

May 27, 2020

3440-6250-59240-09

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

Dear Ms. Wood:

**RE: PRESSURE MAINTENANCE WATERFLOOD ORDER 85-09-001 AMENDMENT #10  
EAGLE FIELD – BELLOY-KISKATINAW UNIT #1**

The Commission is presently reviewing and amending waterflood approvals to conform to current requirements. The continued operation of a pressure maintenance waterflood in the Eagle field – Belloy-Kiskatinaw Unit #1 by Canadian Natural Resources Limited (CNRL) requires this review.

The Eagle Belloy-Kiskatinaw oil pool commenced production in June 1973. A pressure maintenance waterflood project was approved in November 1985, with injection starting in the same month. A number of approval amendments have occurred. The pool currently has 12 producer and two injectors. A review of reservoir performance indicates that the waterflood was successful in stabilizing the GOR, achieving a cumulative oil recovery of approximately 37%.

The following Orders are attached;

- 1) Order 85-09-001 Amendment #10 designating Pressure Maintenance Waterflood within the Eagle field – Belloy-Kiskatinaw Unit #1, as a Special Project under section 75 of the *Oil and Gas Activities Act*, and
- 2) Order 85-09-001 Amendment #10 - 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 (MWHIP), an ultimate pool pressure limit, restriction of injection for the purpose of oil recovery, the submission of annual packer isolation tests, and a requirement for annual reservoir pressure testing. The ultimate reservoir pressure has been limited to the initial pool pressure, with the most recent tests indicating approximately that value. Only the two active injectors, CNRL Unit Eagle A7-35-84-18 (WA 11327) and CNRL Unit Eagle 4-35-84-18 (WA 11329), are approved for injection in the Order as all other injectors have not been used for injection service in over three years. Injectors are only approved to inject fresh water, as currently operated. Injection of produced water would require an amendment to this Order, with adjustment to the MWHIP.

Seismicity has been observed in the vicinity of the Eagle Belloy-Kiskatinaw Unit #1 pool. Note that operations related to induced seismicity are subject to the requirements of section 21.1 of the Drilling and Production Regulation, regarding reporting and injection shut-in.

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

Sincerely,



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

Attachments

**ORDER 85-09-001 – Amendment #10**

1. Under Section 75 (1) (a) of the *Oil and Gas Activities Act*, the Commission designates by Order the development and production of petroleum and natural gas from a pool using pressure maintenance waterflood enhance recovery scheme within the Eagle field – Belloy-Kiskatinaw Unit #1 following area;

Twp 84 Rge 18                      Sections 14, E/2 15, NE/4 21, 22, SW/4 & N/2 23, 25, 26, 27,  
SE/4 28, 34, 35 and W/2 36.

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:

- a) The project Daily Oil Allowable is 672.5 m<sup>3</sup>.
- b) All associated produced gas must be conserved.
- c) Water may be injected into the wells:

<b>Well Permit #</b>	<b>Well Name</b>	<b>Interval</b>
11327	CNRL Unit Eagle A7-35-84-18	1914.0 – 1923.0 mKB
11329	CNRL Unit Eagle 4-35-84-18	1806 – 1810.0 mKB

- i) Inject only fresh water for wells listed in (c)
- 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) A yearly reservoir pressure must be obtained from one injector listed in (c) and one other well completed in the pool, and submitted to the Commission within 60 days via e-submission.
- e) Not exceed an average pool pressure of 16,910 kPa measured at 1166.0 meters subsea for the wells listed in (c).
- f) Cease injection for the well listed in (c) and notify the Commission immediately if hydraulic isolation is lost in the wellbore or formation
- g) 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.
- h) Include the monthly injected volume, injection hours and the maximum injection pressure value for the well listed in (c) via Petrinex.
- i) Injection must cease upon termination of production from the pool.

**Advisory Guidance for Order 85-09-001 – Amendment #10**

- 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 Petrinex not later than the 20<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 27<sup>th</sup> day of May 2020.

## ORDER 85-09-001 Amendment #10 - OTN

1. Under Section 75 (1) (a) of the *Oil and Gas Activities Act*, the Commission designates by Order the development and production of petroleum and natural gas from a pool using pressure maintenance waterflood enhance recovery scheme within the Eagle field – Belloy-Kiskatinaw Unit #1 following area;

Twp 84 Rge 18                      Sections 14, E/2 15, NE/4 21, 22, SW/4 & N/2 23, 25, 26, 27,  
SE/4 28, 34, 35 and W/2 36.

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 27<sup>th</sup> day of May 2020.