



March 23, 2017

0320-4100-32640-02

Graham Janega, P. Eng.  
VP, Subsurface  
Canbriam Energy Inc.  
2100, 215 2<sup>nd</sup> Street SW  
Calgary, AB T2P 1M4

Dear Mr. Janega,

**RE: PRODUCED WATER DISPOSAL SPECIAL PROJECT APPROVAL; AMENDMENT #1  
CANBRIAM ALTARES B15-01-85-26 W6M; WA# 27473  
ALTARES FIELD – BALDONNEL FORMATION**

Oil and Gas Commission staff have reviewed the letter from Canbriam Energy Inc, dated March 13, 2017, requesting approval to resume disposal into the Baldonnell formation of the subject well for a temporary 90 day injection period. This request follows a presentation at our office on March 9, 2017.

Disposal was originally approved into the Baldonnell formation of the subject well under Order 16-02-001, issued on January 22, 2016. The well has disposed a cumulative volume of 72,330 m<sup>3</sup> in the 9 months since disposal started in February 2016. In December 2016, the well was shut-in for an extended reservoir pressure test. The results show a 60-day shut in pressure that is significantly elevated above the pressure limit prescribed in condition 2j) of Order 16-02-001. Canbriam has provided extensive reservoir modelling to prove that the pressure will continue to fall off below the pressure limit within 6 months. Canbriam has proposed to gather more data with a 90 day temporary injection period.

Attached please find **Order 16-02-001 Amendment #1** designating an area near the Altares field – Baldonnell 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, including a volume limit for the temporary injection period, and a requirement for two pressure tests to be performed, prior to and following the 2017 injection period.

Continuous seismic monitoring was required in condition 2e) of Order 16-02-001. Results of this monitoring during the initial 9 months of injection have shown clusters of low-level events that track the reservoir pressure response from the disposal fluids. During a portion of the 90 day trial period, additional seismic monitoring will be conducted using a 40-station surface deployed seismic array deployed as part of the 15-01-85-26 pad completion operations. This array will enhance the precision of the seismic event detection, in part to verify that events and fluid remain contained within the disposal formation. As before, seismicity events of concern attributed to this well may result in an amendment to this Order to alter disposal operations or termination of this Order.

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

Sincerely,

A handwritten signature in black ink, appearing to read 'R Stefik', written over a horizontal line.

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


Attachment

**ORDER 16-02-001 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 Baldonnel formation – near the Altares field as a special project in the following area:

DLS Twp 85 Rge 26 W6M Section 01 -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 Canbriam Altares B15-01-85-26 W6M; WA# 27473 – Baldonnel formation (disposal perforations 1529.0 to 1539.0 mKB).
  - b) Following re-commencement of disposal in 2017, cease injection upon reaching a temporary volume limit of 27,000 m<sup>3</sup>, or after 90 days, whichever comes first.
  - c) Not exceed an injection pressure, measured at the wellhead on the subject well, of 14,100 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.
  - f) Continually monitor seismicity using currently installed passive seismic monitoring array and provide recorded information with interpretation upon request.
  - g) During the temporary injection period outlined in condition b), complete a minimum of 30 days enhanced seismic monitoring with the 40-station surface deployed seismic array deployed as part of the 15-01-85-26 pad completion operations.
  - h) Cease injection and notify the Commission immediately if hydraulic isolation is lost in the wellbore or formation.
  - i) Submit the annual packer isolation test report to the Commission within 30 days of the completion of the test.
  - j) Include the disposal operating hours and the maximum injection pressure value on the monthly BC-S18 disposal statement.
  - k) Prior to the temporary injection period outlined in condition b), perform a reservoir pressure test on the formation in the subject well, and submit a report of the test within 60 days of the end of the test.
  - l) Following the temporary injection period outlined in condition b), perform a reservoir pressure fall-off test with bottomhole recorders, with a shut in time of at least 60 days, and submit a report of the test within 60 days of the end of the test.
  - m) 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 23<sup>rd</sup> day of March, 2017.

## Advisory Guidance for Order 16-02-001 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.