

DRILLING WASTE MANAGEMENT PROGRAM

Drilling Fluids Disposal: OFFSITE Drilling Fluids Disposal Method: Commercial Disposal

Cutting Disposal: OFFSITE Cuttings Disposal Method: Commercial Disposal

Other Disposal Description:

Beneficial reuse or land application plan submitted? No

Reuse Facility ID: _____ or Document Number: _____

Centralized E&P Waste Management Facility ID, if applicable: _____

SURFACE & MINERALS & RIGHT TO CONSTRUCT

Name: Patricia Castrodale Phone: _____

Address: 4 Sears Ct Fax: _____

Address: _____ Email: _____

City: Keokuk State: IA Zip: 52632

Surface Owner: Fee State Federal Indian

Check all that apply. The Surface Owner: is the mineral owner
 is committed to an oil and Gas Lease
 has signed the Oil and Gas Lease
 is the applicant

The Mineral Owner beneath this Oil and Gas Location is: Fee State Federal Indian

The Minerals beneath this Oil and Gas Location will be developed from or produced to this Oil and Gas Location: No

The right to construct this Oil and Gas Location is granted by: Surface Use Agreement

Surface damage assurance if no agreement is in place: _____ Surface Surety ID: _____

Date of Rule 306 surface owner consultation _____

CURRENT AND FUTURE LAND USE

Current Land Use (Check all that apply):

Crop Land: Irrigated Dry land Improved Pasture Hay Meadow CRP

Non-Crop Land: Rangeland Timber Recreational Other (describe): _____

Subdivided: Industrial Commercial Residential

Future Land Use (Check all that apply):

Crop Land: Irrigated Dry land Improved Pasture Hay Meadow CRP

Non-Crop Land: Rangeland Timber Recreational Other (describe): _____

Subdivided: Industrial Commercial Residential

CULTURAL DISTANCE INFORMATION

Provide the distance to the nearest cultural feature as measured from Wells or Production Facilities onsite.

| | From WELL | From PRODUCTION FACILITY |
|-----------------------------------|-----------|--------------------------|
| Building: | 943 Feet | 1128 Feet |
| Building Unit: | 1131 Feet | 1278 Feet |
| High Occupancy Building Unit: | 5280 Feet | 5280 Feet |
| Designated Outside Activity Area: | 5280 Feet | 5280 Feet |
| Public Road: | 520 Feet | 681 Feet |
| Above Ground Utility: | 502 Feet | 664 Feet |
| Railroad: | 5280 Feet | 5280 Feet |
| Property Line: | 531 Feet | 695 Feet |

INSTRUCTIONS:

- All measurements shall be provided from center of nearest Well or edge of nearest Production Facility to nearest of each cultural feature as described in Rule 303.b.(3)A.
- Enter 5280 for distance greater than 1 mile.
- Building - nearest building of any type. If nearest Building is a Building Unit, enter same distance for both.
- Building Unit, High Occupancy Building Unit, and Designated Outside Activity Area - as defined in 100-Series Rules.
- For measurement purposes only, Production Facilities should only include those items with an asterisk(*) on the Facilities Tab.

DESIGNATED SETBACK LOCATION INFORMATION

Check all that apply. This location is within a:

- Buffer Zone
- Exception Zone
- Urban Mitigation Area

Pre-application Notifications (required if location is within 1,000 feet of a building unit):

Date of Rule 305.a.(1) Urban Mitigation Area Notification to Local Government: _____

Date of Rule 305.a.(2) Buffer Zone Notification to Building Unit Owners: _____

- Buffer Zone - as described in Rule 604.a.(2), within 1,000' of a Building Unit.
- Exception Zone - as described in Rule 604.a.(1), within 500' of a Building Unit.
- Urban Mitigation Area - as defined in 100-Series Rules.
- Large UMA Facility - as defined in 100-Series Rules.

