



September 13, 2017

3425-6200-59240-16

Kris Kruse, P.Eng.  
ARC Resources Ltd.  
1200, 308 – 4<sup>th</sup> Avenue SW.  
Calgary AB T2P 0H7

Dear Mr. Kruse:

**RE: ACID GAS DISPOSAL APPROVAL 10-16-002 AMENDMENT #2**  
**ARCRES DOE 5-35-79-14: WA# 25345**  
**DOE FIELD – BELLOY FORMATION**

The subject well is operated for deep disposal of waste by-product acid gas (H<sub>2</sub>S & CO<sub>2</sub>), approved as Special Project Order Approval #10-16-002 Amendment #1 under section 75 of the Oil and Gas Activities Act.

The Commission is amending approvals to include current requirements for monitoring, measurement, operating, testing and reporting. The review includes wellbore integrity, well operation, maintenance, reservoir monitoring and emergency planning.

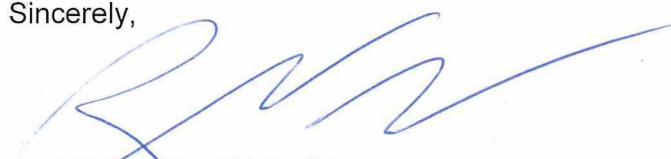
Attached please find Order 10-16-002 Amendment #2 designating an area in the Doe field Belloy formation, for the operation and use of a storage reservoir for the disposal of acid gas. The previous requirement for a dedicated observation well has been removed as the reservoir plume will be monitored through modelling.

Changes to emergency response planning requirements and planning zone determination is expected as a result of this amendment. The Emergency Planning Zone will be calculated based on the maximum H<sub>2</sub>S and maximum allowed reservoir pressure. The changes to the Emergency Response Plans and planning zones will be conducted through the Commission's Security and Emergency Management branch. Please contact Peter Dalton (Peter.Dalton@bcogc.ca), Director, Security & Emergency Management, to make the required amendments.

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



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

Attachments

## ORDER 10-16-002 AMENDMENT #2

- 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 79    RNG 14 W6M        Sec 35.

- 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 5-35-79-14; WA 25345 – Belloy formation (2199.0 – 2208.5 mKB MD).

### Operating Limits

- b) Limit the maximum H<sub>2</sub>S concentration of the disposal fluid stream to 78%.
- c) Not exceed an injection pressure, measured at the wellhead on the subject well, of 20,300 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 27,050 kPaa measured at MPP of 2203.8 mKB.

### Monitoring

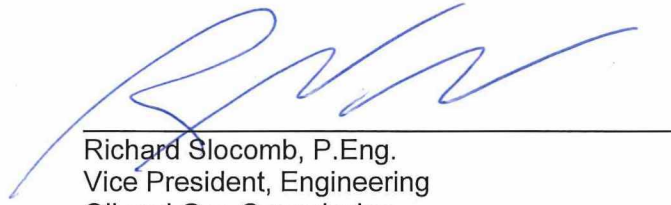
- h) An inspection satisfactory to the Commission is required within 2 months of approval amendment date.
- i) Sample gas from all producing lower Montney wells within 3 km of the subject disposal well each 6 months and submit the gas composition analysis, on a best efforts basis.
- j) Sample the disposal 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 daily average injection pressure and the minimum daily average temperature values on the monthly BC-S18 disposal statement.
- n) Commence 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 December 31, 2017.



- o) At each scheduled facility maintenance shut-down 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 H<sub>2</sub>S detection 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 requires more rigorous function testing.
- 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 yrs. 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 the next scheduled facility maintenance shut-down. Subsequently at an interval of not more than 6 years.
- 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>.
- bb) Prior to abandonment of the disposal zone or well, 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.



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

DATED AT the City of Victoria, in the Province of British Columbia, this 13<sup>th</sup> day of September, 2017.

### **Advisory Guidance for Order 10-16-002 Amendment #2**

- 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 25<sup>th</sup> 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.