

**Office of Science**  
**Notice 99-15**

***Natural and Accelerated Bioremediation Research Program***  
***(NABIR)***

**Department of Energy**  
**Office of Science**

**Office of Science Financial Assistance Program Notice 99-15; Natural and Accelerated Bioremediation Research Program (NABIR)**

**Agency:** U.S. Department of Energy

**Action:** Notice inviting grant applications.

**SUMMARY:** The Office of Biological and Environmental Research (OBER) of the Office of Science (SC), U.S. Department of Energy (DOE), hereby announces its interest in receiving applications for research grants in the Natural and Accelerated Bioremediation Research (NABIR) Program. Grant applications are being solicited for the Biomolecular Science and Engineering research element.

**DATES:** Applicants are strongly encouraged to submit a brief preapplication, containing a title, a list of investigators, and a summary (not to exceed one typed page) of proposed research. All preapplications, referencing Program Notice 99-15, must be received by DOE by 4:30 P.M., E.S.T., March 26, 1999. A response encouraging or discouraging a formal application generally will be communicated within 7 days of receipt.

The deadline for receipt of formal applications is 4:30 P.M., E.D.T., May 4, 1999, to be accepted for merit review and to permit timely consideration for award in Fiscal Year 1999.

**ADDRESSES:** Preapplications referencing Program Notice 99-15, should be sent by E-mail to [daniel.drell@science.doe.gov](mailto:daniel.drell@science.doe.gov). Preapplications will also be accepted if mailed to the following address: Ms. Joanne Corcoran, Office of Biological and Environmental Research, SC-72, U.S. Department of Energy, 19901 Germantown Road, Germantown, MD 20874-1290.

Formal applications, referencing Program Notice 99-15, must be sent to: U.S. Department of Energy, Office of Science, Grants and Contracts Division, SC-64,

19901 Germantown Road, Germantown, MD 20874-1290, ATTN: Program Notice 99-15. This address must also be used when submitting applications by U.S. Postal Service Express Mail or any other commercial overnight delivery service, or when hand-carried by the applicant.

**FOR FURTHER INFORMATION CONTACT:** Dr. Daniel Drell, Life Sciences Division, SC-72, Office of Biological and Environmental Research, Office of Science, U.S. Department of Energy, 19901 Germantown Road, Germantown, MD 20874-1290, telephone: (301) 903-6488, E-mail: [daniel.drell@science.doe.gov](mailto:daniel.drell@science.doe.gov), fax: (301) 903-8521. The full text of Program Notice 99-15 is available via the Internet using the following web site address: <http://www.er.doe.gov/production/grants/grants.html>.

**SUPPLEMENTARY INFORMATION:** The mission of the NABIR Program is to provide the scientific understanding needed to use natural in situ processes and to develop new methods to accelerate those processes for bioremediation at DOE facilities. The NABIR program is initially emphasizing the bioremediation of metals and radionuclides in the subsurface below the root zone, including both thick vadose and saturated zones. The program is implemented through seven interrelated scientific research elements (Acceleration; Assessment; Biogeochemical Dynamics; Biomolecular Sciences and Engineering; Biotransformation and Biodegradation; Community Dynamics and Microbial Ecology; and System Engineering, Integration, Prediction, and Optimization); and a social and legal element called Bioremediation and its Social Implications and Concerns (BASIC). Additional information about NABIR, such as references to infrastructure that are available to the research community, can be accessed from the NABIR Homepage:

<http://www.lbl.gov/NABIR/>. Abstracts of currently funded projects are available via the Internet using the following web site address:  
<http://www.lbl.gov/NABIR/awardees.html>.

Each scientific research element is directed by a program manager from OBER, who is responsible for providing support and overall direction for the element, including determining the relevance of the proposed research to the goals and objectives of the program element to the NABIR and other DOE programs. The NABIR program also has Science Team Leaders, selected through an earlier peer review process, who provide scientific leadership and coordination to the community of NABIR investigators. Information on the current Science Team Leaders and DOE program staff is available via the Internet using the following web site address:  
[http://www.lbl.gov/NABIR/research\\_5.html](http://www.lbl.gov/NABIR/research_5.html).

## **Program Focus**

The NABIR Program supports fundamental, hypothesis-driven research directed at specific topics that will provide the understanding necessary to develop effective new bioremediation technologies for DOE site cleanup. This research will help determine the future viability of bioremediation technologies at the DOE sites. The NABIR Program will not support research to evaluate risks to humans associated with the implementation or deployment of specific bioremediation technologies. Although the program is directed at specific goals, it supports research that is more fundamental in nature than demonstration projects.

