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Deep Underground Science and Engineering Laboratory (DUSEL) Site Selection and Technical Design Development

Program Solicitation

NSF 06-614



National Science Foundation

Directorate for Mathematical & Physical Sciences
Division of Physics

Directorate for Engineering
Division of Civil and Mechanical Systems

Directorate for Geosciences
Division of Earth Sciences

Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):

January 09, 2007

REVISION NOTES

In furtherance of the President's Management Agenda, NSF has identified programs that will offer proposers the option to utilize Grants.gov to prepare and submit proposals, or will require that proposers utilize Grants.gov to prepare and submit proposals. Grants.gov provides a single Government-wide portal for finding and applying for Federal grants online.

In response to this program solicitation, proposers may opt to submit proposals via [Grants.gov](#) or via the [NSF FastLane](#) system.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Deep Underground Science and Engineering Laboratory (DUSEL) Site Selection and Technical Design Development

Synopsis of Program:

Multiple scientific and engineering communities have identified the need for a deep underground laboratory infrastructure in order to address frontier research questions in a broad, multidisciplinary array of subfields. This solicitation invites proposals to conduct design and development activities for a Deep Underground Science and Engineering Laboratory (DUSEL) for a specific site. Based on the detailed competitive review

of the resulting proposals, a down-select will be made to a single site, and an award will be made for design and development activities leading toward a detailed cost/schedule/scope/management baseline plan.

The process for development of an executable baseline plan for DUSEL will be conducted in accordance with the NSF Guidelines for Planning and Managing the MREFC Account (Guidelines, [NSF-03-049, http://www.nsf.gov/bfa/docs/mrefcguidelines1206.pdf](http://www.nsf.gov/bfa/docs/mrefcguidelines1206.pdf)). This solicitation requests proposals that demonstrate a prior level of planning and design at the site sufficient to meet the requirements for completing the Conceptual Design phase, as well as a plan for continuing design and development through the Preliminary Design phase and subsequent pre-construction development. These design phases are defined in the Guidelines.

The scope of the design work will include: (1) the infrastructure necessary to support the initial science and engineering program, (2) the initial suite of experiments, (3) a commissioning, operations and management plan for a DUSEL, and (4) any additional groundwork in the form of engineering, studies, or additional infrastructure that might be required to accommodate a long term science and engineering program. The science and engineering scope will be based on the extensive planning by the several scientific and engineering communities requiring DUSEL for their research.

The guiding principle governing the review process for the proposals in response to this solicitation is to select and develop the site-specific plan that shows the greatest potential for development of a world-leading DUSEL at the best cost/risk value to the government, and that would enable the science and engineering activities defined by the relevant communities, as referenced below. The initial suite of experiments are to be of sufficient impact to justify the construction of a DUSEL, and the site-specific plan is to be visionary, in that the plan could be extended in future phases to accommodate the most important scientific goals defined by the research communities. The pursuit of these new directions of study could call for next-generation experiments that require development of additional infrastructure at a DUSEL.

Cognizant Program Officer(s):

- Jonathan Kotcher, telephone: (703) 292-8235, email: jkotcher@nsf.gov
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Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 47.041 --- Engineering
- 47.049 --- Mathematical and Physical Sciences
- 47.050 --- Geosciences

Award Information

Anticipated Type of Award: Cooperative Agreement

Estimated Number of Awards: 1

Anticipated Funding Amount: \$15,000,000 Up to \$5,000,000 per year for a period of up to three years.

Eligibility Information

Organization Limit:

Proposals may only be submitted by the following:

- Academic Institutions located in the U.S.: U.S. universities and colleges located in the U.S.

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI: 1

An individual may be the Principal Investigator (PI) or Co-Principal Investigator (Co-PI) for only one proposal.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not Applicable
- **Full Proposals:**
 - Full Proposals submitted via FastLane: Grant Proposal Guide (GPG) Guidelines apply. The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg.
 - Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: <http://www.nsf.gov/bfa/dias/policy/docs/grantsgovguide.pdf/>)

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required by NSF.
- **Indirect Cost (F&A) Limitations:** Not Applicable
- **Other Budgetary Limitations:** Not Applicable

C. Due Dates

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):

January 09, 2007

Proposal Review Information Criteria

Merit Review Criteria: National Science Board approved criteria. Additional merit review considerations apply. Please see the full text of this solicitation for further information.