FOR MULTI-WELL PADS AND PRODUCTION FACILITIES WITHIN DESIGNATED SETBACK LOCATIONS ONLY:

- Check this box if this Oil and Gas Location has or will have Production Facilities that serve multiple wells (on or offsite) and the Production Facilities are proposed to be located less than 1,000 feet from a Building Unit. *(Pursuant to Rule 604.c.(2)E.i., the operator must evaluate alternative locations for the Production Facilities that are farther from the Building Unit, and determine whether those alternative locations were technically feasible and economically practicable for the same proposed development.)*
- By checking this box, I certify that no alternative placements for the Production Facilities, farther from the nearest Building Unit, were available based on the analysis conducted pursuant to Rule 604.c.(2)E.i.

In the space below, explain rationale for siting the multi-well Production Facility(ies) that supports your Rule 604.c.(2)E.i determination. Attach documentation that supports your determination to this Form 2A.

SOIL

List all soil map units that occur within the proposed location. attach the National Resource Conservation Service (NRCS) report showing the "Map Unit Description" report listing the soil typical vertical profile. This data is to be used when segregating topsoil.

The required information can be obtained from the NRCS web site at <http://soildatamart.nrcs.usda.org/> or from the COGCC web site GIS Online map page found at <http://colorado.gov/cogcc>. Instructions are provided within the COGCC web site help section.

NRCS Map Unit Name: UIC - Ulm loam 3 to 5 percent slopes

NRCS Map Unit Name: ReD - Renohill loam, 3 to 9 percent slopes

NRCS Map Unit Name: Gr - Gravelly Land-Shale outcrop complex

PLANT COMMUNITY:

Complete this section only if any portion of the disturbed area of the location's current land use is on non-crop land.

Are noxious weeds present: Yes No

Plant species from: NRCS or, field observation Date of observation: _____

List individual species:

Check all plant communities that exist in the disturbed area.

- Disturbed Grassland (Cactus, Yucca, Cheatgrass, Rye)
- Native Grassland (Bluestem, Grama, Wheatgrass, Buffalograss, Fescue, Oatgrass, Brome)
- Shrub Land (Mahogany, Oak, Sage, Serviceberry, Chokecherry)
- Plains Riparian (Cottonwood, Willow, Aspen, Maple, Poplar, Russian Olive, Tamarisk)
- Mountain Riparian (Cottonwood, Willow, Blue Spruce)
- Forest Land (Spruce, Fir, Ponderosa Pine, Lodgepole Pine, Juniper, Pinyon, Aspen)
- Wetlands Aquatic (Bullrush, Sedge, Cattail, Arrowhead)
- Alpine (above timberline)
- Other (describe): _____

WATER RESOURCES

Is this a sensitive area: No Yes

Distance to nearest

downgradient surface water feature: 42 Feet

water well: 835 Feet

Estimated depth to ground water at Oil and Gas Location 125 Feet

Basis for depth to groundwater and sensitive area determination:

Basis for depth of groundwater was DRW Well Permit# 57278. This area is not determined a "sensitive area" due to its distance to a downgradient surface water feature and static water level.

Is the location in a riparian area: No Yes

Was an Army Corps of Engineers Section 404 permit filed No Yes If yes attach permit.

Is the location within a Rule 317B Surface Water Supply Area buffer No zone:

If the location is within a Rule 317B Surface Water Supply Area buffer have all public water supply systems within 15 miles been notified: _____

Is the Location within a Floodplain? No Yes Floodplain Data Sources Reviewed (check all that apply)

Federal (FEMA)

State

County

Local

Other

GROUNDWATER BASELINE SAMPLING AND MONITORING AND WATER WELL SAMPLING

Water well sampling required per Rule 318A

WILDLIFE

- This location is included in a Wildlife Mitigation Plan

This location was subject to a pre-consultation meeting with CPW held on _____

Operator Proposed Wildlife BMPs

No BMP

DESIGNATED SETBACK LOCATION EXCEPTIONS

Check all that apply:

