

April 2, 2020 7750-2885-32640-02

Brad Makowecki Crew Energy Inc. Suite 800, 250 – 5th Street S.W. Calgary, Alberta T2P 0R4

Dear Mr. Makowecki:

PRODUCED WATER DISPOSAL SPECIAL PROJECT RE: **CREW HZ MONIAS B8-22-82-20 (WA #30266)** SEPTIMUS FIELD - CADOMIN-NIKANASSIN FORMATION

The Commission has reviewed the application submitted by Crew Energy Inc. (Crew), dated March 6th, 2020 requesting approval to dispose of produced water into the Cadomin formation of the subject well. The subject well was purpose drilled horizontally into the Cadomin-Nikanassin formation for disposal with a rig release date of Feb 29th, 2020. The well was completed with an open-hole 13-stage ball drop system. Crew has a surplus of produced water due to decreased completions activities and the close proximity to Crew's 10-14-82-20 facility allows water to be pipelined, reducing trucking.

Attached please find Order 20-02-002, designating an area in the Septimus field - Cadomin-Nikanassin 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. The Commission recognizes the Cadomin and Nikanassin formations as a compound, unsegregated zone in this area for disposal use. This Order includes a number of detailed operational conditions including: continuous tubing and casing pressure measurements, a maximum wellhead injection pressure, an ultimate reservoir pressure limit, as well as wellbore integrity monitoring and reporting requirements. Disposal wells are subject to regular field inspection and audit. Contravention of a condition of this Order may be subject to enforcement under section 62 of OGAA, or suspension or cancellation of the Order under section 75(2)(b).

Disposal of fluid with high total dissolved solids content requires adjustment of the wellhead injection pressure to remain below formation fracture pressure. It is the responsibility of the permit holder make adjustments to wellhead injection pressure.

In certain circumstances, disposal well operation may induce seismicity of values that require modification of operations to mitigate.

For the inspection requirement of Order condition 2 I), please arrange via email to OGCPipelines.Facilities@bcogc.ca.

Should you have any questions, please contact Logan Gray at (250) 419-4465 or Ron Stefik at (250) 419-4430.

Sincerely,

Ron Stefik, Eng. L.

Supervisor, Reservoir Engineering

Oil and Gas Commission

Attachment



ORDER 20-02-002

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, in the Septimus field – Cadomin-Nikanassin formation as a special project in the following area:

DLS Twp 82 Rge 20 W6M Section 14 – LSDs 9, 10, 15, and 16 Section 22 – LSDs 1, 2, 7, and 8 Section 23 – LSDs 3, 4, 5, and 6

- 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 water into the well Crew HZ Monias B8-22-82-20; WA# 30266 Cadomin-Nikanassin formation from 1049.0 2386.0 mKB MD.
 - b) Not exceed an injection pressure, measured at the wellhead on the subject well, of 13,150 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) Include the disposal operating hours and the maximum injection pressure value on the monthly Petrinex disposal report.
 - f) Cease injection and notify the Commission immediately at Reservoir@BCOGC.ca if there are any indications that hydraulic isolation is lost in the wellbore or formation.
 - g) Conduct and submit an annual Surface Casing Vent Flow test to the Commission within 30 days of the completion of the test.
 - 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 10,750 kPaa, measured at 915.3 mKB TVD.
 - 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.
 - I) Complete an inspection, satisfactory to the Commission, within 4 weeks of initial disposal operations.

Ron Stefik, Eng.L.

Supervisor, Reservoir Engineering

Oil and Gas Commission



ORDER 20-02-002

PAGE 2

Advisory Guidance for Order 20-02-002

- 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 conducted and the associated report must be submitted to the Commission within 30 days of test completion, 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.