State of Montana

Board of Oil and Gas

Docket No: TBD

Underground Injection Control Application

Candee 1H SWD

Section 6, Township 24N, Range 53E

White Rock Oil and Gas, LLC

May 8th, 2025

May 8, 2025

John Gizicki
Underground Injection Control (UIC) Program Director
Montana Board of Oil and Gas Conservation
2535 St. Johns Avenue
Billings, MT 59102

RE: Request for Injection Permit
Candee 1H SWD located in Section 6, Township 24N, Range 53E
Richland County, Montana

Dear Mr. John Gizicki,

Please find enclosed an Underground Injection Control (UIC) application by White Rock Oil and Gas, LLC. requesting an aquifer exemption for the Dakota / Lakota Formations in the well, Candee 1H SWD, operated by White Rock Oil and Gas, LLC. in Lone Tree Field. This well will be plugged back and completed as a water disposal well.

I certify the information contained in this application is, to the best of my knowledge, true and correct, and the work associated with the operation proposed herein will be performed by White Rock Oil and Gas, LLC. in conformity with this application and the terms and conditions under which it is approved.

White Rock Oil and Gas, LLC. is requesting the application be placed on the docket for the MBOGC June 12, 2025 hearing.

If you have any questions concerning the enclosed application, please contact Michael Wiggins, Operations Engineer at (214) 981-1400 or via email at mwiggins@whiterockog.com.

Sincerely,

Brett Keener
VP Engineering
White Rock Oil and Gas, LLC.

Underground Injection Control (UIC) Permit Application
Candee 1H SWD Injection

The following report and justification are submitted in support of the application by White Rock Oil and Gas, LLC. to permit the Candee 1H SWD for the purpose of water injection into the Dakota/ Lakota formations as required by Rule 36-22-1403 of the Rules and Regulations of the Montana Board of Oil and Gas Conservation.

1(a) Location of Injection Well:
The Candee 1H SWD well is herein proposed for drilling a new water injection well. This well will be on the same pad as two new horizontal Bakken wells drilled by White Rock Oil & Gas (Candee Switch 21X-6 & Candee 21X-6). Attachment 1 shows the surface & bottomhole location and a circle of a quarter (1/4) mile radius representing the area of review (AOR) for this well.

Candee 1H SWD	437 ft FNL, 2588 ft FEL	NWNE, Sec 6, T24N, R53E

1(b) Wells within a Quarter Mile (1,320 ft) Area of Review (AOR):
There are not any current wells drilled within ¼ mile AOR.

The closest well to the Candee 1H SWD is the BR 41-6H 43 Bakken well which is outside the AOR at 0.36 miles.

1(c) Location of all pipelines:
The Candee 1H SWD surface facilities will be constructed on the same pad as the injection well. Injection fluids will predominately come from the two Candee wells drilled on the same pad. Additional injection fluid will be hauled in via trucks.

1(d) Area Producing Formations, Freshwater Aquifers, and Water Well Information:
There is one well within the ¼ mile Area of Review (AOR) producing stockwater from 150' – Freeman Dorothy. The Freeman Dorothy produces from an upper member of the Fort Union, the Tongue River, normally less than 200' from the surface. There are several shallow water wells drilled for cattle watering and for domestic use that appear to be in this zone. White Rock will sample & test the water before & after drilling the Candee 1H SWD. The closest water quality sample in these shallow zones is the Swihart Allen in Section 27, T25N, R52E. Total dissolved solids for this water well 2 miles northwest of Candee 1H SWD were 1,299 ppm. See Exhibit 3 for full water analysis.

Underground Sources of Drinking Water (USDW) is defined as an aquifer or its portion which: (1) Supplies any public water system, or (2) Contains a sufficient quantity of ground water to supply a public water system; and (i) Currently supplies drinking water for human consumption; or (ii) Contains fewer than 10,000 milligrams of total dissolved

solids per liter. A review of the area that USDW with a TDS less than 10,000 mg/l may be available to the base of the Fox Hills. The proposed injection zones Lakota and Dakota formations may contain fluids with Total Dissolved Solids (TDS) between 3,000 and 10,000 mg/L. There is data within a 12 miles radius that indicates the TDS will be greater than 10,000 mg/L. Additional information about these zones, potential wells, and ground water protection is detailed in this section. An aquifer exemption was included in the SWD application for the Lakota and Dakota Formations.

