



July 24, 2015

2000-2800-32640-02

Garth Mulvey
Whitecap Resources Inc.
Suite 3800, East Tower 525 – 8th Ave SW
Calgary, AB T2P 1G1

Dear Mr. Mulvey,

**RE: PRODUCED WATER DISPOSAL SPECIAL PROJECT APPROVAL
WHITECAP ET AL BOUNDARY 1-2-85-14 W6M; WA# 6918
BOUNDARY LAKE FIELD – CADOMIN FORMATION**

Oil and Gas Commission staff have reviewed the application dated June 23, 2015, prepared by VZFox Canada Engineering on behalf of Whitecap Resources Inc., for deep well disposal of produced water into the Cadomin formation at well Whitecap et al Boundary 1-2-85-14 W6M (WA 6918).

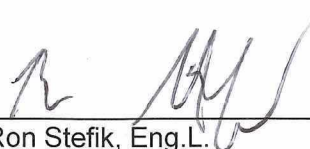
The subject well was rig released October 5, 1988 and converted to a water injection well in the Boundary Lake formation to aid oil production. The well injected 4,312 m³ of water from April 1993 to September 1994 and was subsequently suspended in 2007. The Boundary Lake formation was abandoned with a permanent bridge plug in May 2015, and the Cadomin formation was completed for the purpose of disposal of produced fluids from Whitecap operations in the area. It is noted that there is 83m of casing exposed to injected fluids between the base of Cadomin perforations and the PBTD in the well. The Baldonnell and Cecil formations within this interval have developed porosity and could potentially accept disposal fluids if casing and cement integrity were to degrade. This should be taken into account when completing future wellbore integrity testing specified in the attached approval.

Attached please find **Order 15-02-012** designating an area in the Boundary Lake field – Cadomin 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. Annual packer isolation tests, required to be submitted as per condition 2h) of the approval, can be sent in pdf form to welldatamail@bcogc.ca. 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 Natural Resources Canada seismic monitoring network at <http://www.earthquakescanada.nrcan.gc.ca/recent/index-eng.php>.

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




ORDER 15-02-012

- 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 Cadomin formation – in the Boundary Lake field as a special project in the following area:

DLS Twp 85 Rge 14 W6M Section 2 - 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 Whitecap et al Boundary 1-2-85-14 W6M; WA# 6918 – Cadomin formation (disposal perforations 1139.0 – 1155.0 mKB).
 - b) Not exceed an injection pressure, measured at the wellhead on the subject well, of 13,100 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 12,480 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 24th day of July, 2015.

Advisory Guidance for Order 15-02-012

- 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