

DOE/MC/29244-96/C0543

**Disposal of Fluidized-Bed Combustion Ash in an Underground Mine to Control Acid Mine Drainage and Subsidence**

**Authors:**

Paul F. Ziemkiewicz, Ph.D.  
D. Courtney Black  
William J. Head, Ph.D.

Donald D. Gray, Ph.D.  
Hema J. Siriwardane, Ph.D.  
William A. Sack, Ph.D.

**Contractor:**

West Virginia University  
National Research Center for Coal and Energy  
P.O. Box 6064, Suite 202  
Morgantown, WV 26506-6064

**Contract Number:**

DE-FC21-94MC29244

**Conference Title:**

Advanced Coal-Fired Power Systems '95 Review Meeting

**Conference Location:**

Morgantown, West Virginia

**Conference Dates:**

June 27-29, 1995

**Conference Sponsor:**

U.S. Department of Energy, Morgantown Energy Technology Center (METC)

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED *JR*

**MASTER**

## **DISCLAIMER**

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

This report has been reproduced directly from the best available copy.

Available to DOE and DOE contractors from the Office of Scientific and Technical Information, 175 Oak Ridge Turnpike, Oak Ridge, TN 37831; prices available at (615) 576-8401.

Available to the public from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161; phone orders accepted at (703) 487-4650.

## **DISCLAIMER**

**Portions of this document may be illegible electronic image products. Images are produced from the best available original document.**

**PB.10**

**Disposal of Fluidized-Bed Combustion Ash in an  
Underground Mine to Control Acid Mine  
Drainage and Subsidence**

**CONTRACT INFORMATION**

<b>Contract Number</b>	DE-FC21-94MC29244
<b>Contractor</b>	West Virginia University National Research Center for Coal and Energy P.O. Box 6064, Suite 202 Morgantown, WV 26506-6064 (304) 293-2867 ext 447 (304) 293-7822
<b>Other Funding Sources</b>	West Virginia University and Anker Energy Corporation
<b>Contractor Project Manager</b>	Paul F. Ziemkiewicz, Ph.D. and D. Courtney Black
<b>Principal Investigator</b>	Paul F. Ziemkiewicz, Ph.D.; William J. Head, Ph.D.; Donald D. Gray, Ph.D.; Hema J. Siriwardane, Ph.D.; William A. Sack, Ph.D.
<b>METC Project Manager</b>	Scott Renninger
<b>Period of Performance</b>	Phase I February 16, 1994, to August 15, 1995

**ABSTRACT**

This project will evaluate the technical, economic, and environmental feasibility of filling abandoned underground mine voids with alkaline, advanced coal combustion wastes (fluidized-bed combustion (FBC) ash). Both pneumatic and hydraulic injection methods will be investigated. Success will be measured in terms of technical feasibility of the approach (i.e., percent void filling), cost, environmental benefits (acid mine drainage and subsidence control) and environmental impacts (noxious ion release).

Phase I of the project is scheduled for 18 months starting in February 1994 and is concerned with the development of the grout and a series of predictive models. These models will be verified through the field phases and will allow the results to be packaged in such a way that the technology can be easily adapted to different site conditions. Phase I will also

redesign a pneumatic ejector, that was developed to stow limestone, to efficiently stow FBC ash. Bench-scale testing will verify the redesign in Phase I.

The 12-month Phase II is a small-scale field test at Anker Energy's Fairfax mine. An inactive panel will be used to evaluate flow, strength, and pressure requirements for hydraulic (grout) injection. The Phase II pneumatic injection activities will take place at an Anker Energy mine in Preston County, West Virginia. Air flow requirements, pressure requirements, stowing rate (tons per hour), and stowing efficiency (distance blown) will be determined.

Phase III is to take 26 months and will be a full-scale test at Anker's 11-acre Long Ridge mine site. The mine will be filled using both pneumatic and hydraulic injection methods.

It is expected that the FBC ash will replace what is now an acid mine pool with an alkaline solid so that the groundwater will tend to flow around rather than through the previously mined areas. The project will demonstrate whether FBC ash can be successfully disposed of in underground mines. Additionally, the project is directed towards showing that such disposal can lead to the reduction or elimination of environmental problems associated with underground mining such as acid mine drainage and subsidence.