

Biosolids Research

Porcupine Gold Mines is committed to research and innovation towards sustainable development as well as the development of synergies with other resource-based industries.

In 2001, a partnership was initiated between Porcupine Gold Mines and Abitibi-Consolidated to use pulp-and-paper wastewater sludge as a soil amendment for the rehabilitation of mine-affected lands. The biologically active material, more commonly referred to as biosolids, was traditionally disposed of as a waste in specially constructed landfills where it decomposed in such a manner that greenhouse gases such as methane were being generated. Similar materials from various pulp-and-paper processes had been used on a small scale throughout North America and it had been proven that pulp-and-paper biosolids, which are similar to yard waste compost, provided an environmentally sound solution to more traditional chemical fertilizers when used in conjunction with revegetation efforts.

Under the guidance of the local office of the Ministry of the Environment, Porcupine Gold Mines first began using biosolids on the Pamour Mine No. 3 Tailings Dam where a quick solution to persistent dust issues was required.



Tailings after failed revegetation attempts

In the space of less than two years of spreading and seeding of biosolids on this facility, dust emissions were nearly eliminated and a self-sustaining vegetative cover was established which, in subsequent years, developed local segregation of flora not unlike what may be encountered in more natural settings. In less than five years, local invasive tree species had also begun to populate localized areas of the facility and a variety of small mammals, birds of prey, migrating birds and black bears had begun using the facility.

Following the early success at the Pamour Mine Tailings, Porcupine Gold Mines adopted the use of biosolids as the soil amendment of choice on nearly all mine affected surfaces such as tailings and waste rock deposits as well as other areas where traditional revegetation methods had not yielded sustainable covers.

In the process of using biosolids as a soil cover, PGM also discovered that the biosolids' ability to retain several times their dry weight in water before releasing it through evapotranspiration worked in our advantage by significantly reducing surface runoff. In one instance, on the Aunor Mine Tailings Dam B where approximately 400 millimetres of biosolids were spread and seeded as part of dam closure, almost no water was observed running off the 8.5 hectare facility during each spring thaw since the works took place.

With regards to Goldcorp's global commitment to sustainable development, the use of pulp-and-paper biosolids on our properties is anticipated to result in an increase in atmospheric carbon removal as the organic soil layer builds up and perennial plant species establish themselves, thus augmenting the local biomass.



Same area four years after biosolids application

In 2006, PGM joined a consortium of mining and forestry industries, including CVRD-INCO, Xstrata Nickel, Abitibi-Consolidated, Domtar and St. Mary's Paper as well as government and institutional research groups CANMET, Laurentian University and MIRARCO in a project geared to determining the feasibility of redeveloping mine affected lands for the culture of biofuels crops. As such, biosolids amended lands could eventually be used to cultivate high-yield corn and canola species for the production of ethanol and biodiesel.

The research project will also investigate the potential effects of biosolids on tailings geochemistry. Results of this study will help confirm the possibility of using biosolids as an oxygen barrier on acid-generating tailings. Preliminary laboratory indications are that anoxic conditions created by the biosolids have resulted in the rapid re-mineralization of metals and sulphides at the interface between biosolids and tailings under a laboratory's controlled environment. This knowledge could lead to the elimination of expensive and often failure-prone water covers or engineered clay covers on some acid-generating tailings where metals leaching could be virtually eliminated by using biosolids.