Office of Science
Financial Assistance
Funding Opportunity Announcement
DE-PS02-09ER09-07

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Environmental Remediation Science Program

The Office of Science (SC), U.S. Department of Energy (DOE), hereby announces interest in receiving applications for research grants in the Environmental Remediation Sciences Program (ERSP), which is within the Climate and Environmental Sciences Division (CESD) in the Office of Biological and Environmental Research (BER). The ERSP seeks to advance fundamental science to understand, predict and mitigate the impacts of environmental contamination from past nuclear weapons production and provide a scientific basis for the long term stewardship of nuclear waste disposal. The program supports an integrated portfolio of research ranging from molecular to field scales with emphasis on the use of advanced computer models and multidisciplinary, iterative experimentation to understand and predict contaminant transport in complex subsurface environments. This mission is guided by the **BER long term performance measure** to "*provide sufficient scientific understanding such that DOE sites would be able to incorporate coupled physical, chemical and biological processes into decision making for environmental remediation and long-term stewardship*." To meet this measure, BER funds basic research to investigate the key processes affecting the mobility of subsurface contaminants found at DOE sites. The goal of this solicitation is to support innovative, fundamental research to investigate the coupled physical, chemical, and biological processes affecting the transport of subsurface contaminants commonly found at DOE sites. Applications should identify critical knowledge gaps and address hypothesis-driven research to better understand the significant physical, chemical, and biological processes influencing the form and mobility of specific inorganic contaminants in the subsurface. Research projects should aim to provide the scientific basis for the long term stewardship of contaminated sites across the DOE complex and the development of new remediation concepts and strategies. **Applications must include an explanation of how the proposed research supports the BER long term performance measure**. The environment of interest is the terrestrial subsurface including the vadose zone, the saturated zone and key groundwater-surface water interfaces. The proposed research is expected to contribute to the public good by advancing the fundamental science associated with the cycling and transport of inorganic elements in the subsurface, and that benefit will be expressed through contributions to the technical literature. Listed below are the specific radionuclide and

heavy metal Contaminants of Concern for this Funding Opportunity Announcement (FOA) and an outline of the general science needs of the ERSP. Phytoremediation and the study of organic contaminants are NOT addressed in this FOA.

It is anticipated that up to **$4,000,000 will be available for approximately 15 to 20 awards** to be made in Fiscal Year 2010, contingent on the availability of appropriated funds. For a **Full Application** (narrative limited to 20 pages), applicants may request project support for up to three years with annual budgets for single investigator projects not to exceed $250,000/year total costs. Annual budgets for multi investigator projects may not exceed $450,000/year total costs. For an **Exploratory Application** (narrative limited to 10 pages), applicants may request project support for up to two years with a total budget of up to $150,000. **Applicants should specify whether they are submitting a Full Application or an Exploratory Application.**

PREAPPLICATIONS

Potential applicants are **strongly encouraged** to submit a brief preapplication, referencing Funding Opportunity Announcement (FOA) DE-PS02-09ER09-07 for receipt by DOE by 4:30 p.m., Eastern Time, January 30, 2009.

Preapplications are limited to **three pages total**, including a prescribed cover page. The cover page should include: the project title, the Lead PI's name and complete contact information, whether a **Full or Exploratory application** is anticipated, and a table listing the Lead PI and institution and all funded Co-PIs, their institutions and the amount of funding requested for each year for the project for each funded investigator. The template for the required cover page should be downloaded from http://www.lbl.gov/ERSP/generalinfo/proposalcalls.html. Preapplications should be sent individually as a single PDF file attachment via email to: Kim.Laing@science.doe.gov. **The subject line of the email must state: "Preapplication DE-PS02-09ER09-07 - [Full or Exploratory]".** Preapplications must be received by DOE by 4:30 PM, Eastern Time, January 30, 2009. **No FAX or mail submission of preapplications will be accepted.**

Preapplications will be reviewed for conformance with the guidelines presented in this FOA and suitability in the technical areas specified in this FOA. A response to the preapplications encouraging or discouraging formal applications will be communicated to the applicants by February 20, 2009. Applicants who have not received a response regarding the status of their preapplication by this date are responsible for contacting the program office to confirm the status of their preapplications.

