



June 22, 2017

6600-2800-32640-02

Kyle Dobson  
Senior Production Engineer  
ARC Resources Ltd.  
1200, 308 4th Avenue, SW  
Calgary, Alberta T2P 0H7

Dear Mr Dobson,

**RE: PRODUCED WATER DISPOSAL SPECIAL PROJECT APPROVAL; AMENDMENT #1  
ARCRES PARKLAND 15-17-81-16; WA# 13295  
PARKLAND FIELD – CADOMIN FORMATION**

Approval for disposal of produced water, Order 08-02-008, was issued for the subject well, Cadomin formation, on November 19, 2008. The Commission is presently amending disposal well approvals to conform to current requirements.

The subject well was initially completed in the Kiskatinaw and Halfway formations, however both were unproductive for commercial gas and subsequently abandoned. The Cadomin formation was completed in December 2008, evaluated as a wet zone, and tested for disposal potential. Disposal approval was granted, however no disposal has occurred to date. In preparation for disposal start, wellbore and reservoir testing was performed in 2014, with good results. The casing inspection log shows some sections of significant pitting and corrosion, but these are mainly below the BP set at 1475 mKB.

Attached please find **Order 08-02-008 Amendment #1**, designating an area in the Parkland field – Cadomin 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 tubing and casing pressure monitoring requirements, a maximum wellhead injection pressure and an ultimate reservoir pressure limit. The Commission expects that another BP will be set below the Cadomin perms to reduce the sump depth and to isolate from casing damage below. Additional general information regarding disposal wells is available on the Commission's website at <http://www.bcogc.ca/industry-zone/documentation/Subsurface-Disposal>.

In certain circumstances, disposal well operation may induce seismicity of values that require modification of operations to mitigate.

Disposal of fluid with high total dissolved solids content requires adjustment of the wellhead injection pressure to remain below formation fracture pressure

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 'R. Stefik', written over a horizontal line.


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

Attachment



## ORDER 08-02-008 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 Cadomin formation – Parkland field as a special project in the following area:  
DLS Twp 81 Rge 16 W6M Section 17 - Lsds 9, 10, 15 and 16
- 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 Parkland 15-17-81-16; WA# 13295 – Cadomin formation (disposal perforations 1239.0 – 1275.0 mKB).
  - b) Not exceed an injection pressure, measured at the wellhead on the subject well, of 12,685 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 13,200 kPaa, measured at 1257 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.
    - 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.
  - k) Not conduct a hydraulic fracture stimulation on any formation in the subject well without prior Commission approval.

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

DATED AT the City of Victoria, in the Province of British Columbia, this 22<sup>nd</sup> day of June, 2017.



**ORDER 08-02-008 Amendment #1**

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Advisory Guidance for Order 08-02-008 Amendment #1

- 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 25<sup>th</sup> 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.