Program Announcement To DOE National Laboratories
LAB 00-21
Bioremediation and its Societal Implications and Concerns (BASIC) Research Program

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 Bioremediation and its Societal Implications and Concerns (BASIC). BASIC is a key element of the Natural and Accelerated Bioremediation Research (NABIR) program that provides the fundamental science underlying bioremediation of radionuclides and metals in subsurface environments at DOE sites. Research is encouraged that identifies critical societal, cultural, legal, policy, regulatory or other issues that could enhance or complicate the development and utilization of bioremediation methods or approaches. Educational activities that enhance the dialogue among scientists, regulators and community members about plausible implementation of bioremediation of radionuclides and metals are also being sought. Partnerships between social scientists and physical/biological scientists in the development of BASIC projects are strongly encouraged.

Approximately 50 years of U.S. production of nuclear weapons have left a legacy of radioactive, chemical and other hazardous waste at DOE sites. Much of this legacy consists of mixtures of these waste components. Cleanup or stabilization of contaminated sites using conventional technologies such as landfilling, vitrification or incineration carries a very high price tag, estimated to be in excess of $100 billion. This high cost has sparked interest in the development of innovative and potentially cost-saving technologies such as bioremediation. Bioremediation of metals and radionuclides involves the use of microorganisms to remove these contaminants from the aqueous phase by precipitation or complexation, thus reducing the risk to humans and the environment. Such approaches may involve stabilizing the radionuclides and metals by immobilizing them in place, and long-term stewardship to ensure that they are not re-mobilized over time.

The Natural and Accelerated Bioremediation Research (NABIR) Program provides the fundamental science to serve as the basis for development of cost-effective bioremediation of radionuclides and metals in subsurface environments at DOE sites. NABIR research encompasses both intrinsic bioremediation by naturally occurring microbial communities, as well as accelerated bioremediation through the use of nutrient amendments or addition of microorganisms. At present, the program is exploring the use of naturally occurring microorganisms as amendments; however, genetically engineered microorganisms may also be considered in the future. The

program consists of seven interrelated scientific research elements (Biogeochemical Dynamics, Biotransformation, Community Dynamics and Microbial Ecology, Assessment, Biomolecular Science and Engineering, Bacterial Transport, and Systems Integration/Data Management). A Field Research Center (FRC) for NABIR research has recently been established in Bear Creek Valley near the Y-12 site at the Oak Ridge National Laboratory in Oak Ridge, Tennessee. The FRC provides an area containing both contaminated and uncontaminated subsurface environments for performing field-scale, hypothesis-driven research and for collecting field samples for laboratory based studies. Additional information about NABIR and the Field Research Center may be found on the NABIR homepage: http://www.lbl.gov/NABIR or on the FRC homepage: http://www.esd.ornl.gov/BCV-FieldSite.

The NABIR program also includes an element addressing educational, legal and societal issues of bioremediation called Bioremediation and its Societal Implications and Concerns (BASIC) which is the subject of this announcement. The BASIC element is directed at defining and understanding the societal implications of implementing in situ bioremediation approaches for metals and radionuclides. Stabilization of radionuclides and metals in place through biologically mediated immobilization is a bioremediation approach under investigation by NABIR researchers. Such an approach, however, necessitates long term stewardship to ensure the contaminants remain immobilized. Communities and other stakeholders may have concerns regarding this potential bioremediation strategy. The introduction of non-native microorganisms or the manipulation of the environment to change its microbial composition or chemical characteristics may raise concerns among those who live or work nearby. Even the reintroduction of native microorganisms into their natural environment can raise concerns. Although it might be many years before genetically engineered microorganisms may be considered for limited release to clean up DOE sites, it is wise to begin now to consider some of the issues involved. It is a fundamental principle of the NABIR program that stakeholders associated with affected communities must be involved in any discussions about the possible use of novel approaches and/or processes to remediate a contaminated site and that identifying issues of potential concern to stakeholders should be done well in advance of any possible deployment decisions.

DOE seeks proposals for research to investigate societal issues and to inform stakeholders and the general public on bioremediation issues related to NABIR. Proposals should address effective ways to:

(1) Define the societal, legal, ethical, cultural and regulatory concerns associated with plausible application of in situ bioremediation of radionuclides and metals. Concerns to be addressed might include: 1) introduction of chemical additives to the subsurface to enhance immobilization of

radionuclides or metals and to reduce risk; 2) introduction of naturally occurring but non-indigenous microorganisms to enhance bioremediation; 3) introduction of genetically engineered microorganisms to stabilize radionuclides and metals at contaminated sites; and 4) public attitudes toward long term stewardship for sites where radionuclides and metals are left in place in an immobile, biologically unavailable form, following bioremediation. Research and conferences are encouraged that identify critical regulatory, policy, societal, legal and other issues that could enhance or complicate the development and plausible implementation of NABIR bioremediation approaches or methods. Partnerships between social scientists and physical/biological scientists in the development of BASIC projects are strongly encouraged.

(2) Develop and promote greater understanding of the science and societal implications of bioremediation. DOE solicits proposals for the preparation and dissemination of educational materials, in any appropriate medium, that will enhance understanding of the scientific as well as the societal aspects of bioremediation among the general public or specified groups. Educational efforts that target specific groups should include a detailed description of the relationship between NABIR and that group or community in addition to assessment measures for determining the effectiveness of the educational effort. DOE also encourages proposals for the support of conferences focusing on the legal and societal implications of NABIR.

