

March 1, 2019

3400-2600-32640-02

Kris Kruse
Sr. Production Engineer, Dawson
ARC Resources Ltd.
1200, 308 – 4th Avenue SW
Calgary AB T2P OH7

Dear Mr. Kruse:

**RE: PRODUCED WATER DISPOSAL SPECIAL PROJECT
ARCRES DAWSON 5-34-79-14 W6M (WA #15377)
DAWSON CREEK FIELD - BLUESKY FORMATION**

Oil and Gas Commission staff have reviewed your application, dated January 2, 2019 requesting approval to dispose of produced water into the Bluesky formation of the subject well.

The subject vertical well was drilled in November 2002 into the Montney formation by Star Oil & Gas Limited. The well was perforated and fracture treated and produced a total of 10 e⁶m³ until September 2013. ARC purchased the well in in September 2003 and suspended the Montney formation in September 2015. Continuous development in the Dawson area created the need for additional water disposal resulting from fracture treatment flowback water and produced water. Test results confirm this wellbore and the Bluesky formation are suitable for disposal operations.

Attached please find **Order 19-02-002**, designating an area in the Dawson Creek 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 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.

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

Should you have any questions, please contact Petra Kriescher-Trudgeon at (250) 419-4415 or Ron Stefik at (250) 419-4430.

Sincerely,



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

Attachment

ORDER 19-02-002

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 disposal of produced salt water into the Bluesky formation – Dawson field as a special project in the following area:

DLS Twp 79 Rge 14 W6M Sec 34 - 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 produced water, including well flowback completion fluids only into the vertical well ARCRES Dawson 5-34-79-14 W6M; WA# 15377 – Bluesky formation (perfs. 1171.0 to 1184.5 mKB MD).
 - b) Not exceed an injection pressure, measured at the wellhead on the subject well, of 13,650 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) 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) Conduct and submit an annual Surface Casing Vent Flow test to the Commission within 30 days of the completion of the test.
 - h) Include the disposal operating hours and the maximum injection pressure value on the monthly Petrinex disposal report.
 - i) Conduct a reservoir pressure test on the formation in the subject well annually, 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 12,700 kPaa measured at 1172.5 mCF.
 - 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 injection.
 - 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 injection.
 - 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 1st day of March, 2019.

Advisory Guidance for Order 19-02-002

- 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.