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DOE's Fossil Energy Program Provides 10th Year of Research Support to Historically Black Colleges and Universities and Other Minority Institutions

PITTSBURGH, PA - With new projects to study microbes that can boost oil recovery to advanced ways of providing high-purity hydrogen for fuel cells, the U.S. Department of Energy's Office of Fossil Energy commemorates its 10th year of research support for Historically Black Colleges and Universities and other minority institutions this week with seven new grants.

For the last decade, the department's fossil energy program has provided almost \$1 million each year specifically to give blacks and other minority students hands-on experience in conducting science and energy research.

This year, another \$1 million will go to seven institutions for a wide range of projects that tackle many of the nation's major energy concerns - from generating reliable, clean electricity to producing more crude oil and natural gas from domestic fields.

In four of the projects, the government's funding share of nearly \$200,000 each will go to professor-student research teams. The other three projects are for smaller scale efforts that will be led by students. For these projects DOE will provide \$20,000 grants.

The winning projects are:

Professor-Student Team Projects

Prairie View A&M University, Prairie View, TX, proposes to enhance oil recovery from low-volume oil wells by adding microbes to long-chained molecules called polymers that can be injected into oil reservoirs to force out more oil than can be typically recovered by conventional technologies. The novel technology will study bacteria that can produce both additional polymers and chemicals called "surfactants" (substances that act like soap to make oil droplets move more easily through the reservoir rock).

More effective microbially-enhanced polymers could extend the productive life of many declining U.S. oil reservoirs. Laboratory investigation of microbial processes, recovery experiments and simulation studies compose the project. Bio-Engineering Inc., a small business, will join Prairie View.

Project duration: 36 months

Project cost/DOE share: \$199,373

Principal investigator: Jorge Gabitto, 936-857-2427

Florida International University, Miami, FL, will study the way fluids are distributed and flow through rock formations where oil and natural gas are often trapped and rarely recovered. The three-part project consists of mapping fractures, developing a model for fracture architecture using data from an existing wells, and modeling how oil and water flows through the fracture networks that are typical of many reservoirs.

Project duration: 36 months

Project cost/DOE share: \$199,004

Principal investigator: Michael R. Gross, 305-348-3932

Hampton University, Hampton, VA, will continue research pioneered in an earlier DOE grant for improving the durability of iron catalysts used in a common chemical reaction that produces liquid fuels from gases. The Fischer-Tropsch reaction is increasingly being studied as a way to convert gases that can be made from coal, natural gas or other energy resources into liquid fuels and chemicals, including transportation-grade fuels. Iron catalysts, however, can wear down and break apart, sometimes plugging equipment and fouling the chemical reaction. As the catalyst wears away, it is also difficult to separate catalyst particles from the waxy byproducts.

In this follow-on project, Hampton proposes to conduct further studies on how these catalysts degrade and how sulfide ions and water affect the catalysts' performance and resistance to attrition. SUD-CHEMIE Inc., a commercial catalyst manufacturer, will provide guidance and cost sharing.

Project duration: 36 months

Project cost: \$199,997; DOE share: \$181,997; participant share: \$18,000

Principal investigator: Adeyinka A. Adeyiga, 737-727-5289

North Carolina A&T State University, Greensboro, NC, will develop a new type of alloy-based membrane for producing high-purity hydrogen from liquid hydrocarbons for use in fuel cell-powered vehicles. The project builds on earlier DOE-funded research, which produced a palladium-ceramic composite membrane. In the new effort, researchers will try to develop a palladium-silver alloy membrane that would be mounted on microporous stainless steel to provide structural strength. The membrane would be capable of simultaneously producing and

separating hydrogen in nearly pure form for use in fuel cells. The single-step process could offer significant cost and energy savings. Collaborating with North Carolina A&T will be the BP R&D Center in Naperville, IL.

Project duration: 36 months

Project cost/DOE share: \$199,981

Principal investigator: Shamsuddin Ilias, 336-334-7564

Student-Led Projects

University of Texas at El Paso, El Paso, TX, plans to enhance the design of pulverized coal burners and lower smog-forming nitrogen oxide pollutants from these burners by studying the flow of coal particles of various sizes and how they are dispersed in particle-laden jets. Four faculty members and over 15 graduate and undergraduate students from the College of Engineering are expected to participate.

Project duration: 12 months

Project cost/DOE share: \$20,000

Professor: Ahsan R. Choudhuri, 915-747-6005

University of Texas at Pan American, Edinburg, TX, proposes to optimize natural gas swirl burners to reduce pollution emitted from diesel engines, utility boilers, gas turbines and jet engines. Student-teacher teams will study the effect the "swirl level" has on temperature and pollution emissions. The swirl level helps to stabilize flames by enhancing the mixing of air and fuel so that combustion is more efficient.

Project duration: 12 months

Project cost: \$59,714; DOE share: \$20,000; participant share: \$39,714

Professor: Ala R. Qubbaj, 956-381-5220

Clark Atlanta University, Atlanta, GA, will look at the effect trace additives have on hydrogen in heavy oil by developing an education and research program for chemistry and chemical engineering students to study equilibrium thermodynamics. This involves enhancing and expanding laboratory infrastructure and widening interdisciplinary research by focusing on the fundamentals of hydrogen's solubility in some liquids. All data from this project are to be made available on the Internet.

Project duration: 12 months

Project cost/DOE share: \$19,911

Professor: Jalal Abedi, 404-880-6938