The initial emphasis of the NABIR Program is on field-related research and metal and radionuclide contamination, specifically on the metals and radionuclides associated with past weapons production activities. However, the research program will support laboratory, theoretical, modeling, and other non-field research projects, if they fill important gaps that would be necessary to complete understanding for field-scale studies. The study of real problems might iterate between, for example, the laboratory and the field. Investigators without access to laboratories licensed to work with radionuclides may propose research with non-radioactive surrogates of radionuclides, or collaborate with a licensed laboratory. Typically, the bioremediation of metals and radionuclides involves, but is not limited to, mobilization and immobilization scenarios. Consideration of organic contaminants, such as solvents and complexing agents that would be important substrates, facilitators, inhibitors, or sources of carbon or electron donors or acceptors, can be included in the proposed research to the extent that they influence the primary goal of understanding the remediation of metals and radionuclides. Applicants are encouraged to review Chemical Contaminants on DOE Lands, DOE/ER-0547T, available at the OBER Homepage: <http://www.er.doe.gov/production/ober/EPR/contam.pdf>, for a compilation of wastes and waste mixtures at the DOE sites.

NABIR is a research program designed to serve as a foundation for microbial in situ bioremediation techniques. Although "spillover" benefits of the research to other cleanup needs such as the use of bioreactors to process waste streams are anticipated, NABIR emphasizes investigations into bioremediation of subsurface waste sites and their by-products released to the environment. This emphasis includes research that will assist the application of in situ bioremediation in conjunction with other cleanup methods, for example, using bioremediation to mobilize radionuclides so that pump-and-treat techniques could be more effective. Problems characterized by large areas with low-concentration contamination are emphasized over problems of localized, high concentration contamination. Research on phytoremediation will not be supported during this funding period.

In research plans that involve the potential release of chemicals, enzymes, and/or microorganisms to the field (both at contaminated and non-contaminated control

sites), applicants must discuss how they will involve the public or stakeholders in their research, beginning with experimental design through completion of the project. All applicants should discuss other relevant societal issues, where appropriate, which may include intellectual property protection, and communication with and outreach to affected communities (including members of affected minority communities where appropriate) to explain the proposed research. NABIR Infrastructure

The NABIR program proposes to select at least one Field Research Center (FRC) located at a DOE site. The FRC would serve as a central facility for researchers to use at their option. However, FRCs would not be identified for at least 6 months from the date of this solicitation and until National Environmental Policy Act (NEPA) review of the NABIR Program is complete. Applicants may use any available contaminated or uncontaminated field site that is presently available to them, including but not limited to DOE sites. However, investigators are encouraged to consult the listing of current FRC-related field research sites and facilities available to NABIR investigators on the NABIR Homepage, at [http://www.lbl.gov/NABIR/research\\_6.html](http://www.lbl.gov/NABIR/research_6.html). Investigators should describe how their research will interface with or transfer to field-scale research at the site they are using, to FRC-related sites, or to the FRC site that might be available in the future. A centrally maintained database will be developed to provide limited information, such as site characterization and kinetics data that will be needed by a broad segment of investigators. When appropriate, applications must include a short discussion of the Quality Assurance and Quality Control (QA/QC) measures that will be applied in data gathering and analysis activities. Successful applicants will be expected to coordinate their QA/QC protocols with NABIR program personnel. A draft of guidelines to be used by Natural and Accelerated Bioremediation Research (NABIR) program investigators in managing their information and data can be found on the NABIR Homepage: <http://www.lbl.gov/NABIR/data-guide.html>.

### **Scientific Research Elements**

The following section describes the NABIR scientific research element that is emphasized in this Notice, the Biomolecular Science and Engineering element. Applicants may propose research that transcends this research element, but proposed research should be firmly rooted in Biomolecular Science and Engineering. For example, applicants may propose research on metals that may be of interest to the mining and chemical industries. Ongoing (previously funded) activities in this element can be viewed at: <http://www.lbl.gov/NABIR/elem3.html> and prospective applicants are strongly encouraged to review already funded research in this element to avoid duplication.

The overall goal of studies within this element is to further understanding of bioremediation using molecular and structural biology, particularly knowledge and approaches emerging from both human and especially microbial genome sequencing projects. The long-term goal is to develop improved cellular pathways and organisms capable of exploiting microbial capacities to further bioremediate metals and radionuclides found at DOE waste sites. To this end, and using where appropriate data and information from other program elements, studies under the Biomolecular Science and Engineering element should identify the genes, genetic systems, molecules, and pathways most effective for biotransforming metals and radionuclides. These studies can include (but are not limited to): 1) identifying, cloning, and sequencing novel genes and promoters important to the bioremediation of metals and radionuclides; and 2) the construction or enhancement of bioremedial enzymatic pathways by identifying active genes from different microbial organisms and inserting those genes into one or more organisms that are able to survive and compete effectively in environments contaminated with metals and/or radionuclides.

Research is encouraged in this notice that includes:

- 1) environmental regulation of the expression of genes, genetic systems, and key proteins involved in the sequestration, biotransformation, or mobilization, or immobilization of metals and radionuclides;
- 2) the occurrence, the rates, the regulation, and the significance of natural exchanges of genetic material between microorganisms comprising consortia that are involved in bioremediation of metals and radionuclides;
- 3) new methods for genetic analysis of naturally occurring microbes and microbial communities that are involved in bioremediation, including methods for diversity sampling and characterizing subtle genetic differences between consortial species.

