A fabricated soil is applied to a pyritic waste rock pile. The soil minimizes the exposure of the waste rock to air and water, thereby minimizing its acid-generating potential and improving runoff.

SOIL FABRICATION TO MITIGATE ACID MINE DRAINAGE

Client: Lehigh Hanson Materials Limited

The Monteith Bay silica mine is located in a remote inlet on the northwest corner of Vancouver Island. Rock associated with the silica can be acid generating. The frequent and intense rainfall events that occur on the west coast, in contact with the exposed rock result in acidic surface water runoff. To minimize acid generation the waste rock is temporarily covered with tarps, and lime is used in buffering the pH of water collected on site. The long-term objective in reducing the acid generation is to minimize the exposure of the rock to air. In the absence of oxygen, acid generation is minimized. Increasing the pH of water that reacts with the exposed rock faces will assist in neutralizing run-off.

Interim reclamation focused on establishing a mantle of fabricated soil with an elevated pH. SYLVIS was retained to design a fabricated soil that would effectively cap the acid-generating rock and improve runoff quality. A biosolids soil product was manufactured in Southwestern British Columbia (BC) and transported by barge to the mine site. Approximately 3,000 m^3 of soil was fabricated from biosolids, sawdust, compost, lime paste and overburden. The lime paste was added to increase and sustain the soil pH. The soil was fabricated with a low porosity, using overburden that had a high concentration of silt and clay. The soil met the requirements of the BC Organic Matter Recycling Regulation (OMRR), but did not resemble a typical potting soil. At the mine site it was unloaded and applied to previously disturbed areas and the face of steep waste rock piles.

The significant rainfall (over 2 m annually with a 50% chance of precipitation every day) results in a saturated soil profile at depth. This saturation minimizes the potential for acid generation. The elevated pH of the soil water assists in neutralizing any acid generation that may occur. The pH and quality of the surface water on the mine site has improved following the application of the biosolids fabricated soil products. The fabricated soils are sustaining vegetation with minimal erosion, despite steep slopes and intense rainfall events. The enhancement of water resources represents an innovative use of residuals to solve environmental challenges.

AREAS OF EXPERTISE

- Applied Research
- Consultation & Education
- Operational Management
- **> Options Assessment & Development**
- Policy & Practices

RESIDUALS

- Ash
- **> Biosolids**
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- Pulp and Paper Residuals
- Unique Residuals
- Water Treatments Residuals

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