



November 21, 2014

8157-2800-32640-02

Scott Hagen  
Tervita Corporation  
500, 140 – 10<sup>th</sup> Avenue SE  
Calgary, AB T2G 0R1

Dear Mr. Hagen:

**RE: PRODUCED WATER AND NON-HAZARDOUS WASTE DISPOSAL  
SPECIAL PROJECT APPROVAL  
TERVITA TOWER A08-31-81-17 W6M; WA# 30428  
TOWER LAKE FIELD – CADOMIN FORMATION**

Oil and Gas Commission staff have reviewed the application, dated October 10<sup>th</sup>, 2014, requesting approval to dispose of produced water and non-hazardous fluids into the Tower Lake field Cadomin formation via the subject well.

Wellbore integrity has been examined to ensure disposal fluid containment during operation and following eventual abandonment, with attention to a casing deformation detected at 1,290 mKB, likely caused during hydraulic fracture treatment. The subsequent temperature log shows injection fluid placement within the objective zone. Specific approval conditions, for monitoring, testing and operational limits to ensure ongoing safe and contained disposal into the formation, are included in the attached Order.

Attached please find Order 14-02-012, designating an area in the Tower Lake 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 and non-hazardous 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. The reservoir pressure limit, based on the initial Cadomin reservoir, may be reviewed upon application to consider as a basis a normal hydrostatic pressure at depth, pending the collection of performance data, particularly reservoir pressures following disposal volumes, from this well.

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 that disposal well permit holders 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>

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

Sincerely,



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


Attachment

ORDER 14-02-012

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, and non-hazardous waste into the Cadomin formation – Tower Lake field as a special project in the following area:

DLS Twp 81 Rge 17 W6M Section 31 - 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 and non-hazardous waste only into the well Tervita Tower A08-31-81-17 W6M; WA# 30428 Cadomin formation perforations 1148 to 1211 mKB TVD
  - b) Hold a valid Permit under the Environmental Management Act for the disposal of non-hazardous waste.
  - c) Not exceed an injection pressure, measured at the wellhead on the subject well, of 17,070 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.
  - 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 BC-S18 disposal statement.
  - i) Cease injection upon reaching a maximum formation pressure of 12,200 kPaa.
  - j) 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.
  - k) 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 a hydraulic isolation log every 5 years on the subject well to plug back depth and submit results to the Commission within 30 days of the completion of logging.
  - l) 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 21<sup>st</sup> day of November 2014.

## Advisory Guidance for Order 14-02-012

- 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 25<sup>th</sup> day of the month following the reported month, as per section 75 of the Drilling and Production Regulation.