Award Administration Information

Award Conditions: Additional award conditions apply. Please see the full text of this solicitation for further information.

Reporting Requirements: Additional reporting requirements apply. Please see the full text of this solicitation for further information.

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I. INTRODUCTION

Significant advances in the science and engineering disciplines often require access to exotic environments, either to investigate process that only occur in conditions not available in the laboratory or to search for rare processes that are easily masked under most realizable circumstances. Scientists and engineers then must create those environments artificially; in some instances, they can exploit naturally existing environments with the needed characteristics, provided there is appropriate access and infrastructure. The present solicitation addresses such a case, made more remarkable by the convergence of the needs of multiple disciplines for an eclectic set of novel circumstances that can be provided by a single infrastructure, namely, a deep underground laboratory.

In the past several years, research communities in physics, geosciences, engineering, biology and other fields have developed powerful technical arguments and a collective vision that establish the need for access to facilities deep underground and place the proposed facility in an international context. A series of reports, some of which are enumerated below, lays out a fabric of compelling questions that can be answered only by providing a deep underground infrastructure for their studies:

- *Bahcall Report (2001)*, NSF-DOE sponsored ad-hoc scientific committee on underground science
- *Nuclear Science Advisory Committee Long-Range Plan (2002)*
- *International Workshop on Neutrinos and Subterranean Science (NESS 2002) Final Report*
- *Connecting Quarks to the Cosmos (2003)*, National Research Council report
- *High Energy Physics Advisory Panel Long-Range Plan (2003)*
- *Neutrinos and Beyond (2003)*, National Research Council report
- *EarthLab (2003)*, NSF-sponsored report of underground opportunities in GeoSciences and GeoEngineering
- *Physics of the Universe (2004)*, National Science and Technology Council report
- *Quantum Universe (2004)*, NSF-DOE High Energy Physics Advisory Panel Sub-Panel report
- *Revealing the Hidden Nature of Space and Time (EPP2010 - 2006)*, National Research Council report
- *Deep Science (2006)*, available at www.dusel.org, report prepared in response to NSF DUSEL solicitation #1

Developed in a forward-looking way, such multi-faceted infrastructure, by successive extensions to increasing depth, capacity, and specialized probes into new environments, is expected to advance science and engineering by producing significant discoveries, educational benefits, and public interest over decades.

Experiments performed in a DUSEL would address the missions of multiple agencies and shared research goals of other countries. A DUSEL would be developed as a national resource to be open, on a peer-reviewed, competitive basis, to projects sponsored by other US agencies, to co-sponsorship of projects by the NSF and other agencies, and to cooperative international activities.

The NSF Directorates of Mathematical and Physical Sciences, Geosciences, and Engineering have been working with the relevant communities to implement a sequence of steps that might lead to the creation of such a laboratory. A set of three solicitations were designed to request proposals that develop (1) a report documenting the scientific and engineering opportunities of a DUSEL and the physical requirements for meeting the research goals identified; (2) conceptual designs which meet the goals identified in Solicitation 1, based on specific proposed sites; and (3) a technical design for a DUSEL, including a Preliminary Design, as defined in the NSF Guidelines for Planning and Managing the MREFC Account (Guidelines, [NSF-03-049](http://www.nsf.gov/bfa/docs/mrefcguidelines1206.pdf), <http://www.nsf.gov/bfa/docs/mrefcguidelines1206.pdf>) and Section II of this solicitation, for a single site. Awardees for all three solicitations are selected by means of a peer-reviewed competition.

Solicitation 1 (S1, [NSF-04-595](#)) has resulted in a report, *Deep Science* (2006), available at www.dusel.org, that provides a description of the technical scope and physical requirements for a DUSEL. Solicitation 2 (S2, [NSF-05-503](#)) selected two sites, Henderson Mine and Homestake Mine, that were judged to be the most promising candidates for a DUSEL, and awards were made to develop conceptual designs. These have been submitted.

