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Students, Teachers at Four Minority Universities Are 1999 Winners of Fossil Energy Research Grants

For students and professors at four minority universities, the upcoming school year will include not only time in the classroom but also work in the research laboratory, looking for answers to such energy problems as air pollution and declining domestic oil production.

The four institutions were named today by Energy Secretary Bill Richardson as the 1999 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.

Hampton University, Hampton, VA, took top honors with three proposals selected for funding. Other grants will go to Prairie View A&M University, Prairie View, TX; North Carolina A&T State University, Greensboro, NC; and Florida International University, Miami, FL.

"These grants will help technical innovation flourish at our nation's minority institutions while encouraging private sector companies to partner with student-teacher research teams," Richardson said. "This initiative gives students an opportunity to improve research skills, increase contacts with energy firms and enhance their future employment opportunities."

The grant program, now in its eighth year, encourages professors and students to submit research ideas in a wide range of advanced coal, petroleum and natural gas topics. The Energy Department's Fossil Energy office, through its Federal Energy Technology Center in Pittsburgh, PA, typically offers up to \$1 million a year in research grants specifically for historically black colleges and universities and other minority institutions.

This year, four grants of approximately \$200,000 each will be awarded for "core" projects that support key priorities in the department's fossil fuel research program. Two additional grants, of \$20,000 each, will go for exploratory research training projects.

Details of the winning projects follow.

Hampton University, Hampton, VA, selected to receive three research grants:

A \$200,000 grant to develop improved catalysts for an advanced pollution control method called "Selective Catalytic Reduction." Selective catalytic reduction is a technology expected to be used increasingly by utilities, especially in the eastern United States, to reduce nitrogen oxide and other pollutants from the flue gases of power plants. By developing improvements to the process

-- such as more effective catalysts that can be recycled and the use of less expensive materials to capture the nitrogen oxide pollutants - the Hampton University project could help the nation's energy industry reduce emissions that contribute to smog, ground-level ozone, and acid rain. TDA Research, Wheat Ridge, CO, will join as the research team's industrial partner. The contact at Hampton is the university's president, Dr. William R. Harvey, at (757) 727-5231. The research professor will be Dr. Ates Akyurtlu.

A \$199,982 grant to develop more durable chemical catalysts that can be used to convert coal and other energy resources into clean, alternative liquid fuels. The student-teacher research team will study a family of iron-based catalysts used in a chemical process called the "Fischer-Tropsch" method. In this process, gases made from coal, biomass, or other carbon-based materials are chemically changed into liquids that can be substituted for conventional petroleum-based fuels. The research team will be studying ways to make the catalysts more attrition-resistant, i.e., less susceptible to breaking down and losing their effectiveness in the reaction process. The research could identify new ways to eventually reduce the nation's reliance on foreign crude oil by developing affordable ways to make liquid fuels from more plentiful resources available in this country. Energy International, based in Pittsburgh, PA, will work with the student-teacher team. Dr. William R. Harvey, President, is the University's contact (see above). Dr. K. Jothimurugesan will be the lead researcher.

A \$20,000 exploratory research training grant to study the removal of organic chemicals from the wastewater of energy facilities. The students and professor will study the effectiveness of a class of chemicals called "surfactants" which act like detergents to clean and separate impurities from wastewater. The exploratory project may identify new research paths that will lead to better ways to purify water and prevent contamination of watersheds around energy operations. Dr. William Harvey is the contact for this project (see above). Dr. Liang Hu will be the lead researcher.

Prairie View A&M University, Prairie View, TX, will conduct a series of experiments and theoretical studies of the viscosity of "heavy" crude oil under different reservoir conditions. The United States has significant quantities of captive crude oil; but, as much of the lighter and more easily produced crude oil is extracted, the proportion of heavy oil is increasing. In addition, many of the reservoirs in the western United States are dominated by heavy oil resources. The viscosity of this oil is a key factor in its ability to flow through the rock formations of an underground reservoir to production wells. Prairie View A&M students and teachers will examine how viscosities are influenced by heat, pressure and other conditions in oil reservoirs. Knowing this will allow future producers to better tailor their production techniques to extract greater quantities of this type of crude oil and avoid more costly alternatives. Bio-Engineering International, Katy, TX, will join the Prairie View team as the private sector collaborator. DOE will provide a grant of \$199,410 for the 3-year project. The contact at the University is W.F. Trotty, Vice President for Research and Development. The lead research professor will be Dr. Jorge Gabitto.

North Carolina A&T State University, Greensboro, NC, will receive a \$199,963 grant from DOE's Office of Fossil Energy to develop a novel membrane that can be used to separate hydrogen and carbon dioxide simultaneously from future fossil energy processes. Coal and other fossil fuels can be chemically broken down into a mixture of different gases; this research effort could lead to a way to separate hydrogen, a valuable source of ultra-clean energy, from these gases. Hydrogen may be used to power fuel cells (which don't rely on combustion), burned in turbines, used in a refinery to upgrade petroleum fuels, or perhaps in the future, provide a new type of automotive fuel. Carbon dioxide is a greenhouse gas, and if an economical means can be found to separate it from other gases, it might be possible to sequester, or dispose, of it. This could lead to a way to prevent its buildup in the atmosphere and potentially reduce the threat of global warming. The university had previously developed a palladium-ceramic membrane for separating these gases; the new research effort will develop an improved palladium silver-alloy membrane. The university will be joined by Amoco Exploration & Production Technology in the 3-year project. The University contact is Dr. Earnestine Psalmonds, Vice Chancellor for Research, (336) 334-7995. The research professor will be Dr. Shamsuddin Ilias.

Florida International University, Miami, FL, will receive a \$20,000 faculty/student exploratory research training grant for a 12-month project to study ways nitrogen oxide pollutants can be removed from power plant flue gases using light-activated chemical catalysts - a process called "photocatalytic oxidation." The students and professor will develop mathematical expressions for fundamental chemical reactions and reaction rates - the kinetics - and other conditions involved in the process. In turn, these expressions can be used as tools for designing future devices that will convert nitrogen oxide pollutants into nitric acid. The university contact is Douglas Backman, Associate Director, (303) 348-6388; the lead researcher will be Dr. M.A. Ebadian.