



March 11, 2019

8157-2800/2850-32640-02

Trevor Befus
Environment and Regulatory Planner
Catapult Environmental Inc.
Suite 1620, 700 – 9th Ave S.W.
Calgary, AB T2P 3V4

Dear Mr. Befus,

**RE: PRODUCED WATER DISPOSAL SPECIAL PROJECT AMENDMENT #3
CATAPULT TOWER 13-26-81-17; WA# 20155
TOWER LAKE FIELD – CADOMIN AND NIKANASSIN FORMATIONS**

Approval for disposal of produced water, Order 18-02-006, was issued for the subject well, Cadomin and Nikanassin formations, on October 17, 2018. The Commission amended this disposal approval to include the ratio of fluids to be reported to each formation and removed condition 2m) as the inspection has been completed.

Attached please find **Order 18-02-006 Amendment #3**, designating an area in the Tower Lake field – Cadomin and Nikanassin 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. A dual packer arrangement isolates the previously perforated and cement squeezed Bluesky interval. This Order includes a requirement for annual packer isolation testing. For this test, only the uppermost packer will be tested. As a result, the maximum wellhead pressure is limited to the fracture gradient for the Bluesky formation.

Disposal of fluid with high total dissolved solids content requires adjustment of the wellhead injection pressure to remain below formation fracture pressure.

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

Sincerely,

A handwritten signature in blue ink, appearing to read "Ron Stefik", written over a horizontal line.

Ron Stefik, EngL
Supervisor, Reservoir Engineering
Oil and Gas Commission

Attachment

ORDER 18-02-006 Amendment #3

- 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, including flowback from fracturing operations, in the Tower Lake field – Cadomin and Nikanassin formations as a special project in the following area:

DLS Twp 81 Rge 17 W6M Section 26 - 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 Catapult Tower 13-26-81-17; WA# 20155 – Cadomin (perforations 1235.0 to 1263.0 mKB) and Nikanassin (perforations 1287.0 to 1301.0 mKB) formations.
 - b) Report the injection volumes 50% to the Cadomin formation and 50% to the Nikanassin formation.
 - c) Not exceed an injection pressure, measured at the wellhead on the subject well, of 13,800 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) Cease injection and notify the Commission immediately if hydraulic isolation is lost in the wellbore or formation.
 - g) Submit the annual packer isolation test report to the Commission within 30 days of the completion of the test.
 - h) Include the disposal operating hours and the maximum injection pressure value on the monthly disposal statement.
 - 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) Cease injection upon reaching a maximum formation pressure of 13,400 kPaa, measured at 1249.0 mKB TVD.
 - k) 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.
 - l) Not conduct a hydraulic fracture stimulation on any formation in the subject well without prior Commission approval.



Ron Stefik
Supervisor, Reservoir Engineering
Oil and Gas Commission

Advisory Guidance for Order 18-02-006

- 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 via Petrinex not later than the 20th 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.