

**MONTANA BOARD OF OIL AND GAS CONSERVATION
2535 ST. JOHNS AVENUE, BILLINGS, MONTANA 59102**

Lease Name:

Young 0403

Lease Type (Private/State/Federal):

Private

Application for Permit To:

Drill Deepen Re-enter
Oil Gas Other

Well Number:

1H

RECEIVED

Operator: Heritage Energy Operating, LLC

Address: 2448 E. 81st Street, Suite 2036

City: Tulsa

State: OK

Zip: 74137

Telephone Number: 405-202-3874

Field Name or Wildcat:

Wildcat

MAR 21 2023

Unit Name (if applicable):

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Surface Location of Well (quarter-quarter and footage measurements):

NW/4 SW/4 of Section 04-T28N-R57E (380' FWL & 1,805' FSL)

Objective Formation(s):

Middle Bakken

Township, Range, and Section:

04-T28N-R57E

Proposed Total Depth and Bottom-hole Location(s) if directional or horizontal well:

TD: 20,144' MD, 10,105' TVD

SESE Section 3 T28N R57E

580' FSL 200 FEL

→ Spacing Order 81-2023

County:

Roosevelt

Elevation (indicate GL or KB):

2,238 KB

Size and description of drilling/spacing unit and applicable order, if any:

1,280 acre spacing (Sections 3 & 4 of T28N-R57E)

Formation at total depth:

Middle Bakken

Anticipated Spud Date:

05/01/2023

| Hole Size | Casing Size | Weight / Foot | Grade (API) | Depth | Sacks of Cement | Type of Cement |
|-----------|-------------|---------------|-------------|-------|-----------------|----------------|
| 13 1/2 | 9 5/8 | 36# | J-55 | 1900 | 649 | See Attached |
| 8 3/4 | 7 | 32# | P-110 | 10416 | 664 | See Attached |
| 6 | 4 1/2 | 13.5# | P-110 | 20144 | 539 | See Attached |

Describe Proposed Operations:

Describe or attach labeled diagram of blowout preventer equipment. Indicate if air drilled or describe mud program.

Heritage Energy Operating, LLC requests to drill a horizontal well to complete and produce the Bakken formation situated in drilling and spacing unit encompassing Sections 3 & 4 of T28N-R57E, Roosevelt County, Montana.

See attachments for details.

Heritage Energy Operating, LLC requests variance to not run open hole logs on the subject well. Offset logs can be found for the Johnson Trust 1 Sec. 4-T28N-R57E

BOARD USE ONLY

Approved (date) AUG 18 2023

Permit Fee \$15000

The undersigned hereby certifies that the information contained on this application is true and correct:

By Benjamin J Davis

Check Number 1044

Signed (Agent) [Signature]

Title Technical Program Coordinator

Permit Expires FEB 18 2024

Title Chief Executive Officer

THIS PERMIT IS SUBJECT TO THE CONDITIONS OF APPROVAL STATED ON THE BACK

API Number: 25 - 085 - 22040

Date 01/11/2023

Telephone Number 405-202-3874

Samples Required: NONE ALL _____ FROM _____ feet to _____ feet

Core chips to address below, full cores to USGS, Core Laboratory, Arvada, CO. Required samples must be washed, dried and delivered prepaid to:

Montana Board of Oil and Gas Conservation
2535 St. Johns Avenue
Billings, MT 59102

SUPPLEMENTAL INFORMATION

Note: Additional information or attachments may be required by Rule or by special request.

