

(<http://public.ornl.gov/nabirfrc/area123.cfm>).

The initial focus of in situ research conducted at the FRC has been on biostimulation experiments to understand or promote the immobilization of uranium and technetium by microbial processes. Understanding natural and stimulated uranium biotransformation in the presence of high nitrate and low pH in unconsolidated residuum and fractured rock is one of the biggest challenges at the FRC at Oak Ridge, and at other DOE sites. The NABIR program is currently funding the following three in situ projects within the contaminated area of the FRC: (1) A stimulated biocurtain for uranium biotransformation combined with denitification; (2) push-pull tests to determine the kinetics of electron-acceptor and electron-donor use for microbially-mediated uranium and technetium reduction and reoxidation; and (3) stimulation of microbial uranium reduction in hydrologically-accessible fractured zones to precipitate uranium oxide and isolate the uranium in low-permeability porous regions. Applicants should attempt to complement existing projects; additional information can be found at <http://public.ornl.gov/nabirfrc/awards.cfm>.

For this solicitation, the NABIR program is seeking applications that focus on in situ studies that are aligned with the short- and mid-term scientific tasks outlined in the recently completed strategic plan for the FRC (<http://public.ornl.gov/nabirfrc/FRCStrategicPlan070103.pdf>).

Applications should therefore focus on field conditions or processes that affect microbial oxidation/reduction and contaminant transport at the meter or tens of meters scale. The results of in situ research should lead to improved parameters for modeling the fate and transport of uranium, technetium or other contaminants. For example, research could be undertaken on microbial metal reduction in the presence of preferential contaminant flow pathways in the saprolite or in reworked fill, during storm events, in the vadose zone, at increasing distance from the source, or at the seasonally variable capillary fringe. Research findings are expected to be useful for incorporation into a site-wide FRC model for reactive transport and groundwater flow.

Applicants must propose a testable hypothesis that is based on microbially-mediated mechanisms of immobilization for in situ field research, and they should describe a detailed technical approach that should include:

(1) Establishing a defined (surface area and depth) experimental and control plot within the proposed contaminated field site; and (2) manipulating the experimental plot by amendments of nutrients or other chemicals that might stimulate microbial communities to immobilize uranium or technetium. The technical approach must be described in phases such that completion of each phase could result in publishable results. A statistically robust sampling regimen to determine the efficacy of the manipulation should also be described. Moreover, the applicant must explain the technical feasibility of performing the proposed field research. Technology demonstration projects will not be funded by this solicitation.

The applicants must propose research to be performed as an interdisciplinary team including, at a minimum, expertise in microbiology, geochemistry, and hydrology. The Principal Investigator for the team must have prior experience in relevant field research, and the activities of each team member must be clearly defined. Multi-institutional partnerships are strongly encouraged; for example, applicants may draw expertise from National Laboratories, academia, and other institutions engaged in basic research. The successful team must be willing to partner with other funded NABIR investigators who may wish to obtain samples in conjunction with the proposed field studies.

Although compliance with National Environmental Policy Act (NEPA) is the responsibility of DOE, successful applicants who propose to conduct field research are expected to provide information necessary for the DOE to complete the NEPA review and documentation. Successful applicants will also be expected to brief and to obtain approval of their written work plan from the Field Research Review Panel (FRRP) prior to beginning their field work. For this solicitation, applicants should describe how they would communicate their proposed experimental design and their results to stakeholders, regulators, and community groups. Applicants may wish to review the FRC Communication Plan, which can be found on the FRC web site. 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. For further information on NABIR Field Research, please contact Mr. Paul Bayer

([Paul.Bayer@science.doe.gov](mailto:Paul.Bayer@science.doe.gov)), the NABIR Field Activities Manager.

### Additional Information for Applications

#### Long Term Environmental Remediation Goals

The following indicators establish specific long term goals in Scientific Advancement that the BER program is committed to, and against which progress can be measured.

*Environmental Remediation:* Develop science-based solutions for cleanup and long-term monitoring of DOE contaminated sites. By 2013, a significant fraction of DOE's long-term stewardship sites will employ advanced biology-based clean up solutions and science-based monitors.

All grant proposals should address one or more of these measures and/or explain how the proposed research supports the broad scientific objectives outlined above. More information on the program and the scientific research it supports can be found at our Web site: <http://www.sc.doe.gov/ober/>.

### Preapplications

A brief preapplication should be submitted. The preapplication should identify, on the cover sheet, the institution, Principal Investigator name, address, telephone, fax and E-mail address, and title of the project. The preapplication should consist of one or two pages of narrative describing the research objectives and methods. These will be reviewed for responsiveness to the scope and research needs described in this notice. Please note that notification of a successful preapplication is not an indication that an award will be made in response to the formal application.

### Program Funding

It is anticipated that up to \$3 million will be available for multiple awards to be made in late Fiscal Year 2004, and early Fiscal Year 2005, in the categories described above, contingent on availability of appropriated funds. An additional sum, up to \$3 million, will be available for competition by DOE National Laboratories under a separate solicitation (LAB 04-06). Applications 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 Biogeochemistry, Biotransformation or Community Dynamic projects are expected to range from \$100,000 to \$300,000 total costs. Annual budgets for integrative studies involving participants representing