

INTERIM FINAL TECHNICAL REPORT  
April 15, 2003, through August 31, 2003

Project Title: **REDUCING UNDERGROUND PRODUCTION COSTS THROUGH  
ENHANCED FACE PRODUCTIVITY**

ICCI Project Number: 02-1/1.1A-1  
Principal Investigator: Dr. Y. P. Chugh, Southern Illinois University  
Other Investigators: Mr. Mike McGolden and Mr. Krishna Thatavarthy  
Project Manager: Dr. Ron Carty, Illinois Clean Coal Institute

ABSTRACT

In 2000, a Coal Industry Research Steering Committee was formed to identify high priority research areas that would lead to a 20% reduction in production costs. The top priority identified by the committee was improving face productivity. This project consists of four primary tasks aimed at development and demonstration of new technologies and methods for enhancing face productivity. The first task focuses on developing a PC-compatible face production model and design requirements for a surge car. Digitizing the mine layout and automating the data entry process have been accomplished by using AUTOCAD and DXF2XYZ software. The simulation program has been coded in Visual Basic and the output can be stored in TEXT or EXCEL format. The software includes provision to save the paths of the vehicles, extract the change-out and haul distances. Design requirements for the surge car are presently being developed in concert with Phillips Machinery.

The second task involves modification of the SIU/Joy Wet Scrubber Laboratory to test different filter arrangements and other potential scrubber enhancements, and demonstrating a modified commercial unit in a mine. Toward the above goal, a simplified wet scrubber model was developed to identify interactions between airflow, water sprays and filters. Mechanics principles are being utilized to understand interaction between airflow, water spray pressure, and water volume. These principles have been used to modify an existing wet scrubber to: 1) reduce dust concentrations from about 3.8 mg/m<sup>3</sup> to about 1.9 mg/m<sup>3</sup>, 2) reduce water requirement by about 15%, 3) reduce spray water pressure to about 30 psi, and 4) increase airflow through the scrubber from 9,300 cfm to 9,700 cfm.

In the third task an outline for the education program for reducing out-of-seam dilution has been developed. Roof and floor samples from mines have been collected for determination of geotechnical parameters from dilution point of view. Simulation studies are being pursued to evaluate mining delays while mining out-of-seam dilution. The final task consists of information transfer involving seminars for the mine professionals. This will be undertaken when the tasks above are near completion.

A no-cost extension was approved by the ICCI through August 31, 2004 and the final report will be available September 2004.