

12-02-009

1600-7400-32640-02



May 24, 2012

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Lori O'Brien
Planning and Development Advisor
Tervita Corporation
500, 140 – 10th Avenue SE
Calgary AB T2G 0R1

Dear Ms. O'Brien:

**RE: NON-HAZARDOUS WASTE & SALT WATER DISPOSAL SPECIAL PROJECT
TERVITA E BLUEBERRY d-A96-K/94-A-12; WA# 27939
DEBOLT FORMATION**

Oil and Gas Commission (Commission) staff have reviewed the application, dated February 13, 2012, requesting approval to dispose of produced water and non-hazardous waste into the Debolt formation of the subject well. A step rate injectivity test, approved January 11, 2012, has been performed on this well.

Attached please find Order 12-02-009, designating an area in the Blueberry East field – Debolt formation a Special Project under section 75 of the Oil and Gas Activities Act, for use of a storage reservoir for the disposal of produced water and non-hazardous waste generated from oil and gas operations.

It is noted that the current formation pressure is 17,870 kPaa @ MPP. Condition 2(e) of the Order requires a measurement of the static bottom hole pressure after 400,000 m³ has been injected into the subject well, to monitor reservoir performance.

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

Should you have any questions, please contact Curtis Kitchen at (250) 419-4443 or Ron Stefik at (250) 419-4430.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Ken Paulson', is written over a horizontal line.

Ken Paulson, P.Eng.
Chief Operating Officer
Oil and Gas Commission

Attachment


IN THE MATTER of the application from Tervita Corporation (formerly CCS Corporation), to the Oil and Gas Commission (Commission) dated February 13, 2012 for the operation and use of a storage reservoir.

ORDER 12-02-009

- 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 salt water and non-hazardous waste fluids generated from oil and gas operations, into the East Blueberry area – Debolt formation 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:
 - a) Produced salt water and non-hazardous waste shall be injected only into the Debolt formation through the well Tervita E Blueberry d-A96-K/94-A-12 (Well Permit # 27939).
 - b) A record of volume disposed of through this well must be included on a Monthly Injection/Disposal Statement, in the prescribed form (BC-S18), which must be submitted to the Oil and Gas Commission not later than the 25th day of the month following the reported month.
 - c) The non-hazardous waste disposal must be in accordance with the approval conditions of a Waste Discharge Permit, issued by the Ministry of Environment.
 - d) The disposal/injection pressure at the wellhead must not exceed 18,500 kPa.
 - e) A static gradient test, determining reservoir pressure must be conducted after 400,000 m³ of fluid has been injected. Results will be submitted to the Supervisor, Reservoir Engineering.
 - f) A form Notice of Commencement or Suspension of Activities BC-11 must be submitted to the Ministry of Finance to notify of commencement of operations and update the well status.



Ken Paulson, P.Eng.
Chief Operating Officer
Oil and Gas Commission

DATED AT the City of Victoria, in the Province of British Columbia, this 27 day of May 2012.

Confidential

RATIONALE FOR ORDER

I have made **Order 12-02-009** after having considered:

- **Injectivity Performance** – An injectivity test was performed on February 1, 2012 that showed a fracture breakdown pressure at surface of 24 MPa at 2 m³/min (2,880 m³/d). The fracture gradient was determined to be 21.0 kPa/m.
- **Max Operating Wellhead Pressure** – The calculations and values below were used to calculate the Maximum Allowable Wellhead Pressure.
 - Fracture Gradient = 21.0 kPa/m
 - Salt Water Gradient = 10.5 kPa/m
 - Safety Factor = 10%
 - Frictional Pressure Loss = 200 kPa
 - Depth to MPP = 2172m
 - Max WH Pressure = $((21.0 \times 0.9) - 10.5) \times 2172 + 200 = 18,445$ kPa
 - For Simplicity, **Maximum Allowable Wellhead Pressure = 18,500 kPa**
- **Reservoir Containment** – The Debolt formation is directly overlain by a thin 3-9 meter thick massive bedded calcareous, tight chert bed (Belloy formation), which in turn is overlain by 251-346 meters of thick Montney shale.
- **Resource Conservation** – The Montney rights in this area are currently owned by Bonavista Petroleum who has been consulted in regards to putting reserves at risk. Bonavista believes that the injection at this well will not disrupt their recoveries, the Commission agrees.
- **Need for Disposal Well** – CCS Corp. (renamed Tervta) operates treatment/recovery/disposal facilities. Well d-A96-K will provide local disposal capacity, supporting development and production in this area.
- **Objections** – No objections have been received over the 21 day public notice period.
- **Disposal Permit** – The Ministry of Environment identifies the type of effluent approved for injection in the separate Waste Discharge Permit, granted under the Environmental Management Act.

Prepared by Curtis Kitchen, EIT



Ken Paulson, P.Eng.
Chief Operating Officer
Oil and Gas Commission

May 24, 2012