- Rule 604.a.(1)A. Exception Zone (within 500' of a Building Unit) and is in an Urban Mitigation Area
- Rule 604.b.(1)A. Exception Location (existing or approved Oil & Gas Location now within a Designated Setback as a result of Rule 604.a.)
- Rule 604.b.(1)B. Exception Location (existing or approved Oil & Gas Location is within a Designated Setback due to Building Unit construction after Location approval)
- Rule 604.b.(2) Exception Location (SUA or site-specific development plan executed on or before August 1, 2013)
- Rule 604.b.(3) Exception Location (Building Units constructed after August 1, 2013 within setback per an SUA or site-specific development plan)

RULE 502.b VARIANCE REQUEST

Rule 502.b. Variance Request from COGCC Rule or Spacing Order Number _____

ALL exceptions and variances require attached Request Letter(s). Refer to applicable rule for additional required attachments (e.g. waivers, certifications, SUAs).

OPERATOR COMMENTS AND SUBMITTAL

Comments

The Tower LD 19-219HN well was used as the reference point for footages, cultural distances and lat/long data listed under the Location Identification data.

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

Signed: _____ Date: 06/02/2017 Email: regulatorypermitting@gwogco.com

Print Name: Ashley Noonan Title: Regulatory Analyst

Based on the information provided herein, this Application for Permit-to-Drill complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: _____ Director of COGCC Date: _____

Conditions Of Approval

All representations, stipulations and conditions of approval stated in this Form 2A for this location shall constitute representations, stipulations and conditions of approval for any and all subsequent operations on the location unless this Form 2A is modified by Sundry Notice, Form 4 or an Amended Form 2A.

COA Type

Description

| <u>COA Type</u> | <u>Description</u> |
|-----------------|--------------------|
| | |

Best Management Practices

| No | BMP/COA Type | Description |
|----|----------------------|---|
| 1 | Planning | Multi-well Pads (Rule 604.c.(2)E). GWOC strives to utilize multi-well pads wherever technically and economically practicable to minimize potential impacts to neighbors and the environment. Multi-well pads are not always feasible due to numerous possible issues including but not limited to; landowner requirements, topographic constraints, well bore reaches, setback requirements, etc. This pad will be constructed in such a manner that noise mitigation may be installed and removed without disturbing the site or landscaping. The pad has all weather access roads to allow for operator and emergency response. This pad has been placed as far as possible from building units. |
| 2 | Planning | Leak Detection Plan (Rule 604.c(2)F). GWOC designs its new facilities to both avoid leaks or releases as well as to help detect them in a time-efficient manner to minimize potential impacts. Tanks and all visible pipelines and valves etc. are inspected informally on a daily basis by company lease operators. In addition, GWOC also conducts formal annual SPCC inspections, and formal site specific and random audits, by third-party consultants to inspect for general site conditions as well as condition of tanks, pipelines, and containment structures. In addition, our company lease operators and Production staff review production records, including volumes and pressures, looking for irregularities that may indicate a problem with a tank or pipeline. If an irregularity is detected that may indicate a potential release the suspect tank and/or pipeline(s) are removed from service, isolated, and either pressure tested or visibly inspected for indications of a potential leak. |
| 3 | Planning | Pit level indicators (Rule 604.c.(2)K) GWOC does not typically utilize pits in any of its operations. If a pit was to be used proper pit Level indicators would be installed to indicate pit levels and compliance with pit volume rules. |
| 4 | Planning | Drill stem tests (Rule 604.c.(2)L) Conventional drill stem tests will not be conducted on DJ Basin horizontal wells currently being executed or planned by GWOC. If plans change in the future a well specific drill stem testing plan will be prepared for that particular well. Note that GWOC may elect to use one of several available wireline deployed tools for the purpose of measuring downhole formation pressures and/or collecting downhole fluid samples from the target formation(s) of a particular well. |
| 5 | Planning | Identification of P&A wells (Rule 604.c.(2)U) GWOC shall identify the location of the P&A wellbore with a permanent monument as specified in Rule 319.a.(5). The operator shall also inscribe or imbed the well number and date of plugging upon the permanent monument. P&A wellbores shall be cutoff well below ground surface in agricultural areas to provide for landowners to safely farm the reclaimed well area. |
| 6 | Planning | Development from existing well pads (Rule 604.c.(2)V) Where possible, GWOC shall provide for the development of multiple reservoirs by drilling on existing pads. GWOC strives to utilize multi-well pads wherever technically and economically practicable to minimize potential impacts to neighbors and the environment. Multi-well pads are not always feasible due to numerous possible issues including but not limited to; landowner requirements, topographic constraints, well bore reaches, setback requirements, etc. |
| 7 | Traffic control | Traffic Plan (Rule 604.c.(2)D). An access route from the highway or county road to the proposed oil and gas location has been prearranged. Required access road permits will be obtained before construction begins and any special requirements outlined by the municipality will be followed. Emergency routes will be chosen prior to the commencement of operations and will be clearly marked and maintained throughout drilling, completion and production activities. |
| 8 | General Housekeeping | Removal of Surface Trash (Rule 604.c.(2)P) All surface debris, trash, unusable scrap, or solid waste from the facility will be properly temporarily stored on location in a secure container and ultimately removed and disposed of in a legal manner. |
| 9 | General Housekeeping | Well site cleared (Rule 604.c.(2)T) Within ninety (90) days after a well is plugged and abandoned, the well site shall be cleared of all non-essential equipment, trash, and debris. |