1. Attach a survey plat certified by a registered surveyor. The survey plat must show the location of the well with reference to the nearest lines of an established public survey.
2. Attach an 8 1/2 x 11" photocopy of that portion of a topographic map showing the well location, the access route from county or other established roads, residences, and water wells within a 1/2 mile radius of the well.
3. Attach a sketch of the well site showing the dimensions and orientation of the site, the size and location of pits, topsoil stockpile, and the estimated cut/fill at the corners and centerstake. (Note: the diagram need not be done by an engineer or surveyor). Attach a sketch of a top view and two side views of the reserve pit(s), if utilized. The reserve pit sketch must show the length, width, depth, cut and fill, amount of freeboard, area of topsoil stockpile, and the height and width of berms.
4. Describe the type and amount of material or liner, if any, to be used to seal the reserve pit. If a synthetic liner is used, indicate the liner thickness (mils), bursting strength, tensile strength, tear strength, puncture resistance, hydrostatic resistance, or attach the manufacturer's specifications.
5. Describe the proposed plan for the treatment and/or the disposal of reserve pit fluids and solids after the well is drilled. If the operator intends to dispose of or treat the reserve pit contents off-site, specify the location and the method of waste treatment and disposal. (Note: The operator must comply with all applicable federal, state, county, and local laws and regulations with regard to the handling, transportation, treatment, and disposal of solid wastes.)
6. Does construction of the access road or location, or some other aspect of the drilling operation require additional federal, state, or local permits or authorizations? If yes, indicate the type of permit or authorization required:

- No additional permits needed
- 310 Permit (apply through county conservation district)
- Air quality permit (apply through Montana Department of Environmental Quality)
- Water discharge permit (apply through Montana Department of Environmental Quality)
- Water use permit (apply through Montana Department of Natural Resources and Conservation)
- Solid waste disposal permit (apply through Montana Department of Environmental Quality)
- State lands drilling authorization (apply through Montana Department of Natural Resources and Conservation)
- Federal drilling permit (specify agency)
- Other federal, state, county, or local permit or authorization: (specify type) _____

NOTICES:

1. Date and time of spudding must be reported to the Board verbally or in writing within 72 hours after the commencement of drilling operations.
2. The operator must give notice of drilling operations to the surface owner as required by Section 82-10-503, MCA, before the commencement of any surface activity.

BOARD USE ONLY

CONDITIONS OF APPROVAL

The operator must comply with the following condition(s) of approval:

**SEE
ATTACHED
CONDITIONS OF APPROVAL**

WARNING: Failure to comply with conditions of approval may void this permit.

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Hydraulic Fracturing Fluid Components Information Disclosure:



| Trade Name | Supplier | Purpose | Ingredients | Chemical Abstract Service Number (CAS #) | Maximum Ingredient Concentration in Additive (% by mass)** | Mass per Component (LBS) | Maximum Ingredient Concentration in HF Fluid (% by mass)** |
|---|---------------------------|---------------------|---|--|--|--------------------------|--|
| Water | Operator | Carrier | Carrier | 7732-18-5 | 100.00% | 82,315,800.00 | 84.06572% |
| Surf-Flo 430 | Innospec | Flowback Additive | MSDS and Non-MSDS Ingredients Listed Below | | | 7,435.80 | 0.00759% |
| FRP-1S | Liberty Oilfield Services | Friction reduction | MSDS and Non-MSDS Ingredients Listed Below | | | 252,853.79 | 0.25823% |
| DVA75 | Liberty Oilfield Services | Diverting Agent | MSDS and Non-MSDS Ingredients Listed Below | | | 469.00 | 0.00048% |
| Bioclear 5000 | Lubrizol | Biocide | MSDS and Non-MSDS Ingredients Listed Below | | | 8,384.32 | 0.00856% |
| ScaleCease 7103 | Innospec | Scale Inhibitor | MSDS and Non-MSDS Ingredients Listed Below | | | 15,850.17 | 0.01619% |
| HCL-15 | Liberty Oilfield Services | Solvent | MSDS and Non-MSDS Ingredients Listed Below | | | 17,295.26 | 0.01766% |
| ACL-300 | WST | Corrosion Inhibitor | MSDS and Non-MSDS Ingredients Listed Below | | | 67.43 | 0.00007% |
| WA-100 | WST | Wetting Agent | MSDS and Non-MSDS Ingredients Listed Below | | | 34.79 | 0.00004% |
| IC-505 | WST | Iron Control | MSDS and Non-MSDS Ingredients Listed Below | | | 125.74 | 0.00013% |
| Liberty Clean Out | Liberty Oilfield Services | Cleanup Solution | MSDS and Non-MSDS Ingredients Listed Below | | | 74.86 | 0.00008% |
| Crystalline Silica | Liberty Oilfield Services | Sand | MSDS and Non-MSDS Ingredients Listed Below | | | 15,300,000.00 | 15.62526% |
| The trade name(s) of the additive(s) used, supplier(s), and the purpose(s) of the additive(s) are listed above. The ingredient(s) for the above additive(s) are listed below. | | | | | | | |
| | Liberty Oilfield Services | Sand | Crystalline Silica (quartz) | 14808-60-7 | 99.90% | 15,284,700.00 | 15.60963% |
| | Liberty Oilfield Services | Sand | Aluminum Oxide | 1344-28-1 | 1.00% | 153,000.00 | 0.15625% |
| | Liberty Oilfield Services | Friction reduction | Petroleum distillates, hydrotreated light | 64742-47-8 | 45.00% | 113,784.20 | 0.11620% |
| | Liberty Oilfield Services | Sand | Iron Oxide | 1309-37-1 | 0.10% | 15,300.00 | 0.01563% |
| | Liberty Oilfield Services | Sand | Titanium Oxide | 13463-67-7 | 0.10% | 15,300.00 | 0.01563% |
| | Innospec | Scale Inhibitor | Water | 7732-18-5 | 95.00% | 15,057.66 | 0.01538% |
| | Liberty Oilfield Services | Solvent | Water | 7732-18-5 | 85.00% | 14,700.97 | 0.01501% |
| | Liberty Oilfield Services | Friction reduction | Poly(oxy-1,2-ethanediyl), a-tridecyl-w-hydroxy-, branched | 69011-36-5 | 3.00% | 7,585.61 | 0.00775% |
| | Innospec | Flowback Additive | Water | 7732-18-5 | 95.00% | 7,064.01 | 0.00721% |
| | Liberty Oilfield Services | Solvent | Hydrochloric Acid | 7647-01-0 | 15.00% | 2,594.29 | 0.00265% |
| | Lubrizol | Biocide | 2,2-dibromo-3-nitropropionamide | 10222-01-2 | 10.00% | 838.73 | 0.00086% |
| | Innospec | Scale Inhibitor | BHMT Phosphonate | Proprietary | 5.00% | 792.51 | 0.00081% |
| | Innospec | Scale Inhibitor | Proprietary Ingredient | Proprietary | 5.00% | 792.51 | 0.00081% |
| | Innospec | Flowback Additive | Benzenesulfonic Acid, dodecyl-,cmpd, with 2-aminoethanol | 26836-07-7 | 10.00% | 743.58 | 0.00076% |
| | Innospec | Flowback Additive | Dodecylbenzene sulfonate, triethanolamine salt | 27323-41-7 | 10.00% | 743.58 | 0.00076% |
| | Liberty Oilfield Services | Diverting Agent | Poly(lactide Resin | 9051-89-2 | 100.00% | 469.00 | 0.00048% |
| | Innospec | Flowback Additive | Sodium Alpha Olefin Sulfonate | 68439-57-6 | 5.00% | 371.79 | 0.00038% |
| | WST | Iron Control | 2-hydroxypropane-1,2,3-tricarboxylic acid | 77-92-9 | 60.00% | 75.45 | 0.00008% |
| | Liberty Oilfield Services | Cleanup Solution | Oxydenate and paraffinic stream | 876065-86-0 | 99.00% | 74.11 | 0.00008% |
| | WST | Wetting Agent | Ethoxylated Decyl Alcohol | 78330-20-8 | 40.01% | 13.92 | 0.00001% |
| | WST | Corrosion Inhibitor | 2-Propyn-1-ol compound with methyloxirane | 38172-91-7 | 14.99% | 10.11 | 0.00001% |
| | Liberty Oilfield Services | Cleanup Solution | C.i. Solvent Yellow 33 | 8003-22-3 | 1.00% | 0.75 | 0.00000% |
| | Innospec | Flowback Additive | Triethanolamine | 103-71-6 | 0.01% | 0.67 | 0.00000% |
| | Innospec | Flowback Additive | Ethanolamine | 141-43-5 | 0.01% | 0.67 | 0.00000% |

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