Preapplications should describe the research objectives, the technical approach(s), and the proposed team members and their expertise. The intent in requesting a preapplication is to save the time and effort of applicants in preparing and submitting a formal project application that may be inappropriate for the program. Preapplications will be reviewed relative to the scope and research needs as outlined in this FOA and outlined in the ERSP Strategic Plan (at http://www.sc.doe.gov/ober/ERSD/ERSD_2007_Strategic_Plan.pdf). Biographical data are not required for preapplications, nor is an institutional endorsement necessary.

APPLICATION DUE DATE: April 9, 2009, 8:00 pm, Eastern Time.

Applications must be submitted using Grants.gov, the Funding Opportunity Announcement can be found using the CFDA Number, 81.049 or the Funding Opportunity Announcement number, DE-PS02-09ER09-07. Applicants must follow the instructions and use the forms provided on Grants.gov.

FOR FURTHER INFORMATION CONTACT:

GENERAL INQUIRIES ABOUT THIS FOA SHOULD BE DIRECTED TO:

Scientific/Technical Program Contact:

Contact: Dr. David Lesmes
Telephone: (301) 903-2977
E-mail: David.Lesmes@science.doe.gov

SUPPLEMENTARY INFORMATION:

The Department of Energy oversees some of the largest environmental cleanup operations in the world. Cold War Era processing of uranium for nuclear power and weapons has left an enduring legacy of over 6 billion cubic meters of contaminated soil and groundwater. Innovative solutions, based on scientific understanding of subsurface processes, are needed to remediate, manage and monitor the various contaminated sites found across the DOE complex (NRC, 2000). The cleanup of contaminated sites across the DOE complex presents an enormous technical, scientific and financial challenge for the Department of Energy and the nation as a whole. While technologies exist for dismantling and decommissioning surface structures such as contaminated buildings, contaminants that have entered the subsurface are exceptionally difficult to clean up. This is particularly true for those contaminants that are spread over wide areas and whose potent toxicity and persistence require removal to very low levels. Radionuclides, which are products of nuclear fuel and weapons manufacturing, are of particular concern to DOE cleanup operations at DOE sites in addition to heavy metals and non-aqueous phase liquids (NAPLs). This FOA targets a subset of these contaminants listed below under the Contaminants of Concern section of the FOA. At this time, we are **NOT** soliciting research projects that focus on non-aqueous phase liquids (organic contaminants).

The projected performance of long term stewardship strategies and subsurface remediation techniques is often based on insufficient knowledge of the transport behavior of contaminants in the subsurface, across key groundwater-surface water interfaces and the mechanisms of contaminant transformation. As a result, predictions of long-term contaminant mobility often prove to be inaccurate and *in situ* cleanup strategies often do not meet performance expectations, exceeding both cost and time schedule estimates. At many sites, it is likely that subsurface contamination will remain long after surface remediation measures have been completed (DOE, 2001; NRC, 2000). It is therefore imperative that the DOE understand the factors that affect contaminant mobility and transformation within the subsurface and across key groundwater-surface water interfaces to devise new remediation and long-term monitoring strategies and to provide realistic assessments of the threat posed by subsurface contamination. These tasks will

require significant advances in our understanding of the key factors controlling the mobility and fate of contaminants. Additionally, these tasks will require the development of innovative tools for detecting, monitoring, modeling and stabilizing contaminants *in situ*, as well as novel techniques for removing contaminants from the subsurface.

