

# How a major Canadian tailings dam improves monitoring data and increases personnel safety, while cutting costs

## Country

Canada

## Project type

Tailings dam monitoring

## Sector

Mining

## Main product

Monitoring Solution

## Challenge

GEO-Instruments Canada (formerly GKM Consultants), a Worldsensing Partner based in North America, was tasked with installing a monitoring system at a tailings dam attached to a major iron ore mining operation in northern Quebec, Canada. It was a challenging assignment: the mine is a large producer of iron concentrate and the area covered by the tailings dam stretches over several square kilometers.

Any monitoring solution would not only have to operate reliably over massive distances but also keep working at temperatures well below zero for much of the year.

## Solution

At the start of the project, tens of manually surveyed piezometers that had been installed in previous years had to be automated. A key concern for GEO-Instruments Canada (formerly GKM Consultants) was to reliably automate instruments in locations where a failure could compromise mining operations.

These critical instruments were connected to Vibrating Wire data loggers to enable (near) real-time monitoring-. In more recent developments, Measurand SAAs were automated with a Digital Logger to support new developments of the mining complex.

GEO-Instruments Canada (formerly GKM Consultants), an established geotechnical and structural instrumentation firm independently tested and selected Worldsensing's industrial monitoring products as the most appropriate to read the instruments automatically and relay the data back to a central base station, where the data is integrated into a database. Worldsensing's technology was the best fit for the project because of its optimal combination between a 900 Mhz long-range radio communication (LoRa) with a signal a sensitivity of 120 dBm, lithium battery with low power consumption and flexibility to integrate any type of vibrating wire instruments across a large area.

The technology was able to cover all the critical areas of the tailings dam, including regions with natural barriers. This location made real-time communication challenging, but GEO-Instruments Canada (formerly GKM Consultants) was able to overcome the problem by increasing the data logger sampling rate to make sure that at least one reading per hour would get through.

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"We haven't had to change the batteries yet. The Worldsensing devices in this project draw very little power and vibrating wire piezometers also require little power compared to other instruments. We expect the solution to easily have a 10-year battery life."

**Vincent Le Borgne**

R&D Manager

GEO-Instruments Canada (formerly GKM Consultants)

## Benefits

The main benefit of the Worldsensing monitoring solution is a reduction in costs compared to manual data collection. The mine operator now has access to data from across all the critical areas of the tailings dam without having to send technicians out into the field to take data logger readings. The real-time data provided by the data loggers means the mine operator can monitor dam conditions continuously, making sure there is no risk to mining operations or personnel.

And the high quality of the Worldsensing devices means they are able to withstand the harsh Canadian winter, operating without fault for many years even though ambient temperatures can drop to -40°C. Combined with a power consumption that can extend battery life up to a decade, this means technicians rarely need to venture into the field to tend the monitoring equipment, further reducing costs and risks.

**About GEO-Instruments Canada (formerly GKM Consultants)**

GEO-Instruments Canada (formerly GKM Consultants) bridges instrumentation technologies and complex monitoring assignment into a single turnkey servicing company for the benefit of their clients. GEO-Instruments Canada (formerly GKM Consultants) is a leader in monitoring services and data acquisition devices, which range from simple data-logging machines to sophisticated systems that relay the acquired data to a central server. GEO-Instruments Canada (formerly GKM Consultants) provides a range of geotechnical services that include instrument installation, data hosting and monitoring that offer functionalities such as alarm handling and management, and remote data visualization.

## Advantages

- LoRa low-power wide-area network technology allows distant data loggers to communicate with a base station reliably for years.
- Quality manufacturing ensures devices can withstand harsh winter conditions.
- Real-time data capture and analysis ensures trouble-free mining operations.
- Network management software provides the status of the devices in the network and enables integration with other software



The battery-powered data loggers, installed in a major iron ore mine in Quebec, where temperatures may drop to -40°C.