BC Oil & Gas COMMISSION

October 21, 2014 3200-8600-32640-02

Jeremy Sarada
Direct Energy Marketing Ltd.
1200, 525 – 8th Ave SW
Calgary, AB
T2P 1G1

Dear Mr. Sarada

RE: PRODUCED WATER DISPOSAL SPECIAL PROJECT APPROVAL, AMENDMENT #1
DIRECT ET AL CLARKE b-69-L/94-J-9; WA# 2240
CLARKE LAKE FIELD - PINE POINT FORMATION

Approval for disposal of produced water into the Slave Point formation was issued for the subject well as Order 68-02-001 under Section 117 of the Petroleum and Natural Gas Act. The Commission is presently amending disposal well approvals to conform to current requirements. A recent review by Commission staff re-interprets the disposal formation to be the Pine Point, in hydraulic communication with the Slave Point formation but well below the gas/ water contact of the overlying Clarke Lake field Slave Point 'A' gas pool.

The subject well, rig released Jan 28, 1968, was unsuccessful for gas in the Slave Point formation. A salt water disposal approval was issued to Pacific Petroleum Ltd on April 18, 1968. The well commenced disposal in May 1968, and has been successfully disposing of produced water from the Slave Point formation for 46 years. The well b-69-L has operated largely without issue, accepting fluid at very low wellhead pressure into a regional aquifer with vast capacity. However the high water disposal rate increases the risk of corrosion, as seen by multiple workovers to maintain both the casing and tubing.

Attached please find **Order 68-02-001 Amendment #1** designating an area in the Clarke Lake field – Pine Point 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.

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.

A preventative maintenance plan will be crucial to ensure that the subject well continues to operate safely and efficiently. Should you have any questions, please contact the undersigned at (250) 419-4430 or Michelle Harding at (250) 419-4493.

Sincerely,

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

Attachment

ORDER 68-02-001 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 produced water, into the Pine Point formation – Clarke Lake field as a special project in the following area:

NTS 094-J-09 Block L Unit 58, 59, 68, 69

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 DIRECT ET AL CLARKE b-69-L/94-J-9; WA# 2240 – Pine Point formation (open hole 2036.0 – 2162.6 mKB).

b) Not exceed an injection pressure, measured at the wellhead on the subject well, of 4,500 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 every 3 years, 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 24,000 kPaa.

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 7 years, commencing from the date of this amendment.

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 this amendment.

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 21ST day of October 2014.

Advisory Guidance for Order 68-02-001 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.