot of casing string length or 1500 psi, whichever is greater, but not to exceed 70 percent of the minimum internal yield. If pressure declines more than 10 percent in 30 minutes, corrective action shall be taken.

- i. The proposed casing program will be as follows:

Purpose	Depth	Hole Size	Csg. Size	Weight	Grade	Type	New/Used
Conductor	0-40'	20"	16"				New
Surface	0 - 1200'	12-1/4"	9 5/8"	36#ft	J-55	LTC	New
Intermediate	0-5750'	8 3/4"	7"	26#	N-80	LTC	New
Production	0-7400'	6 1/8"	4 1/2"	13.5#	L-80	LTC	New

- j. Casing design subject to revision based on geologic conditions encountered. If used casing is utilized it will be tested to new API standards.

- k. The cement program will be as follows:

Surface	Type and Amount
TOC @ Surface	Lead: 200 sx Class C cement, 0.125 pps Poly-E-Flake., 12.3 ppg, 2.24 yield (448 cubic feet) Tail: 195 sx Class C cement, 0.125 pps Poly-E-Flake, 13.5 ppg, 1.72 yield (335 cubic feet)
Intermediate	Type and Amount
TOC @ Surface	Lead: 460 sx Class A cement, .125 lb/sk poly e flake, 10 lb/sk silicalite, .4% Fluid loss controll, 1% econolite, 5% calseal 122 ppg, 2.22 yield (1021 cubic feet) Tail: 90 sx Class G cement, .125lb/sk poly e flake,.2% fluid loss Control,.4% retarder, 14.2 ppg, 1.29 yield (116 cubic feet)
Production	Type and Amount
TOC @ 4250'	200 sx Class G cement, 2% microbond, .5% fluid loss control, 13.5 ppg, 1.75 yield, (350 cubic feet.)

- l. After cementing but before commencing any test, the casing string shall stand cemented until the cement has reached a compressive strength of at least 500 psi at the shoe. WOC time shall be recorded in the driller's log.

- m. The following reports shall be filed with the Area Manager within 30 days after the work is

completed.

1. Progress reports, Form 3160-5 "Sundry Notices and Reports on Wells", must include complete information concerning:
 - a. Setting of each string of casing, showing the size, grade, weight of casing set, hole size, setting depth, amounts and type of cement used, whether cement circulated or the top of the cement behind the casing, depth of cementing tools used, casing test method and results, and the date work was done. Show the spud date on the first reports submitted.
 - b. Temperature or bond logs must be submitted for each well where the casing cement was not circulated to the surface.
- n. Auxiliary equipment to be used is as follows:
 1. Kelly cock
 2. A float valve above the bit.
 3. A sub with a full opening valve.
 4. All requirements pertaining to air/gas drilling as specified in Onshore Order No. 2 will be adhered to.

5. MUD PROGRAM:

- a. The proposed circulating mediums to be employed in drilling are as follows:

<i>Interval</i>	<i>Mud Type</i>	<i>Weight</i>	<i>Viscosity</i>	<i>FL</i>
0' - 1,200'	Fresh Water	8.4-9.0	26-38	N/A
1,200' - 7,400'	OBM	7.0-10.0	45-60	20-30cc

There will be sufficient mud on location to control a blowout should one occur.

A mud test shall be performed every 24 hours after mudding up to determine, as applicable: density, viscosity, gel strength, filtration, and pH.

- b. Mud monitoring equipment to be used is as follows:
 - 1. Periodic visual monitoring of the mud system will be done to determine volume changes.
- c. The concentration of hazardous substances in the reserve pit at the time of pit backfilling must not exceed the standards set forth in the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA).
- d. All oil and gas drilling related CERCLA hazardous wastes/substances removed from a location and not reused at another drilling location must be disposed of at an EPA approved hazardous waste facility.

6. TESTING, LOGGING & CORING:

The anticipated type and amount of testing, logging and coring are as follows:

- a. No drill stem tests are anticipated.
- b. The following logs will be run:

<i>Log Type</i>	<i>Depth</i>
Triple Combo	0-Base of Surface Casing
Quad Combo	Surface Casing - Intermediate
Triple Combo, FMI, Sonic Scanner	Intermediate - TD

- c. Side Wall Cores will be taken from 5750'-7270.'
- d. Whether the well is completed as a dry hole or as a producer, "Well Completion and Recompletion Report and Log" (Form 3160-4) will be submitted not later than 30 days after completion of the well or after completion of operations being performed, in accordance with 43 CFR 3164. Two copies of all logs, core descriptions, core analysis, well-test data, geologic summaries, sample description, and all other surveys or data obtained and compiled during the drilling, workover, and/or completion operations, will be filed with form

3160-4. Samples (cuttings, fluids, and/or gases) will be submitted when requested by the authorized officer (AO).

- e. The anticipated completion program is as follows: Run and cement production casing, selectively perforate and stimulate as needed. Test well for production.

