Region of Waterloo

ENGINEERING AND
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Water and Wastewater Services
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January 9, 2025

Ministry of Natural Resources: Development and Hazard Policy Branch
300 Water Street, Peterborough, ON K9J 8M5

Re: Comments on "Enabling the Development of Commercial-Scale Geologic Carbon Storage in Ontario: The Geologic Carbon Storage Act": ERO 019-9299

The Region is thankful for the opportunity to review and comment on the captioned consultation document and provides the following comments:

Item 1: Potential Impacts to Water Quality

The Region assumes that only deep geologic storage of carbon dioxide (CO_2) will be approved such that the impacted geologic storage units are much deeper than any of the Region's existing or proposed future drinking water supply aquifers. A primary risk to municipal supply aquifers is CO_2 leakage from deep geologic reservoirs. If leaks occur, and injected CO_2 migrates to municipal supply aquifers, pH impacts could directly impact groundwater by increasing the solubility of certain constituents, which may be present in aquifers (e.g. iron, manganese, arsenic, etc.). If leaks occur, carbon sequestration in underground geologic formations could impact water quality due to the expected reduction in pH associated with increasing CO_2 concentrations. These impacts may include, but are not limited to:

- Changes to raw and treated water quality
- Increased solubility of contaminants, particularly metals
- Treatability impacts

Increased concentrations of constituents in drinking water supply wells will directly reduce treatability with existing process equipment and reduce treated water quality. In the distribution system, lowering the pH may cause increasing lead solubility within distribution systems and result in changes to chemical deposits/due to changing the overall equilibrium conditions.

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Interpretation:
If deep geologic storage is implemented, the impact to the quality of the RMOW's water supplies is restricted to deep geologic units that are hydraulically isolated from municipal groundwater supply aquifers. However, the implications may be much more significant if CO_2 storage occurs in, or CO_2 migrates to, municipal drinking water supply aquifers. If concentrations of parameters such as iron or manganese increase, the existing systems may not be capable of removing the additional contaminant loading, or new systems may be required at facilities which do not currently require treatment. Reduced pH may also result in the dissolution of contaminants which have not previously been observed in the RMOW's water supplies and may require new treatment.

Both chlorine and chloramine disinfection processes are utilized in different areas across the Region. When considering secondary disinfection with chloramination, lowering the pH may cause increased formation of less desirable chloramine species including di- and trichloramines.

General impacts of changing pH in the distribution system may include increased dissolution of metals from pipe material (e.g. lead), changes to the scale existing on the surface of pipes, potential for coloured water events and changes to the rate of disinfectant residual decay.

Support:
The Region supports this proposal with some suggestions.

Rationale:
To protect water quality of municipal water supplies using groundwater sources, the regulation should define specific guidelines for assessing and minimizing the effects of potential groundwater quality impacts on groundwater aquifers used for municipal water supply.

Suggestions:

- A comprehensive disclosure of the risks and effects on regional groundwater supply aquifers from a water quality point of view,
- The regulation should require proponents to complete reviews of Provincial datasets to confirm presence/absence of nearby vertical infrastructure such as private water wells, oil and gas wells, geothermal energy systems, etc.
- The regulation should require pH monitoring by the proponent in nearby groundwater aquifers used for municipal water supply. Prior to the commissioning of a CO_2 injection well, background monitoring should be conducted such that any variation from normal pH ranges can be accurately identified.

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- Clear thresholds related to overall aquifer impacts (e.g. pH decrease from baseline) should be implemented such that storages activities can be immediately stopped when an impact exceeding the threshold is observed.

Item 2: Potential Impacts to Aquifer Supply Capacity

The Minister would only be able to issue a permit if satisfied that the applicant has obtained the rights to the use of land and pore space necessary for the activities for which the permit is sought and potential impacts to agricultural operations and systems, drinking water sources and surface or subsurface uses and activities have been assessed and suitable mitigation measures would be implemented.

Interpretation
In addition to the water quality issues noted above, hydraulic short-circuiting between deep geologic reservoirs and municipal groundwater supply aquifers may cause injected CO_2 to migrate across geologic units, and off-gas in unconfined or lower pressure confined aquifer areas. This off-gassing may result in the formation of bubbles which will plug pore space and could reduce the overall capacity of the supply aquifer, similar to air-binding in media-based water filters.

