

## **Potential Amendments for Acid Generating Mine Soils from Inco's Whistle Mine Closure Project**

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Nickel and copper mining may produce acid generating waste products, aluminium mining produces alkaline waste and limestone mining destroys some unique ecosystems in Canada. The ability to reduce or find alternatives to mining limestone as a neutralization product for acid generating reclamation projects would be very beneficial to the Canadian environment. Inco's Whistle mine in the Sudbury basin is a former small open pit located 12 kilometres from Capreol. Seven million tons of waste rock were removed from the pit and need reclamation. The rock has a pH ranging from 4.2 to 4.7 and is comprised of nickel, copper, iron, manganese, and sulphides that are potential acid-generating materials.

A project was initiated to establish the use of three possible reclamation amendments to neutralize the soils and provide a medium suitable for plant growth. ONDEO-Nalco products, KB-1 and KB-SEA, and Virotech's Bauxsol™ were tested for neutralization and metal binding capabilities on Whistle mine waste soils. The KB-1 and KB-SEA contain approximately 50% calcium oxide and the bauxsol compound was developed from caustic red mud residues generated from the Bayer process of alumina production. After initial soil pH and metal analyses, germination tests were undertaken to determine if any of these chemicals would be toxic to the local reclamation grass seed mix, and if not, to determine an appropriate application rate. Subsequent establishment and growth experiments (measuring biomass, root and shoot lengths) were carried out using calcium carbonate (lime) for a baseline comparison. Germination results indicated application rates of up to 10% chemical compound were not toxic in preventing initial germination of the seeds. However, soil pH results determined application rates of 0.5% for the KB-1 and KB-SEA compounds, and 10% weight/weight for the bauxsol. The growth experiments resulted in two significantly different groups among the treatments, KB-SEA and calcium carbonate in one group and the rest in another. Further field trials are essential to determine longterm effects of the materials.