



September 19, 2014

3425-2600/2800-32640-02

Peter Cochrane
Leucrotta Exploration Inc.
Suite 700, 639 – 5th Avenue SW
Calgary, Alberta
T2P 0M9

Dear Mr. Cochrane:

**RE: PRODUCED WATER DISPOSAL SPECIAL PROJECT APPROVAL
CROCOTTA DOE 07-25-080-15 W6M; WA# 14534
DOE FIELD – BLUESKY AND CADOMIN FORMATIONS**

Oil and Gas Commission staff have reviewed the application, dated March 17th, 2014 requesting approval to dispose of produced water into the Bluesky and Cadomin formations of the subject well.

This well was drilled to a depth of 3,475m in January 2002, to evaluate the Montney and Kiskatinaw formations. The Pekisko formation produced gas from August 2008 to September 2009. In 2009 Crocotta Energy acquired the well bore. In 2013 the well was re-completed as a potential Baldonnel, Bluesky and Cadomin water disposal well. The Baldonnel formation was perforated at 1457 to 1460 mKB, injection tested and acidized but did not achieve a desired feed rate. At the time of application the Baldonnel had not been abandoned. Abandonment of the Baldonnel is required before disposal into the Bluesky and Cadomin can commence. Injection testing indicates that the Bluesky and Cadomin formations in this well are in communication, segregation of the zones is not required.

The subject well is proximal to an acid gas disposal well into the Belloy formation, SEMC Doe 15-24-80-15 W6M. Operation of the well 7-25 is contingent on demonstrating continued competency of the casing cement providing containment of disposal fluids within the objective formations. Ensuring isolation is required annually with a full wellbore temperature log, conducted applying methodology advised in AER Directive 51, as per Order condition 2. (j)(ii).

Attached please find Order 14-02-007, designating an area in the Doe field – Bluesky and Cadomin formations 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 and well stimulation flowback fluid. This Order includes a number of detailed operational conditions including: continuous wellhead measurements, a maximum wellhead injection pressure, ultimate reservoir pressure limit, as well as wellbore integrity monitoring and reporting requirements. Disposal wells are subject to regular field inspection and audit. Contravention of a condition of this Order may be subject to enforcement under section 62 of OGAA, or suspension or cancellation of the Order under section 75(2)(b).

Monthly reporting requirement instructions are posted at <http://www.bcogc.ca/node/11152/download>. 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. The Commission advises disposal well 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 the Natural Resources Canada seismic monitoring network at <http://www.earthquakescanada.nrcan.gc.ca/recent/index-eng.php>

A notice of this application was posted on the OGC website, with no objections received.

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

Sincerely,



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

Attachment

ORDER 14-02-007

1. Under Section 75(1)(d) of the *Oil and Gas Activities Act*, the Oil and Gas Commission (Commission) designates the operation and use of a storage reservoir for the disposal of produced water, including flowback from fracturing operations, into the Bluesky and Cadomin formations – Doe field as a special project in the following area:

DLS Twp 80 Rge 15 W6M Section 25 - Lsds 1, 2, 7 and 8.

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, including well flowback completion fluids, only into the well Crocotta Doe 7-25-80-15 W6M; WA# 14534 Bluesky (1109 – 1112 mKB) and Cadomin (1249 – 1252 and 1304 – 1307 mKB) formations.
 - b) Not exceed an injection pressure, measured at the wellhead on the subject well, of 12,400 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.
 - 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. Report monthly disposal volumes 50% to the Bluesky and 50% to the Cadomin.
 - h) Cease injection upon reaching a maximum formation pressure of 11,300 kPaa.
 - i) 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.
 - j) i) Perform a casing inspection log to plug back depth 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 annual hydraulic isolation log on the subject well to plug back depth and submit results to the Commission within 30 days of the completion of logging.
 - k) Not conduct hydraulic fracture stimulation on any formation in the subject well without prior Commission approval.



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

DATED AT the City of Victoria, in the Province of British Columbia, this 19th day of September 2014.

Advisory Guidance for Order 14-02-007

- I. A production packer must be set above the injection interval and the space between the tubing and casing (including the space between the 3 packers) 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.