



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.

Submitted by

Mayana Kissiova (Golder Associates), Johnny Zhan (Barrick Gold Corporation) and Bruno Bussière (UQAT, Rouyn-Noranda)

Key References

Bussière B, Maqsood, A, Aubertin, M, Martschuk, J, McMullen, J and Julien, M. 2006. **Performance of the oxygen limiting cover at the LTA site, Malartic, Québec.** CIM Magazine, Vol 1, Paper 20.

Maqsood, A, Bussière, B, Aubertin, M, Chouteau, M and Mbonimpa, M. 2011. **Suction break to control slope-induced effects in covers used as gas barrier.** Canadian Geotechnical Journal, Vol 48, pp 53–71.

Photographs



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



Side of the tailings impoundment after revegetation (2007).