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Students, Teachers at Four Minority Universities Win Fossil Energy Research Grants

Washington, DC - For students and professors at four minority universities, the current school year will include not only time in the classroom but also work in the research laboratory, investigating materials, sensors and controls for advanced coal combustion and hydrogen separation.

The four institutions were named as the winners in the Department of Energy's annual competition for fossil energy research ideas from the nation's Historically Black Colleges and Universities and Other Minority Institutions (HBCU/OMI).

"I'm pleased to see the strong interest of faculty in conducting this research and training a promising group of college students," said James Slutz, acting Principal Deputy Assistant Secretary for Fossil Energy. "The bright minds and enthusiasm that the students bring to the program will help promote our nation's energy security and will assure the growth of future energy researchers."

The HBCU/OMI program was established in 1984 to encourage cooperative fossil energy research and development projects between HBCU/OMI, U.S. industries, and federal agencies. Carried out under DOE's Office of Fossil Energy, the program gives minority students valuable hands-on experience in developing technologies to promote the efficient and environmentally safe use of coal, oil, and natural gas.

Program success is based on collaborative efforts between faculty-student teams and the commercial sector to develop and execute innovative research ideas. The HBCU/OMI funding opportunity announcement was released in April 2007 and grants were offered in three technical topic areas. One grant each was awarded in the areas of sensors and controls, and computational energy sciences; two grants were awarded in advanced materials.

The following universities and projects were selected:

- **North Carolina A&T State University** (Greensboro, N.C.) - Researchers will investigate a new approach for coating thin film membranes used in hydrogen separation technology. A palladium thin-film membrane formed by electroless deposition on microporous stainless steel support shows poor integrity and unacceptable thermal and mechanical stability. To overcome these limitations, researchers propose to study pulsed laser deposition method as an activation step and surfactant-induced electroless plating in the overall deposition scheme. The new approach is expected to yield a much more

uniform coating of the palladium thin film, laying the foundation for effective high-temperature hydrogen separation technology.

DOE Share: $200,000. Length of contract: 36 months.

- **Southern University A&M College** (Baton Rouge, La.) - Researchers will study air plasma spray for making new thermal barrier coatings for advanced gas turbines operating on syngas. Their performance will then be compared against standard coatings, based on electron beam vapor deposition. This research would add to the overall knowledge base of thermal barrier coatings for high-temperature and syngas environments, improve performance, and reduce maintenance costs of advanced coal-based power systems.

  DOE Share: $200,000. Length of contract: 36 months.

- **University of Puerto Rico** (Mayaguez, P.R.) - Researchers propose to derive governing and constitutive equations based on the kinetic theory of poly-dispersed systems by using a generalized Boltzman equation that considers both particle size and velocity distribution. Results could provide realistic state-of-the-art design and scale-up tools to optimize both coal conversion and utilization processes while significantly reducing technology development and commercialization time.

  DOE Share: $200,000. Length of contract: 36 months.

- **University of Texas** (El Paso, TX.) - Advanced gas turbines are required to accept variable fuels. With high-hydrogen fuels such as syngas, flashback in gas turbine combustors becomes a problem, limiting engine reliability and emission characteristics. Flashback in combustors is said to be caused by combustion-induced vortex breakdown (CIVB). The proposed research would study the effects of syngas fuel composition on CIVB flame flashback and improve the combustor design. Scientists believe the results could prove helpful in developing advanced gas turbine combustors that could efficiently run on syngas of variable composition.

  DOE Share: $199,802. Length of contract: 36 months.