



March 10, 2015

2400-4805-59240-09

Jason Smith, P.Eng.  
Exploitation Engineer  
Canadian Natural Resources Ltd.  
2500, 855 – 2<sup>nd</sup> Street S.W.  
CALGARY, AB T2P 4J8

Dear Mr. Smith:

**RE: PRESSURE MAINTENANCE WATERFLOOD SPECIAL PROJECT  
OTHER THAN NORMAL SPACING ORDER  
BUICK CREEK FIELD – LOWER HALFWAY “C” POOL**

The Commission has reviewed the application, dated December 9<sup>th</sup>, 2014, requesting waterflood approval for the Buick Creek field – Lower Halfway ‘C’ pool. A waterflood scheme was approved in June 1999 (Approval 99-09-002), consisting of four injectors. In June of 2000 the waterflood scheme was terminated due to lack of available water for injection, resulting in limited pressure response in the pool. The current pressure of the subject pool is approximately 18% of the initial reservoir pressure. The Commission agrees that reinstating the waterflood may benefit oil recovery.

This approval includes conversion of the well CNRL Buick a-88-I/094-A-11 (WA 18149), which has been intermittently producing gas from this pool at a very low rate of  $\sim 1 \text{ e}^3 \text{ m}^3/\text{d}$ , to water injection. This injection location should provide sweep and pressure support to assist oil recovery.

The following Orders are attached;

- 1) Order 15-09-001 designating Pressure Maintenance Waterflood within the Buick Creek field – Lower Halfway ‘C’ pool, as a Special Project under section 75 of the *Oil and Gas Activities Act*, and
- 2) Order 15-09-001-OTN approving Other Than Normal Spacing under section 65.1 of the *Petroleum and Natural Gas Act* for the subject area and formation.

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) submitted to the Commission no later than the 25<sup>th</sup> day of the month in which activity occurred. Upon start of injection into the well a-88-I a form BC-11 Notice of Commencement or Suspension of Operations must be submitted to amend the status to water injector.

Note that Concurrent Production Approval 94-07-005 Amendment #7, for the Buick Creek - Halfway ‘C’ pool, which overlies the area of this Order, remains in effect.

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

Attachments

IN THE MATTER of an application from Canadian Natural Resources Limited to the Commission dated December 9<sup>th</sup>, 2014 for the production of oil using pressure maintenance water injection.

**ORDER 15-09-001**

- 1 Under Section 75(2) of the *Oil and Gas Activities Act*, the Buick Creek field – Lower Halfway “C” pool is designated as a special project for the recovery of oil utilizing Pressure Maintenance waterflood in the following area:

NTS 94-A-11 Block I – Units 75-78, 84-88, 94-98

94-A-14 Block A – Units 4-8, 14-17, 24-27 and 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. The Permit Holder shall:

- a) The daily oil allowable (DOA) is waived.
- b) The project daily gas allowable (DGL) is 453.8 e<sup>3</sup>m<sup>3</sup>/d.
- c) All associated produced gas must be conserved.
- d) Water may be injected into the Buick Creek – Lower Halfway “C” pool through well CNRL Buick a-88-1/094-A-11 (WA 18149).
- e) The maximum wellhead water injection pressure for the injection wells noted in (d) must not exceed 17,900 kPa.
- f) The permit holder must submit a Progress Report to the Commission for each 12 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
  - 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 which must be indicated, in the case of injection wells, on the report of the injected volume, and in the case of producing wells, on the report of the daily average oil production rate
- 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 method actually in use for the quality control and treatment of fluid being injected, or, where there has been no change in the control or treatment from that outlined in a previous report, a statement to that effect.

  
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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 10<sup>th</sup> day of March 2015.

IN THE MATTER of an application from Canadian Natural Resources Limited to the Oil and Gas Commission dated December 9<sup>th</sup>, 2014 for Other Than Normal Spacing.

**ORDER 15-09-001-OTN**

- 1 Under Section 65.1(2) of the *Petroleum and Natural Gas Act*, Other Than Normal Spacing is approved within the Buick Creek field – Lower Halfway C pool within the following area;  
NTS 94-A-11 Block I – Units 75-78, 84-88, 94-98  
94-A-14 Block A – Units 4-8, 14-17, 24-27 and 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 10<sup>th</sup> day of March 2015.