

Program Announcement To DOE National Laboratories LAB 99-15 Natural and Accelerated Bioremediation Research Program (NABIR)

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 proposals for research in the Natural and Accelerated Bioremediation Research (NABIR) Program. Proposals are being solicited for the Biomolecular Science and Engineering research element.

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.

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. Proposers 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), proposers must discuss how they will involve the public or stakeholders in their research, beginning with experimental design through completion of the project. All proposers 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 announcement and until National Environmental Policy Act (NEPA) review of the NABIR Program is complete. Proposers 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. 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, proposals 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 proposers 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 Announcement, the Biomolecular Science and Engineering element. Proposers may propose research that transcends this research element, but proposed research should be firmly rooted in Biomolecular Science and Engineering. For example, proposers 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 announcement 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.

DATES: Proposers are strongly encouraged to submit a brief preproposal, containing a title, a list of investigators, and a summary (not to exceed one typed page) of proposed research. All preproposals, referencing Program Announcement LAB99-15, must be received by DOE by 4:30 P.M., E.S.T., March 26, 1999. A response encouraging or discouraging a formal proposal generally will be communicated within 7 days of receipt.

The deadline for receipt of formal proposals 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: Preproposals referencing Program Announcement LAB99-15, should be sent by E-mail to daniel.drell@science.doe.gov. Preproposals 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 proposals, referencing Program Announcement LAB99-15, must be sent to: U.S. Department of Energy, Office of Science, Office of Biological and Environmental Research, SC-72, 19901 Germantown Road, Germantown, MD 20874-1290, ATTN: Program Announcement LAB99-15. This address must also be used when submitting proposals by U.S. Postal Service Express Mail or any other commercial overnight delivery service, or when hand-carried by the proposer.

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, fax: (301) 903-8521.

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. Proposers 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 proposals or joint research projects, by using information obtained through other forms of communication.

Collaboration

Proposers 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.

Although the required original and seven copies of the proposal 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>.

Any recipient of an award from ER to perform research involving recombinant DNA molecules and/or organisms and viruses containing recombinant DNA molecules shall comply with the National Institutes of Health "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. 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, proposers 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 instructions and format described below should be followed. Reference Program Announcement LAB 99-15 on all submissions and inquiries about this program.

**OFFICE OF SCIENCE
GUIDE FOR PREPARATION OF SCIENTIFIC/TECHNICAL PROPOSALS
TO BE SUBMITTED BY NATIONAL LABORATORIES**

Proposals from National Laboratories submitted to the Office of Science (SC) as a result of this program announcement will follow the Department of Energy Field Work Proposal process with additional information requested to allow for scientific/technical merit review. The following guidelines for content and format are intended to facilitate an understanding of the requirements

necessary for SC to conduct a merit review of a proposal. Please follow the guidelines carefully, as deviations could be cause for declination of a proposal without merit review.

1. Evaluation Criteria

Proposals will be subjected to formal merit review (peer review) and will be evaluated against the following criteria which are listed in descending order of importance:

Scientific and/or technical merit of the project

Appropriateness of the proposed method or approach

Competency of the personnel and adequacy of the proposed resources

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, the uniqueness of the proposer's capabilities, and demonstrated usefulness of the research for proposals in other DOE Program Offices as evidenced by a history of programmatic support directly related to the proposed work.

2. Summary of Proposal Contents

Field Work Proposal Format (Reference DOE Order 5700.7C) (DOE ONLY)

Proposal Cover Page

Table of Contents

Abstract

Narrative

Literature Cited

Budget and Budget Explanation

Other support of investigators

Biographical Sketches

Description of facilities and resources

Appendix

2.1 Number of Copies to Submit

An original and seven copies of the formal proposal/FWP must be submitted.

3. Detailed Contents of the Proposal

Proposals must be readily legible, when photocopied, and must conform to the following three requirements: the height of the letters must be no smaller than 10 point with at least 2 points of spacing between lines (leading); the type density must average no more than 17 characters per inch; the margins must be at least one-half inch on all sides. Figures, charts, tables, figure legends, etc., may include type smaller than these requirements so long as they are still fully legible.