The ERSP portfolio maintains a diverse suite of projects ranging from molecular-scale science to field-scale investigations. The ultimate goal of the ERSP is to provide the DOE with field-scale descriptions of subsurface processes affecting contaminant transport or transformation. One of the more significant challenges is to link field-scale observations of contaminant mobility with key mechanisms controlling contaminant availability, reactivity and transport at smaller scales. Projects funded within the ERSP should progress toward demonstrating the field relevance of processes or techniques under investigation. To promote this approach, the ERSP is soliciting integrative and/or multidisciplinary research proposals addressing the investigation of contaminants of greatest concern to the DOE. This is not meant to preclude single investigator projects of strong DOE environmental relevance.

The preceding discussion is based on the ERSP Strategic Plan which is available on the ERSP website at: http://www.sc.doe.gov/ober/ERSD/ERSD_2007_Strategic_Plan.pdf.

Contaminants of Concern

Key contaminants (and their mixtures) of interest for this FOA are:

- Radionuclides: uranium, technetium-99, strontium-90, plutonium, cesium-137, iodine-129, and neptunium-237.
- Non-Radioactive Metals: mercury and chromium(VI)
- Nitrate and complexing agents as co-contaminants with the listed radionuclides or non-radioactive metals.

Non-aqueous phase liquids (organic contaminants) are NOT a focus for this FOA. Applications addressing NAPL or organic contaminant will not be considered at this time.

Descriptions of the nature and extent of contamination at the principal DOE sites are available at http://emdev.apps.em.doe.gov/emdev/pdfs/Groundwater_Booklet-2008.pdf and http://www.nap.edu/books/0309065496/html/index.html/.

More detailed information is available in some cases from the major DOE sites: Hanford (http://www.hanford.gov, http://www.hanford.gov/cp/gpp/, http://www.hanford.gov/cp/gpp/science/sandt.cfm) Idaho National Laboratory (http://www.inl.gov/subsurface/environmentalissues/vadosezone.shtml) Oak Ridge Reservation (http://www.oro.doe.gov/external/Programs/EnvironmentalManagement/tabid/42/Default.aspx) and Savannah River Site (http://www.srs.gov/general/srs-home.html, http://www.srs.gov/general/programs/soil/extpage.html.

Research Proposals: Full and Exploratory

Applications submitted in response to this FOA should address the basic Science Needs of the ERSP outlined below, and should address at least one of the contaminants of interest. Applications must identify whether the application is a **Full Application** or an **Exploratory Application** as defined below. Both single investigator projects and multi-investigator projects are encouraged. Multi-investigator projects are expected to integrate the efforts of a multi-disciplinary team to tackle problems that cannot be effectively addressed by a single investigator. All projects should clearly delineate an integrative, hypothesis-driven research approach and describe how the results of the research would ultimately improve the understanding of processes affecting the mobility of contaminants at the field scale in the context of the DOE cleanup mission.

A small but critical element of the ERSP research portfolio is the development of enabling scientific tools for characterizing the spatial and temporal evolution of complex subsurface systems. Applicants proposing to develop enabling scientific tools for subsurface science should clearly indicate this in the Executive Summary. Applications to develop enabling scientific tools are NOT required to motivate the proposed research with specific hypotheses; however, these applications MUST justify both the novelty and technical merit of the proposed scientific tools as well as explain the potential to improve the understanding of subsurface processes and the monitoring of contaminated sites.

The intent of the Exploratory Research component of the ERSP is to catalyze the study of new concepts, tools and approaches that could lead to breakthroughs in subsurface remediation science as well as to broaden the pool of researchers in the ERSP. Eligible areas include the ERSP science needs described below. Exploratory Research projects will have shorter duration and less funding than Full Projects. These projects are intended to provide opportunities to conduct preliminary research and to develop novel ideas for later, more substantial funding opportunities within the ERSP (i.e., Full Applications). Exploratory Research applications should address topics that could lead to breakthroughs in one or more of the science areas in the program and align with the ERSP focus on processes occurring in the subsurface including the vadose zone, the saturated zone and key groundwater-surface water interfaces. The contaminants of interest for this FOA are the same as those listed above in the Contaminants of Concern section.

