



The Island Mine

Dubreuilville, Ontario, Canada

The Island Mine, owned and operated by Alamos Gold Inc., is an active underground gold mine located on the north shore of Lake Superior. This was Keller's first North American interlocking pipe pile project.



The project

The Island Mine achieved commercial gold production in 2007. Since then, production has grown significantly through ongoing exploration and in 2019 rose to a record high of 154,400 ounces. One expansion was completed in 2018, with a second initiated in 2019.

The second expansion phase required the installation of a cut-off wall on the downstream side of an existing dam to allow for additional dam tailing deposits. Subsurface conditions consisted of 6.5 ft to 29.5 ft (2 m to 9 m) of sand and gravel till with cobbles and boulders and a flowing water condition. Beneath this was granitic bedrock.

The challenge

Several obstacles needed to be addressed in order to select the best method of cut-off construction:

- Flowing groundwater conditions
- The requirement for a completely watertight cut-off
- The presence of cobbles and boulders in the soil profile
- Uncertain depth to the top of rock, led to changed conditions that put the project on the owner's critical path

The solution

Ledcor, the general contractor, had previously worked with Keller on a number of projects and was familiar with our range of in-house solutions and problem-solving capabilities. Keller was invited to early discussions and provided information on several cut-off techniques, discussed anticipated constructability challenges and technical considerations, and addressed the time-sensitive aspect.

With consideration of the challenges, Keller suggested interlocking pipe pile cut-off technology. Interlocking pipe pile walls are relatively new to North America and consist of tightly interlocked pipe piles utilizing a mechanical "ball-and-socket" type connector to create a watertight cut-off. The wall can be readily embedded into the sound rock to complete the cut-off. Additionally, construction is rapid, which was a vital consideration for the owner. On this basis, interlocking pipe pile technology was accepted by Ledcor and Alamos Gold, and Keller was retained for the work.

Additional subsurface exploration was conducted along the dam to better determine the top of the rock so that the pipe piles could be prefabricated off-site. Sixty-eight 24-in (610-mm) diameter interlocking pipe piles, complete with ring bit, connectors, sealant, and tremie grout pipe, were installed. Interlocking pipe piles varied in length from 16.5 to 36 ft (5 m to 11 m). A pile guide and template ensured verticality during installation, with additional post-installation verticality verification also performed. A full-time, on-site technician performed quality control for each installed interlocking pipe pile. Pre-and post-installation pump tests were conducted to confirm the adequacy of the cut-off wall.

Keller crews worked six days a week for six straight weeks to complete the project safely and in a timely manner, allowing Alamos Gold to maintain its original production schedule.

Project facts

Owner(s)

Alamos Gold Inc.

Keller business unit(s)

Keller

Main contractor(s)

Ledcor

Solutions

Support of excavation

Groundwater control and dewatering

Markets

Mining

Techniques

Interlocking pipe piles

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