



November 3, 2015

2000-2800-32640-02

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

Dear Mr. Hagen:

**RE: PRODUCED WATER AND NON-HAZARDOUS WASTE DISPOSAL
SPECIAL PROJECT APPROVAL; AMENDMENT #2
TERVITA BOUNDARY A16-13-84-14 W6M; WA# 9929
BOUNDARY LAKE FIELD – CADOMIN FORMATION**

Oil and Gas Commission staff have reviewed the email dated October 6, 2015, requesting an amendment to Order 14-02-010 Amendment #1 to change the hydraulic isolation logging requirement from every year to every five years.

The annual hydraulic isolation condition outlined in Order 14-02-010 Amendment #1, more frequent than the typical 5 year requirement for disposal wells, was included due to the casing damage found at 1145.2 – 1160.5 mKB. Upon examination of the wellbore configuration, layers of protection were identified, including good quality cement behind the tie-in liner where the damage was discovered, as well as an intermediate casing layer with cement behind that. Since the damaged casing is above the production packer, annual packer isolation testing and continuous casing pressure monitoring will detect if there is any loss of hydraulic isolation over the damaged interval. Hydraulic isolation temperature logging at standard frequency will be sufficient to verify zonal isolation of injection fluid.

Attached please find **Order 14-02-010 Amendment #2**, designating an area in the Boundary 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. 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 Michelle Harding at (250) 419-4493 or the undersigned at (250) 419-4430.

Sincerely,

A handwritten signature in black ink, appearing to read 'Ron Stefik'.

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

Attachment



ORDER 14-02-010 Amendment #2

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 – Boundary Lake field as a special project in the following area:

DLS Twp 84 Rge 14 W6M Section 13 - 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 Boundary A16-13-84-14 W6M; WA# 9929 Cadomin formation (perforations from 1207.7 to 1222.7 mKB).
 - 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 14,320 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) Cease injection upon reaching a maximum formation pressure of 12,580 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 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 on the subject well to plug back depth, upon failure of a packer isolation test or every 5 years from date of initial disposal if no failure has occurred, 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



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

DATED AT the City of Victoria, in the Province of British Columbia, this 3rd day of November 2015.



ORDER 14-02-010 Amendment #2

PAGE 2

Advisory Guidance for Order 14-02-010 Amendment #2

- 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 not later than the 25th 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.