### **Program Funding**

It is anticipated that up to \$750,000 will be available for multiple awards to be made in FY 1999 in the category described above. Applications may request project support up to three years, with out-year support contingent on the availability of funds, progress of the research, and programmatic needs. Annual budgets for research projects are expected to range from \$150,000 to \$300,000 total costs. Researchers are encouraged to team with investigators already funded in this element, or in other disciplines where appropriate. DOE may encourage collaboration among prospective investigators, to promote joint applications or joint research projects, by using information obtained through other forms of communication.

## Collaboration

Applicants are encouraged to collaborate with researchers in other institutions, such as universities, industry, non-profit organizations, federal laboratories and Federally Funded Research and Development Centers (FFRDCs), including the DOE National Laboratories, where appropriate, and to incorporate cost sharing and/or consortia wherever feasible.

Applications will be subjected to scientific merit review (peer review) and will be evaluated against the following evaluation criteria listed in descending order of importance as codified at 10 CFR 605.10(d):

1. Scientific and/or Technical Merit of the Project
2. Appropriateness of the Proposed Method or Approach
3. Competency of Applicant's Personnel and Adequacy of Proposed Resources
4. Reasonableness and Appropriateness of the Proposed Budget.

The evaluation will include program policy factors such as the relevance of the proposed research to the terms of the announcement and an agency's programmatic needs. Note, external peer reviewers are selected with regard to both their scientific expertise and the absence of conflict-of-interest issues. Non-federal reviewers may be used, and submission of an application constitutes agreement that this is acceptable to the investigator(s) and the submitting institution.

To provide a consistent format for the submission, review and solicitation of grant applications submitted under this notice, the preparation and submission of grant applications must follow the guidelines given in the Application Guide for the Office of Science Financial Assistance Program 10 CFR Part 605.

Information about the development, submission of applications, eligibility, limitations, evaluation, the selection process, and other policies and procedures may be found in 10 CFR Part 605, and in the Application Guide for the Office of Science Financial Assistance Program. Electronic access to the Guide and required forms is made available via the World Wide Web at:

<http://www.er.doe.gov/production/grants/grants.html>. On the SC grant face page, form DOE F 4650.2, in block 15, also provide the PI's phone number, fax number and E-mail address. The research description must be 20 pages or less, exclusive of attachments, and must contain an abstract or summary of the proposed research (to include the hypotheses being tested, the proposed experimental design, and the names of all investigators and their affiliations). Attachments include curriculum vitae, QA/QC plan, a listing of all current and pending federal support, and letters of intent when collaborations are part of the proposed research.

Although the required original and seven copies of the application must be submitted, researchers are asked to submit an electronic version of the abstract of the proposed research in ASCII format along with a valid E-mail address to Ms. Karen Carlson by E-mail at karen.carlson@science.doe.gov. Curriculum vitae should be submitted in a form similar to that of the National Institutes of Health (NIH) or the National Science Foundation (NSF) (two to three pages), for example see: <http://www.nsf.gov/bfa/cpo/gpg/fkit.htm#forms-9>.

The Office of Science as part of its grant regulations requires at 10 CFR 605.11(b) that a recipient receiving a grant and performing research involving recombinant DNA molecules and/or organisms and viruses containing recombinant DNA molecules shall comply with NIH "Guidelines for Research Involving Recombinant DNA Molecules", which is available via the world wide web at: <http://www.niehs.nih.gov/odhsb/biosafe/nih/rdna-apr98.pdf>, (59 FR 34496, July 5, 1994), or such later revision of those guidelines as may be published in the Federal Register. Grantees and contractors must also comply with other federal and state laws and regulations as appropriate, for example, the Toxic Substances Control Act (TSCA) as it applies to genetically modified organisms. If, during the course of the research, a need for regulatory approval arises, these costs are expected to be borne by the investigator and should be included in the proposed budget. Although compliance with NEPA is the responsibility of DOE, grantees proposing to conduct field research are expected to provide information necessary for the DOE to complete the NEPA review and documentation.

**RELATED FUNDING OPPORTUNITIES:** Investigators may wish to obtain information about the following related funding opportunities:

Department of Energy, Office of Environmental Management: The Environmental Management Science Program (EMSP). Contact: Mr. Mark Gilbertson, Director, Office of Science and Risk Policy, Office of Science and Technology, EM-52, U.S. Department of Energy, 1000 Independence Avenue, S.W., Washington, DC 20585, E-mail mark.gilbertson@em.doe.gov. phone (202) 586-7150. The EMSP home page is available at web site: <http://www.em.doe.gov/science/>.

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

Ralph H. De Lorenzo  
Acting Associate Director of Science  
for Resource Management

Published in the Federal Register March 3, 1999, Volume 64, Number 41, Pages 10282-10285.