7. ABNORMAL PRESSURES AND HYDROGEN SULFIDE:

- a. The expected bottom hole pressure is 2,800 psi. No abnormal pressures or temperatures are anticipated.
- b. No hydrogen sulfide gas is anticipated. However, if H₂S is encountered the guidelines in Onshore Order No. 6 will be complied with.

8. OTHER INFORMATION AND NOTIFICATION REQUIREMENTS:

- a. Drilling is planned to commence prior to August 31, 2011 due to a lease expiration. It is anticipated that completion operations will begin within 30 days after the well has been drilled.
- b. It is anticipated that drilling of this well will take approximately 20 days.
- c. The following shall be entered on the driller's log:
 - 1. Blowout preventer pressure tests, including test pressures and results;
 - 2. Blowout preventer tests for proper functioning;
 - 3. Blowout prevention drills conducted;
 - 4. Casing run, including size, grade, weight, and depth set;
 - 5. How the pipe was cemented, including amount of cement, type, whether cement

circulated, location of the cementing tools, etc.

6. Waiting on cement time for each casing string.
 7. Casing pressure tests after cementing, including test pressures and results.
- d. Section 102 (b) (3) of the Federal Oil and Gas Royalty Management Act of 1982, as implemented by the applicable provision of the operating regulations at Title 43 CFR 3162.4-1 (c), requires that "not later than the 5th business day after any well begins production on which royalty is due anywhere on the lease site or allocated to a lease site, or resumes production in the case of a well which has been off production for more than 90 days, the operator shall notify the authorized officer by letter or sundry notice, Forms 3160-5 or orally to be followed by a letter or sundry notice, of the date on which such production has begun or resumed."

The date on which production is commenced or resumed will be construed for oil wells as the date on which liquid hydrocarbons are first sold or shipped from a temporary storage facility, such as a test tank, and for which a run ticket is required to be generated or, the date on which liquid hydrocarbons are first produced into a permanent storage facility, whichever first occurs; and, for gas wells as the date on which associated liquid hydrocarbons are first sold or shipped from a temporary storage facility, such as a test tank, and for which a run ticket is required to be generated or, the date on which gas is first measured through permanent metering facilities, whichever first occurs.

If the operator fails to comply with this requirements in the manner and time allowed, the operator shall be liable for a civil penalty of up to \$10,000 per violation for each day such violation continues, not to exceed a maximum of 20 days. See Section 109 (c) (3) of the Federal Oil and Gas Royalty Management Act of 1982 and the implementing regulations at Title 43 CFR 3163.4-1 (b) (5) (ii).

e. **Notification Requirements:**

1. The BLM in Craig, Colorado-Little Snake Field Office (970-826-5000) will be notified verbally not more than 48 hours after the well is spudded, or on the next regular work day.
2. The Field Office Engineer will be notified at least 24 hours in advance of BOP pressure tests.
3. The BLM will be notified verbally at least 48 hours prior to running/cementing

surface casing.

4. No location will be constructed or moved, no well will be plugged and no drilling or workover equipment will be removed from a well to be placed in a suspended status without prior approved of the BLM - Little Snake Field Office-Craig, CO. If operations are to be suspended for more than 30 days, prior approval of the BLM - Little Snake Field Office-Craig, CO office must be obtained and notification given before resumption of operations.
5. In the event abandonment of a drilling well is desired, an oral request may be granted by the Resource Area Petroleum Engineer, but must be timely followed within 15 days with a "Notice of Intention to Abandon" (form 3160-5).
6. Unless the plugging is to take place immediately upon receipt of oral approval, the Resource Area Petroleum Engineer must be notified at least 48 hours in advance of the plugging of the well, in order that a representative may witness plugging operations. If a well is suspended or abandoned, all pits must be fenced immediately until they are backfilled. The "Subsequent Report of Abandonment" (form 3160-5) must be submitted within 30 days after the actual plugging of the well bore, reporting where the plugs were placed, and the current status of the surface restoration. If surface restoration has not been completed at that time, a follow-up report on form 3160-5 should be filed when all surface restoration work has been completed and the location is considered ready for final inspection.

The following standards apply to the abandonment of newly drilled dry or non-productive wells in accordance with 43 CFR 3162.3-4. Approval shall be obtained prior to the commencement of abandonment. All formations bearing usable-quality water, oil, gas, or geothermal resources, and/or a prospectively valuable deposit of minerals shall be protected. Approval may be given orally by the authorized officer before abandonment operations are initiated. This oral request and approval shall be followed by a written notice of intent to abandon filed not later than the fifth business day following oral approval. Failure to obtain approval prior to commencement of abandonment operations shall result in immediate assessment under 43 CFR 3153.1(b)(3). The hole shall be in static condition at the time any plugs are placed (this does not pertain to plugging lost circulation zones). Within 30 days of completion of abandonment, a subsequent report of abandonment shall be filed.