Application Review Process and Relevance to Mission

A key consideration in the evaluation of research applications will be the potential impact of the proposed research project on the ERSP mission of environmental remediation and long term stewardship of DOE sites. **All applications submitted in response to this FOA must explicitly state in the Executive Summary how the proposed research will support the accomplishment of the BER Long Term Measure to *"provide sufficient scientific understanding such that DOE sites would be able to incorporate coupled physical, chemical and biological processes into decision making for environmental remediation and long-term stewardship."*** Applicants should address the relevance and impact of their proposed research project to a broad scientific audience because all applications will be reviewed by an interdisciplinary panel as well as DOE staff with a wide range of technical backgrounds. We anticipate using two panels to review all of the applications submitted to this FOA. Although the

technical evaluation will primarily be based on written reviews by individual subject matter experts, all of the panelists will have access to all of the applications reviewed by the panel and they will be asked to read the Executive Summaries of all of the applications. After a detailed presentation of the scientific and technical merits of an application by the primary technical reviewers and a vigorous discussion of the application by the entire panel, all panelists will be asked to make individual recommendations as to the funding priority - classifying the applications as Must Fund, Should Fund, Could Fund or Don't Fund. DOE program managers will use all of this information as well as programmatic factors such as the balance among the program areas and research already in progress to make the final funding decisions.

Science Needs

The ERSP seeks to develop a fundamental and quantitative understanding of the physical, chemical and biological processes affecting contaminant transport in the subsurface and at key groundwater-surface water interfaces at DOE sites. Critical to this objective is a better understanding of how these coupled processes affect contaminant mobility, reactivity and stability in subsurface environments.

Understanding contaminant transport at the field scale is limited by our current, inadequate understanding of the physical, chemical and biological factors that control contaminant mobility. Methods to characterize subsurface structures and the physical, chemical and biological properties affecting contaminant transport over a wide range of scales are crucial to providing more realistic conceptual models of contaminant transport. Geophysical and hydrogeologic methods to measure important subsurface structural and/or transport parameters are of interest to the ERSP as well as methods to detect and track temporal geochemical and biogeochemical changes in subsurface environments. Of particular interest are novel methods or techniques that directly impact conceptual and/or quantitative model development of contaminant mobility.

Many chemical and geochemical factors affect the transport and transformation of contaminants found in subsurface environments. Often several competing processes occur simultaneously complicating an overall quantitative description of contaminant mobility. At many DOE sites, DOE-relevant contaminants are found under unusual conditions of pH, ionic strength and redox potential, and in unusual mixtures or mineral forms not previously described. Additionally, various *in situ* remediation techniques produce changes in local geochemical conditions in groundwater or vadose zone settings that directly influence contaminant mobility. The ERSP seeks to develop the understanding of the key chemical and geochemical interactions that have a quantitatively important effect on contaminant transport in subsurface environments and the tools to detect and measure these processes. This requires the identification and prioritization of the essential processes needed to predict the extent and rate of reactions affecting contaminant transport at DOE sites. Insight gained at the molecular scale should be used to interpret or predict processes occurring at larger scales and ultimately along groundwater flowpaths in the subsurface. Refinement of conceptual and computational models of contaminant transport based on new geochemical understanding of contaminant mobility and insight of processes at the microbe-mineral interface is also of interest.

