Common Creek Reservoir
Sudbury, Ontario, CA

Vale Inco
Vale S.A.

November 2008

Groundwater Cut-Off / Chemical Containment
Common Creek Reservoir

Project Name:
Common Creek Reservoir

Location:
Ontario, CA

Owner:
Vale Inco

Contractor:
Vale Inco

Engineer:
Klohn Crippen Berger Ltd. (KCBL)

Date:
11/2008

1. **Background**

The site of the Common Creek Reservoir project is located approximately 1km southwest of Copper Cliff, Ontario and comprises a nominally flat marshland bounded by granitic outcrops to the southeast. Due to the close proximity of a rail line track to the reservoir and the presence of potentially compressible peat on site, it was determined at the preliminary design stage that the effects of reservoir construction and operations on the adjacent groundwater table should be minimized to prevent significant consolidation settlement beneath the rail tracks.

2. **Project Scope**

One of the key criteria for the reservoir included the construction of a low permeability barrier between the reservoir storage and adjacent groundwater table. Several options for the low permeability barrier were considered at the preliminary design stage including a HDPE liner, Geo-synthetic Clay Liner (GCL) and a sheet pile wall. Throughout the design process, these options were evaluated based on permeability requirements, longevity, cost and ease of construction. Based on the above considerations, the final reservoir design incorporated an approximately 2,350 foot long vinyl sheet pile wall. The decision to use vinyl sheet piling with a hydrophilic sealant was based primarily on the ability to achieve a minimum equivalent permeability of $1x10^{-9}$ m/s.

3. **Performance**

As part of on-going performance monitoring for the project, KCBL has designed an instrumentation program for CVRD Inco, to monitor the performance of the sheet pile wall and adjacent ground conditions during reservoir operations. Part of the instrumentation program includes the installation and monitoring of piezometers adjacent to the rail tracks and observation wells on the upstream and downstream sides of the wall to monitor pore pressures downstream of the wall and the phreatic surface across the wall respectively. Monitoring for the instrumentation program was planned to last through to 2009. Testing results concluded that the groundwater levels outside of the reservoir were maintained and that no measurable seepage occurred.

4. **Construction**

The installation of the approximately 2,350 foot long sheet pile wall took approximately 7 weeks with stoppages and was performed by local contractor William Day Construction Inc. Installation equipment comprised an excavator, vibratory hammer, and a steel mandrel.

5. **Wall Specifications**

CL9000

Depth	10-20 ft	3-6 m
Length	2,350 ft	716 m
Wall Area	10,404 ft²	967 m²