

FINAL TECHNICAL REPORT
February 1, 2004, through September 30, 2004

Project Title: **FABRICATION OF A SCALED-UP ISGS INTELLIGENT FILTER PRESS**

ICCI Project Number: 03-1/US-2
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ABSTRACT

The goal of this project was to carry out work that will advance the promising ISGS Intelligent Filter Press toward industrial-scale use. The ISGS team acquired or manufactured all the major components of a larger pilot-scale unit with the same unique operational features as the existing bench-scale unit and designed the automation suite to control the filter press.

This work is an important step toward developing and installing an innovative system for dewatering fine coal at coal processing or power plants.

Pages 3-13 contain proprietary information.

EXECUTIVE SUMMARY

Fine-grained coal is liberated when the coal is handled during mining, haulage, and processing, but fine coal particles are difficult to recover and dewater during cleaning. Success in fine-coal cleaning is partially constrained by the limitations of existing equipment. Because of these limitations, rejection, and subsequent impounding of fine coal at washing plants is a common practice. On average, about 25% of all the coal produced is lost during processing because equipment which can effectively and economically process these coals is not available. Disposal of this fine coal in tailings ponds not only wastes material on which capital was spent for mining, but it also contributes to the environmental disruption of land, and increases the mine's maintenance and reclamation costs.

Successful separation of finely crushed coal from the incombustible mineral impurities results in a cleaner, coal-rich product. However, at the same time, the increase in surface area due to the reduction of particle size results in greater moisture content. In the future, the coal mining industry may benefit from increasing its ability to clean coal fines and generate products that meet environmental acceptability requirements, if the excessive moisture content of the fine coal product can be reduced. The proposed project addressed this issue by advancing the design, fabrication and operation of a state-of-the-art filtration method developed at the ISGS to dewater fine coal.

Although some utility companies have chosen equipment to handle their fly ash in dry form, many others continue to store their fly ash in wet form in holding ponds. When filled, such ponds must be capped with soil. Successful demonstration of the ISGS Intelligent Filter Press to dewater fly ash economically may encourage the U.S. EPA to re-evaluate the current effort to phase out wet sluicing as an option for ash management. Tests show the fly ash can be dewatered enough in the ISGS Intelligent Filter Press, at a sufficient rate, to allow economical removal and transportation of the ponded fly ash for use as a raw material.

An effective filtration system for the dewatering of fine coal and fly ash will promote the use of coal and help coal producers and consumers. During this proposed project, a large-diameter filter press based on the prototype version developed at the ISGS with funds provided by the Illinois Department of Commerce and Economic Development through the Illinois Clean Coal Institute was designed and its major components fabricated.

Almost all the coal mines and coal burning power plants in Illinois will benefit from this technology. The work proposed here in response to the ICCI RFP 03-1 (4.1C and 6.1D) was an important step in developing an innovative system to dewater fine coal and fly ash. The ISGS Intelligent Filter Press will be fully automated and could be operated with minimal supervision and be controlled remotely.

The remainder of this report contains proprietary information and is not available for distribution except to the sponsors of this project.