7. The spud date will be reported orally to the BLM-Little Snake Field Office-Craig, CO within 48 hours after spudding. If the spudding occurs on a weekend or holiday, wait until the following regular workday to make this report.
 8. Periodic drilling progress reports must be filed directly with the BLM - Little Snake Field Office-Craig, CO Office on a periodic basis and form or method as may be acceptable to the Petroleum Engineer.
 9. In accordance with NTL-1, this well must be reported on the "Monthly Report of Operations" (form 3160-6) starting with the month in which operations commence and continue each month until the well is physically plugged and abandoned. This report should be filed in duplicate, directly with the Minerals Management Service (MMS).
- f. There shall be no deviation from the proposed drilling and/or work over program as approved. Safe drilling and operating practices must be observed. All wells, whether drilling, producing, suspended or abandoned, shall be identified in accordance with CFR 43, 3162.2. There shall be a sign or marker with the name of the operator, lease serial number, well number and surveyed description of the well. Any changes in operation must have prior approval from the BLM - Little Snake Field Office-Craig CO - Petroleum Engineer.
- g. Any change in the program must be approved by the BLM - Little Snake Field Office-Craig, CO. "Sundry Notices and Reports on Wells" (form 3160-5) must be filed for all changes of plans and other operations in accordance with CFR 43, 3162.2. Emergency approval may be obtained orally, but such approval does not waive the written report requirement. Any additional construction, reconstruction, or alterations of facilities, including roads, gathering lines, batteries, etc., which will result in the disturbance of new ground, will require the filing of a suitable plan pursuant to Onshore Oil & Gas Order No 1 of CFR 43, 3164.1 and prior approval by the BLM - Little Snake Field Office-Craig CO Office.
- h. If a replacement rig is contemplated for completion operations, a "Sundry Notice" (form 3160-5) to that effect must be filed for prior approval of the BLM - Little Snake Field Office-Craig CO and all conditions of this approved plan are applicable during all operations conducted with the replacement rig.
- i. Whether the well is completed as a dry hole or as a producer, "Well Completion and Recompletion Report and Log" (form 3160-4) will be submitted not later than 30 days after completion of the well or after completion of operations being performed, in accordance with CFR 43, 3162.4-1. Two copies of all logs run, core descriptions, and all other surveys

or data obtained and compiled during drilling, work over, and/or completion operations, will be file on form 3160-4. Samples (cuttings, fluid and/or gas) will be submitted only when requested by the BLM - Little Snake Field Office-Craig, CO.

- j. All off-lease storage, off-lease measurement, commingling on-lease or off-lease will have prior written approval from the BLM - Little Snake Field Office-Craig CO.
- k. The oil and gas measurement facilities will be installed on the well location. Oil and gas meters will be calibrated in place prior to any deliveries. The Resource Area Petroleum Engineer will be provided with a date and time for the initial meter calibration and all future meter proving schedules. A copy of the meter calibration reports will be submitted to the BLM - Little Snake Field Office-Craig CO Office. All meter measurement facilities will conform with the API standards for liquid hydrocarbons and the AGA standard for natural gas measurement.
- l. A schematic facilities diagram as required by CFR 43 Part 3162.7-5 (b.9.d.) shall be submitted to the BLM - Little Snake Field Office-Craig CO Office within sixty (60) days of installation or first production, whichever occurs first. All site security regulations as specified in Onshore Oil & Gas Order No. 3 shall be adhered to. All product lines entering and leaving hydrocarbon storage tanks will be effectively sealed in accordance with 3162.7-5 (b.4.).
- m. This APD is subject to the requirement that, should the well be successfully completed for production, the BLM - Little Snake Field Office-Craig CO office must be notified when it is placed in a producing status. Such notification will be by telegram or other written communication and must be received in this office by not later than the fifth business day following the date on which the well is placed on production. The notification shall provide, as a minimum, the following informational items:
 - 1. Operator name, address, and telephone number.
 - 2. Well name and number.
 - 3. Well location (1/4 1/4, Sec., Twn., Range and P.M.)
 - 4. Date well was placed in a producing status (date of first production for which royalty will be paid).
 - 5. The nature of the well's production, (i.e., crude oil, or crude oil and casing head

gas, or natural gas and entrained liquid hydrocarbons).

6. The Federal or Indian lease prefix and number on which the well is located. Otherwise, the non-Federal or non-Indian land category, i.e., State or private.
 7. As appropriate, the unit agreement name, number and participating area name.
 8. As appropriate, the communitization agreement number.
- n. Any venting or flaring of gas will be done in accordance with Notice to Lessees (NTL 4A) and may need prior approval from the Resource Area Petroleum Engineer.
- o. All undesirable events (fires, accidents, blowouts, spills, discharges) as specified in Notice to Lessee (NTL-3A) will be reported to the BLM - Little Snake Field Office-Craig, CO. Major events will be reported verbally within 24 hours, followed by a written report within 15 days. "Other than Major Events" will be reported in writing within 15 days. "Minor Events" will be reported on the Monthly Report of Operations and Production (Form 3160-6).