

July 31, 2017

3445-6200-59240-09

Kelly Okuszko, P.Eng.  
Exploitation Engineer  
Canadian Natural Resources Limited  
2500, 855 2nd Street SW  
Calgary, AB T2P 4J8

Dear Mrs. Okuszko:

**RE: PRESSURE MAINTENANCE WATERFLOOD ORDER 80-09-002 AMENDMENT #7**  
**EAGLE WEST FIELD – BELLOY “A” POOL**

The Commission is presently reviewing and amending waterflood approvals to conform to current requirements. It came to our attention that reservoir pressures in portions of the Eagle West field – Belloy “A” pool exceed the initial reservoir pressure.

The Eagle West field Belloy “A” oil pool commenced production in February 1977. A waterflood pressure maintenance project was approved in July 1980 with injection starting in December 1980. A review of reservoir performance indicates that the Belloy formation is highly compartmentalized, with significant pressure variation between wells. Waterflood operation has shown limited overall oil recovery enhancement from the pool. The Commission is highly concerned regarding current elevated reservoir pressures in the vicinity of the injectors. Good reservoir management requires a limit on the ultimate reservoir pressure at the cessation of pool operation, with consideration of demonstrated potential for pool pressure equalization.

Currently, there are eleven producing wells and one active injector. Recently submitted pressure tests show that in the vicinity of the current injector, well CNRL ET AL West Eagle 16-12-085-19 (WA 4453), the pressure of the adjacent wells are near or exceeding initial pool pressure. A reservoir pressure taken in 2013 shows a pressure value for the injector of 22,155 kPa exceeding the 120 percent of the initial reservoir pressure. The Commission requests that CNRL obtain a stable reservoir pressure within the next three months for this injector to verify the current reservoir pressure.

The following Orders are attached;

- 1) Order 80-09-002 Amendment #7 designating Pressure Maintenance Waterflood within the Eagle West field – Belloy “A” pool, as a Special Project under section 75 of the *Oil and Gas Activities Act*, and
- 2) Order 80-09-002 Amendment #7 - OTN approving Other Than Normal Spacing under section 65.1 of the *Petroleum and Natural Gas Act* for the subject area and formation.

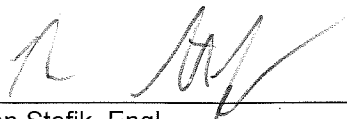
This amended approval includes a maximum wellhead injection pressure, an ultimate pool pressure limit, restriction of injection for the purpose of oil recovery, and the submission of a packer isolation test. Also included is a requirement for annual reservoir pressure tests on the injector and the observation wells. This approval will be re-evaluated upon review of the requested pressure test.

All injection wells, other than the currently active well 16-12, are no longer included in the Order as approved for injection service.

Please note that, as per section 75 of the *Drilling and Production Regulation*, a record of the volume of water injected must be included on a Monthly Injection or Disposal Statement (BC-S18). This statement must be submitted to the Commission no later than the 25<sup>th</sup> day of the month in which activity occurred.

Should you have any questions, please contact Petra Kriescher-Trudgeon at (250) 419-4415 or the undersigned at (250) 419-4430.

Sincerely,



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Ron Stefik, EngL  
Supervisor, Reservoir Engineering  
Oil and Gas Commission  
Attachments

## ORDER 80-09-002 AMENDMENT #7

1. Under Section 65.1(2) of the *Petroleum and Natural Gas Act*, Other Than Normal Spacing is approved within the Eagle West field – Belloy “A” pool within the following area;

DLS Twp 84 Rge 18 - S/2 & NW/4 Sect 19, NE/4 Sect 29, Sect 30, 31, 32, N/2 &  
SW /4 Sect 33

Twp 84 Rge 19 - N/2 Sect 24, NE/4 Sect 23, Sect 25, 36, E/2 Sect 26, 35

Twp 85 Rge 18 - W/2 Sect 4, Sect 5-7, SW/4 Section 8

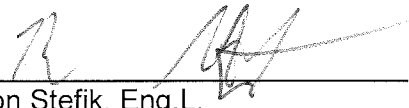
Twp 85 Rge 19 - Sect 1, 2, 11, 12, S/2 Sect 14.

2. Under section 75(2) of the *Oil and Gas Activities Act*, I specify the following:

- a) The project unadjusted daily oil allowable (UDOAA) is 1572.3 m<sup>3</sup>/d.
- b) All associated produced gas must be conserved.
- c) Water may be injected into the injection well CNRL et al W Eagle 16-12-085-19 W6M (WA 4453).
  - i) For wells injecting other than fresh water, inject only through tubing with a packer set as near as is practical above the injection interval.
  - ii) Not exceed an injection pressure, measured at the wellhead of 21,000 kPa or the pressure required to fracture the formation, whichever is lesser.
- d) Not exceed an average pool pressure of 20,120 kPa measured at 1,168 meters subsea.
- e) Cease injection for the well listed in (c) and notify the Commission immediately if hydraulic isolation is lost in the wellbore or formation
- f) Submit the annual packer isolation test report for the well listed in (c) to the Commission within 30 days of the completion of the test.
- g) Include the injection hours and the maximum injection pressure value for wells listed in (c) on the monthly BC-S18 form.
- h) Injection must cease upon termination of production from the pool.

Advisory Guidance for Order 80-09-002 AMENDMENT #7

- 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 injection statement must be submitted to the Commission not later than the 25<sup>th</sup> 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 injection operations suspended as per section 21.1 of the Drilling and Production Regulation.

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

DATED AT the City of Victoria, in the Province of British Columbia, this 31<sup>st</sup> day of July 2017.

**ORDER 80-09-002 AMENDMENT #7**

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DLS Twp 84 Rge 18 - S/2 & NW/4 Sect 19, NE/4 Sect 29, Sect 30, 31, 32, N/2 &  
SW /4 Sect 33

Twp 84 Rge 19 - N/2 Sect 24, NE/4 Sect 23, Sect 25, 36, E/2 Sect 26, 35

Twp 85 Rge 18 - W/2 Sect 4, Sect 5-7, SW/4 Section 8

Twp 85 Rge 19 - Sect 1, 2, 11, 12, S/2 Sect 14.

- 2 Under section 65.1(3) of the *Petroleum and Natural Gas Act*, I specify the following:
- a) the target area for an oil well completed within the project area is not nearer than 100 m to the sides of the Other Than Normal Spacing area,
  - b) an oil well completed outside the target area specified in paragraph (a) may be subject to an off-target production penalty,
  - c) oil wells drilled within the specified project area are not subject to spacing requirements.



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

DATED AT the City of Victoria, in the Province of British Columbia, this 31<sup>st</sup> day of July 2017.