

November 17, 2016

1260-2600-32640-02

Florin Hategan
Exploitation Engineer
Canadian Natural Resources Ltd.
Suite 2500, 855 – 2nd Street S.W.
Calgary, Alberta T2P 4J8

Dear Mr. Hategan,

**RE: PRODUCED WATER DISPOSAL SPECIAL PROJECT APPROVAL
CNRL BIRCH a-85-H/94-A-13; WA# 7392
BIRCH FIELD – BLUESKY “A” POOL**

The Commission has reviewed CNRL’s application, received September 12, 2016, for produced water disposal into the subject well, Bluesky “A” pool. The a-85-H well was rig released in February, 1991 and placed on production in March 1991. In November 2011, this single well for the Birch Bluesky “A” pool was deemed uneconomic and was shut-in.

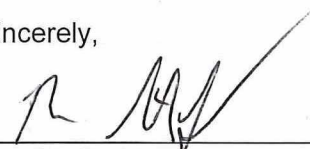
The conversion for disposal purposes took place in August 2016. The proposed disposal well will meet produced water disposal requirements from the surrounding area as well as Montney development.

Attached please find **Order 16-02-006**, designating an area in the Birch field – Bluesky formation as a Special Project under section 75 of the *Oil and Gas Activities Act*, for the operation and use of a storage reservoir for the disposal of produced water. This Order contains a number of detailed operational conditions, including continuous wellhead measurements, a maximum wellhead injection pressure, and an ultimate reservoir pressure limit. The casing inspection logging performed in September 2016 indicates a significant penetration at 1103mKB. Condition 2g) of the attached Order requires submission of a casing pressure report once per year, in addition to the packer isolation test. The casing pressure report will included data and a plot of the average daily casing pressure for the previous year. Additional general information regarding disposal wells is available on the Commission’s website at <http://www.bcogc.ca/industry-zone/documentation/Subsurface-Disposal>.

In certain circumstances, disposal well operation may induce seismicity. The Commission advises that disposal well permit holders monitor seismic events in proximity to the well and be prepared to modify operations to mitigate induced seismicity. Permit holders may monitor seismic events through the Natural Resources Canada seismic monitoring network at <http://www.earthquakescanada.nrcan.gc.ca/recent/index-eng.php>

Should you have any questions, please contact Michelle Gaucher at (250) 419-4482 or the undersigned at (250) 419-4430.

Sincerely,




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

Attachment

ORDER 16-02-006

- 1 Under Section 75(1)(d) of the *Oil and Gas Activities Act*, the Commission designates the operation and use of a storage reservoir for the disposal of produced water, including flowback from fracturing operations, into the Bluesky "A" pool – Birch field as a special project in the following area:
NTS 94-A-13 Block H Unit 85
- 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) Inject produced water only into the well CNRL Birch a-85-H/94-A-13; WA# 7392 – Bluesky formation (disposal perforations 1128.0 – 1139.0 mKB).
 - b) Not exceed an injection pressure, measured at the wellhead on the subject well, of 8,100 kPag or the pressure required to fracture the formation, whichever is lesser.
 - c) Inject only through tubing with a packer set as near as is practical above the injection interval.
 - d) Continually measure and record the wellhead casing and tubing pressures electronically.
 - e) Cease injection and notify the Commission immediately if hydraulic isolation is lost in the wellbore or formation.
 - f) Submit the annual packer isolation test report to the Commission within 30 days of the completion of the test.
 - g) Submit once annually a casing pressure report indicating daily casing pressure averages by January 30th for the preceeding year.
 - h) Include the disposal operating hours and the maximum injection pressure value on the monthly BC-S18 disposal statement.
 - i) Conduct an annual reservoir pressure test on the formation in the subject well, with a shut-in period of sufficient length to provide data for calculation of the reservoir pressure, and submit a report of the test within 60 days of the end of the test.
 - j) Cease injection upon reaching a maximum formation pressure of 6,000 kPaa, measured at 1133.5 mKB.
 - k)
 - i) Perform a casing inspection log on the subject well and submit results to the Commission within 30 days of the completion of logging, at an interval of not more than every 10 years, commencing from the date of initial disposal.
 - ii) Perform a hydraulic isolation temperature log on the subject well and submit results to the Commission within 30 days of the completion of logging, at an interval of not more than every 5 years, commencing from the date of initial disposal.
 - l) Not conduct a hydraulic fracture stimulation on any formation in the subject well without prior Commission approval.



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

DATED AT the City of Victoria, in the Province of British Columbia, this 17th day of November, 2016.



Advisory Guidance for Order 16-02-006

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