

July 2, 2024

3600-2885-32640-02

Nicholas Haddow, Regulatory Specialist
AQT Water Management Inc.
700 – 1816 Crowchild Trail NW
Calgary, AB T2M 3Y7

Dear Mr. Haddow:

**RE: PRODUCED WATER AND NON-HAZARDOUS WASTE DISPOSAL
SPECIAL PROJECT APPROVAL; AMENDMENT #5
AQT FT ST JOHN 11-12-84-19; WA# 3010
FORT ST JOHN FIELD – CADOMIN-NIKANASSIN FORMATION**

Following a loss of hydraulic isolation at the subject well in May of 2019, the BC Energy Regulator (“Regulator”) issued General Order 2022-0032-01 to AQT Water Management Inc. (AQT) on April 8, 2022. General Order 2022-0032-01 required that AQT conduct a preliminary groundwater assessment at the site to assess whether produced water entered the usable groundwater zone and if further action is required to contain/address any contamination. A report was submitted to the Regulator by AQT on August 31, 2022. Based on the information provided in the report, Special Project Order 16-02-002 has been amended (Amendment #5) to include revised monitoring and sampling requirements at the site, including the collection and analysis of groundwater samples from the newly installed monitoring well MW22-01 on an annual basis, and the collection and analysis of a disposal fluid sample on an annual basis.

Attached please find **Order 16-02-002 Amendment #5**, designating an area in the Fort St John field – Cadomin-Nikanassin formation as a Special Project under section 75 of the Energy Resource Activities Act (ERAA), for the operation and use of a storage reservoir for the disposal of produced water and non-hazardous fluid. 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 ERAA, 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 to make adjustments to wellhead injection pressure.

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

Sincerely,



Ron Stefik, P.L.Eng.
Supervisor, Reservoir Engineering
BC Energy Regulator

Attachments



ORDER 16-02-002 Amendment #5

1. Under Section 75(1)(d) of the *Energy Resource Activities Act*, the Regulator designates the operation and use of a storage reservoir for the disposal of produced water, including flowback from fracturing operations, and non-hazardous waste into the Fort St John field – Cadomin-Nikanassin formation as a special project in the following area:

DLS Twp 84 Rge 19 W6M Section 12 - Lsds 11, 12, 13 and 14.

2. Under section 75(2) of *Energy Resources Activities Act*, the special project designation in this Order is subject to the following conditions. The Permit Holder shall:
 - a) Inject produced water and non-hazardous waste only into the well AQT Ft St John 11-12-84-19; WA# 3010 Cadomin-Nikanassin formation (perforations from 1030.5 to 1067.0 mKB).
 - b) Hold a valid Permit under the *Environmental Management Act* for the disposal of non-hazardous waste.
 - c) Not exceed an injection pressure, measured at the wellhead on the subject well, of 8,450 kPag or the pressure required to fracture the formation, whichever is lesser.
 - 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 electronically.
 - f) Cease injection and notify the Regulator immediately at reservoir@bc-er.ca if there are any indications that hydraulic isolation is lost in the wellbore or formation.
 - g) Conduct a packer isolation test every six months and submit the test report to the Regulator within 30 days of the completion of the test.
 - h) Cease injection upon reaching a maximum formation pressure of 11,485 kPaa measured at 1,048.8 mKB.
 - i) 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.
 - j)
 - i) Perform a casing inspection log on the subject well and submit results to the Regulator 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 log on the subject well and submit results to the Regulator 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 Regulator approval.
 - l) Maintain a groundwater monitoring program and collect and analyze disposal fluid samples as detailed in Appendix A.

Ron Stefik, P.L.Eng.
Supervisor, Reservoir Engineering
BC Energy Regulator

DATED AT the City of Victoria, in the Province of British Columbia, this 2nd day of July 2024.



Advisory Guidance for Order 16-02-002 Amendment #5

- 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 Regulator 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 including the volume of disposal fluid, maximum wellhead injection pressure, and total operating hours must be submitted to the Regulator 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.

Appendix A – Groundwater Monitoring Requirements**AQT Ft St John 11-12-84-19 (WA 3010) Non-Hazardous Waste and Produced Water Disposal**

1. The collection of groundwater samples from monitoring wells at the site (P14 series wells, MW16 series wells, and MW22-01) on an annual basis, and analysis for general water chemistry parameters including total dissolved solids (TDS), cations and anions. Groundwater samples must be collected using standard environmental sampling and quality assurance/quality control protocols.
2. The collection of a disposal fluid sample on an annual basis, and analysis of the disposal fluid sample for the same suite of parameters as the groundwater samples.
3. Annual measurement of static water levels in the monitoring wells.
4. Completion of an updated elevation survey in 2024 for the tops of the monitoring wells at the site relative to a common datum.
5. Groundwater monitoring reports must be prepared by a professional with competency in hydrogeology who is registered and in good standing with Engineers and Geoscientists of British Columbia. Reports must be submitted to the Regulator on an annual basis via email to hydrogeology@bc-er.ca, and must document the field methods undertaken, the groundwater monitoring and analytical results, and the disposal fluid sample analytical results.
6. Additional documentation and/or further sampling or investigation may be required by the Regulator based on review of submitted documentation.

Submission of Documentation

Groundwater monitoring reports for the long-term groundwater monitoring/sampling program (5. above) must be submitted to the Regulator annually via email to hydrogeology@bc-er.ca. For each annual report;

- Sampling procedures and dates must be documented and any relevant site observations should be noted.
- Monitoring and sampling results must be presented in tabular form with appropriate BC comparison criteria and include previous monitoring and sampling results.
- Tables must be presented to allow for comparison of groundwater sampling results collected on different dates from the same well.
- Laboratory analytical reports for the sampling must be appended to the report.
- Laboratory analytical reports may be requested by the Regulator at any time prior to the submission of the annual report.