

May 6, 2015

7750-4800-59240-16

Nick Kozak
Completions Engineer
Crew Energy Inc.
800, 250 – 5th Street S.W.
Calgary AB T2P 0R4

Dear Mr. Kozak,

**RE: PRODUCED WATER EXTENDED INJECTION TEST AMDENDMENT #1
CREW SEPTIMUS 09-36-081-19 W6M; WELL PERMIT #6812
SEPTIMUS FIELD - HALFWAY FORMATION**

Commission staff have reviewed your wellbore integrity submission dated April 1, 2015, seeking consent to continue injection testing based on these results. Approval for an extended injection test on potential deep disposal well locations in the Septimus field – Halfway “A” pool was granted by the Commission on March 17, 2015. Pre-application review also occurred for these wells.

Halfway formation perforations extend from 1,648mKB to 1,661mKB, but hydraulic isolation testing was limited due to a solid fill top of 1,667m in the wellbore. Logs were unable to confirm hydraulic isolation below 1,655m. However, as this fill demonstrated competency during the inability to drill out, injected water is not expected to penetrate below this depth. As well, there is minimal Halfway and Doig porosity below the fill level and therefore water is considered contained within the Halfway formation.

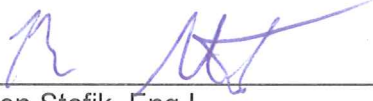
A casing weakness was identified through the MIT casing inspection log at 1,620m. Due to this corrosion issue, the packer was set at 1,618m. The weakened casing will be within the injection zone. There are no porous intervals within the damaged casing interval from 1,618 to the top of the Halfway at 1,646m. The closest porous Charlie Lake is from 1,586.4 to 1,591.4m; 25 meters above the damaged zone. The cement evaluation indicates good quality cement, confirming porous Charlie Lake isolation from disposal fluids.

An additional weakness was noted from surface to 358m. The cement evaluation log shows little to no cement in this section of the wellbore. To date, there have been no surface casing vent flows or packer isolation failures. However, an amended approval with a reduced maximum wellhead injection pressure will ensure further safety for this injection test. Full approval will require on-going monitoring of surface casing vent flow, packer isolation testing, continuous casing and tubing pressure monitoring and potentially, ground water monitoring.

Attached please find Order 15-02-006 Amendment #1, designating an area in the Septimus field, Halfway formation a Special Project under section 75 of the Oil and Gas Activities Act, for the temporary operation and use of a storage reservoir for the disposal of salt water. Please note this is a temporary approval. The Commission cannot guarantee that a future application will be approved. Additional general information regarding disposal wells is available on the Commission's website at <http://www.bcogc.ca/industry-zone/documentation/Subsurface-Disposal>.

Should you have any questions, please contact Michelle Gaucher at (250) 419-4482 or the undersigned (250) 419-4430.

Sincerely,



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

Attachment

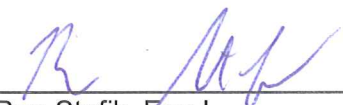
IN THE MATTER of a submission from Crew Energy Inc., to the Oil and Gas Commission (Commission) dated April 1, 2015 for the temporary operation and use of a storage reservoir.

ORDER 15-02-006 Amendment #1

- 1 Under Section 75(1)(d) of the *Oil and Gas Activities Act*, the Commission designates the temporary operation and use of a storage reservoir for the disposal of produced salt water or recovered fluids from well completions in the Septimus field – Halfway “A” pool as a special project in the following area:

DLS Twp 81 Rge 19 W6M Section 36 - Lsds 9, 10, 15 and 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, including well flowback completion fluids, only into the well Crew Septimus 9-36-81-19 W6M; WA# 6812 Halfway formation, 1648.0 – 1661.0 mKB.
 - b) Not exceed an injection pressure, measured at the wellhead on the subject well, of 9,400 kPag or the pressure required to fracture the formation, whichever is lesser.
 - c) The total volume of injected water must not exceed 15,000 m³.
 - d) Inject only through tubing with a packer set as near as is practical above the injection interval.
 - e) Continually measure and record the wellhead casing and tubing pressures.
 - f) Cease injection and notify the Commission immediately if hydraulic isolation is lost in the wellbore or formation.
 - g) Perform a casing inspection log to plug back depth on the subject well and submit results to the Commission within 30 days of the completion of logging.
 - h) Perform a hydraulic isolation log on the subject well to plug back depth and submit results to the Commission within 30 days of the completion of logging.
 - i) Not conduct 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 May, 2015.

Advisory Guidance for Order 15-02-006 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.