# PROJECT FACTS

UNIVERSITY OF KENTUCKY
CENTER FOR APPLIED ENERGY RESEARCH

## Development of Dry Fine Coal Processing

Project Completed: 2008

### PARTICIPANTS

University of Kentucky
Center for Applied Energy Research
Bratney Companies
Alliance Coal, LLC

### SPONSORS

The Kentucky Office of Energy Policy Energy (KOEP)R&D Program
Bratney Companies
Alliance Coal

### COST SHARING

KOEP Cost $100,848
Industry Cost $10,000
UK Cost $ 32,957

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The economic recovery in 2005 pushed total U.S. coal consumption to another record level. Preliminary data show that total coal consumption increased 9.4 million short tons, an increase of 0.9 percent. In 2008-2009, total domestic energy demand is projected to increase at an annual rate of about 1.3 percent each year. In order to meet the increasing demand for coal, it is necessary to increase the coal production in the Commonwealth of Kentucky. Currently, processing of run-of-mine (ROM) coal is done at a site away from the mine using water. If the coal can be cleaned near the mine mouth without using water, it will avoid transportation of rocks and also avoid the water pollution problem associated with the slurry ponds. The dry process will be economical as it will not utilize water and thus no dewatering or drying of the product will be required.

The goal of the study was to evaluate a dry separation process for processing coal finer than ¼ inch. The program was conducted as a joint project between the University of Kentucky, a coal company and an equipment manufacturing company, on two types of ROM coal obtained from different coal mines. The high-ash coal samples from the Dotiki and the Warrior mines were selected for the study. The tests showed that for the Dotiki coal, the air table was able to reduce the ash from 27% to 10-12% ash with a clean yield of about 75-80% for ¼ inch x 6 mesh and 6x14 mesh size fractions. The ash rejection was about 77-80% with a combustible recovery of about 95%, indicating excellent separation efficiency. The pyritic sulfur was reduced from 2.7% to about 1.5%. For the Warrior coal, the clean coal yield was as high as 78% for ¼ inch x 6 mesh size fraction. The 6x14 mesh fraction provided a clean coal product contaning 9% ash at a yield of 86%. The total sulfur was reduced from 3.36% to 3.05%. The air table was effective in reducing ash by 65% and sulfur by about 25-35% .

Processing of -1/4″ x 14 mesh Dotiki coal reduced the ash content from 25.5% to 10.9%. The total sulfur was reduced from 4.05% to 3.35%. The heating value of the coal was increased from 10326 Btu/lb to 12623 Btu/lb. The study showed that dry separation of -1/4 in x 14 mesh coal is feasible. The removal of rock at the mine site will greatly reduce the cost of transportation of coal and also improve process efficiency, if further processing of coal is required.

Rock removed from coal

Clean Coal