MISSISSIPPI DOE EPSCoR
PLANNING GRANT

Final Report

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ABSTRACT

The Mississippi DOE EPSCoR planning grant committee identified four focus areas for a proposal submitted on March 1, 1993 to the DOE: Human Resource Development, Clean Coal for Fluidized Bed Coal Combustion, Environmental Restoration and Waste Management, and Energy Efficient Heat Transfer Equipment and Materials. In the human resources area, efforts were undertaken to identify and develop linkages with educational institutions, national laboratories, and industries and to identify strategies for attracting and involving students in areas leading to technical careers. The clean coal project was directed toward beneficiating coals, measuring efficiencies of the various beneficiation methods, measuring the flue gas components both before and after beneficiations, and modeling the production of soot and of NO_x and SO_x . The environmental restoration project was focused on methods to sample and characterize waste dump sites at nuclear processing plants and on ways to convert the waste into safe materials. In the energy efficient heat transfer area, analytical and experimental investigations were planned to increase the efficiency of heat exchangers and insulating materials.

INTRODUCTION

The DOE planning grant funding to the State of Mississippi for the preparation of a proposal for the Experimental Program to Stimulate Competitive Research (EPSCoR) has provided the opportunity for the development of a statewide,

coordinated approach toward energy research and human resource development. Mississippi's four largest institutions of higher learning, Mississippi State University (MSU), Jackson State University (JSU), the University of Mississippi (UM), and the University of Southern Mississippi (USM), are working together to identify research expertise and potentially competitive research areas. They are also working to develop the infrastructure for greater cooperation among faculty and for increased participation of students in energy related projects.

The EPSCoR activities are managed by the Mississippi Research Consortium (MRC). The chief research officers of the four participating universities constitute both the Board of the Consortium and the EPSCoR Executive Committee. The planning committee for the DOE EPSCoR proposal is composed of Dr. Glenn Steele (MSU), proposal coordinator, Dr. Cecil Burge (USM), Dr. Robert Woolsey (UM), and Dr. Wedad Hussein (JSU). Associated with the planning committee are additional research area leaders Dr. David Wertz (USM) and Dr. Robert Taylor (MSU), and the human resource development leader, Dr. Ruth Ann Cade (USM). The organizational structure of the Mississippi DOE EPSCoR program is given in Figure 1.

PLANNING COMMITTEE ACTIVITIES

The calendar of activities of the Mississippi DOE EPSCoR planning committee is given in Figure 2. In order to develop an inventory of energy expertise and research capability within the state, preproposals were solicited from the four participating universities. The initial focus areas for these preproposals were Fossil

Figure 1. Organization of Mississippi DOE EPSCoR Program

Figure 2. Calendar of activities of the Mississippi DOE EPSCoR Planning Committee for the 1991-1992 Project Year

October- December 1991	Planning grant committee coordinating meetings
January 1992	Research preproposals received from faculty at participating universities
February-	Committee screening and grouping of preproposals
April	Committee visit to each participating campus to discuss program with faculty
May	Meeting of EPSCoR states in Washington, DC
June-July	Committee focusing of research areas
August	Research area leaders coordinating with faculty in their area
September	Three research areas and human resource area meeting separately to begin proposal preparation Area leaders meeting to coordinate activities
January 1993	Initial draft of proposal completed
February	Second draft of proposal completed
March	Completed proposal submitted to DOE
August	Revision of proposal begun
December	First draft of revised proposal completed

Fuel Pollutants, Power and Conservation, Enhanced Oil Recovery, and other energy related research.

After considering all of the preproposals, meeting with the participating faculty on the four campuses, and attending a DOE briefing meeting in Washington, DC, the committee developed three focused research areas to mesh with the human resource development area. These research areas are summarized in Figure 3. These projects were summarized in detail in "Mississippi DOE EPSCoR Planning Grant - Final Report," DOE/ER/75676-1, September 1992.

A human resources plan was developed that included a summer program on mathematics, science and engineering for the 9th grade students and teachers. The plan was for the research cluster personnel to interact with the students and teachers during the summer programs. Followup programs were also planned for the academic year.

CONCLUSION

The Mississippi Research Consortium, the planning grant committee, and the research area leaders prepared a proposal to the U.S. DOE for the EPSCoR program. The research focus areas were identified and budgets were prepared for the projected work in each area. The proposal was submitted to the U.S. DOE on March 1, 1993. On August 10, 1993, the Mississippi group was informed that their proposal was not funded but that a bridging grant was to be awarded. The remaining funds from U.S. DOE Agreement No. DE-FG02-91ER75676 were used to assist in the revision of the DOE EPSCoR proposal for resubmission in 1994.

Figure 3. Research Areas for DOE EPSCoR Proposal

Clean Coal for Fluidized Bed Coal Combustion - Lead (Wertz)

The pilot-plant fluidized bed at the University of Mississippi will be used to investigate the effects of various beneficiation processes for coal combustion. Preburning beneficiation and in-the-bed sorbents will be studied. Characterization of the bed materials and of the flue gas will be a major part of the efforts.

- Microbial Beneficiation
Ward (UM), Hussein (JSU)
- Coal Characterization
Wertz (USM)
- Coal Combustion
Chen, Sukanek (UM)
- Flue Gas Characterization
Cook, Linder, Monts (MSU)
- Modeling
NO_x Emmissions - Chen (UM)
Soot Formation- J. Leszczynski (JSU)

Environmental Restoration and Waste Management - Lead (Hussein)

A top priority of the USDOE is the cleanup of waste dumps at nuclear processing plants. The research projects in this area will focus on methods to sample and characterize the dump site and on ways to convert the waste into safe materials.

- Site Characterization
Robotic Drill - Bowden, King, Luck (MSU)
- Waste Processing and Technology Development
Electrochemical - Hussein, (JSU), Wertz, Lee (USM)
Polymer Membranes - Mauritz, Storey (USM)
Polymer Extraction - McCormick, Lochhead, Cannon (USM)
- Wetlands - Leszczynka (JSU)

Energy Efficient Heat Transfer Equipment and Materials - Lead (Taylor)

Analytical and experimental investigations of various techniques to increase the efficiency of heat transfer equipment and insulating materials will be undertaken. The primary emphasis will be on heat exchanger technology and on building insulation.

- Heat Exchanger Technology
CFD Analysis - Taylor, Briley, Hodge (MSU)
Modeling - Pandy (USM), Taylor, Stevens (MSU)
Experimentation - Stevens, Taylor, Hodge, Steele, (MSU)
Design - Taylor, Hodge, Steele, (MSU), Liu (JSU)
- Building Insulation
Roux, Sinha, McCarty (UM)