BC Oil & Gas COMMISSION

August 31, 2015 8120-6200-32640-02

Andrew Evans
Production/ Completion Engineer
Tourmaline Oil Corp.
3700, 250 – 6 Ave SW
Calgary, AB T2P 3H7

Dear Mr. Evans,

RE: PRODUCED WATER DISPOSAL SPECIAL PROJECT APPROVAL
TOURMALINE HERITAGE 10-15-80-16 W6M; WA# 24618
BELLOY FORMATION

Oil and Gas Commission staff have reviewed the application, dated June 11, 2015, requesting approval to dispose of produced water into the Belloy formation at well Tourmaline Heritage 10-15-80-16 W6M (WA 24618).

The subject well was drilled in November 2008 to evaluate the Kiskatinaw formation. Logging showed no reservoir potential and the Kiskatinaw was abandoned. The Montney was perfed and hydraulic fracture stimulated, then abandoned with a cement squeeze. Since the Montney perforations are above the intended disposal zone, care must be taken to ensure the integrity of the cement squeeze. Wellbore integrity testing performed in June 2015 proves that the wellbore in good condition and the disposal zone is hydraulically isolated.

Attached please find **Order 15-02-013** designating an area near the Sunrise field – Belloy 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 produced water. This Order contains a number of detailed operational conditions. Additional general information regarding disposal wells is available on the Commission's website at http://www.bcogc.ca/industry-zone/documentation/Subsurface-Disposal.

This well is noted to be in an area susceptible to seismic activity. In certain circumstances, disposal well operation may induce seismicity. Section 21.1 of the Drilling and Production Regulation requires permit holders to 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. In the event that seismicity is attributed to this well, the Commission may request that Tourmaline activate their nearby seismic array to better locate and monitor events.

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

BC Oil & Gas COMMISSION

ORDER 15-02-013

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, into the Belloy formation – near the Sunrise field as a special project in the following area:

DLS Twp 80 Rge 16 W6M Section 15 - Lsds 9, 10, 15, and 16.

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 Tourmaline Heritage 10-15-80-16 W6M; WA# 24618 – Belloy formation (disposal perforations 2379.0 to 2386.0 mKB).

b) Not exceed an injection pressure, measured at the wellhead on the subject well, of 17,520 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 26,880 kPaa, measured at MPP.

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.

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

DATED AT the City of Victoria, in the Province of British Columbia, this 31st day of August, 2015.

Advisory Guidance for Order 15-02-013

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.