



December 6, 2016

7770-8600-32640-02

Owen Bailey
Shanghai Energy Corporation
#600, 444 – 5th Ave, SW
Calgary, AB, T2P 2T8

Dear Mr Bailey:

**RE: PRODUCED WATER DISPOSAL SPECIAL PROJECT APPROVAL, AMENDMENT #1
SEC SIERRA a-97-F/94-I-11; WA# 7866
SIERRA FIELD – PINE POINT FORMATION**

Approval for disposal of produced water, Order 02-02-008, was issued for the subject well, Pine Point formation, on April 2, 2002. The Commission is presently amending disposal well approvals to conform to current requirements.

The subject well was originally drilled and abandoned in July/ August 1982, and then re-entered in January 2002. Disposal began in June 2002 and has been mostly continuous for 14 years. A static gradient February 2016 indicates that reservoir pressure has not increased significantly past initial pressure, and integrity testing indicates good quality casing and annular integrity.

Attached please find **Order 02-02-008 Amendment #1**, designating an area in the Sierra field – Pine Point 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 including a maximum wellhead injection pressure, reservoir pressure fill-up limit, and continuous tubing and casing pressure monitoring. A hydraulic isolation log is required to be run by December 31, 2017, since one was not run during the February 2016 workover. 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 02-02-008 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 Pine Point formation – Sierra field as a special project in the following area:
NTS 94-I-11 Block F Unit 97
- 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 SEC Sierra a-97-F/94-I-11; WA# 7866 – Pine Point formation (perforations from 2052.0 – 2152.0 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 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 23,540 kPaa, measured at 2102 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.
 - ii) Perform a hydraulic isolation temperature log on the subject well by December 31, 2017, and thereafter at an interval of not more than every 5 years, and submit results to the Commission within 30 days of the completion of logging.
 - 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 6th day of December, 2016.



Advisory Guidance for Order 02-02-008 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.