facsimile to (303) 275–4788 or electronically to *james.damm@go.doe.gov.* Solicitation questions must be submitted through IIPS per the instructions contained in the Solicitation. Responses to questions will be posted on the IIPS Web site. Further information on DOE's Hydrogen, Fuel Cells, and Infrastructure Technologies Program can be viewed at *http://www.eere.energy.gov/hydrogenandfuelcells.*

SUPPLEMENTARY INFORMATION: Under this Solicitation, DOE seeks Applications for four specific activities intended to educate key target audiences, including teachers, students, and the public about the use of hydrogen as an energy carrier and the future path to a hydrogen economy.

Awards under this Solicitation will be Grants or Cooperative Agreements with terms of one to five years beginning in Fiscal Year 2004. Subject to the availability of annual congressional appropriations, the total cumulative DOE funding available under this Solicitation for all projects is anticipated to be between $1 million and $3.5 million over the five-year period. The minimum required cost share varies by specific activity and will be specified in the Solicitation.

Issued in Golden, Colorado.

Jerry L. Zimmer,

Director, Office of Acquisition and Financial Assistance.

[FR Doc. 03–24349 Filed 9–25–03; 8:45 am]

BILLING CODE 6450–01–P

DEPARTMENT OF ENERGY

Notice of Availability of a Financial Assistance Solicitation

AGENCY: National Energy Technology Laboratory, Department of Energy (DOE).

ACTION: Notice of availability of a financial assistance solicitation.

SUMMARY: Notice is hereby given of the intent to issue a Financial Assistance Solicitation No. DE–PS26–04NT41898 entitled ''Support of Advanced Coal Research at U.S. Colleges and Universities.'' Pursuant to 10 CFR 600.6(b), DOE has determined that issuance of this financial assistance solicitation on a restricted eligibility is necessary and appropriate.

In support of advanced coal research to U.S. colleges and universities, financial assistance awards under this Program Solicitation are intended to maintain and upgrade the education, training, and research capabilities of our colleges and universities in the fields of science, environment, energy, and technology related to coal. The involvement of professors and students generates fresh research ideas and enhances the education of future scientist and engineers.

DATES: The solicitation will be available for downloading on the DOE/NETL's Home page at *http://www.netl.doe.gov/business* and the IIPS ''Industry Interactive Procurement System'' Internet page located at *http://e-center.doe.gov* on or about September 26, 2003. Applications must be prepared and submitted in accordance with the instructions in the Program Solicitation and must be received by November 6, 2003. Prior to submitting your application to the solicitation, periodically check the NETL Web site for any amendments.

FOR FURTHER INFORMATION CONTACT: Jodi L. Collins, MS I07, U.S. Department of Energy, National Energy Technology Laboratory, 3610 Collins Ferry Road, P.O. Box 880, Morgantown, WV 26507–0880, *E-mail Address: jodi.collins@netl.doe.gov. Telephone Number:* (304) 285–1390.

SUPPLEMENTARY INFORMATION: Through Program Solicitation DE–PS26–04NT41898, the DOE is interested in applications from U.S. colleges and universities, and university-affiliated research centers submitting applications through their respective universities. Applications will be selected to complement and enhance research being conducted in related Fossil Energy programs. Applications will be subjected to a merit review by a technical panel of DOE subject-matter experts and external peer reviewers. Awards will be made to a limited number of applicants based on: The scientific merit of the applications, application of relevant program policy factors, and the availability of funds.

Eligibility

To assure this Program continues to support the performance of high quality fundamental research by professors and students at U.S. colleges and universities, applications must be submitted by U.S. colleges, universities, and university-affiliated research institutions provided the following criteria are met:

- Principal Investigator or a Co-Principal Investigator listed on the application is a teaching professor at the submitting university. If this condition is met, other participants, including Co-Principal Investigators or research staff, who do not hold teaching positions may be included as part of the research.
- Proposals from university-affiliated research institutions must be submitted through the college or university with which they are affiliated.
- At least one student registered at the university is to receive compensation for work performed in the conduct of research proposed in the Core and the Innovative Concepts Phase-II Subprograms. This criterion is not applicable in the Innovative Concepts Phase-I Subprogram where the grants are of shorter duration and funded at lower levels to develop unique ideas applicable to coal utilization and conversion.
- Under the Innovative Concepts Phase-I Grants, research may be done by either the Principal Investigator, postdoctoral students, or graduate students.