The present Solicitation 3 (S3) calls for proposals to continue design activities for a DUSEL at a specific site. The purpose of S3 is to down-select to a single site and to support continuing design and development leading to a final design of sufficient detail and accuracy to allow it to be considered for implementation, as described in the Guidelines document. This competition is open; proposals will be accepted that are based on sites other than the two sites selected in Solicitation 2. All submitted proposals will be considered on an equal footing, with no special consideration or proposal preparation support given to proposals that did not receive an award from the Solicitation 2 process.

II. PROGRAM DESCRIPTION

This solicitation invites proposals for development of a technical design for a Deep Underground Science and Engineering Laboratory (DUSEL) at a particular site. This solicitation advances consideration of a DUSEL by NSF in three ways: (1) competitive review of the proposals received will be used to down select the sites proposed to one site for further design and planning; (2) the solicitation has been designed so that the proposals prepared in accordance with the proposal preparation instructions in Section V will comply with the requirements for completion of the Conceptual Design phase described in the Guidelines; and (3) the scope of the work to be funded under a cooperative agreement would be directed towards completion of the Preliminary Design phase, with further refinement and improvement of the design funded in later phases of the award. In each stage of design development the product is a cost/schedule/scope/management baseline plan of progressively increasing completeness, complexity and realism that is strongly grounded in the science a DUSEL will support.

The purpose of a DUSEL is to enable the broad range of science and engineering research that requires a deep underground infrastructure for reasons such as shielding from cosmic rays or direct access to physical/chemical/biological/engineering processes that occur deep underground. The technical scope of the multidisciplinary program enabled by such a DUSEL and the resulting infrastructure requirements have been documented in *Deep Science* (2006), available at www.dusel.org, a report prepared in response to the first DUSEL solicitation in this series, entitled "Deep Underground Science and Engineering Program and Technical Requirements" (NSF-04-595). The present solicitation is designed to result in the development of a plan for the DUSEL infrastructure and the initial suite of experiments that will define and accommodate the broad sweep of multidisciplinary research activities contained in the initial science and engineering program. The plan will also address the expandability of the infrastructure at the proposed site to support future generations of experiments envisioned in *Deep Science* and as new opportunities arise.

As detailed below, the work carried out through this award will target the design and development of the infrastructure and the initial suite of experiments required for a DUSEL. Specific DUSEL planning objectives include: (1) a physical layout of all underground chambers, passage ways, and other developed spaces; (2) complete Work Breakdown Structure (WBS) plan of the activities needed to construct a DUSEL; (3) cost estimates and bases for estimation for each WBS element, including a contingency estimate based on a bottom-up risk assessment of the elements of the WBS; (4) a resource loaded schedule for construction; (5) a management plan satisfying the requirements given in Section V, below; (6) a detailed safety and risk analysis and mitigation plan, including external reviews of the evolving design and construction of DUSEL; (7) a description of the education and outreach program at DUSEL; (8) plans and cost drivers associated with disposal of waste rock and waste

water and all environmental compliance issues, including indemnification for any environmental impact after closure of DUSEL; (9) documentation of access to the site and duration and conditions of such access; (10) utility requirements and sources, including requirements for clean rooms, air handling, potable water, etc.; (11) a conceptual design for extensions of the basic infrastructure to accommodate future generations of experiments, including those that might require creation of large volumes of laboratory space deep underground or other special requirements beyond those in the initial implementation plan; (12) geological and geotechnical characterization of the site (geological description of the rock formations, engineering properties of the rock and rock joints, groundwater conditions, thermal gradient, etc.), indicating the suitability of the proposed site for the initial suite of experiments and future expansions; (13) a plan, including costs and staffing requirements, for commissioning the facility and experiments after construction; (14) a plan for operation of the DUSEL infrastructure and experiments, including a management plan, that describes how the various functions will be created, overseen and maintained, such as the needed laboratory space and passage ways, DUSEL staff, utilities, safety protocols, implementation and personnel, and education and outreach and community interactions. An estimate of the cost of operations for both the experiments and the infrastructure should be included, as well as a definition of the roles of all of the partners in governance in the management of operations; (15) present state of interactions with the local community, and plan for future initiatives; (16) plans for community input, advisory bodies, project advisory committees, international collaborations, and the multiple communities to be served by a DUSEL.

