BC Oil & Gas COMMISSION

April 20, 2016 0800-7400-32640-02

Stephen Penner, C.E.T.
Exploitation Engineering Technologist
Canadian Natural Resources Limited
Suite 2100, 855 – 2nd Street SW
Calgary, Alberta T2P 4J8

Dear Mr. Penner,

RE: PRODUCED WATER DISPOSAL TESTING WAIVER
CNRL BEG B-A79-I/94-B-16; WA# 10656
DEBOLT FORMATION

The Commission has received CNRL's request, dated March 15, 2016, to waive the temperature log requirement for the subject well. Approval for disposal of produced water, Order 98-02-004, was issued for the Debolt formation on April 27, 1998. As part of a provincial disposal well review, the subject well was examined and testing was requested, including a reservoir pressure test and casing inspection log. Annual pressure tests from 2014 to 2016 have confirmed that the Debolt formation is approaching its pressure limit, and therefore the well is approaching the end of its disposal life. Successful packer isolation tests from 2014 and 2015, as well as positive results from the casing inspection log, indicate wellbore integrity. As such, the temperature log requirement is hereby waived.

CNRL has calculated that the remaining volume to reach the 120% limit of **24,278kPa** is 2,880m^3. At low rates of ~19m3/d, CNRL has estimated disposal can continue in the well until approximately September 2016. CNRL may continue disposal until the volume limit has been reached, subject to the following conditions. The permit holder must:

- Not exceed an injection pressure, measured at the wellhead, of **15,300kPag** or the pressure required to fracture the formation, whichever is lesser.
- Continually measure and record the wellhead casing an tubing pressures electronically
- Cease injection and notify the Commission immediately if hydraulic isolation is lost in the wellbore or formation
- Perform a reservoir pressure test on the Debolt formation by December 31, 2016, if the volume limit of 2,880m^3 has not been reached by this time.

Additional general information regarding disposal wells is available on the Commission's website at http://www.bcogc.ca/industry-zone/documentation/Subsurface-Disposal.

A number of possible induced seismicity events have occurred in proximity to the subject disposal well. CNRL is advised to carefully monitor seismic events and be prepared to modify operations, as per Section 21.1 of the Drilling and Production Regulation. Seismic events can be monitored 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,

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

Attachment