Pulsed Atmospheric Fluidized Bed Combustion

**Quarterly Report
January - March 1996**

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For
U.S. Department of Energy
Office of Fossil Energy
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Schedule

The project is currently a little behind the expected schedule due to severe inclement weather experienced during the months of January and February which hindered much of the construction schedule.

Section 1.0 DESIGN

1.1 Process Design

The process configuration remained unchanged during this quarter.

1.2 Mechanical Design

1.2.1 Fluid Bed Combustor and Piping

Mechanical design drawings remain unchanged in this quarter. A 8" extension was added to the top of the pulse combustor piping to prevent direct impingement of the rupture disc and premature rupturing by the back flow of the gas. A 2 MMBtu/hr pilot burner was installed in the side of the combustion chamber required minor modifications to retrofit the burner into the code vessel.

1.2.2 Pulse Combustor Components

No changes were made in the pulse combustor components design during this period.

1.2.3 Feed System

The feed system was modified slightly to better distribute the coal and limestone in the pickup hopper. As seen in Figure 1 the inlet to the pick-up hopper was changed from a Y configuration to one vertical pipe with two separate branches to the coal and limestone feed lines from the hoppers. This vertical line then dropped the coal/limestone mixture onto a rotating distributor plate which evenly distributes the mixture into the compartments of the pickup hopper. The compartments of the pickup hopper were modified to have a 70° cone angle. The pneumatic feed lines were also modified as shown in Figure 2 with compressed air nozzles welded at a 20° angle off the horizontal to assist the solid feed to the bed.

Figure 2 Coal/Limestone Feed Line Modification

1.2.4 Ash System

The pneumatic ash conveying scheme remains unchanged except as mentioned above: a steam silencer was added to the exit of the vacuum eductor exit and the flexible hose assembly.

1.3 Civil and Structural Design

No new civil or structural designs were made this quarter.

1.4 Electrical Design

The electrical design remain unchanged during this quarter.

1.5 Controls and Instrumentation Design

The PLC program and the interface of the control package were written during this quarter. They were tested and interfaced to the system and the program was debugged and modified slightly. An automatic data acquisition system was also designed and implemented to monitor essential process data and stack emissions.

Section 3.0 SITE CONSTRUCTION ACTIVITIES

Installation of all the heavy equipment was completed as reported during last three quarters. The following construction activities were completed during this quarter.

- All non-code piping within PAFBC plant.
- Modification of Coal/Limestone Feed system
- Installation of baghouse filter bags
- All Instrument & Controls wiring
- Burner management panel and D.C. drive panel
- Insulation and aluminum cladding

Figures 3 and 4 are photographs of the completed PAFBC system; Figure 5 is the Burner Management Controller.

Figure 3 Photograph of Completed PAFBC System

Figure 4 Photograph of Completed PAFBC System

Figure 4 Burner Management Controller

Figure 5 Photograph of Burner Management Controller

Section 4.0 PLANNED ACTIVITIES FOR NEXT QUARTER

4.1 Design

The following design activities have been planned for the quarter which will end on June 30, 1996:

- Revising and restamping the electrical drawings (as-built) by Duke/Fluor Daniel
- Completing the Maintenance Manual to include all the design/installation information of PAFBC parts/equipment
- Completing the operation manual to include a detailed plant startup and shutdown instructions

4.2 Fabrication

No fabrication activities are planned for the quarter which will end on June 30, 1996.

4.3 Site Construction

No site constructions activities are planned for the quarter which will end on June 30, 1996.

Section 5.0 SCHEDULE

The project schedule reflecting the above targets and milestones is provided in Figure 6.

CLEMSON PAFBC PROJECT SCHEDULE

AS OF: 1-Apr-96 8:00am

Figure 6 Project Schedule

Section 6.0 THERMOCHEM SITE CORRESPONDENCE

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