Additional restricted eligibility is also imposed on the Innovative Concepts Phase-II Grants. Only Innovative Concepts Phase-I grantees will be eligible to compete for subsequent Phase-II continuation of their Phase-I projects.

Background

FY 2004 Focus Areas/Technical Topics

The current landscape of the U.S. energy industry, not unlike that in other parts of the world, is undergoing a transformation driven by changes such as deregulation of power generation, more stringent environmental standards and regulations, climate change concerns, and other market forces. With these changes come new players and a refocusing of existing players in providing energy services and products. The traditional settings of how energy (both electricity and fuel) is generated, transported, and utilized are likely to be very different in the coming decades. As market, policy, and regulatory forces evolve and shape the energy industry both domestically and globally, the opportunity exists for university, government, and industry partnerships to invest in advanced fossil energy technologies that can return public and economic benefits many times over. These benefits are achievable through the development of advanced coal technologies for the marketplace.

Energy from coal-fired powerplants will continue to play a dominant role as an energy source, and therefore, it is prudent to use this resource wisely and ensure that it remains part of the sustainable energy solution. In that regard, our focus is on pathways to clean, affordable energy achieved through a combination of technology evolution and innovation aimed at creating the most advanced collection of

flexible, clean, efficient, competitively priced coal-derived products, and low-cost environmental compliance energy systems. Subsequently, this focus remains key to this nation's continuing prosperity and our commitment to tackle environmental challenges, including climate change. It is envisioned that these advanced systems can competitively produce low-cost electricity at efficiencies higher than 60% with coal. This class of facilities will involve ''near-zero discharge'' energy plants—virtually no emissions will escape into the environment. Sulfur dioxide and nitrogen oxide pollutants would be removed and converted into environmentally benign substances, perhaps fertilizers or other commercial products. Carbon dioxide could be (1) concentrated and either recycled or disposed of in a geologically permanent manner, or (2) converted into industrially useful products, or (3) by creating offsetting natural sinks for CO_2.

Coal-fired powerplants remain the major source of electricity for the world while distributed generation, including renewables, will assume a growing share of the energy market. Technological advances finding their way into future markets could result in advanced co-production and co-processing facilities around the world, based upon Vision 21 technologies developed through universities, government, and industry partnerships.

Recent improvements within advanced coal-based power systems, in many ways is the culmination of decades of power and fuels research and development (R&D). The most advanced systems have the full energy potential of fossil fuel feedstocks and ''opportunity'' feedstocks such as biomass, petroleum coke, and other materials that might otherwise be considered as wastes, can be tapped by integrating advanced technology ''modules.'' These technology modules include fuel-flexible coal gasifiers and combustors, gas for fuels and chemical synthesis and can be built in the configuration best suited for its market application by combining technology modules. Designers of these systems would tailor their use of the desired feedstocks and produce the desired products by selecting and integrating the appropriate ''technology modules.''

The DOE goals for these advanced systems are to effectively eliminate, at competitive costs, environmental concerns associated with the use of fossil fuel for producing electricity and transportation fuels. Research objectives for these advanced power systems are based on three premises: that we will need to rely on fossil fuels for a major share of our electricity and transportation fuel needs well into the twenty-first century; that it makes sense to rely on a diverse mix of energy resources, including coal, gas, oil, biomass and other renewables, nuclear, and so-called ''opportunity'' resources, rather than on a reduced subset of these resources; and that R&D directed at resolving our energy and environmental issues can find affordable ways to make energy conversion systems meet ever more strict environmental standards.

To develop and sustain a national program of university research that advances the previously stated objectives, DOE is interested in innovative and fundamental research pertinent to coal conversion and utilization. To accomplish the program objective, applications will be accepted in three program areas: (1) The Core Program and (2) The Innovative Concepts Phase-I Program, and the Innovative Concepts Phase-II Program.

