



November 13, 2015

3445-4800-32640-02

Kelly Okuszko, P. Eng.
Exploitation Engineer
Canadian Natural Resources Ltd.
Suite 2500, 855 2nd Street S.W.
Calgary, Alberta T2P 4J8

Dear Ms. Okuszko:

**RE: PRODUCED WATER DISPOSAL SPECIAL PROJECT APPROVAL
CNRL ET AL W EAGLE 16-36-84-19; WA 4339
EAGLE WEST – HALFWAY FORMATION**

Commission staff have reviewed the application, dated October 13, 2015, requesting approval to dispose of produced water into the Halfway formation of the well CNRL et al W Eagle 16-36-84-19 (WA 4339).

The subject well was previously completed in the Eagle West field Belloy 'A' oil pool. Produced from 1978 to 1980, the well was converted to water injection service as part of a pressure maintenance water flood project, from 1981 to 2015. The Belloy zone was abandoned, with consultation with the Commission, in September 2015.

The well 16-36 was the subject of a pre-application review, a letter from the Commission dated March 25, 2015 indicating that the Halfway formation may be suitable for disposal, pending further wellbore integrity and formation injectivity testing. Information contained in the recent application provides confidence that Halfway disposal is appropriate at the subject well location.

Attached please find **Order 15-02-014** designating an area in the Eagle West field – Halfway formation as a Special Project under section 75 of the *Oil and Gas Activities Act*, for the use of a storage reservoir for the disposal of produced water. This Order contains a number of detailed operational conditions. Additional general information regarding disposal wells is available on the Commission's website at <http://www.bcogc.ca/industry-zone/documentation/Subsurface-Disposal>.

In certain circumstances, disposal well operation may induce seismicity. The Commission advises that disposal well permit holders monitor seismic events in proximity to the well and be prepared to modify operations to mitigate induced seismicity. Permit holders may monitor seismic events through the Natural Resources Canada seismic monitoring network at <http://www.earthquakescanada.nrcan.gc.ca/recent/index-eng.php>.

Should you have any questions, please contact the undersigned at (250) 419-4430 or Michelle Harding at (250) 419-4493.

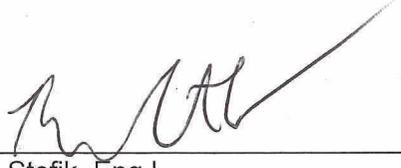
Sincerely,

A handwritten signature in black ink, appearing to read 'Ron Stefik', written over a horizontal line.

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

ORDER 15-02-014

- 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 produced water, into the Halfway formation – in the West Eagle field as a special project in the following area:
DLS Twp 84 Rge 19 W6M Section 36 - Lsds 9, 10, 15 and 16.
- 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 produced water only into the well CNRL et al W Eagle 16-36-84-19 W6M; WA# 4339 – Halfway formation (disposal perforations 1435.0 – 1440.0 mKB).
 - b) Not exceed an injection pressure, measured at the wellhead on the subject well, of 17,375 kPag or the pressure required to fracture the formation, whichever is lesser.
 - c) Inject only through tubing with a packer set as near as is practical above the injection interval.
 - d) Continually measure and record the wellhead casing and tubing pressures electronically.
 - e) Cease injection and notify the Commission immediately if hydraulic isolation is lost in the wellbore or formation.
 - f) Submit the annual packer isolation test report to the Commission within 30 days of the completion of the test.
 - g) Include the disposal operating hours and the maximum injection pressure value on the monthly BC-S18 disposal statement.
 - h) 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.
 - i) Cease injection upon reaching a maximum formation pressure of 16,380 kPaa, measured at MPP.
 - j) Maintain and manage the well head to prevent surface liquids from entering the well bore through the annulus outside or between casing strings.
 - k) 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.
 - l) 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 13th day of November, 2015.

Advisory Guidance for Order 15-02-014

- 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 submitted, 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 not later than the 25th 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.