Les Terrains Aurifères (LTA) ‘Cover with Capillary Barrier Effects’ (CCBE) to Control Acid Mine Drainage

Geographical location

The Les Terrains Aurifères (LTA) mine site tailings impoundment, approximately 8 km southeast of Malartic, Abitibi, Québec

When it began or was completed

The tailings impoundment cover was constructed in 1995 and 1996; monitoring has been ongoing since construction.

Why a Canadian geotechnical achievement?

The LTA tailings pond is approximately 60 ha in area and contains approximately 12 m of sulphidic (acid-generating) tailings placed over 5 m of non-acid-generating tailings. The reclamation work consisted mainly of constructing a multi-layered cover designed as a ‘cover with capillary barrier effects’ (CCBE).

The CCBE design was selected after extensive geochemical and hydro-geotechnical studies. The cover is 1.6 m thick and consists of 50 cm of sand (capillary break) placed on the reactive tailings, over 80 cm of non-acid-generating tailing (moisture-retaining layer, MRL), and more than 30 cm of sand and gravel (protection and drainage layer) on the surface. The design objective was to maintain a minimum degree of saturation of 85% in the MRL to effectively reduce the oxygen flux from the atmosphere to the acid-generating tailings. The CCBE has been monitored since construction. It has been functioning very well and its performance has exceeded the design criteria.

This was the first time a CCBE has been successfully used as an effective oxygen barrier on a large tailings impoundment; it was also the first time non-acid-generating tailings were used as a construction material (MRL) in a large-scale CCBE. Other innovative components of the project are described in the key references.

Barrick Gold Corporation is the mine site owner.

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Key References


Photographs

Aerial view of the LTA site before construction of the cover.

Side of the tailings impoundment after revegetation (2007).