Montana Board of Oil and Gas Conservation
Environmental Assessment

Proposed Action: Approve Drilling Permit (Form 22)
Operator: Kraken Operating LLC
Well Name/Number: Rowin 17-8 #1H
Location: NW NW Section 21 T26N R59E
County: Richland**, MT; Field (or Wildcat)** Wildcat

Air Quality

(possible concerns)
Long drilling time: No, 25-35 days drilling time.
Unusually deep drilling (high horsepower rig): Triple derrick drilling rig to drill a single lateral horizontal Bakken Formation test, 21,277'MD/10,319'TVD.
Possible H2S gas production: Yes, slight H2S possible from 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:
X Air quality permit (AQB review)
X Gas plants/pipelines available for sour gas
__ Special equipment/procedures requirements
__ Other:_____

Comments: If there are existing pipelines for natural gas in the area then associated gas must be tied into system 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, will drill with oil based invert drilling fluids for the intermediate casing hole. Horizontal hole will be drilled with saltwater. Surface casing hole will be drilled with freshwater and freshwater mud system, Rule 36.22.1001.
High water table: No high water table anticipated at this surface location.
Surface drainage leads to live water: No, closest drainage is an unnamed ephemeral drainage about 1/10 of a mile to the northeast. The Missouri River is about 7/10 of a mile to the northeast from this location.
Water well contamination: None, all wells are ½ of a mile or farther from this location. This proposed oil well will be drilled with freshwater and freshwater mud to 1,800' and steel surface casing will be run and cemented to surface to protect groundwater.
Porous/permeable soils: No, sandy silty clay soils.
Class I stream drainage: Closest Class I stream drainage is the Missouri River, about 7/10 of a mile to the northeast from this location.

Mitigation:
__ Lined reserve pit
X Adequate surface casing
__ Berms/dykes, re-routed drainage
X Closed mud system
X Off-site disposal of solids/**liquids (in approved facility)**
X Other: Lined cuttings pit (16 mil liner) will be used since this is a closed loop mud system to be employed. Cuttings will be buried on the wellsite.

Comments: 1,800' surface casing will be drilled with freshwater, steel casing will be run to 1,800' and cemented back to surface, to protect freshwater zones in adjacent water wells, Rule 36.22.1001. Also, covering Fox Hills aquifer. Adequate surface casing and BOP equipment to prevent

problems, (5,000 psig annular and double ram), Rule 36.22.1014.

Soils/Vegetation/Land Use

(possible concerns)
Steam crossings: No stream crossings anticipated. Crossing only ephemeral drainages over existing county roads.
High erosion potential: Possible high erosion potential on high cut and fill slopes, large cut of up to 21.5' and a large fill of up to 25.1', required.
Loss of soil productivity: _No, location to be restored after drilling, if nonproductive. If productive, unused portion of this drillsite will be reclaimed.
Unusually large wellsite: A large well site 400'X440' required for a three well pad.
Damage to improvements: Slight surface use appears to be mix of cultivated and grass lands.
Conflict with existing land use/values: Slight

Mitigation
__ Avoid improvements (topographic tolerance)
__ Exception location requested
_X Stockpile topsoil
__ Stream Crossing Permit (other agency review)
_X Reclaim unused part of wellsite if productive
__ Special construction methods to enhance reclamation
_ Other

Comments: Access will be over existing county road, #147. A new access of 1,997' will be built into location. Oil based invert drilling fluids will be recycled. Completion fluids will hauled to a commercial Class II disposal. Cuttings will be allowed to dry in the pit and the pit will be reclaimed.

Health Hazards/Noise

(possible concerns)
Proximity to public facilities/residences: Closes residences are located about 1 mile to the north and multiple about 1.1 miles to the southeast. The town of Fairview, MT is about 13.9 road miles to the southeast.
Possibility of H2S: Yes, slight from Mississippian Formations.
Size of rig/length of drilling time: Triple drilling rig 25 to 35 days drilling time.

Mitigation:
_X Proper BOP equipment
__ Topographic sound barriers
__ H2S contingency and/or evacuation plan
__ Special equipment/procedures requirements
__ Other:_____

Comments: Adequate surface casing cemented to surface, Rule 36.22.1001, with working BOP stack should mitigate any problems, (5,000 psig annular and double ram), Rule 36.22.1014.

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, Piping Plover, and the Northern Long-eared Bat. Candidate specie is the Sprague's Pipit. NH tracker website indicates the following three (3) species of concern are as follows: Whooping Crane, Northern Redbelly Dace, and Iowa Darter.

Mitigation:

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

Comments: Private surface 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.

Historical/Cultural/Paleontological

(possible concerns)

Proximity to known sites: None identified.

Mitigation

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

Comments: Private surface 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.

Social/Economic

(possible concerns)

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

Comments: Wildcat well. No concerns

Remarks or Special Concerns for this site

A wildcat exploratory single lateral horizontal Bakken Formation test, 21,277'MD/10,319'TVD.

Summary: Evaluation of Impacts and Cumulative effects

No long term impacts expected, some short term impacts will occur, but can be mitigated.

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/ John Gizicki
(title:) Compliance Specialist
Date: November 09, 2015

Other Persons Contacted:

Montana Bureau of Mines and Geology, GWIC website
(Name and Agency)

Richland County water wells_____
(subject discussed)
November 09, 2015_____
(date)

US Fish and Wildlife, Region 6 website
(Name and Agency)
ENDANGERED, THREATENED, PROPOSED AND CANDIDATE SPECIES MONTANA COUNTIES, Richland County, Montana
(subject discussed)
November 09, 2015 (date)

Montana Natural Heritage Program Website
(Name and Agency)
Heritage State Rank= S1, S2, S3, S4 Location T26N R59E
(subject discussed)

November 09, 2015_____
(date)

Montana Cadastral Website
(Name and Agency)
Surface Ownership and surface use Section 21 T26N R59E
(subject discussed)

November 09, 2015_____

If location was inspected before permit approval:
Inspection date: _____
Inspector: _____
Others present during inspection: _____