Core Program

The DOE anticipates funding at least one proposal in each focus area under the Core Program; however, DOE reserves the right not to fund any of the proposals in a given area if they do not meet programmatic needs of the agency. Additionally, high-quality proposals in a higher ranked focus area may be given more consideration during the selection process. Research in the Core Program is *limited* to the following six (6) focus areas and are listed in descending order of programmatic priority:

Materials for Advanced Fossil Energy Systems

New materials, ideas, and concepts are required to significantly improve performance and reduce the costs of existing advanced power systems or to enable the development of new systems and capabilities for coal combustion and coal gasification, gas separations, hydrogen storage, high-temperature fuel cells, and advanced turbine systems. Materials' issues are related to operation in the hostile conditions created when fossil fuels are converted to energy. These conditions include high temperatures, elevated pressures, pressure oscillations, corrosive environments (oxidizing or reducing conditions, gaseous alkali, chloride or sulfur-containing species), surface coating or fouling, and high particulate loading. The following topics are of interest in this solicitation:

(a) Computer-Aided Design of High-Temperature Materials

The quest for high-temperature materials is one of the dominant themes in materials development for efficient energy systems. High-temperature materials is a fast-moving research area with numerous practical applications. Materials that can withstand extremely high temperatures and extreme environments are generating considerable attention worldwide; however, designing materials that have low densities, elevated melting temperatures, oxidation resistance, creep resistance, and intrinsic toughness encompass some of the most challenging problems in materials science. The search for high-temperature materials is largely based on traditional, trial-and-error experimental methods which are costly and time-consuming. An effective way to accelerate research in this field is to use advances in materials simulations and high performance computing and communications to guide experiments. This synergy between experiment and advanced materials modeling will significantly enhance the synthesis of novel high-temperature materials. The studies should only address materials of interest to fossil energy conversion systems.

(b) Coatings for Coal-Fired Environments

Coatings with superior corrosion resistance in oxidizing, sulfidizing, carburizing and water-containing environments are needed to sustain the life of advanced energy systems. They are of particular interest for improving the corrosion resistance of Fe- and Ni-base alloys to achieve higher operating temperatures in fossil energy systems where sulfur and water vapor can cause severe oxidation problems. For optimum utilization of new coatings, one needs sufficient data about their potential benefits in terms of lifetime and applicable environments. In order to address that issue, model coatings need to be fabricated for corrosion testing and diffusion studies aimed at developing a comprehensive lifetime evaluation approach for the coatings. At least one ferritic and one austenitic alloy should be selected as substrate materials for study. Additionally, nickel-based superalloys are also of interest.

(c) Materials for Hydrogen Storage

Another critical need of advanced energy systems, is the development of materials for hydrogen storage. These may include alloys and intermetallics, sodium and lithium alanates, nanocubes, carbon nanotubes or other emerging materials. Factors that are relevant for useful materials are hydrogen storage density and stability at

commercially relevant conditions of temperature and pressure. Experimental studies should include analytical methods such as XRD, SEM, TEM and pressure-composition isotherm measurements to determine the phase purity, microstructure and hydrogen absorption characteristics. The investigations should aim to optimize the hydrogen absorption characteristics, such as the amount of hydrogen absorbed, the plateau pressure and kinetics by modifying the composition of the material and its microstructure.

Sensors and Control

DOE/NETL's Advanced Research Program is aimed at bridging the gap between the basic sciences and applied research as it relates to fossil energy applications. One area in which this transitional fundamental type research is needed is in the area of novel high temperature materials that can be used in the fabrication of miniaturized in-situ sensing devices for the measurement of various gas species.

Available sensors for measuring gaseous emission of CO, CO_2, HC's, Hg, H_2S, NO_X, etc. cannot withstand the high temperature, hostile environments found in advanced fossil energy systems. Experimental research projects are sought for the development of materials suitable for the production of low cost disposable sensors which can be used in a ''plug and play'' fashion for the detection of various fossil fuel gases under high temperature (>500 °C) and high pressure (200 psi) conditions. Fundamentally-based research programs focused on new materials (including material matrices, functionalized or coated substrates, doped ceramics, nano derived micro structures) such that the bulk properties of the material can be utilized in miniaturized devices with sensing characteristics at high temperature are encouraged.

The long term envisioned use of the materials will be to fabricate low cost micro sensors that can be used and easily replaced after 180–360 days of exposure to the harsh conditions found in ultra clean fossil energy applications. Hence the promising candidates identified as a result of this fundamental research will be explored to address cost associated with the development and fabrication processes that would provide sensing devices for commercial applications.

