



February 15, 2019

6600-2600/2800-32640-02

Mr. Kyle Dobson
ARC Resources Ltd.
1200, 308 – 4th Avenue S.W.
Calgary, AB T2P 0H7

Dear Mr. Dobson:

**RE: PRODUCED WATER DISPOSAL WELL APPROVAL, AMENDMENT #1
ARCRES ET AL PARKLAND 7-9-81-16 W6M; WA# 22580
PARKLAND FIELD; BLUESKY AND CADOMIN FORMATIONS**

Approval for disposal of produced water, Order 13-02-003, was issued for the subject well, Bluesky and Cadomin formations, on June 28, 2013. This amendment reduces the maximum wellhead injection pressure and removes the condition to isolate the individual formations anytime disposal operations are suspended for three months or longer. The new maximum wellhead injection pressure has been calculated using a salt water gradient based on the results of a recent static gradient in the subject well. A number of other conditions have minor updates to bring the approval in line with current requirements.

The subject well was originally drilled in February 2007 and the Doig and Halfway formations were completed; but did not produce. The Cadomin and Blueskey formations were completed for the purpose of disposal in February 2013. The well has disposed a cumulative volume of 769,493.6 m³ as of December 31, 2018.

Attached find **Order 13-02-003 Amendment #1**, designating an area in the Parkland field – Bluesky and Cadomin formations a Special Project under section 75 of the *Oil and Gas Activities Act* (OGAA), for use of a storage reservoir for the disposal of produced water and well stimulation flowback fluid. This Order includes a number of detailed operational conditions, including: maximum wellhead injection pressure, maximum reservoir pressure limit, wellbore integrity monitoring and reporting requirements. Additional general information regarding disposal wells is available on the Commission's website at <http://bcogc.ca/node/5997/download>.

Should you have any questions, please contact Kathryn Archibald at (250) 419-4406 or Ron Stefik at (250) 419-4430.

Sincerely,



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

Attachment



ORDER 13-02-003 Amendment #1

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 and Cadomin formations – Parkland field as a special project in the following area:

DLS Twp 81 Rge 16 W6M Section 9 - Lsds 1,2,7 and 8.

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 well ARCRES et al Parkland 7-9-81-16; WA# 22580, Bluesky (1134.0 mKB - 1141.0 mKB) and Cadomin (1284.0 mKB - 1305.0 mKB) formations.
 - b) Not exceed an injection pressure, measured at the wellhead on the subject well, of 13,800 kPag or the pressure required to fracture the formation, whichever is lesser.
 - c) Inject only through tubing with a packer set as near as 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 values in the monthly volumetric reporting in Petrinex.
 - h) Report the disposal volumes in Petrinex 50% to the Bluesky and 50% to the Cadomin.
 - i) Cease injection upon reaching a maximum formation pressure of 9,850 kPaa, measured at 1137.5 mKB.
 - j) Conduct an annual reservoir pressure test on the unsegregated formations 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.
 - k) Maintain and manage the wellhead to prevent surface liquids from entering the well bore through the annulus outside or between casing and conductor strings.
 - l)
 - 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 original 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.
 - m) Not conduct a hydraulic fracture stimulation on any formation in the subject well without prior Commission approval.

A handwritten signature in black ink, appearing to read "Ron 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 15th day of February, 2019.

Advisory Guidance for Order 13-02-003 Amendment #1

- I. A production packer must be set above the injection interval and the space between the tubing and casing filled with corrosion 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. Monthly disposal must be reported to the Petrinex not later than the 20th day of the month following the reported month, as per section 75 of the Drilling and Production Regulation.