

March 8, 2018

8120-2800-32640-02

Nicholas Haddow, J.D.  
Regulatory Specialist  
Aqua Terra Water Inc.  
#700, 1816 Crowchild Trail N.W.  
Calgary, AB, T2M 3Y7

Dear Mr. Haddow,

**RE: PRODUCED WATER DISPOSAL SPECIAL PROJECT APPROVAL  
AQTWM SUNRISE 7-24-78-17 W6M; WA# 35043  
SUNRISE FIELD – CADOMIN FORMATION**

The Commission has reviewed the application submitted by CG Engineering Ltd., on behalf of Aqua Terra Water Inc., dated January 19, 2018, for produced water disposal into the subject well, Cadomin formation. The subject well was drilled for disposal purpose and the Nikanassin and Cadomin zones completed for disposal potential. The Nikanassin zone was determined to be unsuitable and suspended. Aqua Terra requested a 1,500 m<sup>3</sup> extended injectivity test approval into the Cadomin zone, granted on January 24, 2018, under Order 18-02-002.

Attached please find **Order 18-02-002 Amendment #1**, designating an area near the Sunrise field – in the 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. This Order contains a number of detailed operational conditions. The maximum wellhead injection pressure, condition 2b), is based on a more recent disposal fluid sample density than that utilized for Order 18-02-002, resulting in a more conservative calculation value. The Commission notes that Aqua Terra has drilled four groundwater monitoring wells near the subject well, a stewardship initiative for conducting baseline and ongoing water sampling to verify contained disposal operation. The forthcoming baseline sampling report will guide determination of appropriate the testing frequency, as an Appendix to an amendment to this Order.

For the inspection requirement of Order condition 2l), please arrange via email to [OGCPipelines.Facilities@bcogc.ca](mailto:OGCPipelines.Facilities@bcogc.ca).

In certain circumstances, disposal well operation may induce seismicity of values that require modification of operations to mitigate.

Please note that disposal of fluid with high total dissolved solids content requires adjustment of the wellhead injection pressure to remain below formation fracture pressure, as per condition 2(b).

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

Sincerely,



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

Attachment

cc: Crosby Cook, CG Engineering

**ORDER 18-02-002 Amendment #1**

- 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 water, including flowback from fracturing operations, into the Cadomin formation – near the Sunrise field as a special project in the following area:

DLS Twp 78 Rge 17 W6M Section 24 – Lsds 1, 2, 7, and 8

- 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 only into the well AQTWM Sunrise 7-24-78-17; WA# 35043 – Cadomin formation (perforations 1578.0 – 1606.0 mKB).
- b) Not exceed an injection pressure, measured at the wellhead on the subject well, of 19,710 kPag or the pressure required to fracture the formation, whichever is lesser.
- c) Inject only through tubing with a packer set as near as is practical above the injection interval.
- d) Continually measure and record the wellhead casing and tubing pressures electronically.
- e) Cease injection and notify the Commission immediately if hydraulic isolation is lost in the wellbore or formation.
- f) Submit the annual packer isolation test report to the Commission within 30 days of the completion of the test.
- g) Include the disposal operating hours and the maximum injection pressure value on the monthly BC-S18 disposal statement.
- h) 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.
- i) Cease injection upon reaching a maximum formation pressure of 18,670 kPaa, measured at 1592 mKB.
- j)
  - 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.
- k) Not conduct a hydraulic fracture stimulation on any formation in the subject well without prior Commission approval.
- l) Complete an inspection, satisfactory to the Commission, within 4 weeks of initial disposal operations under this Order.



---

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

DATED AT the City of Victoria, in the Province of British Columbia, this 8<sup>th</sup> day of March, 2018.



**ORDER 18-02-002 Amendment #1**

PAGE 2

Advisory Guidance for Order 18-02-002 Amendment #1

- 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 25<sup>th</sup> 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.