

Montana Board of Oil and Gas Conservation Environmental Assessment

Operator: Brigham Oil & Gas, L.P.
Well Name/Number: Berry 21-28 #1H
Location: NE NW 21 T25N R59E
County: Richland, MT; Field (or Wildcat) Wildcat

Air Quality

(possible concerns)

Long drilling time: No, 35-40 days drilling time.
Unusually deep drilling (high horsepower rig): Triple derrick rig to drill a 20,015' MD/10,381' TVD Bakken Formation single lateral horizontal well test.
Possible H₂S gas production: Slight chance of H₂S gas production, Mississippian Formations.
In/near Class I air quality area: No Class I air quality area nearby.
Air quality permit for flaring/venting (if productive): Yes, DEQ air quality permit required under 75-2-211.

Mitigation:

- Air quality permit (AQB review)
- Gas plants/pipelines available for sour gas
- Special equipment/procedures requirements
- Other: _____

Comments: To drill a 20,015' MD/10,381' TVD Bakken Formation single lateral horizontal well test. If there are existing pipelines for natural gas in the area, associated gas can be gathered or if no gathering system nearby, associated gas can be flared under Board Rule 36.22.1220.

Water Quality

(possible concerns)

Salt/oil based mud: Yes to intermediate casing string hole to be drilled with oil based invert drilling fluids. Horizontal lateral will be drilled with brine fluids. Surface casing hole will be drilled with freshwater and freshwater drilling fluid system (Rule 36.22.1001).
High water table: No high water table anticipated, in the area of review.
Surface drainage leads to live water: No, closest drainage is an unnamed ephemeral tributary drainage to Missouri River, about 1/4 of a mile to the north and the Missouri River, about 1/2 of a mile to the northeast from this location.
Water well contamination: None, closest water wells are about 3/4 of a mile to the southeast and about 7/8 of a mile to the northeast from this location, all other water wells are further out than 1 mile. Depth of these water wells range from 24' to 800'. These water wells are shallower than the surface casing setting depth of 1800' (Rule 36.22.1001). Surface casing hole will be drilled with freshwater and freshwater drilling fluids. Surface casing will be run to 1800' and cemented to surface to protect ground water (Rule 36.22.1001).
Porous/permeable soils: No, sandy silty clay soils.
Class I stream drainage: Yes, Class I stream drainages is the Missouri River.

Mitigation:

- Lined reserve pit
- Adequate surface casing
- Berms/dykes, re-routed drainage
- Closed mud system
- Off-site disposal of **solids/liquids (in approved facility)**
- Other: Offsite disposal of cuttings at Clean Harbors (Sawyer Landfill), Sawyer, North Dakota.

Completion fluids will be trucked to an authorized Class II SWD. _____

Comments: 1,800' surface casing well below freshwater zones in adjacent water wells. Also,

covering Fox Hills aquifer (Rule 36.22.1001). Adequate amount of surface casing will be set and BOP (5,000 psig annular, pipe and blind rams) equipment (Rule 36.22.1014) to prevent problems.

Soils/Vegetation/Land Use

(possible concerns)

Stream crossings: None anticipated.

High erosion potential: Yes possible high erosion potential on cut and fill slopes, location will require a large cut of up to 54.4' and moderate fill, up to 26.6', required.

Loss of soil productivity: None, location to be restored after drilling well, if nonproductive. If productive unused portion of wellsite will be reclaimed.

Unusually large wellsite: Yes, unusually large well site designed as a quad well pad, 550' X 550' a two location wellsite for the Berry 21-28 #1H and Berry 21-28 #2H.

Damage to improvements: Slight, surface use is grazing land.

Conflict with existing land use/values: Slight

Mitigation

Avoid improvements (topographic tolerance)

Exception location requested

Stockpile topsoil

Stream Crossing Permit (other agency review)

Reclaim unused part of wellsite if productive

Special construction methods to enhance reclamation

Other Requires DEQ General Permit for Storm Water Discharge Associated with Construction Activity, under ARM 17.30.1102(28)

Comments: Will use existing county highway, #351. About 0.4 of a mile of new access road will be built into this location off existing county highway. Cuttings will be trucked to Clean Harbors (Sawyer Landfill), Sawyer, North Dakota for disposal. Oil base invert drilling fluids will be recycled. Completion fluids will be removed and hauled to commercial Class II Disposal. No concerns.

