



ENVIRONMENTAL & COAL TECHNOLOGY

PROJECT FACTS

UNIVERSITY OF KENTUCKY
CENTER FOR APPLIED ENERGY RESEARCH

Pilot Demonstration of Technology for the Production of High Value Materials from the Ultra-Fine (PM_{2.5}) Fraction of Coal Combustion Ash

PARTICIPANTS

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SPONSORS

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COST SHARING

UK CAER \$372,018
US DOE \$750,001
LG&E \$378,000

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Pulverized coal combustion produces 62 million tons of fly ash annually, of which about 32% is utilized beneficially. To substantially improve beneficial use, new markets must be found. One of these is as filler for use in plastics. For this use however, the fly ash must be cleaned of residual carbon, magnetite and soluble salts, and the finest fraction of the ash separated and recovered. A technology, termed "MicroAsh", has been developed at the CAER to clean fly ash and recover a polymer filler grade material. This project will include the construction of a pilot-scale demonstration plant of this technology.

The approach used in MicroAsh is to remove all of the contaminants from the ash hydraulically, including the carbon, magnetite, and soluble salts. The ash is then conditioned with an organic dispersant and the finest fraction is recovered. The technology achieves high recovery in the 1µm to 2µm range, with a mean product size (D₅₀) of approximately 3µm.

Two of the MicroAsh products have been evaluated as fillers in polyolefins with excellent results. Another use for the product is as a speciality pozzolanic additive to compete with, or compliment, silica fume. Mortar strength index values of 100 % have been achieved in as short as 3 days, and strengths of 150 % in 7 days, compared to cement-only controls.

The work will include an assessment of ash from LG & E's six largest power plants for this application. The focus of the pilot/demonstration plant will be to provide operational data, assessment of dewatering and drying options and materials for further testing in polymer systems.