While revolutionary ideas that have the sound scientific basis to support significant advancements in this area are sought, experimental studies with material systems in which the sensing properties are understood are discouraged.

Measurement and Technology for Gasification

To sustain our nation's economic growth, utilization of our most abundant fossil energy resource, coal, in an efficient and environmentally responsible manner is needed. Consequently, the DOE is supporting the development of advanced technology power plants that offer higher efficiency, lower emissions, and reduced capital and operating costs. Gasification technologies are key to addressing several of the advanced technologies issues of clean production of electric power, hydrogen for the new ''hydrogen economy,'' and industrial chemicals or refined fuels while reducing the impacts on water resources, solid waste disposal, and capturing carbon dioxide (CO_2) that is generated in the use of fossil fuels. To meet the demands of the Hydrogen Initiative, the requirements for fuel cell and advanced turbine power units, and to meet the increasingly stringent environmental regulations, the synthesis gas produced by gasification will need to be cleaned to tighter specifications. At the same time, the gasification and gas cleanup processes will need to have reduced costs, improved reliability, and the ability to be readily integrated for increased efficiency. These improvements will enable the integration of advanced concepts for high-efficiency power generation and pollution control into a class of fuel-flexible facilities capable of operating with near zero environmental emissions. Based on gasification, there are a variety of configurations to meet differing market needs, including both distributed and central generation of power. The development and optimization of advanced coal gasifiers will be critical to the success of this program. This topic seeks to develop key support technologies and measurement techniques for these gasifiers. Grant applications are sought only in the following subtopics:

a. Advanced Refractory Systems for Gasification Systems

Refractory liners in high temperature slagging gasifiers are known to undergo significant deterioration over a relatively short period of time, requiring considerable maintenance. Depending upon the operating temperature of the gasifier, plant size, and the feedstock, refractory liners last only 6–18 months and cost over $1 million in materials, manpower, and lost revenues to replace. Therefore grant applications are sought to develop advanced refractory systems or new materials with an expected useful life of three or more years. Of particular interest are materials with the ability to withstand multiple feed stocks such as coal, biomass, and petroleum coke, and materials that contain no chromium.

b. On-Line Flow and Composition Measurements for Gasification Systems

The ability to measure, control, and quickly respond to fluctuations in the flow quantities and composition of feed streams to gasifiers and in the synthesis gas product stream can be crucial to maintaining performance to design standards and keeping the production of gasifiers on-stream at high capacity factors. Real-time and on-stream measurements are likely to be helpful in identifying systems upsets and responses to protect downstream equipment. Grant applications are sought to develop robust on-line measurement and control systems for (1) feeding abrasive and eroding solids across pressure barriers to 1000 psi into gasifiers, and for (2) product synthesis gas streams at high temperatures (to 2500 °F) and high pressure (to 1000 psi) laden with aggressive particulates. Gasifier feeds are typically water slurries with loadings of 50 to 70% solids, or pneumatically fed dry pulverized solids. The feed may contain coal, pet coke, coal-pet coke mixtures (typical 50–50%), water as slurry agent, or biomass (typically 10–20%). On-line measurements of feed quantities and composition should address attributes such as particle size distribution, particle loading, coal/pet coke/biomass composition changes, and amount of water. The synthesis gas product will typically contain bulk constituents (CO, CO_2, H_2, H_2O, CH_4), major contaminants (H_2S, COS, NH_3, Cl), and trace contaminants (Hg, As, Se, V, Ni). On-line measurement of any or all of these constituents at gasifier exit conditions of high temperature and pressure will enable more direct control of the operation of the gasifier.

c. Novel CO_2 and/or Hydrogen Separation Technology

One vision of clean energy in the future is to make hydrogen from coal in an ultra-clean production plant. In this vision, coal is gasified using oxygen, and the resultant syngas (mostly CO, H_2 and H_2O) is then turned into a stream of predominantly H_2 and CO_2 through the water-gas-shift reaction. The purpose of hydrogen separation technology is to economically transform this mixed gas into two pure streams: One of H_2, and one of CO_2. The mixed gas stream is expected to be 450–500 °F and 300 psi. Most current projects in

hydrogen separations are membrane processes. The only non-membrane process is the hydrate process, which must operate at low temperatures. This solicitation seeks completely novel CO_2 and/or H_2 separation technologies, with particular interest in technologies that maintain CO_2 pressure and do not require a significant drop in temperature.