Freshwater well data was obtained from the Ground Water Information Center (MBMG Data Center) website https://mbmggwic.mtech.edu/ . See Exhibit 2. Map of Freshwater Wells. The closest freshwater wells are listed below:

Well Name	Location	Use	Distance from Proposed SWD	Depth of Well
Dorothy Freeman	Sec 6, T24N, R53E	Stockwater	0.25 Miles	150 ft
Alfred Candee	Sec 6, T24N, R53E	Stockwater	0.5 Miles	170 ft
White Rock Oil and Gas	Sec 35, T25N, R52E	Industrial	0.7 Miles	1,128 ft
Whiteman Fred R	Sec 8, T24N, R53E	Stockwater	1.3 Mile	53 ft
Alfred Candee	Sec 8, T24N, R53E	Domestic	1.3 Miles	32 ft
Marvin and Ervin Goss	Sec 25, T25N, R52E	Stockwater	1.9 Miles	155 ft
Swihart Allen	Sec 27, T25N, R52E	Stockwater	2 Miles	40 ft

The Hell Creek and Fox Hill zones act as potential sources of freshwater. The depth to the Fox Hills-Lower Creek Aquifer is approximately 1,000-1,200' in the area of the BR 41-35H per Depth to the Fox Hills – Lower Hell Creek Aquifer, Lower Yellowstone River Area map by Larry Smith which is part of the GWAA 1-2-03 publication dated 1998. White Rock has drilled a Fox Hills well near the BR 41-35H. Candee 1 WSW in Section 35, T25N, R52E lab confirmed total dissolved solids for this water well 0.51 miles west of BR 41-35H 52 of 1,433 ppm. See Exhibit 3 for full water analysis. Surface casing has been cemented to surface to protect shallower freshwater zones.

Any potential Underground Sources of Drinking Water (USDW) will be protected from the proposed injection zone by surface casing set to 1,300' cemented to surface. The production string, tubing, and an injection packer will result in further isolation of fresh USDW from produced water.

1(e) Name and Geologic Description of Injection Zone:

The Candee 1H SWD will be completed for disposal into the Lakota and Dakota formations.

Water quality information for the proposed disposal zones in the immediate area of Candee 1H SWD is not available. However, a water sample from the Dakota in Verschoot 1-19 SWD located ~10.0 miles southeast of the proposed disposal site had total dissolved solids of 20,346 mg/L. In addition, the Charlie Creek 8-23 SWD located 12 miles northeast had a TDS in the Lakota of 11,600 mg/L and water from the Dakota had a TDS of 11,500 mg/L. The Dakota and Lakota in the Candee 1H SWD are expected to be similar. The samples from the Verschoot 1-19 SWD were acquired at the wellhead shortly after the well was recompleted as an injector. The Charlie Creek 8-23 samples were acquired by swabbing each zone. In some areas, the upper Dakota water lies between the 3,000 ppm and 10,000 ppm cutoff. Due to the distance between the Candee 1H SWD and Dakota/Lakota water samples, White Rock will apply for an aquifer exemption. When the well is recompleted, swab analysis will be used to confirm the TDS.

Proposed injection zones for the Candee 1H SWD are as follows:

Formation	Lithology	Top (ft)	Bottom (ft)	Net pay (ft)	Pressure (psi)	Porosity
Dakota	Sandstone	4660	4805	20	2,090	12%
Lakota	Sandstone	4960	5274	100	2,555	17%

Depth and net pay for each of the proposed injections zones are estimate from the Cement Bond Log and Gamma Ray, on the BR 41-6H 43. The porosity is based on the density logs across the zones of interest in the following wellbores: NP 1-33 (8 miles W) and Edeburn 1-2H (5 miles N). The porosity was derived from the bulk density curve calculated on a sandstone matrix. Formation pressure was estimated using a water gradient of 0.435 psi/ft.

The confining formations for the proposed injection zones are the Skull Creek for the Dakota and the Fuson for the Lakota.