3.1 Field Work Proposal Format (Reference DOE Order 5700.7C) (DOE ONLY)

The Field Work Proposal (FWP) is to be prepared and submitted consistent with policies of the investigator's laboratory and the local DOE Operations Office. Additional information is also requested to allow for scientific/technical merit review.

Laboratories may submit proposals directly to the SC Program office listed above. A copy should also be provided to the appropriate DOE operations office.

3.2 Proposal Cover Page

The following proposal cover page information may be placed on plain paper. No form is required.

Title of proposed project
SC Program announcement title
Name of laboratory
Name of principal investigator (PI)
Position title of PI
Mailing address of PI
Telephone of PI
Fax number of PI
Electronic mail address of PI
Name of official signing for laboratory*
Title of official
Fax number of official
Telephone of official
Electronic mail address of official
Requested funding for each year; total request
Use of human subjects in proposed project:
 If activities involving human subjects are not planned at any time during the proposed project period, state "No"; otherwise state "Yes", provide the IRB Approval date and Assurance of Compliance Number and include all necessary information with the proposal should human subjects be involved.
Use of vertebrate animals in proposed project:
 If activities involving vertebrate animals are not planned at any time during this project, state "No"; otherwise state "Yes" and provide the IACUC Approval date and Animal Welfare Assurance number from NIH and include all necessary information with the proposal.
Signature of PI, date of signature
Signature of official, date of signature*

*The signature certifies that personnel and facilities are available as stated in the proposal, if the project is funded.

3.3 Table of Contents

Provide the initial page number for each of the sections of the proposal. Number pages consecutively at the bottom of each page throughout the proposal. Start each major section at the top of a new page. Do not use unnumbered pages and do not use suffices, such as 5a, 5b.

3.4 Abstract

Provide an abstract of no more than 250 words. Give the broad, long-term objectives and what the specific research proposed is intended to accomplish. State the hypotheses to be tested. Indicate how the proposed research addresses the SC scientific/technical area specifically described in this announcement.

3.5 Narrative

The narrative comprises the research plan for the project and is limited to 25 pages. It should contain the following subsections:

Background and Significance: Briefly sketch the background leading to the present proposal, critically evaluate existing knowledge, and specifically identify the gaps which the project is intended to fill. State concisely the importance of the research described in the proposal. Explain the relevance of the project to the research needs identified by the Office of Science. Include references to relevant published literature, both to work of the investigators and to work done by other researchers.

Preliminary Studies: Use this section to provide an account of any preliminary studies that may be pertinent to the proposal. Include any other information that will help to establish the experience and competence of the investigators to pursue the proposed project. References to appropriate publications and manuscripts submitted or accepted for publication may be included.

Research Design and Methods: Describe the research design and the procedures to be used to accomplish the specific aims of the project. Describe new techniques and methodologies and explain the advantages over existing techniques and methodologies. As part of this section, provide a tentative sequence or timetable for the project.

Subcontract or Consortium Arrangements: If any portion of the project described under "Research Design and Methods" is to be done in collaboration with another institution, provide information on the institution and why it is to do the specific component of the project. Further information on any such arrangements is to be given in the sections "Budget and Budget Explanation", "Biographical Sketches", and "Description of Facilities and Resources".

3.6 Literature Cited

List all references cited in the narrative. Limit citations to current literature relevant to the proposed research. Information about each reference should be sufficient for it to be located by a reviewer of the proposal.

3.7 Budget and Budget Explanation

A detailed budget is required for the entire project period, which normally will be three years, and for each fiscal year. It is preferred that DOE's budget page, Form 4620.1 be used for providing budget information*. Modifications of categories are permissible to comply with institutional practices, for example with regard to overhead costs.

A written justification of each budget item is to follow the budget pages. For personnel this should take the form of a one-sentence statement of the role of the person in the project. Provide a detailed justification of the need for each item of permanent equipment. Explain each of the other direct costs in sufficient detail for reviewers to be able to judge the appropriateness of the amount requested.

Further instructions regarding the budget are given in section 4 of this guide.

* Form 4620.1 is available at web site: <http://www.er.doe.gov/production/grants/forms.html>

3.8 Other Support of Investigators

Other support is defined as all financial resources, whether Federal, non-Federal, commercial or institutional, available in direct support of an individual's research endeavors. Information on active and pending other support is required for all senior personnel, including investigators at collaborating institutions to be funded by a subcontract. For each item of other support, give the organization or agency, inclusive dates of the project or proposed project, annual funding, and level of effort devoted to the project.