Partitioning and Mechanism Studies for Mercury and Associated Trace Metals Within Coal-Fired Processes

Understanding mercury chemistry and process-related speciation mechanisms and transformations in laboratory experiments provide necessary steps to first understanding partitioning and subsequently developing mercury removal processes for advanced power systems, *i.e.*, industrial and coal-fired applications for PC-boilers, cyclone boilers, tangentially-fired boilers, fluidized-bed boilers and gasification processes. Past research has shown a reasonable link between mercury speciation and several parameters including the various constituents of fly ash (*i.e.*, unburned carbon/ LOI); fly ash properties (such as fly ash alkalinity); and process specific information (coal rank, boiler type, flue-gas temperature, Cl concentration, NO_X concentration, sulfur compounds, and CO/CO_2 concentrations). Grant applications are sought to further understand partitioning and chemistry of mercury and other trace metal and organic substances in coal-fired (bituminous, subbituminous, and lignite) systems. Specifically, modeling or experiments using statistical analysis of these identified parameters on chemical intermediaries and mechanisms is sought.

Solid Oxide Fuel Cells (SOFC) Sealing Systems

A secure future for our Nation depends on the continued availability of reliable, affordable, and environmentally-safe technologies for production of energy from advanced power systems, such as fuel cells. Solid oxide fuel cells are capable of operating on a variety of fossil fuels, including coal derived synthesis gas. Currently, numerous SOFC design concepts are under development by industry. These industrial developers have identified sealing as a top-priority technical barrier in their efforts to commercialize advanced power generation systems based on solid oxide fuel cell technology and operating on coal and other fossil fuels. These seals have a demanding set of imposed performance criteria due to the extreme SOFC operation environment. The seals must prevent the mixing of fuel and oxidant streams as well as prevent reactant escape to the surrounding environment. The seal material must have a low electrical conductivity and be mechanically and chemically stable under reducing/oxidizing/wet conditions, as well as with oxidizing and reducing environments separated by the seal. Of particular importance is the ability to seal, with adequate bond strength, materials (*e.g.* Fe-Cr alloys, Ni-YSZ cermet and LSM) with differing coefficients of thermal expansion (CTE), and do so while exposed to temperature transients over a range from room temperature up to SOFC operating temperature (~850 °C). In addition, the seals must accommodate the thermal expansion of the fuel cell caused by temperature gradients in the direction of fuel flow, the result of the electrochemical reaction, without imposing excessive stresses within the cell. In the case of auxiliary power unit (APU) and mobile applications, the seals must be resistant to thermal shock in order to permit a rapid ($\simeq$10 minutes) transition from ambient to operating temperature, and in the latter case, vibration. The seal material must be capable of a service life of more than 40,000 hours and hundreds of thermal cycles for stationary systems, or at least 5,000 hours and 3,000 thermal cycles for transportation systems.

Current state-of-the-art sealing concepts utilizing glass or glass-ceramic materials have been largely successful in meeting performance requirements in the *short-term.* The viscous, wetting behavior of glass facilitates hermetic sealing, and glass-ceramics avoid viscous flow and uncontrolled, progressive crystallization during operation. The properties of these materials (CTE, T_g for glasses) can be affected via composition/structure modifications. Furthermore, glasses are relatively inexpensive and easily fabricated.

However, *long-term* performance under thermal cycling has been unsatisfactory. Glasses and glass-ceramics are brittle; consequently, thermal stress-induced bulk microcracking of the seal, resulting from as few as one start-up/shut-down/start-up cycle, may cause unacceptable reactant leakage. Furthermore, these stresses are affected by a host of factors, including the cell/interconnect/seal geometry and the unique component material properties of the particular SOFC stack design. The potential for seal fracture is exacerbated by the potential chemical reaction of glass with metal interconnects, resulting in the formation of interfacial compounds and/or extensive porosity in the glass near the glass/metal interface.