| | | |
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| 10 | General Housekeeping | <p>General housekeeping will consist of neat and orderly storage of materials and fluids. Wastes will be temporarily stored in sealed containers and regularly collected and disposed of at offsite, suitable facilities. If spills occur cleanup will be implemented within 24-48 hours, as appropriate, to minimize any commingling of waste materials with storm water runoff. Routine maintenance will be limited to fueling and lubrication of equipment. Drip pans will be used during routine fueling and maintenance to contain spills or leaks. Any waste product from maintenance will be containerized and transported offsite for disposal or recycling. There will be no major equipment overhauls conducted onsite. Equipment will be transported offsite for major overhauls. Cleanup will consist of patrolling the roadways, access areas, and other work areas to pick up trash, scrap debris, other discarded materials, and any contaminated soil. These materials will be disposed of properly.</p> |
| 11 | Storm Water/Erosion Control | <p>Storm Water Management Plans (SWMP) are in place to address construction, drilling and operations associated with Oil and Gas development throughout the state of Colorado in accordance with Colorado Department of Public Health and Environment (CDPHE). Storm water controls will be constructed around the perimeter of the site prior to construction. Typically, GWOC utilizes a ditch and berm system of storm water control at its sites. BMP's used are determined just prior to construction by a thirdparty storm water contractor and may vary according to the location. Storm water controls will remain in place until the pad is stabilized or reaches final reclamation.</p> |
| 12 | Material Handling and Spill Prevention | <p>Spill Prevention Control and Countermeasures (SPCC) plans in place to address any possible spills associated with Oil and Gas operations throughout the state of Colorado in accordance with CFR 112.</p> <p>In accordance with COGCC Rule 1002.f.(2)A. & B., shall provide a designated storage area for dry bulk chemicals and miscellaneous fluids. The dry chemicals in the storage area shall be adequately protected to prevent contact with precipitation, shall be elevated above storm- or standing water, and shall provide sufficient containment for liquid chemical storage to prevent release of spilled fluids from impacting soil, surface water or groundwater and will prevent the co-mingling of spilled fluids or chemicals with other E & P Waste.</p> |
| 13 | Dust control | <p>Dust Control</p> <p>Dust control measures may include surface stabilization, or dust control with appropriate chemical or water applications.</p> |
| 14 | Construction | <p>BOPE for well servicing (Rule 604.c.(2)J)</p> <p>A BOPE with a minimum pressure rating of 3,000 psi will be utilized. At a minimum it will consist of 2 ram preventers and 1 annular preventer. The blind rams will be positioned below the pipe rams. A backup system of pressure control will be onsite consisting of at a minimum 1,000 psi accumulator (backup pressure). Accumulator is tested to 1,000 psi. Operator may use fixed sized pipe rams matching the tubular size. The annular preventer will be pressure tested to 250 psi low and 2,000 psi high for 10 minutes each. The ram preventers will be tested to 250 psi low and 2,500 psi high for 10 minutes each. All remaining well control equipment will be tested to 250 psi low and 2,500 psi high for 10 minutes each. The pressure tests will be conducted when the equipment is first installed and every 30 days thereafter. Pipe rams and blind rams will be function tested before every well service operation. Annual BOP inspections and pressure tests will be performed by the service company and will be charted & retained for 1 year. Backup stabbing valves shall be used on operations that require reverse circulation. Valves will be pressure tested before each well service operation in low pressure and high pressure range. The GWOC onsite representative will be certified in Well Control Operations by a Well-Cap certified training service.</p> |
| 15 | Construction | <p>Fencing requirements (Rule 604.c.(2)M)</p> <p>At a minimum GWOC installs appropriate fencing to restrict access by any unauthorized persons. This fencing may vary depending on site-specific situations, such as reasonable security, local government or surface owner concerns. Fencing will be properly noted on facility. Fencing will be properly noted on facility layout diagrams for both drilling/completion and the production phases of operations.</p> |

