



April 11, 2017

3425-6200-59240-16

Jeremy Burkhardt, P.Eng
ARC Resources Ltd.
1200, 308 – 4th Avenue SW.
Calgary AB T2P 0H7

Dear Mr. Burkhardt:

**RE: ACID GAS DISPOSAL APPROVAL
ARCRES DOE A13-07-080-14; WA#30922
DOE FIELD – BELLOY FORMATION**

Commission staff have reviewed the application, submitted by Canadian Chemical Technology Inc. on behalf of ARC Resources Ltd., dated October 12, 2016 requesting approval to operate the subject well for acid gas disposal into the Belloy formation.

The A13-7 well was purpose drilled for acid gas disposal in September 2015. ARC has received a permit to construct a 180 Mmcf/d gas processing plant at 13-7-80-14W6M. Phase one will operate at a gas rate of 2.5 e⁶m³/d resulting in approximately 12 e³m³/d of disposed fluids. The Belloy formation has been shown to be thick and extensive, with vertical containment, making it a suitable storage reservoir.

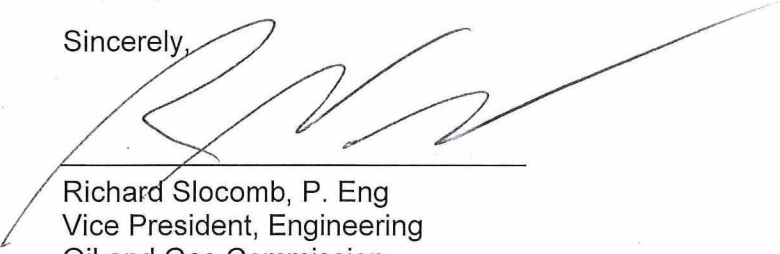
In certain circumstances, disposal well operation may induce seismicity. The Order requires installation of a ground motion accelerometer at the well site. Disposal well permit holders must monitor seismic events in proximity to the well and be prepared to modify operations to mitigate induced seismicity. 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>

Attached please find Order 17-16-001 designating an area in the Doe field Belloy 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 acid gas. The Order contains numerous specific conditions regarding operation, monitoring, testing and reporting to verify continued suitability.

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

Should you have any questions, please contact Michelle Gaucher at (250) 419-4482 or Ron Stefik at (250) 419-4430.

Sincerely,



Richard Slocomb, P. Eng
Vice President, Engineering
Oil and Gas Commission

Attachment

ORDER 17-16-001

- 1 Under Section 75(1)(d) of the *Oil and Gas Activities Act*, the Commission designates the Belloy formation as a special project for the operation and use of a storage reservoir for the disposal of acid gas within the following area:

DLS TWP 80 RNG 14W6M Sec 7.

- 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:

Well Details

- a) Inject acid gas only into the well ARGRES DOE A13-07-80-14; WA 30922 – Belloy formation (2266 – 2282 mKB MD).

Operating Limits

- b) Limit the maximum H₂S concentration to 72.2%
- c) Not exceed an injection pressure, measured at the wellhead on the subject well, of 20,000 kPag or the pressure required to fracture the formation, whichever is lesser.
- d) Inject only through tubing with a packer set as near as is practical above the injection interval.
- e) Continually measure and record the wellhead casing and tubing pressures electronically, including when the disposal well is inactive or suspended.
- f) Alarm the annulus pressure monitoring system to indicate when casing pressure varies outside the normal operating range by greater than 500 kPa.
- g) Cease injection upon reaching a maximum formation pressure of 27,200 kPaa measured at MPP.

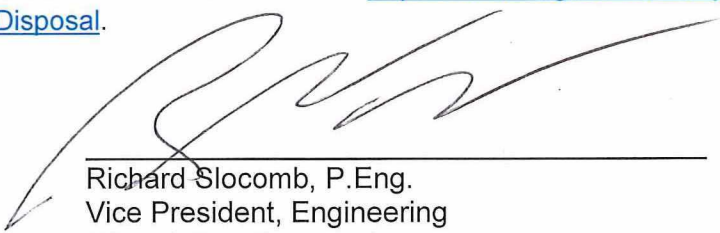
Monitoring

- h) An inspection satisfactory to the Commission is required within 4 weeks of initial disposal operations.
- i) Sample gas from all producing lower Montney wells within 3 km of the subject disposal well each 6 months and submit the gas composition analysis.
- j) Sample the disposal fluid and submit composition analysis at least twice annually, indicating the disposal well as the sample source.
- k) Submit the annual packer isolation test report to the Commission within 30 days of the completion of the test.
- l) Conduct and submit an annual Surface Casing Vent Flow test to the Commission within 30 days of the completion of the test
- m) Include the disposal operating hours, the maximum injection pressure and the minimum temperature values on the monthly BC-S18 disposal statement.
- n) Install seismic ground motion monitoring on the wellsite with capability to measure events as indicated in this document <http://www.bcogc.ca/node/13256/download> by June 30, 2017.

- o) At each facility turn-around and at an interval of no greater than 4 years, conduct a 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.

Wellbore Integrity

- p) Ensure a Wellhead Emergency Shut-Off Device and Subsurface Safety Valve (SSSV) are installed to operate "fail-safe" and are linked to H₂S detector heads at the wellhead.
- q) Implement appropriate corrosion and freeze protection measures in the casing-tubing annulus.
- r) Conduct function testing of SSSV at least annually, or as recommended by API 14B or the manufacturers - whichever is more rigorous.
- s) Conduct SSSV retrieval and inspection as per API 14B or the manufacturers recommended practice – whichever is more rigorous.
- t) Annually confirm the Subsurface Safety Valve is capable of activation remote from the wellhead.
- u) Immediately suspended all injection operations if any injection equipment, monitoring equipment or safety devices considered necessary for safe operation should fail.
- v) Cease injection and notify the Commission immediately if hydraulic isolation is lost in the wellbore or formation.
- w) Perform 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 10 years, commencing from the date of initial disposal. Through tubing logging is acceptable.
- x) 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 5 years, commencing from the date of initial disposal
- y) Install a barricade around the wellhead that is capable of withstanding vehicle collision.
- z) Not conduct a hydraulic fracture stimulation on any formation in the subject well without prior Commission approval.
- aa) Submit a Progress Report to the Commission for each six month period the project is in operation. The Progress Report must be filed within 60 days after the end of each period and must contain the information specified in the Acid Gas Progress Report Requirements document found on the OGC website here: <http://www.bcogc.ca/industry-zone/documentation/Subsurface-Disposal>.



Richard Slocomb, P.Eng.
Vice President, Engineering
Oil and Gas Commission

DATED AT the City of Victoria, in the Province of British Columbia, this 11th day of April, 2017.

Advisory Guidance for Order 17-16-001

- 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, as per section 16(3) of the Drilling and Production Regulation.
- III. Injected fluids must be metered, 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. All fluid analyses must be submitted with 30 days of tests as per section 34 (5) (a) of the Drilling and Production Regulation.