Support
The Region supports this proposal with some suggestions.

Rationale:
To protect the supply capacity of municipal water supply aquifers, the regulation should define specific guidelines for assessing and minimizing the effects of potential impacts to supply capacity of groundwater aquifers used for municipal water supply.

Suggestions
The regulation should provide:

- A comprehensive disclosure of the risks and effects on regional groundwater supply aquifers from a supply capacity point of view,
- Specific guidelines for assessing and minimizing the effects on groundwater supply aquifers need to be provided including but not limited to the assessments required to detail the safety of geologic carbon storage,
- Specific guidelines for assessing and minimizing the effects of potential migration pathways on groundwater supply aquifers, and
- Recommendations for investigation, standards, mitigation and contingency plans that should be put in place.

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Item 3: Municipal Engagement and Commenting

The proposed Act would allow the Minister to issue research and evaluation permits, as well as storage permits, to individuals or organizations who wish to engage in activities related to carbon storage. To obtain these permits, interested parties would need to submit an application and follow the consultation activities as outlined in the regulations. In cases where concerns are not resolved after completing the required consultations, the Minister would be authorized to refer the applications to the Ontario Land Tribunal (OLT) for further review.

Interpretation
The proposal will allow the Minister to issues carbon storage permits on private and public land including those owned by the crown. Confirmation of municipal approval will be required to support the application. Applicants are also required to follow the regulations and obtain permits before conducting consultation activities. If any concerns related to an application remain unresolved after consultation activities are completed, the Minister has the authority to refer the application to the OLT. It has been noted that the applicant must provide the Minister with confirmation of municipal approval of the proposed project in accordance with the regulations. It is not clear within the proposal, what will be the specific role of municipalities in approving geologic carbon storage projects that are on private or Crown land. In addition, the Region is now an “upper tier municipality will be without planning responsibilities” and therefore will not be allowed to file any appeals to the OLT about decisions made related to applications made under the Planning Act.

Support
The Region supports this proposal with some suggestions.

Rationale
- The requirements and / or ability for carbon storage policies to be included in municipal Official Plan's and zoning bylaws is not defined.
- Can it be clarified that since these applications will be governed by the Geologic Carbon Storage Act, and not the Planning Act, that an “upper-tier municipality without planning responsibilities” (as listed in Bill 23) would be able to appeal decisions made by the OLT with respect to carbon storage permits.

Suggestions
- Municipalities responsible for producing and supplying treated water should be engaged by the Ministry of Natural Resources and Forestry (MNRF) throughout the application process. This should include early consultation, review of technical submissions, and should be provided an opportunity to comment on concerns related to potential impacts to municipal groundwater supply aquifers.

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- The roles and responsibilities of the upper tier municipalities should be clearly defined, including the requirements for inclusion within municipal Official Plan's and zoning bylaws, as well as the authority for an “upper-tier municipality without planning responsibilities” to appeal to the OLT and review permits on private and crown lands.

Item 4: Financial Liability Framework

If the proposed framework becomes law and the associated regulations are implemented, proponents and operators will be obliged to establish and uphold financial assurance and pay fees and other charges to cover the expenses of implementing the regulatory framework. Additionally, those who intend to use public land or resources for carbon storage projects will be required to pay charges such as lease or rental fees.

Interpretation
With the proposed framework in place, it would allow for positive economic development within the province. Mechanisms will be put in place to ensure that the financial burden associated with carbon storage projects in the short term (permitting, administration etc.), medium term (inspection, compliance etc.) and long term (closure monitoring etc.) is covered by the project owner (fees, fines, financial assurance) and will be paid to the province.

Support
The Region supports this proposal with some suggestions.

Rationale
The associated link between the transfer of the financial impact associated with carbon storage projects between the province and municipal government is not clear. For example, if a carbon storage project approved by the province results in an adverse impact to a municipal water supply, who holds the financial responsibility to implement a solution?

Suggestions
Cost recovery mechanisms should be defined under the financial assurance regulations to allow for adverse impacts (environmental or human health) to be addressed by way of funding to implement a solution.

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Closing Remarks

The Region appreciates the opportunity to comment on Enabling the Development of Commercial-Scale Geologic Carbon Storage in Ontario: The Geologic Carbon Storage Act. Thank you for your consideration.

Yours truly,

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