

ALHUÉ MINE

Tailings Design

Chile

Client:

Yamana Gold, Inc.

Contract Value:

\$50,000

Performance Period:

2007 – 2008

Technical Areas:

- Project Piloting
- Solid Waste Management
- Water Resources

Successes:

Established the first lined tailings impoundment in Chile

Realistic seepage analysis alerted the client to future environmental risks

Site inspections led to revisions to the conceptual model of the underlying geology and more realistic seepage analysis

Made inexpensive design modifications to obtain stability under poorer drainage conditions



BACKGROUND

The New Tailings Management Facility at the Alhué Mine in Chile consists of a lined pond bordered by a new dam and the slopes from the original tailings facility. The dam was built using the sandy part of the slurry that comes out of the process plant. The slurry passes through a cyclone that separates the sandy particles from the fines. The sandy material, combined with water, is deposited on the downstream side of the starter dam. The sandy material builds up the dam, while the fine particles and most of the water are projected into the pond.

SES ROLE

SES performed a Third Party review of the design on behalf of the owner. They conducted site visits and inspections, as well as conducting independent seepage analyses of the proposed facility. Based on these evaluations, the owner decided to add a synthetic liner to the facility, the first of its kind in Chile for this type of structure.

Due to concerns that the liner would generate excess pore pressures in the embankment, SES worked with the local designers to refine the seismic design criteria, conduct stability analyses and design a key trench under the embankment to provide for additional stability.

The pond was lined with 1.5 mm geomembrane, while the portion of the dam between the two stability berms was lined with a geocomposite clay liner. The system was designed to withstand a magnitude 7.7 earthquake with 0.9 g peak ground acceleration.