



January 16, 2017

3200-8400-32640-02

Chris Gylander, C.E.T
Operations Supervisor
Quattro Exploration and Production Ltd.
4110, 825 – 8th Avenue SW
Calgary, AB, T2P 2T3

Dear Mr Gylander:

**RE: PRODUCED WATER DISPOSAL SPECIAL PROJECT APPROVAL, AMENDMENT #1
QUATTRO ET AL CLARKE a-99-F/94-J-10; WA# 7517
CLARKE LAKE FIELD – SLAVE POINT 'B' POOL**

Approval for disposal of produced water, Order 01-02-009, was issued for the subject well, Slave Point formation, on November 14, 2001. The Commission is presently amending disposal well approvals to conform to current requirements.

The subject well was rig released in March 1991, and produced gas from the Clarke Lake Slave Point 'B' pool from February 1991 to October 1994. Disposal began in October 2002 and has been mostly continuous for 14 years. Annual packer isolation tests from 2014 through 2016 indicate annular integrity of the well. Low wellhead injection pressures indicate continuing disposal capacity. This well is noted as winter access only; additional integrity testing will be performed.

Attached please find **Order 01-02-009 Amendment #1**, designating an area in the Clarke Lake field – Slave Point 'B' pool 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 including a maximum wellhead injection pressure, reservoir pressure fill-up limit, and continuous tubing and casing pressure monitoring. Integrity testing, including a casing inspection log, cement bond log, and hydraulic isolation log, are due by March 30, 2018 to ensure that the wellbore remains suitable for continued disposal. 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,



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

Attachment



ORDER 01-02-009 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 Slave Point 'B' pool – Clarke Lake field as a special project in the following area:
NTS 94-J-10 Block F Unit 99
- 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 Quattro et al Clarke a-99-F/94-J-10; WA# 7517 – Slave Point 'B' pool (perforations from 2028.0 – 2030.5 mKB MD).
 - b) Not exceed an injection pressure, measured at the wellhead on the subject well, of 4,440 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 a reservoir pressure test on the formation in the subject well prior to June 30, 2017, 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. Thereafter, conduct a reservoir pressure test at an interval of not more than every 2 years.
 - i) Cease injection upon reaching a maximum formation pressure of 22,900 kPaa, measured at 2028.2 mKB TVD.
 - j)
 - i) Perform a cement bond log on the subject well by March 30, 2018. Submit results to the Commission within 30 days of the completion of logging.
 - ii) Perform a casing inspection log on the subject well by March 30, 2018, and submit results to the Commission within 30 days of the completion of logging. Thereafter, perform a casing inspection log at an interval of not more than every 10 years.
 - iii) Perform a hydraulic isolation log on the subject well by March 30, 2018, and submit results to the Commission within 30 days of the completion of logging. Thereafter, perform a hydraulic isolation log at an interval of not more than every 5 years.
 - k) 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 16th day of January, 2017.

Advisory Guidance for Order 01-02-009 Amendment #1

- I. A production packer must be set above the injection interval and the space between the tubing and casing filled with corrosion 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.