



March 14, 2017

3425-2600-32640-02

Kristopher Kruse, P.Eng.
Senior Operations Production Engineer
ARC Resources Ltd.
1200, 308 4th Avenue, SW
Calgary, Alberta T2P 0H7

Dear Mr Kruse,

**RE: PRODUCED WATER DISPOSAL SPECIAL PROJECT APPROVAL
ARCRES DOE B13-7-80-14; WA# 31885
DOE FIELD – BLUESKY FORMATION**

The Commission has received ARC's application, dated November 24th, 2016, for produced water disposal into the subject well, Bluesky formation. The subject well was rig released on March 27, 2016, and completed for disposal into the Bluesky by May 2016. Tests provided in aid of the application show good wellbore integrity, good cement condition, and assurance that the disposal fluids are contained to the proposed disposal formation.

Attached please find **Order 17-02-001**, designating an area in the Doe 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 maximum wellhead injection pressure is based on the DFIT ISIP from nearby well WA 15702, completed in the Bluesky. Additional general information regarding disposal wells is available on the Commission's website at <http://www.bcogc.ca/industry-zone/documentation/Subsurface-Disposal>.

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

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 Harding at (250) 419-4493 or the undersigned at (250) 419-4430.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Ron Stefik', written over a horizontal line.

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

Attachment

ORDER 17-02-001

- 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 formation – Doe field as a special project in the following area:
DLS Twp 80 Rge 14 W6M Section 7 - Lsds 11,12, 13 and 14
- 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 ARGRES Doe B13-7-80-14; WA# 31885 – Bluesky formation (disposal perforations 1180.0 to 1190.0 mKB).
 - b) Not exceed an injection pressure, measured at the wellhead on the subject well, of 10,810 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) Include the disposal operating hours and the maximum injection pressure value on the monthly BC-S18 disposal statement.
 - 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 11,410 kPaa, measured at 1185 mKB.
 - 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 14th day of March, 2017.

Advisory Guidance for Order 17-02-001

- 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.