Glass, glass-ceramic, ceramic-filled glass composite, metal-filled glass composite and/or ceramic-filled metal composite based seal materials and systems are sought with significantly improved long-term durability under SOFC operating conditions, with particular emphasis placed upon the ability of the seal or seal system accommodate dimensional changes of cell components resulting from thermal transients (shock) and thermal gradients. Material composition and/or structure modifications may potentially possess the capability to accommodate larger displacements, local dimensional variations and material movement. In addition, these materials must be chemically and physically stable in a high temperature reactive environment. The seal material must be compatible with the cell and interconnect materials of the particular SOFC system design. The ultimate objective is the development of an economically-practical seal material/system that can provide hermetic sealing under all operating conditions for the life of planar SOFC stacks.

Financial assistance applications are sought to research and develop glass, glass-ceramic, ceramic-filled glass composite, metal-filled glass composite and/or ceramic-filled metal composite based seal materials and systems to address planar SOFC sealing needs. Of particular interest are novel seal concepts focusing on seal material composition and structure with an emphasis on attaining long-term durability under typical SOFC operating conditions. Emphasis in this solicitation is on investigating and developing viable sealing materials for us with synthesis coal gas compositions feed to SOFC. Current Solid-State Energy Conversion Alliance (SECA) program goals require a seal service life of more than 40,000 hours and hundreds of thermal cycles for stationary systems, or at least 5,000 hours and 3,000 thermal cycles for transportation systems. Effective sealing concepts must perform under high temperature, chemically reactive conditions and need to accommodate thermal transient/gradient-induced movement of cell and stack components and enclosures while minimizing transmission of structural loads to delicate cell components. Proposed approaches should combine analysis and experimentation to establish theoretical limits, and to evaluate the practical limit of the sealing concept. Manufacturability and

cost are also critical factors in meeting SECA program goals.

Turbine Combustion: Flashback

In support of the Turbine Program, advanced power systems has goals of very low plant emissions (NO_X less than 2-ppm) and turbine combustors capable of stable operation with fuel compositions ranging from natural gas to a broad range for syngas. Although syngas has wide composition variability, the following gives an example of representative properties for a fuel gas from oxygen blown coal gasification: 25% H_2, 40% CO, 20% H_2O, and 200 BTU/ft^3 lower heating value.

The primary goal for the research is to provide fundamental information and data, or computational tools, that will enable design of turbine combustors with improved stability and emissions. Proposed research should give highest priority to addressing fuel composition and variability issues associated with use of syngas and alternate fuels in gas turbine combustors.

Flashback is an issue for premixed combustors, both in terms of increased emissions and hardware damage. Proposals are sought in this topic for achieving premixing without excessive pressure drop and suitable fuels with a variety of flame speeds, including syngas and hydrogen. Research of interest includes:

- The effect of syngas compositions and percentage concentrations of higher hydrocarbons in natural gas on the propensity of a premixed flame to flashback. Of particular interest is the propensity to flashback in the presence of combustion oscillations (either self-excited or externally driven).
- Measurement of flashback characteristics representing various fuels and fuel compositions (IGCC syngas, natural gas composition variations, liquid fuels, *etc.*), especially for high pressures and in the 700 to 950K temperature range. Of special interest is the effect of higher concentrations of H_2 in syngas on flashback.

Innovative Concepts Phase-I Program

The DOE anticipates funding at least eight awards under the Phase-I Program. In the twenty-first century, the challenges facing coal and the electric utility industry continue to grow. Environmental issues such as pollutant control, both criteria and trace pollutants, waste minimization, and the co-firing of coal with biomass, waste, or alternative fuels will remain important. The need for increased efficiency, improved reliability, and lower costs will be felt as an aging utility industry faces deregulation. Advanced power systems, such as a Vision 21 plant, and environmental systems will come into play as older plants are retired and utilities explore new ways to meet the growing demand for electricity.

Innovative research in the coal conversion and utilization areas will be required if coal is to continue to play a dominant role in the generation of electric power. Innovative Concepts applications will be accepted in any of the six (6) focus areas listed in the Core Program above or the four (4) technical Innovative Concepts Phase-I Program areas listed below. The focus areas under the IC program are not listed in any programmatic priority.