Proposers should demonstrate their knowledge of any relevant literature and should include detailed plans for the gathering and analysis of factual information and its societal implications. Proposers are encouraged to make use of NABIR relevant activities or field sites, such as the DOE Field Research Center at the Oak Ridge National Laboratory, where bioremediation experiments are planned or underway. All research proposals should address the issue of efficient dissemination of results to the widest appropriate audience; free availability via the World Wide Web is strongly encouraged, where appropriate. Examples of possible BASIC research topics include, but are not limited to:

Cultural risks and concerns about bioremediation - Proposals are sought to identify and explore cultural concerns relating to bioremediation and its possible implementation. Of particular interest is understanding the potential impacts of bioremediation. Would bioremediation be viewed in a positive or negative way in light of its impact on, and potential future uses of, the land? If so, what are the cultural bases for these views? What are the cultural positions or attitudes on the potential need for long term stewardship of sites, where contaminants are stabilized, and what are its impacts? What variation can be

described in attitudes towards the risks that might be associated with the use of bioremediation?

Legal issues - Research should address the potential legal issues surrounding the use of naturally occurring or genetically engineered microorganisms for in situ bioremediation of radionuclides and metals. Such issues might include intellectual property rights, community consent for the use of bioremediation strategies, and adjudication scenarios involving controversies over the use of bioremediation. Potential legal issues involving the need for long term stewardship of sites where contaminants have been stabilized are of special interest. Also, while risk assessments are not a subject of this announcement, legal perspectives on the implications of potential bioremediation strategies compared to other strategies could be explored.

Education of stakeholders and the general public on bioremediation - Educational activities that promote interactions and communications between NABIR scientists and involved stakeholders, as well as enhance the knowledge base of scientists, regulators and community members are strongly encouraged. Of particular interest are communities adjacent to DOE sites. Relevant activities could include 1) the development, deployment and implementation of educational curriculum units on bioremediation and its implications; 2) the development of educational materials using diverse media; or 3) the sponsoring of educational forums bringing together bioremediation scientists, stakeholders, and members of other interested communities (e.g., judges, regulators, etc.). Proposals in response to this element of this announcement should include discussion of dissemination plans as well as ways to assess the impact of the proposed educational activities on the targeted group following completion of the project period.

Program Funding

It is anticipated that up to $500,000 per year will be available for multiple awards to be made in late FY 2001 and early FY 2002 in the categories described above, contingent on availability of appropriated funds. Proposals may request project support up to three years, with out-year support contingent on availability of funds, progress of the research and programmatic needs. Annual budgets for projects in the BASIC Program are expected to range from $50,000 to $200,000 total costs. DOE may encourage collaboration among prospective investigators to promote joint proposals or joint research projects by using information obtained through the preproposals or through other forms of communication.

DATES: Researchers are strongly encouraged to submit a preproposal for programmatic review. Early submission of preproposals is encouraged, to allow time for review for programmatic relevance. The deadline for receipt of preproposals is November 6, 2000. A brief preproposal should consist of one or two pages of narrative describing the research objectives and methods.

The deadline for receipt of formal proposals is 4:30 p.m., E.S.T., December 21, 2000 to be accepted for merit review and to permit timely consideration for award in Fiscal Year 2001 or in early Fiscal Year 2002. An original and seven copies of the proposal must be submitted; however, proposers are requested not to submit proposals using more than one delivery or mail service.

ADDRESSES: If submitting a preproposal, it should reference Program Announcement LAB 00-21, and may be sent by e-mail to: daniel.drell@science.doe.gov. Hard copies can be sent to Daniel Drell, Ph.D., Life Sciences Division, SC-72/GTN, Office of Biological and Environmental Research, Office of Science, U.S. Department of Energy, 19901 Germantown Road, Germantown, MD 20874-1290.

Formal proposals referencing Program Announcement LAB 00-21 on the cover page must be forwarded to: U.S. Department of Energy, Office of Science, Environmental Sciences Division, SC-74, 19901 Germantown Road, Germantown, MD 20874-1290, ATTN: Program Announcement LAB 00-21. 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) 903-4742, e-mail: daniel.drell@science.doe.gov, fax: (301) 903-8521.

Submission Information

DOE is under no obligation to pay for any costs associated with the preparation or submission of proposals if an award is not made. In addition, for this announcement, 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 work to be undertaken or the hypotheses being tested, the proposed approach(s) and method(s), and the names of all investigators and their affiliations). Attachments should include short curriculum vitae for all key personnel, a QA/QC plan, a listing of all current and pending federal support and letters of intent when collaborations are part of the

proposed research. Curriculum vitae should be submitted in a form similar to that of NIH or NSF (two to three pages), see for example: http://www.nsf.gov:80/bfa/cpo/gpg/fkit.htm#forms-9.

Additional information on the NABIR Program is available on the World Wide Web at: http://www.lbl.gov/NABIR/. For researchers who do not have access to the world wide web, please contact Karen Carlson, Environmental Sciences Division, SC-74, U.S. Department of Energy, 19901 Germantown Road, Germantown, MD 20874-1290, phone: (301) 903-3338, fax: (301) 903-8519, E-mail: karen.carlson@science.doe.gov, for hard copies of background material mentioned in this announcement.

The instructions and format described below should be followed. Reference Program Announcement LAB 00-21 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 (FWP) 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.sc.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.