Microorganisms detected in the subsurface can profoundly alter geochemical conditions along groundwater flowpaths. In addition to indirectly creating conditions hindering contaminant mobility, many microorganisms are known to directly biotransform contaminants to innocuous or immobile forms. This is the basis for several *in situ* bioremediation technologies and natural attenuation mechanisms and may also play a role in the effectiveness of some *in situ* barrier systems. However, the sustained manipulation of subsurface microbial communities to affect contaminant transport and/or degradation is still largely an empirical exercise. Likewise, the microbially-mediated mechanisms of natural attenuation processes and potential microbial involvement in other, more physical/chemical *in situ* remediation techniques, remain poorly understood. Much remains to be learned about the identity, and more importantly, the functioning of subsurface microbial communities relevant to contaminant biotransformation processes. Of particular concern to the ERSP is a better understanding of how microbial growth and activity quantitatively relate to mineral and contaminant biotransformation, and the tools to measure and monitor this activity *in situ*. This requires a mechanistic understanding of how microorganisms access/obtain essential nutrients, electron donors and electron acceptors in order to sustain activity. ERSP is particularly interested in the integration of genome-enabled science with environmental studies to provide a more quantitative understanding of microbial metabolism and how metabolism is influenced by environmental conditions found at DOE sites. Also, interactions among groups of active microorganisms need to be better understood to more fully explain competitive processes and shifts in community structure. Additional techniques are needed to evaluate the distribution of active microbial communities in heterogeneous subsurface environments as well as to identify novel mechanisms of microbially-mediated contaminant transformation.

The emphasis of the ERSP is on an integrative understanding of the relationships among the coupled physical, chemical and biological processes influencing the transport and/or remediation of contaminants at DOE sites. Applications submitted to the ERSP need not necessarily incorporate an investigation of all three processes for situations where contaminant transport is dominated unequally by one process or another, but should describe the rationale for the overall focus of the research. These science needs are inherently multidisciplinary, but do not preclude single investigator projects of strong DOE environmental relevance. Coordination with an ERSP field project is encouraged where appropriate but not required. The contaminants of interest for this FOA are listed above in the Contaminants of Concern section.

The following is a list of example areas of interest for this FOA. This list is intended to illustrate, but not necessarily constrain research to these selected areas:

- Advanced techniques to assess the form, stability and distribution of immobilized DOE relevant subsurface contaminants.
- Scaling of biogeochemical reactions and gradients, important for understanding the fate and transport of DOE relevant contaminants in the subsurface, occurring at the molecular, mineral surface and pore levels to larger scales.
- Techniques to quantitatively identify active members of subsurface microbial communities and relate growth and activity to rates of biogeochemical reactions associated with contaminant remediation or attenuation.

- Understanding the hydrogeological and biogeochemical factors that govern the distribution and functioning of subsurface microbial communities.
- Quantification of scale-dependent hydrobiogeochemical factors that govern plume migration, remediation efficacy, and aquifer natural attenuation capacity.
- Methods to integrate information about subsurface hydrobiogeochemical mechanisms and properties across scales.
- Improved representation of microbial activity, sorption, mineralization dynamics, and scaling within reactive transport models as needed to improve subsurface contaminant fate and transport predictions.
- Understanding the formation/nucleation, thermodynamic stability, transport characteristics, and sorptive capacity of nanoparticulate/colloid materials associated with natural or induced gradients relevant to contaminated DOE field sites.
- Geophysical and hydrogeological techniques for characterizing properties that control groundwater flow and transport.
- New techniques for quantifying biogeochemical mechanisms affecting contaminant transport and sustained immobilization.
- Sensors for evaluating redox, chemical gradients and, mineral or contamination speciation at crucial biogeochemical interfaces.
- Quantitative techniques to measure the distribution and contaminant sorption characteristics of minerals in natural materials
- Quantitative techniques for monitoring biogeochemical transformations associated with natural or induced gradients and for assessing their impact on flow characteristics from the pore to field scales.
- Improving the understanding of the metabolic potential and physiology of subsurface microorganisms catalyzing contaminant transformation and/or the transformation of subsurface materials *in situ*.

