

September 10, 2020

8110-4060-32640-02

Don Spencer, P. Eng.
Canadian Natural Resources Limited
2100, 855 – 2nd St SW
Calgary, AB T2P 4J8

Dear Mr. Spencer:

**RE: PRODUCED WATER DISPOSAL SPECIAL PROJECT
SUKUNKA W SUKUNKA c-45-J/93-P-4 (WA #4431)
SUKUNKA FIELD – PARDONNET-BALDONNEL 'E' POOL**

The subject well was spudded in July of 1978. During drilling operations, gas pressure was detected in the annulus between the intermediate and production casing strings, indicating that there was a poor cement bond on the production casing. The casing was perforated at 1,813 m and a cement squeeze was successfully performed in February of 1979. The well was first completed in the Halfway 'A' pool in July of 1979 as a gas producer however the Halfway was immediately abandoned. The Pardonet-Baldonnel 'E' pool was hydraulically completed in the subsequent month for gas production. The well cumulatively produced 4,487 e⁶m³ of gas and stopped production in 2019. There are currently three permanent packers in the well. The Pardonet-Baldonnel 'E' pool is still producing from a single well, d-79-J/93-P-4 WA 7410.

Attached please find **Order 20-02-008**, designating an area in the Sukunka field – Pardonnet-Baldonnel 'E' pool 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 includes a number of detailed operational conditions including: continuous tubing and casing pressure measurements, a maximum wellhead injection pressure, as well as wellbore integrity monitoring and reporting requirements. The ultimate reservoir pressure limit is based on hydrostatic fluid column height in this well. Disposal wells are subject to regular field inspection and audit. Contravention of a condition of this Order may be subject to enforcement under section 62 of OGAA, or suspension or cancellation of the Order under section 75(2)(b).

There is a history of induced seismicity in the area however the risk from disposal operations in this pool is considered low. Should seismic events of concern be attributed to this well, an amendment to this Order to alter disposal operations, or cancellation of this Order may occur.

For the inspection requirement of Order condition 2n), please arrange via email to OGCPipelines.Facilities@bcogc.ca.

Disposal of fluid with high total dissolved solids content requires adjustment of the wellhead injection pressure to remain below formation fracture pressure. It is the responsibility of the permit holder make adjustments to wellhead injection pressure.

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

Sincerely,



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

Attachment



IN THE MATTER of the application from Canadian Natural Resources Limited to the Oil and Gas Commission (Commission) dated August 18, 2020 requesting disposal approval:

ORDER 20-02-008

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, in the Sukunka field – Pardonnet-Baldonnel 'E' pool as a special project in the following area:

NTS 93-P-4 Block J Unit 55

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 water into the well Sukunka W Sukunka c-45-J/93-P-4; WA# 4431 Pardonnet-Baldonnel 'E' pool from 1,826.0 – 2,209.0 mKB MD.
- b) Not exceed an injection pressure, measured at the wellhead on the subject well, of 10,125 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) Include the disposal operating hours and the maximum injection pressure value on the monthly Petrinex disposal report.
- f) Cease injection and notify the Commission at Reservoir@bcogc.ca immediately if there are any indications that hydraulic isolation is lost in the wellbore or formation.
- g) Conduct and submit an annual Surface Casing Vent Flow test to the Commission within 30 days of the completion of the test.
- h) 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.
- i) Cease injection upon reaching a maximum formation pressure of 13,675 kPaa, measured at 1,992.0 mKB TVD.
- j)
 - 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.
- k) Not conduct a hydraulic fracture stimulation on any formation in the subject well without prior Commission approval.
- l) Complete an inspection, satisfactory to the Commission, within 4 weeks of initial disposal operations.

A handwritten signature in blue ink, appearing to read "R Stefik".

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

DATED AT the City of Victoria, in the Province of British Columbia, this 10th day of September 2020.

Advisory Guidance for Order 20-02-008

- 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 conducted and the associated report must be submitted to the Commission within 30 days of test completion, 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 via Petrinex not later than the 20th 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.