Health Hazards/Noise

(possible concerns)

Proximity to public facilities/residences: Closest residences are about ¾ of a mile to the southeast and about 1.25 miles to the northeast from this location. Town of Bainville, Montana is about 11.2 miles to the northwest from this location.

Possibility of H2S: Slight chance H2S, from Mississippian Formations.

Size of rig/length of drilling time: Triple drilling rig 35 to 40 days drilling time.

Mitigation:

Proper BOP equipment

Topographic sound barriers

H2S contingency and/or evacuation plan

Special equipment/procedures requirements

Other _____

Comments: Adequate surface casing cemented to surface with working BOP stack should mitigate any problems. (BOP's 5,000 psig annular, pipe and blind rams) rule 36.22.1014. No concerns.

Wildlife/recreation

(possible concerns)

Proximity to sensitive wildlife areas (DFWP identified): None identified.

Proximity to recreation sites: None identified

Creation of new access to wildlife habitat: No

Conflict with game range/refuge management: No

Threatened or endangered Species: Species identified as threatened or endangered are the Pallid Sturgeon, Interior Least Tern, Whooping Crane and Piping Plover. Candidate species are the Greater Sage Grouse and Sprague's Pipit. MTFWP Natural Heritage Tracker website indicates thirteen (13) species of concern. These species are the Great Blue Heron, Piping Plover, Whooping Crane, Least Tern, Northern Redbelly Dace, Blue Sucker, Iowa Darter, Shortnose Gar, Sturgeon Chub, Sicklefins Chub, Paddlefish, Sager and Sturgeon. Potential species of concern lists one (1) the Hayden's Shrew.

Mitigation:

- Avoidance (topographic tolerance/exception)
- Other agency review (DFWP, **federal agencies**, DSL)
- Screening/fencing of pits, drillsite
- Other: _____

Comments: Private surface grazing land. There may be species of concern that maybe impacted by this wellsite. We ask the operator to consult with the surface owner as to what he would like done, if a species of concern is discovered at this location. The Board of Oil & Gas has no jurisdiction over private surface lands. BLM minerals will cut by the horizontal lateral. BLM will do surface EA and permit.

Historical/Cultural/Paleontological

(possible concerns)

Proximity to known sites: None identified.

Mitigation

- avoidance (topographic tolerance, location exception)
- other agency review (SHPO, DSL, **federal agencies**)
- Other: _____

Comments: On private surface grazing land. There may be possible historical/cultural/paleontological sites that maybe impacted by this wellsite. We ask the operator to consult with the surface owner as to his desires to preserve these sites or not, if they are found during construction of the wellsite. The Board of Oil & Gas has no jurisdiction over private surface lands. BLM minerals will be crossed by the horizontal lateral. BLM minerals will cut by the horizontal lateral. BLM will do surface EA and permit.

Social/Economic

(possible concerns)

- Substantial effect on tax base
- Create demand for new governmental services
- Population increase or relocation

Comments: Wildcat Bakken Formation horizontal well. No concerns.

Remarks or Special Concerns for this site

This well is a 20,015' MD/10,381' TVD Bakken Formation single lateral horizontal well test. No concerns.

Summary: Evaluation of Impacts and Cumulative effects

Short term impacts expected, no long term impacts anticipated.

I conclude that the approval of the subject Notice of Intent to Drill (does/**does not**) constitute a major action of state government significantly affecting the quality of the human environment, and (does/**does**

not) require the preparation of an environmental impact statement.

Prepared by (BOGC): /s/Steven Sasaki
(title:) Chief Field Inspector
Date: October 19, 2012

Other Persons Contacted:

Montana Bureau of Mines and Geology, Groundwater Information Center GWIC
website

(Name and Agency)
Richland County water wells

(subject discussed)

October 19, 2012
(date)

US Fish and Wildlife, Region 6 website
(Name and Agency)

ENDANGERED, THREATENED, PROPOSED AND CANDIDATE SPECIES MONTANA
COUNTIES, Richland County

(subject discussed)

October 19, 2012
(date)

Montana Natural Heritage Program Website (FWP)
(Name and Agency)

Heritage State Rank= S1, S2, S3, T26N R59E
(subject discussed)

October 19, 2012
(date)

If location was inspected before permit approval:

Inspection date: _____

Inspector: _____

Others present during inspection: _____