

PF 092F 330

Geochemical Assessment of Subaqueous Tailings

007614

Disposal in Buttle Lake, British Columbia

1993 Study Program,

MEND Report 2.11.4a,

May 1995,

MEND CD-2, Natural Resources Canada

Executive Summary

The dissolved metal concentrations within Buttle Lake are among the lowest observed in the last 20 years of observations despite continued inputs of several trace metals (most notably Zn) from acid drainage in the Myra Creek watershed. The tailings are restricted to the South Basin and are now buried by several centimetres of oxic, natural sediments admixed with a small component of tailings bioturbated upward from below. The natural site indicates diffusive influxes of dissolved Cd and Zn into the sediments while Cu and Pb show no indication of reactivity. At both of the tailings sites, near surface pore waters indicate remobilization of Cd, Cu, Pb and Zn (and Hg at the distal site) likely associated with oxide dissolution. However, the impact of the upward flux toward the water column is likely attenuated by reprecipitation of Mn and Fe oxides which scavenge trace metals. Arsenic distributions follow Mn and Fe cycling but show no evidence of efflux. Simple flux-based diffusion calculations suggest that effluxes of Cu, Pb and Zn to the South Basin bottom waters are small and have limited impact on water quality; very little, if any, oxidation of sulphide particles can be accommodated by the near-surface pore water data. These observations are consistent with those of previous studies of Buttle and other lakes.

A preamble entitled, "An Overview of the Reactivity of Subaqueous Mine Tailings Deposits" precedes the report to provide an appropriate foundation upon which the data may be viewed.