

**Montana Board of Oil and Gas Conservation
Environmental Assessment**

Operator: Whiting Oil and Gas Corporation
Well Name/Number: Sundheim 21-27-2H, 3H and 4H (3 wells)
Location: NE NW Section 27 T25N R58E
County: Richland, MT; Field (or Wildcat) W/C (Bakken Horizontal)

Air Quality

(possible concerns)
Long drilling time: No, 20 to 30 days drilling time per well
Unusually deep drilling (high horsepower rig): No, triple derrick drilling rig to drill 3 single lateral Bakken Formation wells, 20,000+'MD/10,463'TVD.
Possible H₂S gas production: Possible H₂S gas, slight chance from Mississippian Formations.
In/near Class I air quality area: No Class I air quality area in the area of review.
Air quality permit for flaring/venting (if productive) Yes, DEQ air quality permit required under rule 75-2-211.

Mitigation:

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

Comments: No special concerns – using triple derrick drilling rig to drill 3 single lateral horizontal Bakken Formation wells. If existing gas gathering system for natural gas in the area, associated gas can be gathered or if no gathering system nearby, limited quantities of associated gas can be flared under Board Rule 36.22.1220.

Water Quality

(possible concerns)
Salt/oil based mud: Yes, oil based invert mud system will be used for drilling the mainhole (oil/water ratio 70/30 invert mud) and saltwater for drilling the horizontal lateral. Freshwater and freshwater mud system will be used for drilling the surface hole, Rule 36.22.1001.
High water table: No, high water table at this well location.
Surface drainage leads to live water: No, closest drainages are unnamed ephemeral tributaries to Second Hay Creek, about 5/16 of a mile to the northeast, about 3/8 of a mile to the east and about 3/8 of a mile to the south from this location. Within in Second Hay Creek there is a stock pond, about 3/4 of a mile to the southeast from this location.
Water well contamination: None, closest water wells are about 3/8 of a mile to the southwest, about 3/8 of a mile to the west, about 1/2 of a mile to the west northwest, about 1/2 of a mile to the northwest, about 5/8 of a mile to the west northwest, about 5/8 of a mile to the southeast, about 5/8 of a mile to the northeast, about 3/4 of a mile to the west northwest, about 3/4 of a mile to the east and about 3/4 of a mile to the southwest from this location. Depth of these stock and domestic water wells range from 57' to 326'.
Surface hole will be drilled with freshwater and freshwater mud to 2000', rule 36.22.1001. Steel surface casing will be run and cemented from 2000' to surface.
Porous/permeable soils: No, sandy silty clay soils.
Class I stream drainage: No Class I stream drainages in the area of review.

Mitigation:

- Lined reserve pit
- Adequate surface casing
- Berms/dykes, re-routed drainage
- Closed mud system
- Off-site disposal liquids (in approved facility)**
- Other: Lined cuttings pit, 14 mil pit liner.

Comments: 2000' of surface casing cemented to surface adequate to protect freshwater zones and will cover the base of the Fox Hills Formation, Rule 36.22.1001.

Soils/Vegetation/Land Use

(possible concerns)

Stream crossings: No, stream crossings anticipated.

High erosion potential: No high erosion potential on this location, small cut, up to 5.5' and small fill, up to 2.0', required.

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

Unusually large wellsite: a very large location, 425'X510' location size required for a 4 well locations, Sundheim 21-27-1H, Sundheim 21-27-2H, Sundheim 21-27-3H and Sundheim 21-27-4H.

Damage to improvements: Slight, surface use is cultivated 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 _____

Comments: Access to location will be over existing county road, #348 and #138. An access road of 310' will be built off the county road into this location. Oil based invert drilling fluids will be recycled. Pit fluids will be recycled for use on other Whiting wells or hauled to North Dakota for use on other Whiting wells or hauled to a Class II Disposal. Cuttings will be solidified with fly ash and buried in the lined cuttings pit. No special concerns.

Health Hazards/Noise

(possible concerns)

Proximity to public facilities/residences: Yes, nearest residences, about 1/2 of a mile to the west, about 5/8 of a mile to the east and about 1 mile to the northeast from this location. The town of Fairview, Montana is about 8 miles to the southeast from this location.

Possibility of H2S: Slight possibility of H2S from Mississippian Formations.

Size of rig/length of drilling time: Triple drilling rig/short 20 to 30 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 and operational BOP equipment 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 the Sprague's Pipit. MTFWP Natural Heritage Tracker website indicates three (3) species of concern is the 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 cultivated surface lands. 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 management of private surface lands.

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: Private cultivated surface lands. 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

Whiting Oil and Gas proposes to drill a 3 single lateral horizontal Bakken Formation wells from a single surface site.

Summary: Evaluation of Impacts and Cumulative effects

No significant long term impacts expected, some short term impacts will occur.

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/Thomas Richmond
(title:) Administrator
Date: December 17, 2013

Other Persons Contacted:

Montana Bureau of Mines and Geology, GWIC website
(Name and Agency)
Water wells in Richland County
(subject discussed)
December 17, 2013
(date)

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

March 21, 2013 (reviewed for first well on pad)
(date)

Montana Natural Heritage Program Website (FWP)
(Name and Agency)
Heritage State Rank= S1, S2, S3, T25N R58E
(subject discussed)

March 21, 2013 (reviewed for first well on pad)
(date)

Montana Cadastral Website

(Name and Agency)

Surface Ownership and surface use Section 27 T25N R58E

(subject discussed)

December 17, 2013

(date)

If location was inspected before permit approval:

Inspection date: _____

Inspector: _____

Others present during inspection: _____