Innovative Concepts Phase-I Technical Topics

Water Impacts From Coal-Burning Power Plants

Producing electric power from coal has impacts to water quality from the beginning of the process, mining the coal, to the disposal of ash remaining after the coal has been combusted. Coal mining has left large amounts of overburden wastes that contain sulfide minerals that weather to form sulfuric acid. Many of these areas are causing problems with water quality and re-vegetation. It is estimated that 10,000 miles of streams in the United States are affected by acid mine drainage. The EPA has initiated a Total Maximum Daily Load (TMDL) program to restore impaired water bodies, some of which are degraded from past mining. Coal washing is used to remove pyritic sulfur and other impurities that could be emitted into the air; however, wastewater from this process may release these substances to water bodies. A large quantity of water is used in power plants to condense the steam leaving the turbine. Once-through cooling systems can damage aquatic life and add heat to streams. The EPA has developed new regulations under the Clean Water Act, section 316(b), to reduce once through cooling usage of water and improve cooling water intake structures. Re-circulating cooling towers require the addition of biocides and corrosion inhibitors, which may be released to water bodies during blowdowns. Wet scrubbing of air pollutants from flue gas generates a large quantity of wastewater. Ash ponds have the potential for creating run-off problems and groundwater infiltration. Research opportunities for improving water quality associated with coal combustion for power generation include: (1) Novel active and passive treatment technologies to address acid mine drainage; (2) Innovative solutions to restoring abandoned mine lands to enhance watersheds; (3) Improved intake and outflow structures for cooling water; (4) Novel uses for waste heat from power plant cooling; (5) Advanced water-related sensors and controls at power plants to minimize adverse impacts to water quality; (6) Novel treatment techniques for scrubber wastewater; and (7) Novel techniques for reducing coal-washing waste and ash pond runoff.

Mercury and Associated Trace Metal Chemistry Studies Within NO_X Control Systems

By the year 2010, it is estimated that over 50% of coal-fired utilities will install either selective catalytic reduction or selective non-catalytic reduction units to meet NO_X emission limits. Understanding mercury chemistry and process-related speciation mechanisms and transformations related to NO_X control systems would provide necessary information to develop more effective, less costly mercury removal processes for industrial and coal-fired boilers. Past research has shown a probable relationship between degree of mercury oxidation and age of NO_X catalyst, coal rank, size (or residence time) of NO_X control vessel, degree of NO_X conversion, amount of SO_2 converted to SO_3, and ammonia slip. Grant applications are sought to further understand partitioning and chemistry of mercury and other trace metal and organic substances in coal-fired (bituminous, subbituminous, and lignite) systems utilizing SCR/SNCR or ammonia injection. Specifically, statistical analysis clarifying the importance of each of these identified parameters and/or their interactions on chemical intermediaries and mechanisms is sought.

Novel Uses of the Calcium Sulfate and Calcium Sulfite-Based FGD Material

In order to clean up sulfur dioxide emissions from power plants, many utilities have installed either wet or dry flue gas desulfurization (FGD) systems. Currently, the majority of this FGD material is disposed of into landfills. However, there are some utilities that market this material.

The largest reuse market of the material is in wallboard manufacturing processes.

It is estimated that in order to meet future stringent air pollution requirements, many additional utilities will install this technology in the next decade. *Grant applications are*

requested that will look at novel uses of the calcium sulfate and calcium sulfite-based FGD material.

Development of Advanced SCR Catalysts

National NO_X emissions may be capped at levels well below current emissions under proposed multi-pollutant control initiatives to address continued concerns about secondary fine particles (including those formed by reactions with NO_X) and ozone. Such proposals would essentially extend the current NO_X State Implementation Plan Call to twelve months and expand it to all 48 contiguous states. While selective catalytic reduction (SCR) is the workhorse for the largest units of the existing generating fleet in meeting current NO_X regulations, future more stringent requirements drive the need to lower the cost of this technology. Accordingly, development of advanced SCR catalyst technology that is cheaper and has fewer balance-of-plant issues than current SCR technology could offer a lower cost option for the smaller units. In order to adapt SCR technology to hard to retrofit boilers, three options are proposed for research:

a. Development of a more reactive catalyst than current commercially available catalysts that would require a smaller reactor with less catalyst and able to operate at higher gas velocities to achieve NO_X removal efficiencies of 90%.

b. Development of a catalyst that would operate at low dust conditions and temperatures experienced after the particulate removal device to achieve NO_X removal efficiencies of 90%.

c. Development of a catalyst for items (1) or (2) that has a dual function of oxidizing elemental mercury.

