

June 5, 2019

7410-2885-32640-02

Jaryn Flower, P.Eng
Production Engineer, NEBC
ARC Resources Ltd.
1200, 308 – 4th Avenue S.W.
Calgary, AB T2P 0H7

Dear Jaryn Flower:

**RE: PRODUCED WATER DISPOSAL SPECIAL PROJECT
ARCRES HZ N RED A4-6-86-21 W6M (WA #24530)
RED CREEK NORTH FIELD – CADOMIN-NIKANASSIN FORMATION**

The Commission has reviewed the application submitted by Benoit Regulatory Compliance on behalf of ARC Resources Ltd., dated April 4, 2019 requesting approval to dispose of produced water into the Cadomin and Nikanassin formations of the subject well.


This well was drilled and completed for production from the Doig “B” pool. Production of oil, gas and water occurred for only 4 months, ending Nov 2011. In September 2017, the well was re-entered and perforated in the Halfway formation for disposal purposes. The Halfway was not viable for disposal and was abandoned. The vertical Cadomin interval was perforated and injection tested in November 2017, proving suitable for disposal.

Attached please find **Order 19-02-008**, designating an area in the Red Creek North field – Cadomin-Nikanassin 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. The Commission identifies the formations at this location for disposal as a single compound name, reflecting the likely natural communication. This Order includes a number of detailed operational conditions including: continuous tubing and casing pressure measurements, a maximum wellhead injection pressure, an ultimate reservoir pressure limit, as well as wellbore integrity monitoring and reporting requirements. 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).

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

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

Sincerely,



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

Attachment


ORDER 19-02-008

- 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 Red Creek North field – Cadomin-Nikanassin formation as a special project in the following area:

DLS Twp 86 Rge 21 W6M Section 6 – Lsds 3 - 6

- 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 ARCRES Hz N Red A04-06-86-21; WA# 24530 Cadomin-Nikanassin formation from 1,202.0 – 1212.0 mKB TVD.
- b) Not exceed an injection pressure, measured at the wellhead on the subject well, of 15,550 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 immediately if hydraulic isolation is lost in the wellbore or formation.
- g) Submit the annual packer isolation test report to the Commission within 30 days of the completion of the test.
- h) Conduct and submit an annual Surface Casing Vent Flow test to the Commission within 30 days of the completion of the test.
- 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 12,000 kPaa, measured at 1207.0 mKB TVD.
- 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.
- m) Complete an inspection, satisfactory to the Commission, within 4 weeks of initial disposal operations.



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

DATED AT the City of Victoria, in the Province of British Columbia, this 5th day of June 2019.

Advisory Guidance for Order 19-02-008

- 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 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 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.