



March 10, 2015

1600-7400-32640-02

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 E BLUEBERRY d-A96-K/94-A-12; WA# 27939
DEBOLT FORMATION**

Approval for disposal of non-hazardous waste and produced water, Order 12-02-009, was issued for the subject well, Debolt formation, on May 24, 2012. The Commission is presently amending disposal well approvals to conform to current requirements.

The subject well was drilled in January 2012 and commenced disposal in July 2012. Annual reservoir pressure tests indicate that the reservoir is filling up linearly. At the current limit of 120% of initial reservoir pressure, capacity is projected to be reached in August 2016. The Debolt formation at this location was under-pressured for depth at initial condition. Tervita has requested that this limit be raised to hydrostatic pressure. The Commission is in agreement, based on demonstrated wellhead injection pressure below the maximum limit and ongoing testing and monitoring that further characterizes this reservoir for improved understanding. The limit has been set using a hydrostatic gradient in the mid-range of normal for saline reservoirs.

Attached please find **Order 12-02-009 Amendment #1** designating an area in the East Blueberry field – Debolt 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, including a condition for annual pressure tests to ensure that the reservoir is not filling up prematurely. 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 subject well is at increased risk due to its proximity to a fault acting as a permeability barrier, however no seismic activity has been recorded to-date. It is expected that Tervita will closely monitor seismic events through the Natural Resources Canada seismic monitoring network at <http://www.earthquakescanada.nrcan.gc.ca/recent/index-eng.php>, and through any other means Tervita has access to. Seismic events that are identified to be linked to the subject well must be immediately reported to the Commission, and may trigger the need for modified operations or further seismic monitoring to be installed.

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

Sincerely,

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

Attachment

ORDER 12-02-009 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 Debolt formation – Blueberry East field as a special project in the following area:

NTS 94-A-12 Block K Unit 96

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 E Blueberry d-A96-K/94-A-12; WA# 27939 Debolt formation perforations 2179 to 2203 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 18,500 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 BC-S18 disposal statement.
 - i) Cease injection upon reaching a maximum formation pressure of 22,860 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 injection.
 - 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 10th day of March, 2015.

Advisory Guidance for Order 12-02-009 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.