

Project Summary

1) TITLE: DE-FC26-02NT41726

Pilot Demonstration of Technology for the Production of High Value Materials from the Ultra Fine (PM 2.5) Fraction of Coal Combustion Ash.

2) PROJECT PARTICIPANTS: University of Kentucky Center for Applied Energy Research, LG&E Energy, Inc.

3) PROJECT DESCRIPTION:

A. Objective(s): The objective of the project is to develop and demonstrate technology to make new products from coal combustion ash. Specifically, the finest sizes ash fractions are recovered for use as a polymer filler or as a specialized high value cement additive.

B. Background/Relevancy: Pulverized coal combustion produces 62 million tons of fly ash annually, of which about 32% is utilized beneficially. Even if all of the current conventional applications were completely saturated, there still would be more than 1/3 left to landfill. To substantially improve beneficial use, and meet the U.S. DoE state long term goals, new applications and markets must be found. One of these with great potential is as filler for use in plastics. For this however, the fly ash must be cleaned of residual carbon, magnetite and soluble salts, and the finest fraction of the ash separated and recovered.

C. Period of Performance: 21/7/2003 to 20/11/06

D. Project Summary: A mobile pilot plant will be built to demonstrate technology (MicroAsh) to produce new high value products from coal ash. The approach used is to remove all of the contaminants from the ash hydraulically, including the carbon, magnetite, and soluble salts. The ash is then conditioned with a patented organic deflocculating reagent and the finest fraction is recovered. The technology achieves high recovery in the 1 μ m to 2 μ m size range, with a mean product size (D_{50}) of approximately 3-4 μ m. The project includes an assessment of ash from LG&E's six largest power plants relative to suitability for processing. The focus of the pilot/demonstration plant operation will be to provide process data, assessment of dewatering and drying options, and most importantly materials for testing in polymer and cement systems.

4) PROJECT COSTS:

- A. DOE Costs - \$776,758
- B. Recipient Share * \$816,806
- C. Project Total * \$1,593,564

5) MAJOR ACCOMPLISHMENTS SINCE THE BEGINNING OF THE PROJECT: Tests procedures and protocols were developed to evaluate the amount of organic dispersant that was required for each of the ash types. Six different fly ashes were fully evaluated and characterized chemically and physically. A model was developed for the hydraulic classification and a new unique hydraulic classifier was developed for this application. A design of the mobile pilot plant has been developed.

6) MAJOR ACCOMPLISHMENT PLANNED DURING THE NEXT 6 MONTHS: Major testing of two final substrates will be concluded. Ultra fine ash will be produced and tested. Construction of mobile processing plant will be initiated.

7) ISSUES: Another utility has shown interest in joining the study. As the ashes from two of the power plants that were initially examined were of such poor quality, it may be advisable to add

additional plants to the test series. This would also increase the number of participants in the study. Also a materials producer has shown interest in joining the study.