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|----|--------------------------------|---|
| 16 | Construction | Control of Fire Hazards (Rule 604.c.(2)N) GWOC constructs and operates our facilities to meet state and API codes, as appropriate, including API RP 500 electrical classifications inside bermed areas. Any unused potentially flammable materials are moved a minimum distance of 25-feet from wellhead, tanks, and separator areas. In addition, GWOC implements a Hot Work Permit Program for employees and contractors doing any defined 'Hot Work' activities on GWOC locations. |
| 17 | Construction | Load lines (Rule 604.c.(2)O) In any designated setback zone all loadlines are capped or bullplugged or locked shut to reduce the likelihood of a release occurring. In addition, GWOC places all load line receivers/valves inside secondary containment areas or in a proper load line containment device or both. |
| 18 | Construction | Guy line anchors (Rule 604.c.(2)Q) Guy line anchors left buried for future use shall be identified by a brightly colored marker at least 4-feet in height and within 1-foot to the east of the anchor. |
| 19 | Construction | Access Roads (Rule 604.c.(2)S) All access roads are designed, constructed, and maintained such that heavy equipment, including emergency response vehicles, can readily access and exit the location. In addition, GWOC will implement manual mud mitigation measures (eg. tracking control rock aprons) at location exits onto paved roads as necessary and in conjunction with county requirements. |
| 20 | Noise mitigation | Noise (Rule 604.c.(2)A). Great Western Operating Company, L.L.C. (GWOC) will operate in accordance with permissible noise levels per COGCC Rule 604.c.(2)A. and 802, as applicable. Where possible, drilling rig and completion equipment engine exhaust will be directed away from occupied buildings to assist with noise mitigation. These practices will be implanted upon initiation of drilling and production. |
| 21 | Noise mitigation | Sound and Light Mitigation During the drilling and completions phase, Great Western plans to construct sound/visual walls that will be placed along all edges of the pad. This will also assist to block out any lighting from nearby occupied structures. This pad will be constructed in such a manner that noise mitigation may be installed and removed without disturbing the site or landscaping. |
| 22 | Odor mitigation | Odors Mitigation Where possible, drilling rig and completion equipment engine exhaust will be directed away from occupied buildings to assist in mitigating potential odors. Sealed tanks with pressure relief valves and emissions controls will be utilized for the production phase. Great Western will be using a synthetic oil based drilling fluid called D822. Based upon laboratory analysis, the D822 contains lower levels of VOC and aromatics when compared to diesel. This will be used during the drilling phase in order to minimize any possible odors emitting from the site. |
| 23 | Drilling/Completion Operations | Closed Loop Drilling Systems - Pit Restrictions (Rule 604.c.(2)B). GWOC is utilizing a Closed Loop Drilling System on the subject facility. No open pit storage of water is foreseen for this facility. If open pit storage of fresh water is required, a Form 15 will be submitted and approved prior to use of such pit, and appropriate signage and escape provisions will be provided as required. Cuttings and drilling fluids will be removed from location and properly treated or disposed of according to applicable regulations. |

