



September 1, 2015

6600-2800-32640-02

Mike Charles  
Production Engineer NE BC  
ARC Resources Ltd.  
1200, 308 – 4<sup>th</sup> Avenue SW  
Calgary AB T2P OH7

Dear Mr. Charles,

**RE: PRODUCED WATER DISPOSAL SPECIAL PROJECT APPROVAL, AMENDMENT #1  
ARCRES PARKLAND 12-20-81-16 W6M; WA# 13033  
PARKLAND FIELD – CADOMIN FORMATION**

Approval for disposal of produced water, Order 05-02-007, was issued for the subject well, Cadomin formation, on September 19, 2005. The Commission is presently amending disposal well approvals to conform to current requirements.

The subject well was rig released September 4, 2000, and production tested in various formations below the Cadomin between September 2000 and July 2005. All zones were abandoned with a bridge plug and cement. Disposal was initiated in 2005. Wellbore integrity testing performed in July 2015 proves that the wellbore is still in excellent condition after 10 years of continuous disposal, and hydraulic isolation is maintained. A June 2015 static gradient proves that the reservoir pressure is less than 105% of the initial pressure, indicating remaining disposal capacity. It is noted that there is 244m of casing exposed to injected fluids between the base of Cadomin perforations and the PBSD in the well. The Baldonnell formation within this interval has some developed porosity and should be taken into account when completing future wellbore integrity testing specified in the attached approval.

Attached please find **Order 05-02-007 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 use of a storage reservoir for the disposal of produced water. This Order contains a number of detailed operational conditions. 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. Section 21.1 of the Drilling and Production Regulation requires 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 Natural Resources Canada seismic monitoring network at <http://www.earthquakescanada.nrcan.gc.ca/recent/index-eng.php>.

Should you have any questions, please contact Ron Stefik at (250) 419-4430 or Michelle Harding at (250) 419-4493.

Sincerely,

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

Attachment



### ORDER 05-02-007 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, into the Cadomin formation – in the Parkland field as a special project in the following area:

DLS Twp 81 Rge 16 W6M Section 20 - 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 ARCRES Parkland 12-20-81-16 W6M; WA# 13033 – Cadomin formation (disposal perforations 1222.0 – 1256.0 mKB).
- b) Not exceed an injection pressure, measured at the wellhead on the subject well, of 16,000 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 12,720 kPaa, measured at MPP.
- 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.

  
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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 1<sup>st</sup> day of September, 2015.

Advisory Guidance for Order 05-02-007 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.