

July 21, 2015

8100-2800-32640-02

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

Dear Mr. Hagen,

**RE: NON-HAZARDOUS WASTE AND PRODUCED WATER DISPOSAL
SPECIAL PROJECT; AMENDMENT #1
TERVITA HZ W STODDART A10-30-087-20 W6M; WA# 28116
CADOMIN FORMATION**

Approval for disposal of non-hazardous waste and produced water, Order 12-02-023, was issued for the subject well, Cadomin formation, on November 5, 2012. The Commission is presently amending disposal well approvals to conform to current requirements.

The subject well was rig released August 10, 2012 and commenced disposal in December 2012. Since that time the disposal rate has dropped off significantly due to apparent reservoir damage. Annual reservoir pressure tests are likely not representative of the true reservoir pressure based on the near-wellbore damage along the horizontal wellbore. Tervita has requested a maximum reservoir pressure limit of 110% of hydrostatic pressure to indicate true reservoir fill-up, initial pressure being underpressured for depth. Due to Tervita's compliance with Order 12-02-023 and the low risk factors on this well, condition 2i) of the amended order specifies the maximum formation pressure as **13,500 kPa**.

Attached please find **Order 12-02-023 Amendment #1** designating an area in the Stoddart West field – Cadomin formation as a Special Project under section 75 of the *Oil and Gas Activities Act*, for the use of a storage reservoir for the disposal of non-hazardous waste and produced water. This Order contains a number of detailed operational conditions. Annual packer isolation tests, required to be submitted as per condition 2g) of the approval, can be sent in pdf form to welldatamail@bcogc.ca. Additional general information regarding disposal wells is available on the Commission's website at <http://www.bcogc.ca/industry-zone/documentation/Subsurface-Disposal>.

The Ministry of Environment identifies the type of effluent approved for injection in the separate Waste Discharge Permit, granted under the *Environmental Management Act*.

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 Natural Resources Canada seismic monitoring network at <http://www.earthquakescanada.nrcan.gc.ca/recent/index-eng.php>.

Should you have any questions, please contact Ron Stefik at (250) 419-4430 or Michelle Harding at (250) 419-4493.

Sincerely,



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

Attachment



ORDER 12-02-023 Amendment #1

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 – Stoddart West field as a special project in the following area:

DLS Twp 87 Rge 20 W6M Section 30 - Lsds 3, 4, 5, 6, 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 and non-hazardous waste only into the well Tervita Hz W Stoddart A10-30-87-20W6M; WA# 28116 Cadomin formation (perforations from 1330 to 2234 mKB MD).
 - 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 14,800 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) Cease injection upon reaching a maximum formation pressure of 13,500 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 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, Eng. L.
Supervisor, Reservoir Engineering
Oil and Gas Commission

DATED AT the City of Victoria, in the Province of British Columbia, this 21st day of July 2015.

Advisory Guidance for Order 12-02-023 Amendment #1

- I. A production packer must be set above the injection interval and the space between the tubing and casing 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 25th day of the month following the reported month, as per section 75 of the Drilling and Production Regulation.