

DATE: December 18, 2025

TO: Jay Mak  
Environmental Approvals Branch  
Environment and Climate  
14 Fultz, Winnipeg, MB  
R3Y 0L6

FROM: Joy Kennedy  
Water Quality Management Section  
Environment and Climate  
14 Fultz, Winnipeg, MB  
R3Y 0L6

cc. Andrew Burton

PHONE NO.: 204-451-2418

SUBJECT: RM OF SPRINGFIELD, WATER TREATMENT FACILITY UPGRADE, FILE 6013.10/6219.00

- 1) Seasonal (April – November) average water quality concentration in the Red River (MB050CS004) for Chromium (VI) Hexavalent is 3.70 ug/L. In the October 31, 2025 additional information memo, Tables 1-1, the effluent concentration proponent provided Chromium (VI) Hexavalent concentration is 0.6 ug/L. Using a November 7Q10 of the Red River (20.41 m3/S) and the maximum effluent flow (0.029 m3/S), the Water Quality Management Section (WQMS) estimates the concentration of Chromium (VI) Hexavalent within a 25% mixing zone would be 3.68 ug/L and the full river mixed downstream concentration would 3.70 ug/L. Where the instream Manitoba Standards Objectives and Guidelines objective for Chromium (VI) Hexavalent is 11 ug/L, the impacts of the proponent's proposed effluent appear negligible, with respect to Chromium (VI) Hexavalent, in the Red River.
  - a) In the October 31, 2025 additional information memo, Tables 1-1 the WQMS could not replicate the proponent's values of seasonal averages (April – November). For example, the proponent calculates the Red River Water Quality concentration of Hexavalent Chromium as 1.63 ug/L (contrast 3.7 ug/L). Can the proponent kindly provide the spreadsheet used to create the proponent's seasonal averages in Tables 1-1 and 1-2?
  - b) Alternatively, it is possible errors were created in the proponent's tables were contributed by this officer. A suggestion in the memo dated September 2, 2025 recommended the proponent utilize 25% of 7Q10 flow Red River during the month of November (20.42 m3/S) to calculate downstream concentrations in the Red River. The intent of the recommendation is to assess concentrations within 25% mixing zone as compared to Manitoba Standards Objectives and Guidelines in order to not exceed Water Quality Objectives within the downstream water body (Red River) to which the intermittent stream (Cooks Creek) is tributary.
  - c) The Water Quality Management recommends requesting the proponent review and resubmit Tables 1-1 and 1-2 or provide further clarity on their calculations.
    - i) The 7Q10 of Cook's Creek Diversion is 0.00 m3/S (April – Oct, with no data for Nov). In transparency, the WQMS mixing zone concentrations were calculated using the following Excel Syntax:  
$$=((((@MixingZone/100)*@Red.River_Load)+@Effluent_Load)/86400)/(((@MixingZone/100)*@Red.River_7Q10)+@Eff_flow))*1000$$
    - ii) In transparency, the full river mixed downstream concentrations were calculated using the following Excel Syntax:  
$$=((@Red.River_Conc*@River_7Q10)+(@Effluent_Conc*@Effluent_flow))/(@Red.River_7Q10+@Effluent_flow)$$
- 2) Where the Red River is the downstream receiving water body, utilizing a 25% mixing zone and the proponent's proposed effluent quality and flows from the Proponent's October 31, 2025 additional information memo, Fluoride relative to CCME Guideline for the Protection of Aquatic Life.
  - a) The fluoride levels in the effluent discharge are very high (8436 ug/L). A USGS data report (reference <https://pubs.usgs.gov/sir/2023/5136/sir20235136.pdf>) indicate Fluoride levels in the Red River could be

approximately 200 ug/L (pdf page 24). Using this estimate, Red River background level (200 ug/L) exceed the CCME Protection of Aquatic Life guideline of 120 ug/L, it is calculated that with input from the effluent, fluoride concentrations in Red River could locally increase to 247 ug/L within the mixing zone and 212 ug/L fully mixed.

- i) The Proponent should monitor fluoride to establish baseline conditions in the aquatic environment receiving the effluent.
  - ii) Additional monitoring solely is not a mitigation measure.
  - iii) Effluent from the facility should not further degrade water quality in the downstream receiving environment. This means that effluent from the facility should not result in increased concentrations in the downstream environment, even if Manitoba's aquatic life guideline is being exceeded prior to the new facility coming online.
  - iv) There should be a clause in the license requiring the monitoring of fluoride at sites upstream and downstream of the discharge location to better understand the impacts of the facility on the aquatic environment.
  - v) Developing an effluent standard for fluoride is not possible at the present time because we don't have a good understanding of baseline conditions for fluoride in the Red River. After enough data has been generated (~3years), we could revisit the potential of establishing an effluent standard.
  - vi) Additionally, the proponent could obtain federal Environment and Climate Change Canada water quality data for fluoride in the Red River, <https://data-donnees.az.ec.gc.ca/data/substances/monitor/national-long-term-water-quality-monitoring-data/assiniboine-red-river-basin-long-term-water-quality-monitoring-data?lang=en> , at Emerson site (MA05OC0001).
- b) Please note, the seasonal average (April to November) SAR (sodium absorption ratio) is calculated in the Red River at 35 and the effluent at 35. While the effluent will have minimal impacts to the SAR in the Red River, high levels of sodium within the SAR when discharged onto a clay soil can create less infiltration over time. This may result in changing the soil structure of Cook's Creek Diversion during periods of 0.00 m<sup>3</sup>/S flow.
- c) The proponent indicates an effluent concentration of Total Dissolved Solids as 4148.03 mg/L. This level is very high where Manitoba Standards Objectives and Guidelines Tier II Objective for irrigation is 500 – 3500 TDS mg/L (crop dependent). The Water Quality Management Section recommends establishing a license limit not to exceed 3500 mg/L TDS.

