PROJECT FACTS

UNIVERSITY OF KENTUCKY
CENTER FOR APPLIED ENERGY RESEARCH

Improving Densification of Fine Coal Refuse Slurries to Eliminate Slurry Ponds

PARTICIPANTS

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Clean Soil and Energy Inc.
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SPONSORS

GOEP
US Department of Energy
Ky Science Engineering Foundation

COST SHARING

DOE Cost: $172,900
KSEF Cost: $80,000
GOEP Cost: $99,000
UK Cost: $169,730

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Increased mechanization in the underground coal mining industry has decreased selectivity and increased the amount of refuse created. Coal preparation separates non-combustible material from coal. Thus, a coal preparation plant separates the material it receives into a product stream and a reject stream, which may be further divided into coarse and fine refuse streams. Depending on the source, 20 to 50% of the run-of-mine material ends up in reject streams. One of the reject streams is a slurry stream. This is a blend of water, coal fines, silt, sand, and clay particles, which is commonly disposed of in an impoundment. Since August 2001, MSHA has overseen 713 active fresh-water and slurry impoundments in the United States. The coal industry is required to monitor the impoundments constantly and maintain the dikes holding the slurry. There have been several incidents of impoundment breakthrough. Of these, Buffalo Creek in West Virginia in 1972 and recently, Martin County Coal in Kentucky, have drawn the attention of federal and state governments and local people due to heavy losses of life and property.

In this project an advanced thickening technique known as “Paste Thickening Technology” marketed by Dorr-Oliver EIMCO will be evaluated in the dewatering of fine coal tailings. The technique utilizes the DEEP CONE Thickener™, which is specially designed to concentrate tailings into a high-percent solid, so it can dis-charge as a paste. The thickened material could be stacked at a low angle of repose rather than stored in a pond. Thus, the fine refuse slurry ponds could be completely eliminated.

The main objective of the program is to evaluate the application of the DEEP CONE™ technology for the disposal of fine coal refuse. The program includes study of the basic rheological properties of the flocculated fine refuse solids for producing a highly thickened solid capable of disposing of as a paste. It is also the objective of the research to utilize the rheological data obtained in pilot-scale testing of the DEEP CONE Thickener™ to obtain data for a commercial operation.

Pilot-scale testing of the conventional thickener underflow, containing less than 25% solids, showed that it could be thickened to about 50% solids. Tests are in progress to evaluate applicability of the technique to thickener feed containing about 3% solids.

Paste-thickened material obtained from a pilot-scale test