| | | |
|----|--------------------------------|---|
| 24 | Drilling/Completion Operations | <p>Green Completions (Rule 604.c.(2)C. As applicable, per COGCC Rule 805, GWOC will utilize all reasonable and costefficient best practices, including but not limited to those listed in Rule 805, to maximize resource recovery and mitigate releases to the environment.</p> <ul style="list-style-type: none"> • Initial frac and drillout effluent is routed through a sand catcher/trap and a junk/sand tank to remove sand and well frac debris. • Once any hydrocarbons are detected but prior to encountering salable quality combustible gas or significant volumes of liquid hydrocarbons (condensate or oil) (greater than 10 barrels per day average) the effluent is routed through a highpressure separator and closed-top tanks to minimize emissions to the environment. Hydrocarbon liquids, produced water, and sand are separated utilizing the highpressure separator. • The quality (combustibility) of the gas is typically monitored directly at the highpressure separator. When salable (combustible) quality gas is measured/detected the gas stream is immediately diverted to the sales pipeline or the well is shut in or a from 42 for flaring will be submitted for approval. • The separated produced water and hydrocarbon liquids (condensate/oil) are directed to specific tanks for storage until being unloaded and hauled to disposal or sales as appropriate. |
| 25 | Drilling/Completion Operations | <p>GWOC will comply with the "COGCC Policy for Bradenhead Monitoring during Hydraulic Fracturing Treatments in the Greater Wattenberg Area", dated May 29, 2012</p> |
| 26 | Drilling/Completion Operations | <p>One of the first wells drilled on the pad will be logged with open-hole Resistivity and Gamma Ray Log from the kick-off point into the surface casing. All wells on the pad will have a cement bond log with gamma-ray run on production casing (or on intermediate casing id production liner is run) into the surface casing. The horizontal portion of every well will be logging with a measure-while-drilling gamma-ray log. The Form 5, Completion Report, for each well on the pad will list all logs run and have those logs attached. The Form 5 for a well without open hole logs shall clearly state "No openhole logs were run" and shall clearly identify (by API#, well name and number) the well in which open-hole logs were run.</p> |
| 27 | Drilling/Completion Operations | <p>Stimulation Setback (Rule 317.r and 317.s) Prior to drilling operations, Operator will perform an anti-collision scan of existing offset wells that have the potential of being within close proximity of the proposed well. This anti-collision scan will include definitive MWD or gyro surveys of the offset wells with included error of uncertainty per survey instrument, and compared against the proposed wellpath with its respective error of uncertainty. If current surveys do not exist for the offset wells, Operator may have gyro surveys conducted to verify bottomhole location. The proposed well will only be drilled if the anti-collision scan results indicate that there is not a risk for collision, or harm to people or the environment.</p> |

Total: 27 comment(s)

Attachment Check List

| <u>Att Doc Num</u> | <u>Name</u> |
|--------------------|-------------------------|
| 401292391 | FORM 2A SUBMITTED |
| 401292521 | NRCS MAP UNIT DESC |
| 401292522 | NRCS MAP UNIT DESC |
| 401292523 | NRCS MAP UNIT DESC |
| 401297068 | CONST. LAYOUT DRAWINGS |
| 401297069 | FACILITY LAYOUT DRAWING |
| 401297070 | ACCESS ROAD MAP |
| 401297072 | LOCATION DRAWING |
| 401297073 | MULTI-WELL PLAN |
| 401297075 | LOCATION PICTURES |
| 401297076 | HYDROLOGY MAP |
| 401298420 | SURFACE AGRMT/SURETY |

Total Attach: 12 Files

General Comments

| <u>User Group</u> | <u>Comment</u> | <u>Comment Date</u> |
|-------------------|----------------|---------------------|
| | | Stamp Upon Approval |

Total: 0 comment(s)

Public Comments

No public comments were received on this application during the comment period.

