



December 11, 2018

7750-2800-32640-02

Brad Makowecki
Senior Exploitation Engineer
Crew Energy Inc.
800, 250 – 5th Street S.W.
Calgary, AB T2P 0R4

Dear Mr. Makowecki:

**RE: PRODUCED WATER DISPOSAL SPECIAL PROJECT AMENDMENT #1
CREW SEPTIMUS 15-29-81-18; WA# 18558
SEPTIMUS FIELD - CADOMIN FORMATION**

Approval for disposal of produced water, Order 13-02-001, was issued for the subject well, Cadomin formation, on January 22, 2013. The Commission has amended this disposal well approval to conform to current requirements.

The subject well was drilled in 2004 and commenced disposal in April 2013. The amended Order removes the requirement to submit progress reports to the Commission and extends the interval for integrity logging to ten years.

The amended Order lowers the MWHIP value to a more conservative fracture gradient of 24.7 kPa/m based on Commission studies of fracture gradients in the area.

Attached please find **Order 13-02-001 Amendment #1**, designating an area in the Septimus field – Cadomin formation a Special Project under section 75 of the *Oil and Gas Activities Act*, for 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: <https://bcogc.ca/industry-zone/documentation/Subsurface-Disposal>.

Should you have any questions, please contact Kathryn Archibald at (250) 419-4406 or the undersigned at (250) 419-4430.

Sincerely,



Ron Stefik, EngL
Supervisor, Reservoir Engineering
Oil and Gas Commission


Attachment

ORDER 13-02-001 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 water, into the Cadomin formation – in the Septimus field as a special project in the following area:

DLS Twp 81 Rge 18 W6M Section 29 – Lsds 9,10,15,16.

- 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 Crew Septimus 15-29-81-18 W6M; WA# 18558 – Cadomin formation (disposal perforations 1118.0 – 1141.0 mKB MD).
 - b) Not exceed an injection pressure, measured at the wellhead on the subject well, of 13,400 kPaa, 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 operation hours and the maximum injection pressure value in the monthly Petrinex disposal reporting.
 - 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 13,800 kPaa, measured at 1129.5 mKB MD.
 - j) Maintain and manage the well head to prevent surface liquids from entering the well bore through the annulus outside or between casing strings.
 - k) i) Perform a casing inspection log on the subject well and submit results to the Commission within 30 days of the completion 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.
 - l) 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 11th day of December, 2018.

Advisory Guidance for Order 13-02-001 Amendment #1

- I. A production packer must be set above the injection interval and the space between the tubing and casing filled with corrosion 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 via Petrinex not later than the 20th 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.