

## BASE METAL REMOVAL FROM MINE DRAINAGE

by

Theodore Frostman,<sup>1</sup> Stephan Gale,<sup>2</sup> Dennis Koschak<sup>3</sup>

---

**Abstract.** About 300,000 gallons per day of water containing varying amounts of base metals were draining from beneath the stockpiles at LTV Steel Mining Company's taconite ore mine near Babbitt, Minnesota. This mine drainage demonstrated toxicity to certain aquatic life. The problem was solved by capping critical stockpiles to reduce infiltration, diverting surface water away from the waste rock stockpiles, treating the stockpile drainage to control pH and removing base metals with a man-made peat/wetland system. The peat/wetland treatment system is the only one of its kind in Minnesota and one of the largest in the United States. It is part of the total mine drainage treatment system that is engineered to function long after the mine is closed at one-tenth the cost of conventional treatment methods.

**Keywords:** acid mine drainage, metal removal, peat, water treatment, wetland treatment

---

<sup>1</sup> Theodore Frostman, STS Consultants, Ltd., 3650 Annapolis Lane, Minneapolis, MN 55447.

<sup>2</sup> Stephen Gale P.E., STS Consultants, Ltd, 3650 Annapolis Lane, Minneapolis, MN 55447.

<sup>3</sup> Dennis Koschak, LTV Steel Mining Company, PO Box 847, Hoyt Lakes, MN 55750.