Given its many interactions with the surrounding natural environment, Québec’s mining sector is vulnerable to climate change (CC), particularly in relation to tailings storage facilities and mine site rehabilitation. As such, social acceptability and long term performance of mining projects will be influenced by the ability of mine managers to adapt their infrastructures to the impacts of CC. While the mining industry has historically been more concentrated in southern Québec, the impact of CC in this region has not yet been rigorously studied compared with the efforts made in the north of Québec. Therefore, it is crucial to examine the issue and propose approaches suited to these regions which will enable managers to integrate CC right from the structure design phase.

**OBJECTIVE**

Develop a methodical approach aimed at integrating climate change from the design phase of works for the storage and rehabilitation of mine tailings.

**METHODOLOGY**

- Identify and quantify extreme weather conditions in relation to the design of tailings storage and rehabilitation works.
- Assess the change in the performance of storage structures in the face of climate change in order to gain a better understanding of different rehabilitation methods.
- Estimate the influence of climate change on the design of tailings storage structures by estimating the volumes of water to be managed. Two case studies representing distinct sets of conditions will be conducted: the Canadian Malartic open-pit mine and the Doyon-Westwood underground mine.
- Develop a methodological approach integrating CC in the design and rehabilitation of tailings storage facilities.

**EXPECTED RESULTS**

- Reduction in the environmental impact of mining activity and the rehabilitation of mine sites.
- Development of new approaches that include climate change in the design of storage structures.
- Improvement of current knowledge on the long-term performance of storage and rehabilitation works.
- Integration of new design criteria taking into account changes in extreme weather events.
- Recommendations for corrective work at mine sites under government responsibility in addition to new approaches enabling mining companies to take CC into consideration from the design phase onward.

**BENEFITS FOR ADAPTATION**

This study responds to a need expressed by mining companies and the provincial government to review mining waste management measures by considering climate change and its impacts on the industry in order to ensure the long-term sustainability and safety of tailings structures.

The benefits for adaptation lie both in the assessment of corrective work on mine tailings management structures under government responsibility and in the development of new approaches (i.e., digital, decisional) that will enable mining companies to take CC into consideration right from the structure design phase.