

# A LEADING MINING COMPANY

This client is a large mining concern. Their Canadian operation is one of the largest integrated mining complexes in the world, with six mines, a mill, a smelter, a refinery and nearly 4,000 employees. It produces more than 65,000 metric tons of nickel each year.

## Need: Reduce Unplanned Pump Downtime

At the mine, nickel ore is transported between facilities through a number of slurry pipelines. A slurry is a mix of pulverized ore and water that is driven through the pipelines by heavy duty pumps. The client has six GIW Minerals Severe Duty Slurry Pumps at the site.

Slurry pumps are subject to enormous stress and wear as part of their operations. The slurry mixture is highly abrasive causing components to wear out quickly. In addition, slurry pumps may experience cavitation where vapor bubbles form and then collapse as the slurry passes through the pump impeller.

Cavitation erodes the inside of the pump if not quickly addressed. Because it makes a characteristic “ball peen hammer” sound, it is sometimes detected by nearby employees. However, since the condition is often intermittent and personnel are not always present, the problem sometimes persists for weeks before detection, causing significant damage and high repair costs.

Because production relies on slurry pump operation, unplanned downtime is extremely costly: \$25,000-\$50,000 per hour for each pump. To reduce this downtime as much as possible, the client identified two key strategies:

- Monitor key operating attributes of the pumps to detect cavitation and other signs of trouble before a pump fails
- Move to a predictive maintenance model that allows proactive replacement of components nearing their end of life.

## Need: Reduce Unplanned Pump Downtime

The client viewed this project as the first step in a broader strategy to integrate IIoT with their SCADA monitoring systems. They had already identified a wide variety of additional sensors could be used to optimize operations across their facility. They wanted a universal IIoT framework that could integrate all these IIoT sensors into their existing OSIsoft PI system.

To achieve this goal, the client selected FogLAMP software supported by Dianomic Systems. FogLAMP is an open, industry-wide solution for monitoring the Internet of Things that collects data from sensors, processes it at the edge and delivers it to data systems or the cloud. FogLAMP’s open-source architecture provides a rapid, low-cost way to achieve complete visibility into information needed by businesses to operate more reliably and productively.

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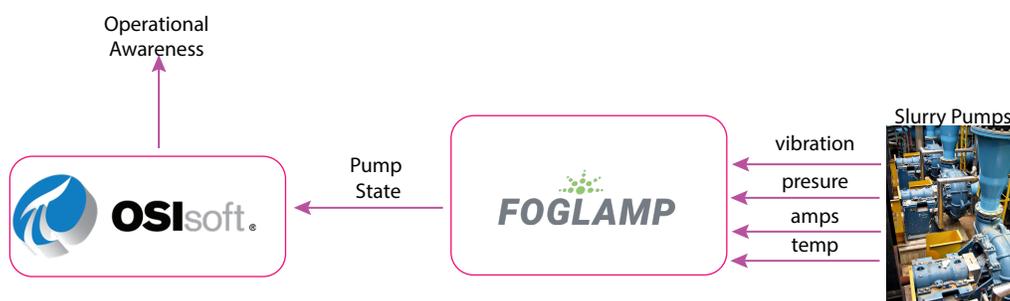
For their initial project, the client deployed a number of sensors on each slurry pump. Three sensors monitor vibration at various points on the pump. Additional sensors measure the pump temperature, discharge pressure and power consumption.

FogLAMP collects readings from the sensors, converts them to JSON format and reliably delivers them to OSIsoft PI for long-term trending, visualization, advanced analytics and event detection

Once the data is collected in PI, the client extensively analyzes it. For example, by looking at the pump flow rate over time, they estimate the cumulative wear on pump components including the liner, impeller and casings. These components can then be proactively replaced as they near the end of their useful life.

From their operations center, the client also monitors pump conditions in real time to spot impending problems. Using vibration analysis, they immediately identify pump cavitation and take corrective action. Other sensor data is used to detect the early signs of failure in hydraulic components, bearings and couplings.

*Now that the FogLAMP infrastructure is deployed, the client plans to extend it to numerous additional uses throughout the facility.*



## Results: Reduced Downtime and Lower Maintenance Expense

The mine's initial FogLAMP-based monitoring project has made pump maintenance significantly more proactive. By predicting wear and identifying signs that components are beginning to fail, they are able to address issue during maintenance windows before they affect production.

Further, the new cavitation monitoring actually reduces pump wear. Cavitation is now immediately addressed before it damages the pump components, increasing the components' useful life.

Now that the FogLAMP infrastructure is deployed, the client plans to extend it to numerous additional uses throughout the facility. The next needs to be addressed include environmental pH monitoring and water pump pressure monitoring.

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Simplify IoT Data

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