TECHNICAL PROGRESS REPORT

For the Fourteenth Quarter
(January 1, 1999 to March 31, 1999)

POC-SCALE TESTING OF A DRY TRIBOELECTROSTATIC SEPARATOR FOR FINE COAL CLEANING

By

R. -H. Yoon, G.H. Luttrell, G.T. Adel and A.D. Walters

Center for Coal and Minerals Processing
Virginia Polytechnic Institute & State University
Blacksburg, Virginia 24061-0258

Contract Number:
DE-AC22-95PC95151--14

Contracting Officer's Representative
Carl Maronde
U.S. Department of Energy
Federal Energy Technology Center
P.O. Box 10940
Pittsburgh, Pennsylvania 15236

U.S./DOE Patent Clearance is not required prior to the publication of this document.

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, manufacture, 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.

WORK DESCRIPTION

Introduction

The project has reached the point where the Proof of Concept (POC) electrostatic separator is in the design stage. During the quarter, the design concepts of the TES unit have been finalized with Carpc. During the past quarter, most of the personnel assigned to this project have been performing work elements associated with process/engineering design (Task 3) of the process including the TES unit, the Turbo charger and the product conveying system

Sample Acquisition

No activity was required in this area during the quarter.

Process Design

In the current design, pulverized coal will be fed to a rotary turbocharger mounted atop the electrostatic separation chamber via the recycle screw feeder which will transport the recirculated middlings product and the new feed. Details related to the design and operation of both the TES separation chamber and the turbocharger has been provided in previous technical progress reports. Carpc have designed the separator to guarantee laminar flow conditions through the separation chamber.

Alternative designs for turbo charging are currently under study. The methods that will be tested are as follows:

1. Particles passing vertically through copper gauze supported on a series of screens.
2. Particles passing vertically over a series of copper rods packed in various configurations.

3. Particles passing vertically over a series of vibrated and rotated copper rods.
4. Particles fed to a rotating drum containing PVC or copper balls.
5. Particles passing vertically down a column over staggered inclined plates.

Procurement and Fabrication

The TES unit will be delivered to Virginia Tech from Carpcu on May 15th. The conveying and feeder system will be delivered to Virginia Tech from AFC Conveyors on May 28th. The configuration of the conveyor system has been modified and is shown in the attached sketch. Several renovation activities have been completed at the Virginia Tech pilot plant to accommodate the new test circuit.

Sample Analysis/Characterization

Analysis and characterization of samples continued throughout the quarter as outlined in the project work plan.

SUMMARY AND CONCLUSION

During the past quarter, most of the project work centered on activities related to the procurement and fabrication of the POC equipment. The TES separation chamber will be delivered on May 15th and the conveying system delivered on May 28th. Fabrication of the Turbocharger will be carried out shortly at Virginia Tech and other turbocharging units are being investigated.