

December 13, 2012

0760-4800-59240-09

Travis Paradis  
Exploitation Engineer  
Canadian Natural Resources Limited  
Suite 2500, 855 – 2<sup>nd</sup> Street SW  
CALGARY, AB T2P 4J8

Dear Mr. Paradis:

**RE: PRESSURE MAINTENANCE WATERFLOOD SPECIAL PROJECT  
ORDER 96-09-004, AMENDMENT #3  
BEAVERTAIL HALFWAY "H" POOL**

The BC Oil and Gas Commission (the Commission) has reviewed your applications dated October 16, 2012 requesting amendments to the pressure maintenance waterflood order previously granted for the Beavertail Halfway "H" oil pool.

The following Orders are attached;


- 1) Order 96-09-004 (Amendment #3) designating Pressure Maintenance Waterflood, within the Beavertail - Halfway "H" pool as a Special Project under section 75 of the *Oil and Gas Activities Act*, and
- 2) Order 96-09-004-OTN (Amendment #3) approving Other Than Normal Spacing under section 65.1 of the *Petroleum and Natural Gas Act* for the subject formation and area.

This amendment includes the conversion of the well c-49-A/94-A-15 (WA 9341) to water injection service. Re-completion of this well should improve project oil recovery with pressure support in the eastern portion of the pool. The project area remains unchanged.

Please note that, as per section 75 of the *Drilling and Production Regulation*, a record of the volume of water injected and average injection pressure must be included on a Monthly Injection or Disposal Statement (BC-S18), which must be submitted to the Commission no later than the 25<sup>th</sup> day of the month in which activity occurred. Also, as per item 4 of the Approval, annual progress reports must be submitted to the Commission.

The operation of the pressure maintenance waterflood project will be subject to periodic review and the Commission may modify the Order, if deemed appropriate. Should you have any questions, please contact Ron Stefik at (250) 419-4430 or Michelle Gaucher at (250) 419-4482.

Sincerely,



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

Attachments

IN THE MATTER of an amendment application from Canadian Natural Resources Limited (CNRL) to the Commission dated October 16, 2012 for waterflood recovery of oil by water injection into the Beavertail Halfway "H" Pool.

**ORDER 96-09-004 (AMENDMENT #3)**

1. Under Section 75(1)(a) of the *Oil and Gas Activities Act*, the Beavertail Halfway "H" pool is designated as a special project for pressure maintenance for recovery of oil by water and gas injection within the following area;  
  
NTS 94-A-15:     Block A - units 38-40, 48-50, 60 and 70  
                      Block B - units 31, 41, 51 and 61.
2. Under section 75(2) of the *Oil and Gas Activities Act*, I specify the following:
  - a) The project oil production for a month shall be based on the previous month's voidage replacement.
  - b) All associated gas production will be conserved.
  - c) Water may be injected into the Beavertail Halfway "H" pool through the wells c-40-A/94-A-15 (WA# 9813) and c-49-A/94-A-15 (WA# 9341).
  - d) The wellhead injection pressure must be continually measured and recorded, and must not exceed the formation fracture pressure, to a maximum well head value of 11,600 kPaa.
  - e) The maximum average formation pressure should not exceed 12,840 kPaa, **120%** of the pool initial pressure of 10,700 kPaa.
  - f) The Permit Holder must conduct annual reservoir pressure (fall-off) tests of the Halfway formation in the wells noted in (c) (or a well in the area of influence), with a shut-in period of sufficient length to provide data for calculation of the reservoir pressure.
3. An oil well may be drilled anywhere within the project area provided that it is not nearer than 100 m to the sides of the project area.
4. The permit holder must submit a Progress report to the Commission for each twelve month period the project is in operation. The Progress report must be filed within 60 days after the end of each period and must contain the following:
  - i. the daily average rate during each month of oil production for each producing well, and for the project as a whole
  - ii. the average gas-oil and water-oil rates during each month for each producing well, and for the project as a whole
  - iii. the monthly cumulative gas, oil and water production for each producing well, and for the project as a whole

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- iv. for each type of fluid being injected, the daily average rate of injection per operating day during each month into each injection well, and for the project as a whole
- v. for each type of fluid being injected, the weighted average wellhead injection pressure during each month for each injection well, and for the project as a whole
- vi. for each type of fluid being injected, the monthly cumulative volume of fluid injected to each injection well, and for the project as a whole
- vii. the current volumetrically weighted formation pressure for the project as a whole and a copy of the isobaric map from which this pressure was calculated
- viii. the date and type of any well treatment or workover must be included on the production/injection report
- ix. calculations of the balance during each month between fluids injected into, and fluids withdrawn from, the part of the pool subject to the project and by individual patterns, where applicable
- x. an outline of the quality control measures in place for injection fluid treatment, or, where there has been no change in the control or treatment from that outlined in a previous report, a statement to that effect



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

DATED AT the City of Victoria, in the Province of British Columbia, this 13 day of December, 2012.

IN THE MATTER of Other Than Normal Spacing within the Beavertail – Halfway “H” pool as described in the amendment application from Canadian Natural Resources Limited (CNRL) to the Commission dated October 16, 2012.

**ORDER 96-09-004 OTN (AMENDMENT #3)**

1 Under Section 65.1(2) of the *Petroleum and Natural Gas Act*, Other Than Normal Spacing within the Beavertail – Halfway “H” pool is hereby approved within the following area;

NTS 94-A-15:      Block A - units 38-40, 48-50, 60 and 70  
                            Block B - units 31, 41, 51 and 61.

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.  
A/Supervisor, Reservoir Engineering  
Oil and Gas Commission

DATED AT the City of Victoria, in the Province of British Columbia, this 13<sup>th</sup> day of December 2012.