

May 9, 2019

6600-2800-32640-02

Izet Ferraj
Sr. Exploitation Engineer
Canlin Energy Corporation
2600, 237 – 4th Avenue SW
Calgary AB T2P 4K3

Dear Mr. Ferraj:

**RE: PRODUCED WATER DISPOSAL SPECIAL PROJECT
CANLIN ET AL PARKLAND A6-29-81-15 W6M (WA #23159)
PARKLAND FIELD - CADOMIN FORMATION**

Oil and Gas Commission staff have reviewed the application, dated January 23, 2019 requesting approval to dispose of produced water into the Cadomin formation of the subject well. The vertical well A6-29 was drilled in October 2007 into the Belloy formation, completed and tested uneconomic. In 2015 the Belloy formation was evaluated for disposal operation, however was zonal abandoned and the well recompleted for Cadomin disposal.

Attached please find **Order 19-02-007**, designating an area in the Parkland field – Cadomin 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 produced water. This Order includes a number of detailed operational conditions including: continuous tubing and casing pressure measurements, a maximum wellhead injection pressure, an 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).

The well A6-29 currently has a sump, distance from base of Cadomin perms to plug-back depth (PBD), of approximately 815 meters. Within this interval a casing inspection log interpretation identified level "2" penetrations starting at a depth of 1499 mKB; exposure to continuous operational pressures and disposal fluids during injection has the potential to further degrade casing integrity. The OGC Water Service Wells Summary document, page 17, recommends limiting disposal fluid casing exposure over porous zones below disposal depth. As per Order condition 2g), Canlin has up to 18 months to reduce the sump depth, to correspond the work with future well activities. Until the PBD is reduced, the MWHIP is based on the burst rating of the compromised exposed casing, to minimize the potential for casing failure. Once PBD is reduced, application may be made to amend the Order to increase the MWHIP based on the formation fracture gradient, estimated to result in a MWHIP value of 12.75 MPa. Failure to reduce the PBD within 18 months of initial disposal operation will result in noncompliance with the Order and requirement to cease disposal operation.

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>.

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

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

Should you have any questions, please contact Petra Kriescher-Trudgeon at (250) 419-4415 or Ron Stefik at (250) 419-4430.

Sincerely,



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

Attachment



ORDER 19-02-007

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 disposal of produced salt water into the Cadomin formation – Parkland field as a special project in the following area:

DLS Twp 81 Rge 15 W6M Sec 29 Lsds 3 - 6

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 vertical well Canlin et al Parkland A6-29-81-15 W6M; WA# 23159 – Cadomin formation (perfs. 1245.0 to 1285.0 mKB MD).
- b) Not exceed an injection pressure, measured at the wellhead on the subject well, of 9,000 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 electronically.
- 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) Reduce the plug back depth of the well, to above any porous zones below the base of the perforation interval, within 18 months of the commencement of disposal operation.
- h) Conduct and submit an annual Surface Casing Vent Flow test to the Commission within 30 days of the completion of the test.
- i) Include the disposal operating hours and the maximum injection pressure value on the monthly Petrinex disposal report.
- j) Conduct a reservoir pressure test on the formation in the subject well annually, 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.
- k) Cease injection upon reaching a maximum formation pressure of 13,750 kPaa measured at 1260.8 mCF.
- l)
 - 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 injection.
 - 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 injection.
- m) Not conduct a hydraulic fracture stimulation on any formation in the subject well without prior Commission approval.
- n) Complete an inspection, satisfactory to the Commission, within 4 weeks of initial disposal operations.



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

DATED AT the City of Victoria, in the Province of British Columbia, this 9th day of May, 2019.

Advisory Guidance for Order 19-02-007

- 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.