



# Final Brief

## Green Mining Initiative – Pilot Environmental Technology Verification

April 2015



Cover Photographs: The two photographs in the lower right-hand corner, furthest to the right, were submitted by Kidd Operations (Glencore).

## **Summary**

This report provides a summary of the pilot to independently assess the performance of a green mining technology through Environment Canada's Environmental Technology Verification (ETV) Program. A key objective of the pilot is to determine if technology verification will accelerate the uptake and commercialization of green mining technologies, in this case, an automated ventilation control system. Performance testing and independent verification of the technology was completed, resulting in successful verification of the performance claim. Outcomes for this pilot will be tracked to determine if ETV will accelerate the uptake and commercialization of green mining technologies.

## **The Pilot Project**

To address barriers to the adoption of green mining technologies, the Energy and Mines Ministers tasked officials in 2013 with piloting one green mining technology through Environment Canada's ETV Program in partnership with provincial and territorial governments. The technology selected for the pilot was the BESTECH automated ventilation control system at the Vale Coleman mine in Sudbury, Ontario.

### Objectives of the pilot project were:

- to verify performance claims of an existing technology with a view of promoting its uptake;
- to determine if ETV will accelerate the uptake and deployment of green technologies by industry and regulators; and,
- to provide support for the commercialization of green mining technology.

## **The Technology: Automated Control of Mine Ventilation Systems**

The green mining technology that was selected for the pilot project is an energy management solution which includes an automated mine ventilation control system, BESTECH's NRG1-ECO® system. To ensure the highest standard of worker health and safety, ventilation systems often pump air throughout the entire mine, even if work is only being carried out in specific locations at specific times. Ventilation can represent around 40% of the total energy used in mineral extraction or approximately \$10 million per year for an average-size underground mine.

The purpose of BESTECH's NRG1-ECO® Ventilation Control System is to provide reduced energy consumption to the mining industry by controlling the use of ventilation equipment, which directs air only to the areas of a mine that need to be ventilated. BESTECH's technology provides an opportunity to reduce energy consumption, costs and greenhouse gas emissions, while maintaining worker safety and health.

## **The Canadian Environmental Technology Verification Program**

The Canadian ETV Program offers an independent review that verifies environmental performance claims for innovative technologies, processes, and products. The ETV process is based on sound science, high-quality data, and recognized protocols. Third-party, independent organizations collect data to test performance claims and review performance results.

### Benefits of the Canadian ETV Program include:

- enhanced credibility and acceptance of verified environmental technologies, both nationally and internationally;
- reduced risk for buyers and end users when investing in new and innovative environmental technologies;
- faster and more widespread commercialization of existing environmental technologies; and,

- increased stakeholder engagement (technology experts, buyers and providers) in the development of performance criteria for selected technologies.

#### Verification of the NRG1-ECO® Ventilation Control System:

The performance claim made by BESTECH is as follows: “The NRG1-ECO® Ventilation Control System enables an underground mine to automatically control the ventilation system’s air flow and volume to when and where it is needed. This allows a mine to reduce the fan’s energy consumption by at least 20% while maintaining a safe working environment for the underground workers. The percentage of energy savings depends on the site’s usage of the solution’s five control strategies.”

Verification of the technology performance claim was conducted by an expert third party, using the Canadian ETV Program General Verification Protocol. This protocol has step-by-step procedures for the verification of performance for an environmental technology or process. A number of criteria must be satisfied for a claim to be verified from the protocol, including that the claim is fully supported by independently generated, peer-reviewed, quality data supplied by the applicant or generated upon the applicant’s request through a test program conducted by a qualified testing agency.

#### **Data and Analysis**

The NRG1-ECO® system was installed at Vale’s Coleman Mine, located in Sudbury, Ontario and data was collected by an independent test agent over a two-week period. Based on this data, it was found that the system was able to control the ventilation system’s air flow and volume based on the needs of the operation. By turning fans off when they were not needed, an average energy savings of 23.77% was realized.

#### **Challenges**

Performance testing requires particular conditions and that every attempt be made to ensure that the conditions at the test site are representative of average mine site operations. A key challenge encountered in the pilot project was the scheduling of testing at the mine site, given the need to minimize the impact on production levels.

#### **Conclusion**

The performance claim for the NRG1-ECO® Ventilation Control System was verified. A verification certificate was awarded to BESTECH in November 2014 and the technology has been listed on the Canadian ETV Program website (etvcanada.ca) under “Current Verified Technologies.” Results of this pilot have been and will continue to be communicated to increase mining industry and regulator awareness of ETV and its benefits. To encourage the adoption of innovative technologies in the mining sector, risks must be mitigated. ETV verification may help lower the risk of adoption of green mining technology by increasing the confidence of mining companies to adopt new, innovative technologies.

#### **Next Steps**

- Track pilot outcomes to determine whether ETV can accelerate the deployment of green mining technologies:
  - Increased mining industry and regulator awareness of ETV
  - Impact of certification of the NRG1-ECO® Ventilation Control System for BESTECH
- Identify other green mining candidate technologies for future verification using the ETV international standard (ISO 14034) presently being developed.