



August 20, 2014

7750-4800-32640-02

Rod McDougall
Canadian Natural Resources Ltd.
Suite 2500, 855 – 2nd Street SW
Calgary, AB T2P 4J8

Dear Mr. McDougall,

**RE: APPLICATION TO DISPOSE OF PRODUCED WATER
CNRL SEPTIMUS 13-9-81-18 W6M, WA# 25459; HALFWAY FORMATION**

Commission staff have reviewed the application by CNRL dated June 30, 2014 requesting permission to dispose of produced water into the Halfway formation of the subject well.

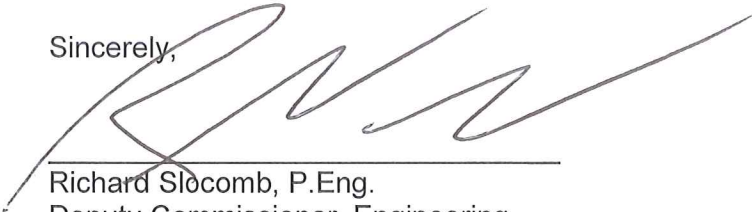
The subject well was drilled in November 2009 to evaluate the Montney formation, logged and cased but not completed until June 2014. At this time the subject well was completed in the Halfway formation and tested for suitability of water disposal. The 13-9 well addresses a need to dispose of completions flowback and produced water from the producing Montney wells in the Septimus area.

Notice of your application was posted on the OGC website, and a number of concerns were raised by Shell Canada Ltd in a letter dated July 25, 2014. These concerns included induced seismicity, leakage to overburden through faults, and risk of pressure plume from the subject well causing a pressure impact at offsetting Shell wells. In response to these concerns, the Commission is issuing an approval for temporary produced water disposal into the Halfway formation of the subject well, up to a **maximum volume of 20,000 m³**. Existing dense array seismograph stations proximal to this area should measure any response to this disposal injection. The Commission requests that during this test period CNRL closely monitor for any seismic events. The subject well will be re-evaluated as a candidate for continuous disposal once the maximum injection volume has been reached and a review of any further technical submissions has been conducted.

Attached please find **Order 14-02-008** designating an area in the Septimus 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 temporary 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/node/5997/download>.

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

Sincerely,



Richard Slodcomb, P.Eng.
Deputy Commissioner, Engineering
Oil and Gas Commission

Attachment

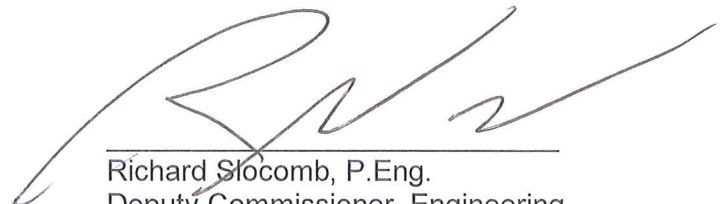
cc: Dean Marcil
Staff Joint Venture & Land Representative – NE B.C.
Shell Canada Ltd
Calgary, AB

ORDER 14-02-008

- 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 temporary disposal of produced water into the Halfway formation – Septimus field as a special project in the following area:

DLS Twp 81 Rge 18 W6M Section 9 - Lsds 11, 12, 13, and 14

- 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, including formation stimulation flowback, only into the well CNRL SEPTIMUS 13-09-081-18; WA# 25459 Halfway formation (disposal perforations 1945.5 – 1953.5 mKB).
 - b) Not exceed an injection pressure, measured at the wellhead on the subject well, of 12,400 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.
 - e) Cease injection and notify the Commission immediately if hydraulic isolation is lost in the wellbore or formation.
 - f) Include the disposal operating hours and the maximum injection pressure values on the monthly disposal statement.
 - g) Conduct a reservoir pressure test on the formation in the subject well at the conclusion of the cumulative injection volume (h), 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.
 - h) Cease injection upon reaching a maximum cumulative injection volume of 20,000m³, or a maximum formation pressure of 20,577 kPaa, whichever occurs first.
 - i) Not conduct a hydraulic fracture stimulation on any formation in the subject well without prior Commission approval.
 - j) Upon reaching the cumulative injection volume (h), submit a report to the Commission commenting on any seismic events proximal to the well location. This report must include event magnitude, frequency, and proposed mitigation plan should seismic events be connected to disposal operation.



Richard Slocomb, P.Eng.
Deputy Commissioner, Engineering
Oil and Gas Commission

DATED AT the City of Victoria, in the Province of British Columbia, this 20th day of August 2014.

Advisory Guidance for Order 14-02-008

- I. A production packer must be set above the injection interval and the space between the tubing and casing filled with corrosion inhibiting fluids, as per section 16(2) of the Drilling and Production Regulation.
- II. Annual packer isolation tests are required, as per section 16(3) of the Drilling and Production Regulation.
- III. Injected fluids must be metered, 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.