

August 1, 2019

8400-4790-32640-02

Lauren Gunnell, P.Eng
Canadian Natural Resources Limited
Suite 2100, 855 - 2nd Street SW
Calgary, AB T2P 4J8

Dear Lauren Gunnell:

**RE: NON-HAZARDOUS WASTE DISPOSAL SPECIAL PROJECT
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 June 17th, 2019 requesting approval to dispose of non-hazardous waste into the Halfway formation of the subject well. The vertical well was drilled into the Halfway “A” pool for oil in October 1961 and produced 4.8 e³m³ of oil and 11.4 e⁶m³ of gas before being converted into a water injection well in March 1966. The Halfway “A” pool ceased production and the subject well ceased injection in October 2018, as remaining oil is uneconomic to recover.

Attached please find **Order 19-02-012**, 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).

CNRL states that their need for disposal is temporary and as such Order condition 2k) and 2l) place an injection volume limit and time limit on disposal operations, respectively. Due to the age of the subject well and other wells in the Halfway “A” pool, a daily rate limit is prescribed by Order condition 2m) to ensure that pressure does not build to levels that may compromise the integrity of pool wellbores. Additionally, the maximum formation pressure set by Order condition 2j) was chosen to ensure protection of useable groundwater.

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.

For the inspection requirement of Order condition 2p), please arrange via email to OGCPipelines.Facilities@bcogc.ca.

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

Sincerely,



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

Attachment

ORDER 19-02-012

- 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-092-B/094-H-02 in 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 into the well CNRL et al Wildmint d-45-A/94-H-2; WA# 810 Halfway formation from 1114.3 – 1116.8 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 immediately if 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 1115.4 mKB TVD.
 - k) Cease injection after 30,000 m³ of approved disposal fluid have been injected.
 - l) Disposal may only occur over 15 calendar months (non-consecutive).
 - m) Do not exceed a daily disposal volume of 200 m³.
 - n)
 - 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.
 - o) Not conduct a hydraulic fracture stimulation on any formation in the subject well without prior Commission approval.
 - p) Complete an inspection, satisfactory to the Commission, within 4 weeks of initial disposal operations.



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

DATED AT the City of Victoria, in the Province of British Columbia, this 1st day of August 2019.

Advisory Guidance for Order 19-02-012

- 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.