AFBC Transition

ANNUAL PROJECT REPORT
AS OF DECEMBER 2004

1. Project Sponsor:
AFBC Transition, Inc.
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2. **Project Manager**
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3. **OCDO Grant No.**
CDO/D-97-12

4. **Project Update** X OR **Final Report**

5. Project Title 10 MMBTU AFBC Boiler Demonstration
Cedar Lane Farms - Wooster, Ohio

6. Project Term: From: December, 1998 To: October 30, 2005

7. Budget:

Name	Cost Share
OCDO	$ 530,750
DOE	$ 225,000
A.F.B.C. Transition, Inc.	$ 381,854
Cedar Lane Farms	$ 498,966
Enercon Systems	$ 20,000
TOTAL PROJECT COST:	$1,656,570

I. ABSTRACT

8. OVERVIEW OF PROJECT & OBJECTIVES:

The objective of this project is to demonstrate a commercial size atmospheric fluidized bed combustion (AFBC) system for use in the commercial, institutional and small scale industrial markets. The thrust of this commercial demonstration is to provide a cost effective, simple to operate and efficient combustion system, that meets or exceeds current and foreseen future Federal and State environmental regulations. This project is the final (commercialization) phase in the development of this small scale market sector AFBC system. The development has progressed through pilot scale operations to a successful 2.2 million Btu/hr prototype installation and operation at Cedar Lane Farms (sponsored by the OCDO). The design, installation, and long- term operation of a 10 million Btu/hr commercial system for the generation of hot water at Cedar Lane Farms - Wooster, Ohio to provide heat for a commercial greenhouse operation has progressed into the installation stages.

This project meets the objectives set forth by the Ohio Coal Development Office (OCDO) for Category 1 of its Solicitation #97-1 which is the deployment of a cost-effective clean coal technology at full scale for final testing, process optimization and long term application.

Currently, oil and gas are the fuels of choice for the space and process heat requirements of commercial and small industrial applications. This is because of the convenience and cleanliness offered by these fuels compared to coal. However, there are certain socioeconomic pressures in coal producing states, especially Ohio, to provide technologies which will enhance the acceptability of coal for these applications. Commercial/small industrial boilers, i.e., those in the range of 1.5 to 10 million Btu/hr size are large oil and gas users. For example, assuming a 50% capacity factor, these boilers consume about 3.5x10'5 Btu/year. It is estimated that if only 25% of oil and gas-fired boilers in this size range were converted to coal, then coal consumption would be increased by some 5 million tons/year, an amount in 1995 of around 1/7 State of Ohio's annual coal production.

Atmospheric fluidized bed combustion offers several potential advantages over conventional coal combustion systems for small scale market applications:

Minimal Fuel Processing: The combustion process is not overly sensitive to the physical characteristics of the coal feed. This characteristic allows for lower purchased coal prices compared to conventional stoker systems that require a certain coal size consistently.

Low Temperature Combustion: Fluidized beds operate at low temperatures. This avoids problems such as clinker formation and slagging which are major areas of concern with certain other coal fired combustion systems.

S02. Emission Control: Limestone sorbent in the fluid bed reacts with SOz liberated during the combustion process to control SO2 emissions. Emissions can be reduced in excess of 80 percent.

NO Emission Control: The use of flue gas recycle and control of oxygen in the AFBC system provides small scale systems with NO, emissions of around 0.5 Ib/million Btu.

9. WORK DONE AND CONCLUSIONS: The AFBC is now being operated for its third heating season at the greenhouse. The system is operating well in fully automated mode and providing reliable heat to a 1.5 acre greenhouse. A very successful Technology Transfer Openhouse was held on November 5, 2004. Environmental tests were performed during February of 2004 demonstrating compliance with all Federal and state regulations. These tests wil be repeated this coming winter to obtain additional data on emission control. At the conclusion of this heating season, the final report will be written.