



November 15, 2019

6800-4800-59240-09

Brittany Jorgensen  
Canadian Natural Resources Limited  
2100, 855 – 2nd St SW  
Calgary, AB T2P 4J8

Dear Brittany Jorgensen:

**RE: PRESSURE MAINTENANCE WATERFLOOD ORDER 67-09-001 AMENDMENT #8**  
**PEEJAY FIELD – HALFWAY FORMATION CNRL UNIT #3**

The Commission is presently reviewing and amending waterflood approvals to conform to current requirements. The continued operation of a pressure maintenance waterflood in the Peejay field – Halfway formation CNRL Unit #3 by Canadian Natural Resources Limited (CNRL) requires this review.

The discovery well, CNRL et al Peejay d-85-H/94-A-15 (WA 1407), was drilled and began production in February of 1964. An additional 42 wells were drilled and completed into the Unit between 1964 and 1972 and the remaining 9 were drilled between 1987 and 1997. Approval for waterflood was granted on March 31<sup>st</sup> of 1967 and injection began in April of 1974 into 5 injection wells. Subsequent waterflood approval amendments were granted to allow conversion of an additional 15 wells to injection service. Of the total 52 wells in the Unit, 21 are abandoned or abandoned zone, 22 are suspended, 4 are active production wells and 5 are active injection wells.

The following Orders are attached;

- 1) Order 67-09-001 Amendment #8 designating Pressure Maintenance Waterflood within the Peejay field – Halfway formation, as a Special Project under section 75 of the *Oil and Gas Activities Act*, and
- 2) Order 67-09-001 Amendment #8 - 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 tests on the injectors. Only the five active injectors (WA 1483, WA 1515, WA 2219, WA 2554, and WA 3383) are approved for injection in the Order as all other injectors have been abandoned. The ultimate reservoir pressure has been limited to the initial pool pressure. Order condition 2i) requires a packer isolation test on the CNRL et al Peejay d-64-H/94-A-15 (WA 1483), as no 2018 nor 2019 test has been received.

Please note that, as per section 75 of the *Drilling and Production Regulation*, a record of the volume of water injected and the MWHIP must be included on a Monthly Injection statement to the Commission via Petrinex not later than 20<sup>th</sup> day of the month following the reported month.

Should you have any questions, please contact Logan Gray at (250) 419-4465 or the undersigned at (250) 419-4430.

Sincerely,

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

Attachments

**ORDER 67-09-001 – Amendment #8**

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 enhanced recovery scheme within the Peejay field – Halfway CNRL Unit #3 following area;

NTS        94-A-15:        Block H - units 34, 44, 45, 51-58, 62-68, 73-78, 84-88 and 95-99

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 unadjusted daily oil allowable (UDOAA) is 1090.9 m<sup>3</sup>.
- b) All associated produced gas must be conserved.
- c) Water may be injected into the wells:

CNRL et al Peejay d-64-H/94-A-15 (WA 1483), interval 1170.4-1173.4 mKB  
CNRL et al Peejay d-44-H/94-A-15 (WA 1515), interval 1179.0-1185.0 mKB  
CNRL et al Peejay b-64-H/94-A-15 (WA 2219), interval 1172.8-1180.2 mKB  
CNRL Peejay b-76-H/94-A-15 (WA 2554), interval 1172.8-1177.7 mKB  
CNRL et al Peejay b-52-H/94-A-15 (WA 3383), interval 1174.0-1180.1 mKB.

- i) 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 10,200 kPa for wells listed in (c), or the pressure required to fracture the formation, whichever is lesser.
- d) An annual reservoir pressure must be obtained from the injectors listed in (c), and submitted to the Commission within 60 days via e-submission.
  - e) Not exceed an average pool pressure of 9,550 kPa measured at 457.0 meters subsea.
  - 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) Include the monthly injected volume, injection hours and the maximum injection pressure value for the well listed in (c) via Petrinex.
  - h) Injection must cease upon termination of production from the pool.
  - i) Complete and submit a pack isolation test on the well CNRL et al Peejay d-64-H/94-A-15 (WA 1483) before January 1<sup>st</sup>, 2020.

Advisory Guidance for 67-09-001 – Amendment #8

- 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 completed and 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 15<sup>th</sup> day of November 2019.




**ORDER 67-09-001 – Amendment #8 – OTN**

1 Under Section 65.1(2) of the *Petroleum and Natural Gas Act*, Other Than Normal Spacing within the Peejay field– Halfway formation is hereby approved within the following area;

NTS 94-A-15: Block H - units 34, 44, 45, 51-58, 62-68, 73-78, 84-88 and 95-99

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 specified target area 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  
BC Oil and Gas Commission

DATED AT the City of Victoria, in the Province of British Columbia, this 15<sup>th</sup> day of November 2019.