



July 4, 2016

2985-6200-32640-02

Kimberley Toews-Koch  
Engineering Technologist  
TAQA North Ltd.  
2100, 308 - 4th Ave S.W.  
Calgary, Alberta T2P 0H7

Dear Ms. Toews-Koch:

**RE: PRODUCED WATER DISPOSAL SPECIAL PROJECT APPROVAL, AMENDMENT #1  
TAQA NORTH ET AL CHINCHAGA d-33-H/94-H-08; WA# 10834  
CHINCHAGA RIVER FIELD – BELLOY FORMATION**

Approval for disposal of produced water, Order 98-02-002, was issued for the subject well, Belloy formation, on February 2, 1998. The Commission is presently amending disposal well approvals to conform to current requirements.

The subject well was drilled for the purpose of disposal in January 1998. The well has been disposing for 18 years with a cumulative volume of 603,000m<sup>3</sup>, and continues to dispose with wellhead pressure 'on vacuum'. Testing provided for the review, including a cement bond log, casing inspection log, temperature log and reservoir pressure test, indicate the well is performing within acceptable parameters.

Attached please find **Order 98-02-002 Amendment #1**, designating an area in the Chinchaga River field – Belloy 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. This Order contains a number of detailed operational conditions including a maximum wellhead injection pressure, reservoir pressure fill-up limit, and continuous tubing and casing pressure monitoring. Additional general information regarding disposal wells is available on the Commission's website at <http://www.bcogc.ca/industry-zone/documentation/Subsurface-Disposal>.

Current disposal well review process includes a hydrogeology review. The subject well was identified to be within the groundwater capture zones of two domestic water supply wells. As such, an annual program for sampling these wells is included in Appendix A of the attached Order. Questions regarding this program can be directed to Laurie Welch, OGC Hydrogeologist, at (250) 980-6066.

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 the Natural Resources Canada seismic monitoring network at <http://www.earthquakescanada.nrcan.gc.ca/recent/index-eng.php>

Should you have any questions, please contact Michelle Harding at (250) 419-4493 or the undersigned at (250) 419-4430.

Sincerely,

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

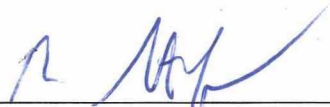
Attachment

**ORDER 98-02-002 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 of produced water, including flowback from fracturing operations, into the Belloy formation – in the Chinchaga River field as a special project in the following area:

NTS 94-H-8 Block H Unit 33

- 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 TAQA North et al Chinchaga d-33-H/94-H-08; WA# 10834 – Belloy formation (disposal perforations 1136.0 – 1170.0 mKB).
  - b) Not exceed an injection pressure, measured at the wellhead on the subject well, of 2,575 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 a reservoir pressure test on the formation in the subject well once every two years, 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 10,400 kPaa, measured at MPP.
  - j) Maintain and manage the well head to prevent surface liquids from entering the well bore through the annulus outside or between casing and conductor strings.
  - k) 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.
  - l) Not conduct a hydraulic fracture stimulation on any formation in the subject well without prior Commission approval.
  - m) Implement a groundwater monitoring program as detailed in Appendix A.



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

DATED AT the City of Victoria, in the Province of British Columbia, this <sup>4<sup>th</sup></sup> day of July, 2016.

## Advisory Guidance for Order 98-02-002 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 not later than the 25<sup>th</sup> 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****TAQA North et al Chinchaga d-33-H/94-H-08 (WA# 10834) Produced Water Disposal**

As the disposal well WA 10834 lies within a “groundwater capture zone” as defined in the Environmental Protection and Management Regulation, the following is required by the Commission.

- The collection of one representative groundwater sample from two water wells known as “TAQA Chinchaga Camp” (identified as Provincial Well Tag Number 105359) well and “TAQA Chinchaga Plant” (identified as Provincial Well Tag number 105360) is required within 60 days of the issuance of this order. The samples shall be analyzed for routine water quality parameters (pH, hardness, total dissolved solids, electrical conductivity, and major cations and anions); total metals; dissolved metals; and dissolved hydrocarbons including dissolved gases C1-C3, benzene, ethylbenzene, toluene, and xylenes (BETX), volatile petroleum hydrocarbons (VPH) and volatile hydrocarbons (VH), and light and heavy extractable hydrocarbons (LEPH/HEPH).
- Samples shall be collected and handled using standard environmental sampling protocols such as those outlined in the *British Columbia Field Sampling Manual* (<http://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/sampling-methods-quality-assurance/bc-field-sampling-manual>), and should be collected from locations upstream of any filtration or water treatment equipment if possible.
- Sampling locations and sampling procedures shall be clearly documented in writing at the time of sampling. These sampling records shall be retained by TAQA and may be requested by the Commission.
- Samples shall be submitted for analysis at a certified laboratory.
- Annual sampling for the same analytical parameters outlined above shall be conducted, unless otherwise directed by the Commission.
- The permit holder shall submit the results of the analysis in the form of a laboratory analytical report, submitted to [Hydrogeology@bcogc.ca](mailto:Hydrogeology@bcogc.ca) and [michelle.harding@bcogc.ca](mailto:michelle.harding@bcogc.ca), upon receipt of the analytical report from the laboratory.