In both cases, it is suggested to have the reducing agent to be other than an ammonia-based reagent or methane due to their balance-of-plant issues, availability, and cost. Utilization of combustion gas constituents such as carbon monoxide would be a plus. In all cases, an economic goal of developing the technology at ¾ the levelized cost of the current state of the art SCR technology should be established.

The proposal of the successful applicants should be able to demonstrate knowledge of the process conditions of a coal-fired utility boiler equipped with low NO_X burners for the targeted area of catalyst development.

Innovative Concepts Phase-II Program

The DOE anticipates funding two to four awards in the Phase-II Program. The goal of the Phase-II Program, the principal R&D effort of the IC Program, is to solicit research that augments research previously funded through the Phase-I Program. Only the institutions receiving a Phase-I grant awarded in fiscal year 2002 will be eligible to submit an application for continuation of their Phase-I projects. The following institutions are eligible to participate in the Phase-II Program in FY04:

Drexel University
—''Ultrasensitive High-Temperature Selective Gas Detection Using Piezoelectric Microcantilevers''
University of Albany
—''Feasibility of a SOFC Stack Integrated Optical Chemical Sensor''
University of Nevada
—''Advanced Heat Exchanges Using Tunable Nanoscale-Molecular Assembly''
University of Pittsburgh
—''A Novel Concept for Reducing Water Usage and Increasing Efficiency in Power Generation''
The Pennsylvania State University
—''Reaction Mechanism of Magnesium Silicates with Carbon Dioxide in Microwave Fields''
Arizona State University
—''Simultaneous Mechanical & Heat Activation: A New Route to Enhanced Serpentine Carbonation Reactivity & Lower CO_2 Mineral Dequestration Process Cost''
University of Utah
—''Carbon Dioxide Sequestration by Mechano-chemical Carbonation of Mineral Silicates''
Iowa State University
—''Development of a Catalyst/Sorbent for Methane Reforming''
University of Maine
—''Inorganic Membranes''
University of North Dakota
—''Advanced Heterogeneous Reburn Fuel from Coal and Hog Manure''
The University of Mississippi
—''Heterogeneous Reburning by Mixed Fuels''
University of North Dakota
—''Mercury Oxidation via Catalytic Barrier Filters''
University of Pittsburgh
—''Engineered Coal Reburning in Oxidizing Environments''

Once released, the solicitation will be available for downloading from the IIPS Internet page. At this Internet site you will also be able to register with IIPS, enabling you to submit an application. If you need technical assistance in registering or for any other IIPS function, call the IIPS Help Desk at (800 683–0751 or E-mail the Help Desk personnel at *IIPS_HelpDesk@e-center.doe.gov.* The solicitation will only be made available in IIPS, no hard (paper) copies of the solicitation and related documents will be made available. Telephone requests, written requests, E-mail requests, or facsimile requests for a copy of the solicitation package will not be accepted and/or honored. Applications must be prepared and submitted in accordance with the instructions and forms contained in the solicitation. The actual solicitation document will allow for requests for explanation and/or interpretation.

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ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–6644–2]

Environmental Impact Statements; Notice of Availability

Responsible Agency: Office of Federal Activities, General Information (202) 564–7167 or *http://www.epa.gov/compliance/nepa/*

Weekly receipt of Environmental Impact Statements

Filed September 15, 2003 Through September 19, 2003

Pursuant to 40 CFR 1506.9.

EIS No. 030426, FINAL EIS, NOA, AK, Cook Inlet Beluga Whale Stock, Federal Actions Associated with the Management and Recovery, Implementation, Cook Inlet, AK, Wait Period Ends: October 27, 2003, Contact: James W. Balsiger (907) 271–5006.

EIS No. 030427, FINAL EIS, AFS, AK, Licking Creek Timber Sale, Timber Harvest, Implementation, Tongass National Forest, Ketchikan Misty Fiords Ranger District, Revillagigedo Island, Ketchikan, AK, Wait Period