



August 13, 2019

7745-2885-32640-02

Sean McDonald
Project Delivery
Shell Canada Ltd.
400-4th Avenue SW
Calgary, AB T2P 2H5

Dear Sean McDonald:

**RE: PRODUCED WATER DISPOSAL SPECIAL PROJECT
SHELL HZ SATURN A8-26-80-19 (WA #37940)
SATURN FIELD – CADOMIN-NIKANASSIN FORMATION**

The Commission has reviewed the application submitted by Shell Canada Ltd., dated July 15th, 2019 requesting approval to dispose of produced water into the Cadomin formation of the subject well. The subject horizontal well was purpose-drilled for disposal in May 2019.

Attached please find **Order 19-02-013**, designating an area in the Saturn field – Cadomin-Nikanassin 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. The Commission recognizes the Cadomin and Nikannassin formations as a compound, unsegregated zone in this area for disposal use. 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 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. It is the responsibility of the permit holder make adjustments to wellhead injection pressure.

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

Should you have any questions, please contact Logan Gray at (250) 419-4465 or Ron Stefik at (250) 419-4430.

Sincerely,

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

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


Attachment

ORDER 19-02-013

- 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 Saturn field – Cadomin-Nikinassin formation as a special project in the following area:

DLS Twp 80 Rge 19 W6M Section 26 – Lsds 1, 2, and 7 - 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 water into the well Shell HZ Saturn A8-26-80-19; WA# 37940 Cadomin-Nikinassin formation from 1512.7 –2798.0 mKB MD.
 - b) Not exceed an injection pressure, measured at the wellhead on the subject well, of 11,650 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) Include the disposal operating hours and the maximum injection pressure value on the monthly Petrinex disposal report.
 - f) Cease injection and notify the Commission immediately if hydraulic isolation is lost in the wellbore or formation.
 - g) Conduct and submit an annual Surface Casing Vent Flow test to the Commission within 30 days of the completion of the test.
 - h) 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.
 - i) Cease injection upon reaching a maximum formation pressure of 13, 250 kPaa, measured at 1283.8 mKB TVD.
 - j)
 - 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.
 - k) Not conduct a hydraulic fracture stimulation on any formation in the subject well without prior Commission approval.
 - l) 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 13th day of August 2019.

Advisory Guidance for Order 19-02-013

- 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 conducted and the associated report must be submitted to the Commission within 30 days of test completion, 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.