The Jurassic Swift formation is the lower confining layer. It is primarily a transgressive-regressive, clastic, shallow marine deposit composed of dark gray to greenish shales, and slightly calcareous, dark gray to greenish, waxy shales, commonly interbedded with glauconitic siltstones and sandstones with occasional carbonate units consisting of sand sized skeletal packstones and grainstones. The upper half of the Swift is mostly shaly,

glauconitic siltstones, and sandstones with associated shales. The Swift formation is approximately 392 ft in this area.

The actual fracture gradients for these confining zones are unknown, but fracture gradients for the confining shale layers are known to be higher than those for the underlying sandstone injection zone.

Formation	Lithology	Top (ft)	Bottom (ft)
Skull Creek	Shale	4,525	4,660
Fuson	Shale	4,804	4,960
Swift	Shale	5,274	5,666

Considering the vertical distance to any USDW and the maximum feasible injection rate that could occur, the likelihood of a fracture extending from the proposed disposal zones to any USDW under any reasonable disposal conditions is considered low.

Proposed injection See Exhibit 4: Cross Section of Dakota/ Lakota, Exhibit 5: Log of Injection Interval, and Exhibit 6: Water Analysis of Injection Intervals.

1(f) Additional Information on Producing Wells within the AOR:

There are no producing wells within the area of review.

1(g) Open Hole Logs:

The Candee 1H SWD will be a new drill SWD. The logging program will consist of a CBL/CCL/GR log ran from TD to surface during the completion of the well. Any logs and geologic information for the Candee 1H SWD will be recorded upon drilling to the MBOGC

1(h) Description of the Wellbore Construction:

Exhibit 7 depicts the proposed wellbore configuration for the Candee 1H SWD. Perforations will be selected after logs will be run. Exhibit 8 illustrates the plan for completion of the subject well. The Dakota Group perforations will be acidized with 12,000 gallons of 15% HCl using rock salt for diversion with a maximum allowable treating pressure of 5,000 PSIG at the wellhead during stimulations.

The 8-3/4" intermediate section will be drilled to approximately 4,600' at which point we will drill the curve section at 10°/100 ft to LP and drill lateral section to approximately 7,500' MD. 7" casing will be ran to TD and cemented in place. TVD will be 5,100'.

When the well is completed, plastic coated equipment will be used to help mitigate corrosion and the tubing/casing annulus will be filled with packer fluid to protect from

corrosion. Pressure gauges will be utilized on both the tubing and the tubing/ casing annulus to monitor pressures. This data will be recorded along with disposal rates and volumes on a daily basis.

1(i) Description of Injection Fluid:

The fluid to be injected will consist entirely of water produced with the Bakken in multiple White Rock wells. Actual injection rates may vary and volumes will be determined by the capacity of the well to take the fluid and at what injection pressure. Exhibit 8 is the representative water chemistry analysis of the produced Bakken water. No incompatibilities are expected.

1(j) Names and addresses of the leasehold owners, including unleased mineral owners, and the surface owners within the area of review of the input well(s).:

The names and addresses of leasehold and surface owners within the area of review for the proposed injection well are listed in Exhibit 9.

White Rock Oil and Gas, LLC. will notify leasehold owners, surface owners, and unleased minerals in accordance with 36.22.1410(1) notification requirements for an underground injection permit. Affidavit of Notification to Surface and Mineral Owners along with an example of the mailed notice is attached in Exhibit 11 and Exhibit 12.

List of All Exhibits

Exhibit 1	Map of General Area with Area of Review (AOR)
Exhibit 2	Map of freshwater wells with Area of Review (AOR)
Exhibit 3	Freshwater sample analysis
Exhibit 4	Geologic Cross Section of the Dakota / Lakota
Exhibit 5	Log of Injection Intervals
Exhibit 6	Water Analysis of Injection Intervals
Exhibit 7	Proposed Wellbore Diagram & Design
Exhibit 8	Completion Overview
Exhibit 9	Bakken Water analysis

Exhibit 10	Surface and Mineral Owner List
Exhibit 11	Notification to Surface and Mineral Owners Letter
Exhibit 12	Affidavit of Notification to Surface and Mineral Owners