

July 7, 2021

8400-4800-32640-02

Brittany Jorgensen, P.Eng
Exploitation Engineer
Canadian Natural Resources Limited
Suite 2100, 855 - 2nd Street SW
Calgary, AB T2P 4J8

Dear Ms. Jorgensen:

**RE: NON-HAZARDOUS WASTE DISPOSAL
SPECIAL PROJECT APPROVAL; AMENDMENT #1
CNRL ET AL WILDMINT d-45-A/94-H-2 (WA #810)
WILDMINT FIELD – HALFWAY “A” POOL**

The Commission has reviewed the application submitted by Canadian Natural Resources Limited (CNRL), dated May 25th, 2021 requesting amendment to the existing non-hazardous waste approval for the subject well.

This vertical well was drilled into the Halfway “A” pool for oil production in 1961 before being converted into a water injection well in 1966. In 2018, the Halfway “A” pool ceased production and the subject well ceased injection. The well was approved for temporary disposal of non-hazardous waste on August 1st of 2019. The approval was temporary due to the lack of a recent cement bond log, general concerns about the integrity of the wells in the pool, and CNRL’s assertion that the disposal need was temporary. CNRL has provided a new cement bond log and reviewed the integrity of other pool wells.

The Commission concurs that the well and formation are appropriate for continued disposal operations. Attached please find **Order 19-02-012 Amendment #1**, designating an area in the Wildmint field – Halfway formation as a Special Project under section 75 of the *Oil and Gas Activities Act*, for the operation and use of a storage reservoir for the disposal of non-hazardous waste. This Order includes a number of detailed operational conditions including: continuous tubing and casing pressure measurements, a maximum wellhead injection pressure, an ultimate reservoir pressure limit, as well as wellbore integrity monitoring and reporting requirements. Disposal wells are subject to regular field inspection and audit. Contravention of a condition of this Order may be subject to enforcement under section 62 of OGAA, or suspension or cancellation of the Order under section 75(2)(b). The maximum daily injection limit has been increased from 200m³/d to 400m³/d, as per condition 2k).

The Ministry of Environment identifies the type of effluent approved for injection in the separate Waste Discharge Permit, granted under the Environmental Management Act.

Disposal of fluid with high total dissolved solids content requires adjustment of the wellhead injection pressure to remain below formation fracture pressure. It is the responsibility of the permit holder make adjustments to wellhead injection pressure.

Should you have any questions, please contact Logan Gray at (250) 419-4465 or Ron Stefik at (250) 419-4430.

Sincerely,



Ron Stefik, P.L.Eng.
Supervisor, Reservoir Engineering
Oil and Gas Commission

Attachment

IN THE MATTER of the application from Canadian Natural Resources Limited to the Oil and Gas Commission dated March 25th, 2021 requesting an amendment to the disposal approval:

ORDER 19-02-012 Amendment #1

- 1 Under Section 75(1)(d) of the *Oil and Gas Activities Act*, the Commission designates the operation and use of a storage reservoir for the disposal of leachate water from the Peejay landfill at a-92-B/94-H-2 into the Wildmint field – Halfway “A” pool as a special project in the following area:
NTS 94-H-2 Block A Unit 45
- 2 Under section 75(2) of the *Oil and Gas Activities Act*, the special project designation in this Order is subject to the following conditions. The Permit Holder shall:
 - a) Inject leachate water only into the well CNRL et al Wildmint d-45-A/94-H-2; WA# 810 Halfway formation from 1,114.3 – 1,116.7 mKB TVD.
 - b) Hold a valid Permit under the Environmental Management Act for the disposal of non-hazardous waste.
 - c) Not exceed an injection pressure, measured at the wellhead on the subject well, of 6,550 kPag or the pressure required to fracture the formation, whichever is lesser.
 - d) Inject only through tubing with a packer set as near as is practical above the injection interval.
 - e) Continually measure and record the wellhead casing and tubing pressures electronically.
 - f) Include the disposal operating hours and the maximum injection pressure value on the monthly Petrinex disposal report.
 - g) Cease injection and notify the Commission at Reservoir@bcogc.ca immediately if there are any indications that hydraulic isolation is lost in the wellbore or formation.
 - h) Conduct and submit an annual Surface Casing Vent Flow test to the Commission within 30 days of the completion of the test.
 - i) Conduct an annual reservoir pressure test on the formation in the subject well, with a shut-in period of sufficient length to provide data for calculation of the reservoir pressure, and submit a report of the test within 60 days of the end of the test.
 - j) Cease injection upon reaching a maximum formation pressure of 7,050 kPaa, measured at 1,115.4 mKB TVD.
 - k) Do not exceed a daily disposal volume of 400 m³.
 - l)
 - i) Perform a casing inspection log on the subject well and submit results to the Commission within 30 days of the completion of logging, at an interval of not more than every 10 years, commencing from the date of initial disposal.
 - ii) Perform a hydraulic isolation temperature log on the subject well and submit results to the Commission within 30 days of the completion of logging, at an interval of not more than every 5 years, commencing from the date of initial disposal.
 - m) Not conduct a hydraulic fracture stimulation on any formation in the subject well without prior Commission approval.



Ron Stefik, Eng.L.
Supervisor, Reservoir Engineering
Oil and Gas Commission

DATED AT the City of Victoria, in the Province of British Columbia, this 7th day of July 2021.

Advisory Guidance for Order 19-02-012 Amendment #1

- I. A production packer must be set above the injection interval and the space between the tubing and casing filled with corrosion and frost inhibiting fluids, as per section 16(2) of the Drilling and Production Regulation.
- II. Annual packer isolation tests are required to be conducted and the associated report must be submitted to the Commission within 30 days of test completion, as per section 16(3) of the Drilling and Production Regulation.
- III. Injected fluids must be metered and the injection pressure measured at the wellhead, as per section 74 of the Drilling and Production Regulation.
- IV. A monthly disposal statement must be submitted to the Commission via Petrinex not later than the 20th day of the month following the reported month, as per section 75 of the Drilling and Production Regulation.
- V. Seismic events must be reported and disposal operations suspended as per section 21.1 of the Drilling and Production Regulation.