Related Programs

ERSP strongly encourages investigators to familiarize themselves with the resources and potential partnering opportunities provided by ERSP. ERSP funds basic research on subsurface contaminant transport and remediation processes ranging from molecular-scale processes to field-scale processes via a unique set of program resources and partnering -- leveraging of these resources is strongly encouraged. Applicants should familiarize themselves with the following resources and potential partnering opportunities provided by ERSP.

ERSP initiated three large multidisciplinary field-scale research projects at three different sites beginning in FY 2007. The Integrated Field-Scale Subsurface Research Challenges (IFRCs) at Oak Ridge, Tennessee and Rifle, Colorado, represent a new format for directed research that continues ongoing subsurface science at these sites. The IFRC at the Hanford site, Washington, provides a framework for a focused, integrated research effort at the Hanford 300 Area. In addition, ERSP supports a project at the Hanford 100H area to perform field investigations to assess the potential for immobilizing and detoxifying chromium-contaminated soils and groundwater using bioremediation. These sites are an important component of ERSP-funded research that enable the testing of laboratory-derived hypotheses under natural conditions at the field scale. The sites also provide ERSP investigators with opportunities to obtain samples of

environmental media for experimental purposes, or opportunities to conduct short-term field experiments. Applicants interested in using these resources must contact the respective Lead Scientist and must include a letter of support from the Lead Scientist in the full application. Programmatic and contact information for these projects can found at: http://www.lbl.gov/ERSP/generalinfo/field_scale.html.

The ERSP supports focused research programs at six DOE National Laboratories and a diverse portfolio of research projects led by University PIs. ERSP supports multi-disciplinary and integrated research programs at the following National Laboratories through BER's Environmental Remediation Scientific Focus Area (SFA) Program (http://www.lbl.gov/ERSP/generalinfo/sfa.html): Argonne National Laboratory, Idaho National Laboratory, Lawrence Berkeley National Laboratory, Oak Ridge National Laboratory, Pacific Northwest National Laboratory, and the SLAC National Accelerator Laboratory. University led research projects for the ERSP are selected and funded through this annual Solicitation. All ERSP PIs and key Co-PIs are required to attend the annual ERSP PI's Meeting. The slides of oral presentations as well as abstracts for all currently funded ERSP projects are available at the ERSP PI's Meeting web site (http://www.lbl.gov/ERSP/generalinfo/PI_ann_mtgs.html?)

Programmatic resources also include the Environmental Molecular Science Laboratory (EMSL, http://www.emsl.pnl.gov/emslweb/) located at the Pacific Northwest National Laboratory. EMSL is a National Scientific User Facility that supports an array of co-located experimental and computational capabilities for molecular-level research that are made available to the scientific community. Investigators are strongly encouraged to consider EMSL capabilities in developing applications.

Biological processes profoundly influence contaminant transport at a variety of scales in the subsurface. ERSP maintains a close relationship with the Genomics:GTL program (http://doegenomestolife.org/) and the microbial genome sequencing efforts at the Joint Genome Institute (JGI, http://www.jgi.doe.gov/) in order to take advantage of revolutionary genome-enabled and systems biology techniques that promise a more mechanistic understanding of subsurface microbial metabolism affecting contaminant transport.

DOE's substantial computational resources are now being applied to simulations of subsurface reactive transport through ERSP's participation in the SciDAC (Scientific Discovery through Advanced Computing, http://www.osti.gov/scidac/) program. The SciDAC program funds computationally intensive research on fundamental science questions using some of the world's most powerful computers. The ERSP in conjunction with DOE's Office of Advanced Scientific Computing are supporting the following two SciDAC projects (http://www.lbl.gov/ERSP/generalinfo/modeling.html): "Modeling Multiscale-Multiphase-Multicomponent Subsurface Reactive Flows using Advanced Computing" and "Hybrid Numerical Methods for Multiscale Simulations of Subsurface Biogeochemical Processes".

