Issue: Effects of Mine Reflooding

- **Issue (AANDC TC3):**
  - "The documents do not include discussion on mine flooding after operation of the mine is finished, potential impacts of mine flooding on groundwater quality, and potential for groundwater discharge to Doris Lake after mine closure."
- **December response**
  - Described potential effects of backfill on water quality in the reflooded mine and expected flow from the reflooded mine to Doris Lake.
- **Outstanding**
  - TMAC committed to provide further evaluation at the hearings.

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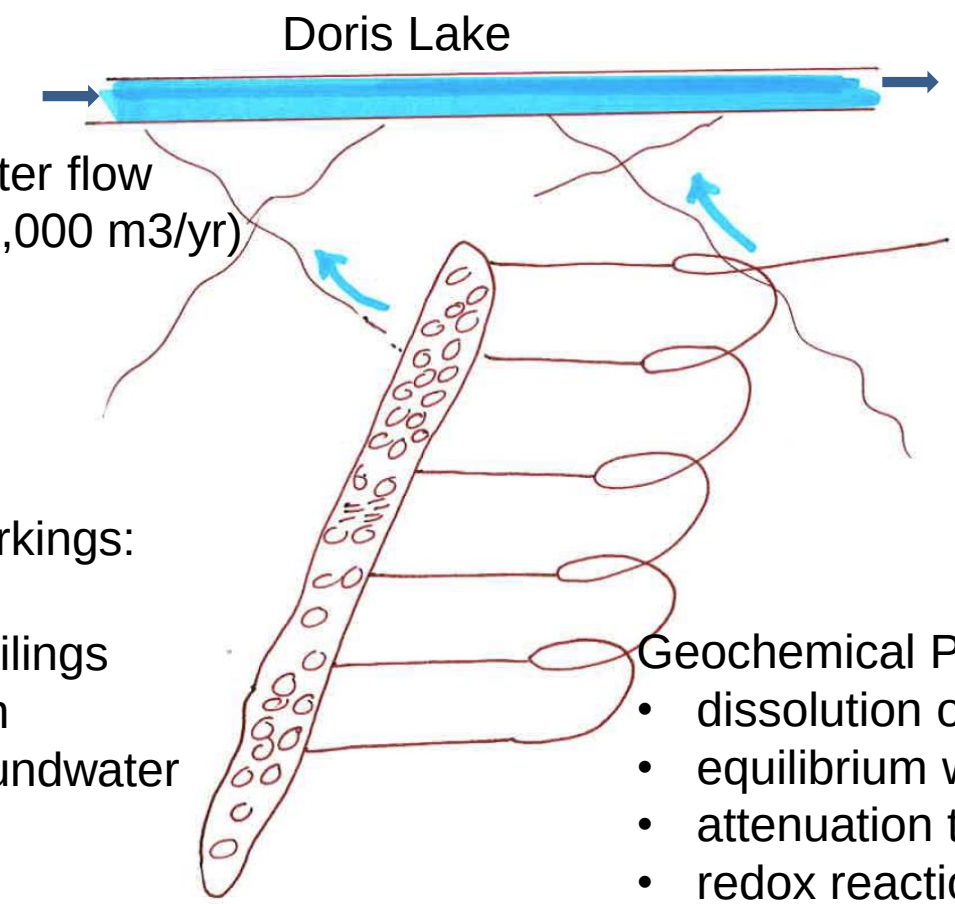

Backfilled Mine Workings:

- 1.6 Mt WR
- 0.15 Mt Detox tailings
- 8 years oxidation
- 881,000 m3 groundwater

Geochemical Processes:

- dissolution of stored contaminants
- equilibrium with secondary minerals
- attenuation to mineral surfaces
- redox reactions
  - dissolution of ferrihydride
  - precipitation of sulphides