3.9 Biographical Sketches

This information is required for senior personnel at the laboratory submitting the proposal and at all subcontracting institutions. The biographical sketch is limited to a maximum of two pages for each investigator.

3.10 Description of Facilities and Resources

Describe briefly the facilities to be used for the conduct of the proposed research. Indicate the performance sites and describe pertinent capabilities, including support facilities (such as machine shops) that will be used during the project. List the most important equipment items already available for the project and their pertinent capabilities. Include this information for each subcontracting institution, if any.

3.11 Appendix

Include collated sets of all appendix materials with each copy of the proposal. Do not use the appendix to circumvent the page limitations of the proposal. Information should be included that may not be easily accessible to a reviewer.

Reviewers are not required to consider information in the Appendix, only that in the body of the proposal. Reviewers may not have time to read extensive appendix materials with the same care as they will read the proposal proper.

The appendix may contain the following items: up to five publications, manuscripts (accepted for publication), abstracts, patents, or other printed materials directly relevant to this project, but not generally available to the scientific community; and letters from investigators at other institutions stating their agreement to participate in the project (do not include letters of endorsement of the project).

4. Detailed Instructions for the Budget

(DOE Form 4620.1 "Budget Page" may be used)

4.1 Salaries and Wages

List the names of the principal investigator and other key personnel and the estimated number of person-months for which DOE funding is requested. Proposers should list the number of postdoctoral associates and other professional positions included in the proposal and indicate the number of full-time-equivalent (FTE) person-months and rate of pay (hourly, monthly or annually). For graduate and undergraduate students and all other personnel categories such as secretarial, clerical, technical, etc., show the total number of people needed in each job title and total salaries needed. Salaries requested must be consistent with the institution's regular practices. The budget explanation should define concisely the role of each position in the overall project.

4.2 Equipment

DOE defines equipment as "an item of tangible personal property that has a useful life of more than two years and an acquisition cost of \$5000 or more." Special purpose equipment means equipment which is used only for research, scientific or other technical activities. Items of needed equipment should be individually listed by description and estimated cost, including tax, and adequately justified. Allowable items ordinarily will be limited to scientific equipment that is not already available for the conduct of the work. General purpose office equipment normally will not be considered eligible for support.

4.3 Domestic Travel

The type and extent of travel and its relation to the research should be specified. Funds may be requested for attendance at meetings and conferences, other travel associated with the work and subsistence. In order to qualify for support, attendance at meetings or conferences must enhance the investigator's capability to perform the research, plan extensions of it, or disseminate its results. Consultant's travel costs also may be requested.

4.4 Foreign Travel

Foreign travel is any travel outside Canada and the United States and its territories and possessions. Foreign travel may be approved only if it is directly related to project objectives.

4.5 Other Direct Costs

The budget should itemize other anticipated direct costs not included under the headings above, including materials and supplies, publication costs, computer services, and consultant services (which are discussed below). Other examples are: aircraft rental, space rental at research establishments away from the institution, minor building alterations, service charges, and fabrication of equipment or systems not available off-the-shelf. Reference books and periodicals may be charged to the project only if they are specifically related to the research.

a. Materials and Supplies

The budget should indicate in general terms the type of required expendable materials and supplies with their estimated costs. The breakdown should be more detailed when the cost is substantial.

b. Publication Costs/Page Charges

The budget may request funds for the costs of preparing and publishing the results of research, including costs of reports, reprints page charges, or other journal costs (except costs for prior or early publication), and necessary illustrations.

c. Consultant Services

Anticipated consultant services should be justified and information furnished on each individual's expertise, primary organizational affiliation, daily compensation rate and number of days expected service. Consultant's travel costs should be listed separately under travel in the budget.

d. Computer Services

The cost of computer services, including computer-based retrieval of scientific and technical information, may be requested. A justification based on the established computer service rates should be included.

e. Subcontracts

Subcontracts should be listed so that they can be properly evaluated. There should be an anticipated cost and an explanation of that cost for each subcontract. The total amount of each subcontract should also appear as a budget item.

4.6 Indirect Costs

Explain the basis for each overhead and indirect cost. Include the current rates.