Collaboration and Training

Multi-disciplinary and inter-institutional collaborations are strongly encouraged to enhance and strengthen research capabilities as needed. Collaboration could include institutions such as

universities, industry, non-profit organizations, federal laboratories and Federally Funded Research and Development Centers (FFRDCs), including the DOE National Laboratories. All collaborative applications should include letters of agreement from each collaborator who would receive funding. These letters should specify the contributions the collaborators intend to make if the application is accepted and funded. Applications for multi-investigator projects should present a management structure for integrating collaborating investigators. Involvement of students and post doctoral scientists is encouraged. Refer to http://www.science.doe.gov/grants/Colab.html for details.

Availability of User Facilities and Other Specialized Resources

The Department of Energy has responsibility for programs and facilities that offer unique and complementary resources that support research in environmental remediation sciences. Potential applicants are encouraged to consider use of these programs/facilities in developing their applications.

- The Environmental Molecular Science Laboratory (EMSL) at the Pacific Northwest National Laboratory (http://www.emsl.pnl.gov/emslweb/), provides users with a suite of nuclear magnetic resonance (NMR) spectrometers, including a 900 MHz NMR, that can be used to probe the structure of contaminant/mineral interactions; a suite of mass spectrometers, including an 11.5 Tesla system, and data analysis software for proteomics studies of microbes and microbial communities; ultra-high vacuum scanning, tunneling and cryogenic electron and atomic force microscopes for imaging and probing cellular and mineral structures; multi-scale mineral and material structure characterization tools; and other experimental resources for microbial dynamics and visualization studies, as well as surface dynamics and interfacial studies.

  The EMSL's 160 TeraFlop high performance supercomputer is available for computational research in the physical, chemical and biological sciences, including geochemistry, groundwater flow and transport simulations, molecular thermodynamics and kinetics, heavy element chemistry, geochemistry, and surface chemistry (http://www.emsl.pnl.gov/capabs/mscf.shtml). Remote and on-site access to the system and associated software, and visualization and data storage capabilities are available through a separate application and external peer review process.

  DOE also provides compute cycles to the scientific user community at other high performance computing centers, including the National Energy Research Scientific Computing Center (NERSC) at the Lawrence Berkeley National Laboratory (http://www.nersc.gov), and the National Center for Computational Sciences (NCCS) at the Oak Ridge National Laboratory (http://nccs.gov/).

- The Joint Genome Institute (JGI) in Walnut Creek, California unites the expertise of the Lawrence Berkeley, Lawrence Livermore, Los Alamos, Oak Ridge, and Pacific Northwest National Laboratories, along with the HudsonAlpha Institute for Biotechnology to advance genomics in support of the DOE missions related to clean energy generation and environmental characterization and cleanup. Through its

Community Sequencing Program (CSP), the JGI solicits proposals related to the DOE missions of bioenergy, global carbon cycling and biogeochemical processes influencing contaminant transport. Targets include bacterial and archaeal isolates, large-scale eukaryotic or bacterial resequencing efforts that exploit next-generation sequencing technologies, eukaryotic reference genomes, and environmental microbial genomes (metagenomes). Letters of intent for the CSP are due January 30, 2009. Further information is available at: http://www.jgi.doe.gov/CSP/user_guide/index.html.

- ERSP provides user support for experiments at synchrotron light sources that are capable of providing structural and chemical information often unavailable with conventional sources of x-rays. DOE laboratories with synchrotrons supporting ERSP research and points of contact include: Argonne National Laboratory (http://www.aps.anl.gov/), contact Ken Kemner (kemner@anl.gov); Lawrence Berkeley National Laboratory (http://esd.lbl.gov/als_environmental_program/), contact Susan Hubbard (sshubbard@lbl.gov); and Stanford Synchrotron Radiation Laboratory (http://www-ssrl.slac.stanford.edu/mes/remedi/index.html), contact John Bargar, (bargar@slac.stanford.edu). Use of the synchrotron light sources requires a separate approval process.

