



## Case Study

# MINING

## Improving Heap-Leaching Efficiency with IoT-enabled PLCs

A Canadian-based gold and silver mining company with a worldwide portfolio of mines, yields 2.5 million ounces of gold annually. To increase operational visibility and efficiency at one of its strategic mine sites in the USA, the company is now seeking to embrace IoT connectivity and technologies in its heap-leaching process.

### The Challenge

In heap-leaching operations, lime is an essential component to control the pH of cyanide – a chemical compound for dissolving and extracting gold from a host rock. The process requires trucks to load and transport the lime from a remote silo to the heap leach where the ore extraction takes place.

The lime silo was entirely isolated and disconnected from the administration building – located on the other side of the 300ft high heap leach. Due to this great physical obstruction, Ethernet

cabling from the local Programmable Logical Controller (PLC), which captures critical data of the silo level and lime dispense rate, was impossible. Traditional wireless solutions were also not feasible because of the weak penetration capability of the radio link. Implementing such solutions would also require complex PLC reprogramming that can cause costly downtime and damage the equipment.

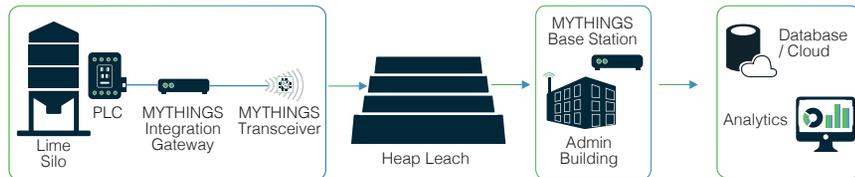
The lack of connectivity left a visibility gap in the company's heap-leaching process. Current lime usage remained entirely unknown. The only way the company could check its silo level for refill was to drive to the site three to four times a day. This manual approach was inefficient and failed to provide accurate information for scheduling refills.

*“Our nearest supplier is a three to four- hour drive from the mine site. A late order can lead to expensive production downtime as we run out of lime. On the other hand, refilling too early can result in increased waste, since we can't load the entire lime batch into a partially full silo.”*

## The Solution

After extensive research, the company turned to BehrTech and MAJiK's joint solution to bring IoT connectivity to their operations. At the heart of this solution is MYTHINGS™ – a robust wireless connectivity platform that integrates into existing PLC systems in a non-invasive manner leveraging MAJiK's software. A pilot installation was successfully conducted to verify the technical viability of the solution at this mine site.

For the deployment, a MYTHINGS integration platform running MAJiK software, interfaces with the local PLC (Allen-Bradley) at the lime silo using Ethernet to derive vital data points. A MYTHINGS transceiver then transmits collected data every 5 minutes to a remote base station inside the administration building. Here the data is relayed to both a central PLC that visualizes current mining processes and a cloud platform for predictive analytics.



*“We were looking at two major criteria. First, the solution should be easy to deploy and, more importantly, not involve any hardware changes or reprogramming in the PLC system. Second, it should provide a secure, robust, and cost-effective data connection that can get around our heap leach and reach our administration building. The joint offering by BehrTech and Majik fulfills both of these criteria.”*

## The Results

Immediately upon installation, the mining company was able to extract and transmit PLC data with no packet errors. With the MYTHINGS platform in place, the company can now monitor in real-time the lime silo level, the weight of each dispensed lime dose, and dose counts per hour. Based on the silo level, refills can be accurately planned and unnecessary manual tasks like on-site inspection can be eliminated. This helps circumvent expensive production delays and over ordering, while improving employee productivity.

The lime dispense rate can also be calculated and monitored for full transparency of lime usage. This improves the pH control of the cyanide to enhance production efficiency and worker safety. The company is also able to correlate ordered and usage amounts to detect any abnormalities and bottlenecks, such as silo leakages or inaccurate deliveries by the supplier.

*“Thanks to MYTHINGS, we now have full visibility into our operations and can proactively take action when needed. Having access to PLC data that was previously inaccessible gives us the ability to better predict when an order should be made and evaluate how efficiently the lime is being used in production.”*