Sincerely,

Joy Kennedy

**From:** Wang, Zijian <Zijian.Wang@gov.mb.ca>  
**Sent:** January 27, 2026 1:22 PM  
**To:** Mak, Jay <Jay.Mak@gov.mb.ca>  
**Subject:** RE: 6013.10 - RM of Springfield Water Treatment Plant

Good afternoon Jay,

Groundwater Management appreciates the technical expertise and thorough responses provided by the proponent regarding the Rural Municipality of Springfield Well Field Expansion. Our mandate requires that all projects meet the highest standards for the long-term sustainability of provincial groundwater and that all potential risks are carefully assessed and addressed. Given that the proposed expansion would constitute the largest groundwater use in the area, Groundwater Management has a duty to seek clarification and additional detail to ensure all potential risks are thoroughly considered. We value the opportunity for open, evidence-based dialogue, and recognize that technical discussions may involve differing interpretations.

**TAC Response to Comment 1:**

Our recommendation regarding monitoring the freshwater/saline boundary is based on established best practices for groundwater protection and not on immediate risk. While current monitoring data have not shown changes in groundwater quality or movement of the boundary (as noted in both the proponent's and Groundwater Management's mapping and data), the planned expansion will double current licensed rates. We emphasize the importance of ongoing and adaptive monitoring to promptly detect any future changes in response to increased withdrawals.

**TAC Response to Comments 2 & 5:**

We acknowledge the historical data and monitoring efforts presented by the proponent. Our recommendation for periodic re-evaluation and adaptive management is intended to address the potential for evolving cumulative effects, especially under changing operational regimes or in lower transmissivity settings. This is consistent with best practices for sustainable groundwater management and aligns with current recommendations in the hydrogeology report.

**TAC Response to Comments 3 & 4:**

No further comments.

**TAC Response to Comment 6:**

Our observations are specifically informed by data from provincial monitoring well pairs OJ011/OJ180 and OJ178/OJ179, located near the project area, as well as foundational studies of the Winnipeg Formation by Betcher (1986), and Betcher et al. (1995), Betcher & Ferguson (2003)\*. These studies indicate that the Sandstone Aquifer is hydraulically isolated from the Carbonate Aquifer by the upper shale unit within the Winnipeg Formation. Water-level measurements from observation wells completed in both aquifers commonly show potentiometric heads in the sandstone several feet higher than in the overlying carbonate—demonstrating the integrity of the confining shale. The groundwater monitoring and well reports in the project confirm this pattern, consistent with these studies.

(\*Betcher, R.N. (1986). "Regional Hydrogeology of the Winnipeg Formation in Manitoba"; Betcher, R.N., Grove, G., & Pupp, C. (1995). "Groundwater in Manitoba: Hydrogeology, Quality Concerns, Management." Betcher, R.N. and Ferguson, G. (2003). "Impacts from Boreholes

Interconnecting Multiple Aquifers – A Case Study of Paleozoic Aquifers in South-Eastern Manitoba”)

Stations SA015 and SA014 referenced in Friesen Drillers’ response are shallower, located closer to a subcrop area beneath glacial deposits, and reflect a different geological setting. Observations from those locations are not directly representative of the hydrogeological conditions at the project site, nor are they likely to be affected in the same way. Based on the documented data, the hydrographs at OJ178 and OJ179 clearly show that, prior to 2021, a significant and consistent head gap existed between the two aquifers—demonstrating the confining effect of the shale. Since the commencement of municipal pumping from the Sandstone Aquifer in 2021, this head difference has largely disappeared, and groundwater levels in both aquifers now fluctuate together, although magnitude differs. The magnitude of drawdown observed in the carbonate aquifer (at OJ179) during periods of municipal pumping is also significantly greater than the 5% of sandstone drawdown cited in the report—a discrepancy that remains unaddressed.

These observations indicate that the cumulative effects on the carbonate aquifer could be more significant than the report suggests, particularly with increased pumping rates and longer operational periods. It is important to clarify that “hydraulic connection” refers not to a permanent change in physical properties, but to the degree to which pumping influences both aquifers. The data since 2021 operation show that water level fluctuations in the carbonate aquifer have become larger and are more closely aligned with those in the sandstone. Should groundwater withdrawals rise further, it is reasonable to anticipate even greater fluctuations and a reversal of the vertical hydraulic gradient over time.

**TAC Response to Comment 7:**

We recognize that the Theis solution, while useful for preliminary estimates, has well-known limitations for long-term impact assessment. While we appreciate the proponent’s rationale for its use, we recommend that more advanced analytical or numerical modeling approaches be considered for future scenario testing and uncertainty quantification, especially for projects of this scale. We also acknowledge that adaptive management and robust monitoring, as outlined in the current recommendations, remain critical.

**TAC Response to Comments 8 & 9:**

Thank you for the explanations provided. No further comments.

Groundwater Management values the technical dialogue and looks forward to continued collaboration with the proponent to ensure the long-term protection and sustainable management of Manitoba’s groundwater resources.

Regards,

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