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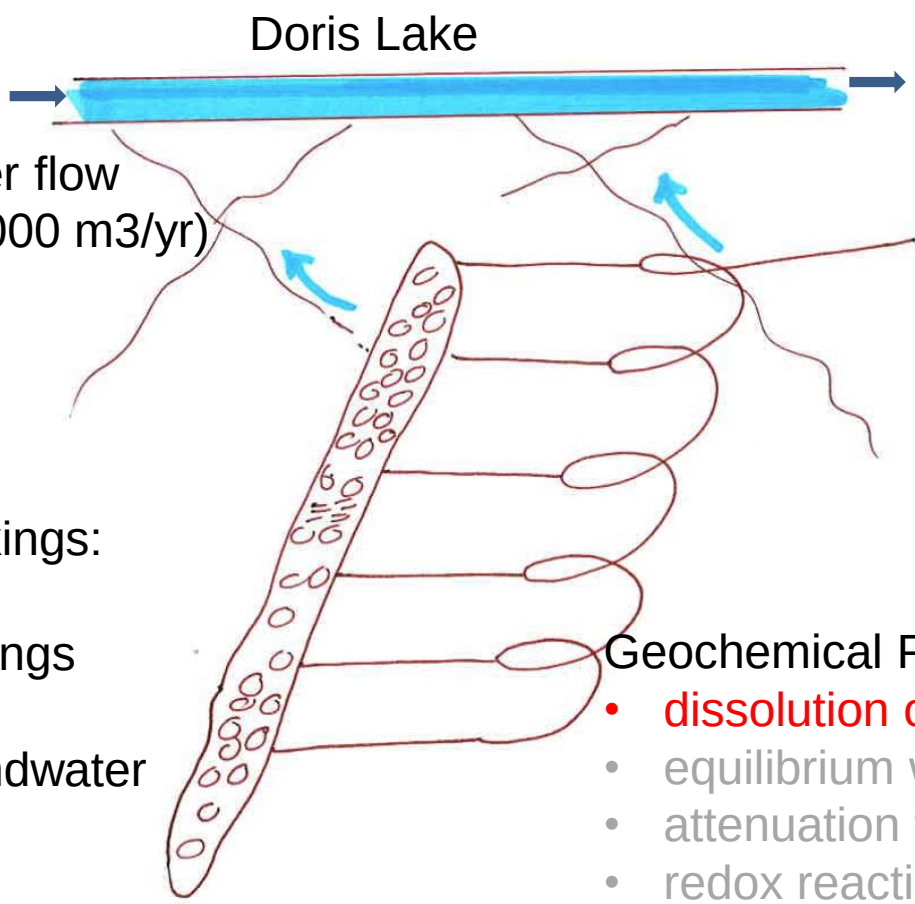

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- **Water Quality Estimates for Reflooded Mine**
  - **Waste Rock (1.6 Mt)**
    - Loading rates from existing waste rock (mg/kg/day)
    - Assumed that half the soluble load is leached, and half accumulates over 8 years
  - **Tailings (0.15 Mt)**
    - Loading rates from humidity cell tests on detox tails
    - Correction for colder temperatures (0.2x factor)
    - Assumed that all of the soluble mass accumulates
  - **Soluble Load**
    - Loading rates x mass x time = kg soluble load

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- **Reflooded Mine Concentrations**
  - Soluble load / volume of voids (881,000 m3) = incremental conc.
  - Add to concentrations in groundwater
  - Secondary mineral controls, attenuation and other chemical reactions were not considered (highly conservative)
- **Doris Lake Concentrations**
  - Calculated loads from reflooded mine plus background loads divided by flow through Doris Lake (680x dilution)

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- **Selected results:**

Parameter	Groundwater (mg/L)	Incremental Backfill Conc. (mg/L)	Reflooded Mine Conc. (mg/L)	Background Conc in Doris Lake (mg/L)	Doris Lake Conc. with mine inputs (mg/L)
SO4	1900	5549	7449	3	14
As	0.0024	0.021	0.024	0.00040	0.00043
Cd	0.00012	0.0068	0.0069	0.000010	0.000020
Fe	4.7	7.9	13	0.13	0.14
Se	0.0019	0.19	0.19	0.00040	0.00068

- **Change in water quality in Doris Lake is minor, even with conservative assumptions**
- **All results below CCME**