REFERENCES

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Department of Energy, 2007. Basic Research Needs for Geosciences: Facilitating 21st Century Energy Systems. DOE Office of Science, Basic Energy Sciences, Washington, DC, 186p. (http://www.sc.doe.gov/bes/reports/files/GEO_rpt.pdf)

Department of Energy, 2006. EMSL Strategic Plan 2006. Prepared for DOE under contract DE-AC06-76RL01830 by Pacific Northwest National Laboratory (PNNL-15578), http://www.emsl.pnl.gov/docs/strategic_plan_01_06.pdf.

Other Special Requirements:

Only the Lead Institution and PI need submit an application to this FOA at this time but the submission must include all budgetary information for all funded Co-PIs. The application narrative should begin with a cover page that includes: the project title, the Lead PI's name and

complete contact information, whether the application is for a **Full or Exploratory** project, and a table listing the Lead PI and institution and all funded Co-PIs, their institutions and the amount of funding requested for each year for the project for each funded investigator. The template for the required cover page should be downloaded from http://www.lbl.gov/ERSP/generalinfo/proposalcalls.html. Additionally, submitting (lead) PIs should include the entire submission package (application, budgets for all funded PIs, certification forms, etc.) in one pdf document as an attachment within the Grants.gov submission system.

The one-page Executive Summary should be a self-contained document that identifies the name of the applicant, the project director/principal investigator(s), the project title, the objectives of the project, the hypotheses to be tested and/or the enabling capabilities to be developed, the proposed experimental design, the names of **all investigators** and their affiliations, and the potential impact of the project to DOE (i.e., benefits, outcomes). **All Executive Summaries should explain how the proposed research will support the accomplishment of the BER Long Term Measure to *"provide sufficient scientific understanding such that DOE sites would be able to incorporate coupled physical, chemical and biological processes into decision making for environmental remediation and long-term stewardship"***. The Executive Summary does not count toward the narrative page limits. Applicants proposing to develop enabling scientific tools for subsurface science should clearly indicate this in the Executive Summary.

Attachments should include short (2 pages) curriculum vitae, a listing of all current and pending federal support and Letters of Intent for proposed collaborators, including use of IFRC sites or samples (when applicable). These attachments do not count toward the narrative page limits.

Grantees must comply with federal and state laws and regulations as appropriate. Although compliance with the National Environmental Policy Act (NEPA) is the responsibility of DOE, grantees proposing to conduct field-related research should expect to provide information necessary for the DOE to complete the NEPA review and documentation.

Program Funding

It is anticipated that up to **$4,000,000 will be available for approximately 15 to 20 awards** to be made in Fiscal Year 2010, contingent on the availability of appropriated funds. Funds for this research will come from the Environmental Remediation Sciences Program. DOE is under no obligation to pay for any costs associated with preparation or submission of applications. DOE reserves the right to fund, in whole or in part, any, all, or none of the applications submitted in response to this FOA.

For a **Full Application** (narrative limited to 20 pages), applicants may request project support up to three years, with year 2 and 3 support contingent on the availability of funds, progress of the research and programmatic needs. Annual budgets for single investigator projects may not exceed $250,000/year total costs. Annual budgets for multi investigator projects may not exceed $450,000/year total costs.

For an **Exploratory Application** (narrative limited to 10 pages), applicants may request project support for up to two years with a total budget of up to $150,000.

Applications that are not compliant with either the page or budget limitations described above may be declined administratively without review.

All Lead PI's are required to attend an annual ERSP PI meeting (generally a four-day meeting held in the Washington DC area). Travel funds should be budgeted to allow at least the lead PI to attend this meeting.

The Catalog of Federal Domestic Assistance (CFDA) number for this program is 81.049, and the solicitation control number is ERFAP 10 CFR Part 605.

Posted on the Office of Science Grants and Contracts Web Site
December 24, 2008.