

July 15, 2019

4900-4800-32640-02

Jaryn Flower, P.Eng
Production Engineer, NEBC
ARC Resources Ltd.
1200, 308 – 4th Avenue S.W.
Calgary, AB T2P OH7

Dear Jaryn Flower:

**RE: PRODUCED WATER DISPOSAL SPECIAL PROJECT
ARCRES INGA 04-15-085-23 (WA #23607)
INGA FIELD – HALFWAY FORMATION**

The Commission has reviewed the application submitted by Benoit Regulatory Compliance on behalf of ARC Resources Ltd., dated June 10th, 2019 requesting approval to dispose of produced water into the Halfway formation of the subject well. The vertical well was drilled into the Montney and Doig formations for gas but never produced. The Montney and Doig intervals were abandoned in August 2018 and then the Halfway was perforated and hydraulically fractured in September 2018 for the purpose of disposal.

Attached please find **Order 19-02-011**, designating an area in the Inga field – Halfway 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 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).

The Commission advises disposal well permit holders to 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>.

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.

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

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


ORDER 19-02-011

- 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 Inga field – Halfway formation as a special project in the following area:

DLS Twp 85 Rge 23 W6M Section 15 – Lsd 3, 4, 5, 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 Inga 04-15-085-23; WA# 23607 Halfway formation from 1598.0 – 1611.0 mKB TVD.
- b) Not exceed an injection pressure, measured at the wellhead on the subject well, of 14,650 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) 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 18,700 kPaa, measured at 1604.5 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.



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

DATED AT the City of Victoria, in the Province of British Columbia, this 15th day of July 2019.

Advisory Guidance for Order 19-02-011

- 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.