CIM MAGAZINE

DEC 2010/JAN 2011 • DÉC 2010/JANV 2011 • WWW.CIM.ORG

CIM Membership Directory
Répertoire des membres de l'ICM

Coast to coast

Exploration and mining activity across Canada

D'un ocean à l'autre

Activités d'exploration et d'exploitation minière au Canada

Publications Mail No. 40062547

Perspectives pour 2011

TECHNOLOGY by Alexandra Lopez-Pacheco

Integrated, efficient solution

Mines adopting energy management system

Photo courtesy of BESTECH

Guy Faubert (BESTECH electrician) and Paul Huffels (BESTECH safety supervisor) installing a rack-mounted IZC at Vale's Coleman Mine. The Intelligent Zone Controller™ is the brains of the underground network and one of the components of the NRG1-ECO system.

The mining industry in Canada has more than its fair share of challenges today — from stringent environmental and regulatory pressures to an urgent need to improve operational costs, productivity and safety, all while having to mine deeper than ever before.

Aware of these challenges, BESTECH, a provider of engineering, automation, software development and environmental monitoring services, developed NRG1-ECO (energy consumption optimization), a multi-faceted approach, which helps mining companies manage their processes, safety, equipment and energy usage more efficiently.

NRG1-ECO combines hardware and software to manage the many pieces of automated equipment in a mine. "It's a complete energy management system and can be applied to processes such as compressors, pumps and any other systems in a mine that could benefit from a reduction in energy consumption," says Trang Tran, BESTECH's manager of software products development.

Typically a mine's ventilation system operates continously at peak capacity. NRG1-ECO's VOD (ventilation-on-demand) module enables the mine to instantly control the ventilation system's air flow to where and when it is needed. This allows a mine to reduce its ventilation costs by as much as 30 per cent — which represents significant savings given that ventilation costs make up almost 50 per cent of a mine's energy costs.

A collaborative effort

When BESTECH was developing the technology, it formed a consortium of industry experts and organizations to establish best practices and standards. The consortium members include organizations such as the Centre for Mining Excellence (CEMI) as well as mining giants Vale and Xstrata Nickel. This year, the technology was installed at Vale's Coleman Mine and Xstrata Nickel's Fraser Mine, both in Sudbury.

"We worked together with BESTECH on what was needed in the industry and they've completed the development of a ventilation management tool for us," says Cheryl Allen, chief engineer, ventilation, Vale mines mill technical services, Canadian operation. "BESTECH designed a system that can be tailored to suit the needs of each mine."

Part of the company's goal was to create a technology with as open an IT architecture as possible, so that it could integrate with technology already in use at any mine.

In addition, the company offers mines assistance with energy-efficiency grants and rebate applications for both the initial site assessments and commissioning of NRG1-ECO. "We work with our clients to provide all the necessary system training for NRG1-ECO stakeholders at a mine," says Dan Dumais, BESTECH energy specialist."A comprehensive education and employee awareness system is also available to ensure the sustained use of NRG1-ECO in their mine."

Control and versatility

NRG1-ECO includes five control strategies. "The programming parameters for the control systems are based on the needs of each mine site and designed according to their specifications," says Tran. "Each mine site has its own protocol and our team customizes their system to reflect that."

One of the first controls that mines utilize is time-of-day scheduling where windows of opportunities exist between shift changes, holidays and other regular set times to control devices. Ventilation technicians preset the execution of batches, based on the mine's planned activities per day, week or month. It can also control the devices by scheduling an automatic reduction that allows the system to reduce energy consumption.

"The second control strategy is the real-time control. This allows mine personnel to turn devices on and off in real

time, either through a web-based user interface or through human machine interface screens that sit in the control room," says Tran.

An event-based control allows the site operators to configure the system to automatically react to a fire or high carbon monoxide level, for example. When the system detects an incident, it knows the actions that need to take place. Those events often relate to safety, and can also include details such as a vent door being left open by mistake.

A environmental monitoring control includes instruments underground that measure different environmental parameters, such as high levels of carbon or nitrogen oxide and the temperature and airflow in a certain area. "Based on real-time data collected, the system can control or reissue air flow requirements for the current real-time environmental needs," says Tran.

Finally, the system integrates with industry tagging systems and monitors and adjusts air flow in real time and responds to incoming sensor data as well as the location of tagged mine personnel and equipment. It then adjusts ventilation to meet their needs," says Tran.

The Intelligent Zone Controller™ (IZC) is the brains of the underground network. It increases the system responsiveness as data can be analyzed and processed internally and does not have to be transmitted to surface for decision-making. In the case of an interruption in communication with the controls above ground, the IZC can execute commands to the devices to operate in fail-safe mode.

Better information, better decisions

NRG1-ECO also stores all the data it processes for its real-time monitoring. The system provides mine intelligence regarding device performance, adherence to established systems and processes, and offers analysis of a mine's key performance indicators. "If you are monitoring your processes then you can make informed decisions," says Allen. "With the NRG1-ECO system, you have better monitoring and control and that allows you to make decisions, helps your management make better decisions, and it helps the people working day-to-day with the systems understand their environment. If you're continually measuring, you should also be able to be continuously improving what you're doing."

BESTECH's new technology is attracting the attention of other mining giants, including North America's fastest growing senior gold producer, Goldcorp Inc. "We looked at two different systems," says Imola Götz, chief engineer, Hoyle Pond Mine, Goldcorp."It seemed BESTECH was offering a complete package from ground up. We're hoping to go ahead with NRG1-ECO in a two-staged approach: first, have the system up and running on two levels in the Hoyle Pond Mine in Timmins, and if that proves to be satisfactory, then we will expand it to the rest of the mine." CIM