Proposals submitted in response to this solicitation will be peer-reviewed by a panel of experts in the relevant specialties, with site visits and reverse site visits, as appropriate. As described in more detail in Section VI.A, the successful proposal will be the one that shows the greatest potential for developing a reliable plan for a world-leading DUSEL at the best cost/risk value to the government. The award resulting from this solicitation will provide funding to develop a Preliminary Design in the initial phase of work, and for further refinement and improvement of the design in later phases of the award. Selection as the awardee in the S3 process does not imply that a DUSEL will be approved for implementation, but it does select the only site and team that will receive further consideration in the NSF MREFC process described in the Guidelines.

III. AWARD INFORMATION

Estimated program budget is subject to the availability of funds. One award will be made, as a cooperative agreement. Anticipated funding is for up to \$5,000,000 per year for a period of up to three years.

IV. ELIGIBILITY INFORMATION

Organization Limit:

Proposals may only be submitted by the following:

- Academic Institutions located in the U.S.: U.S. universities and colleges located in the U.S.

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI: 1

An individual may be the Principal Investigator (PI) or Co-Principal Investigator (Co-PI) for only one proposal.

Additional Eligibility Info:

Proposals may be submitted by universities and colleges in the United States with research and education programs in at least some of the areas of research relevant to an underground laboratory. Collaborations that include a large fraction of the relevant research areas are encouraged. In proposals involving multiple

organizations, a single organization must submit the proposal as the lead organization, and accept overall management responsibility. Although their organizations may not serve as the lead organization, collaborators may also be affiliated with state governments or national laboratories.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Preparation Instructions: Proposers may opt to submit proposals in response to this Program Solicitation via Grants.gov or via the NSF FastLane system.

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.
- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov. The complete text of the NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: (<http://www.nsf.gov/bfa/dias/policy/docs/grantsgovguide.pdf>). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

This program solicitation contains deviations from the standard Grant Proposal Guide (GPG) or NSF Grants.gov Application Guide proposal preparation guidelines. The only deviations are in the specific information requested in the project description and in the additional review criteria, as indicated below.

NSF Cover Sheet. Indicate the total amount requested for the award period of NSF support in the box entitled "requested amount."

Biographical Sketches. List the senior investigators (faculty level or equivalent), key engineering and technical personnel, higher level project management staff, and consultants, providing their full names, institutional (and departmental, where relevant) affiliations, and roles and/or titles within the project. Include a biographical sketch for each of these participants, listing up to ten publications and other professional accomplishments most pertinent to this proposal.

Project description. This forms the core of the proposal. It is limited to 250 pages. The proposal should provide information necessary to satisfy the requirements for a Conceptual Design in the Guidelines (see below), adequately address the DUSEL-specific items described below, and allow evaluation of the merits for developing a technical design for a DUSEL at the proposed site, including a Preliminary Design as described in the Guidelines and Section II of this solicitation. The CDRs should therefore include:

- I. All of the elements, described at the appropriate level of detail required for a Conceptual Design Report, as defined in the NSF Guidelines for Planning and Managing the MREFC Account (Guidelines, NSF-03-049), which may be found at the following url: <http://www.nsf.gov/bfa/docs/mrefcguidelines1206.pdf>.
- II. The following more descriptive and DUSEL-specific items:
 1. A description of the construction project for the infrastructure - including cost, schedule, staffing requirements, etc. - based on information developed in WBS format at a level of detail consistent with a CDR as described in the Guidelines, including WBS dictionaries and bases of estimate for each WBS element, initial risk-based contingency estimates, description of the risk assessment methodology to be

used, and any other relevant project elements;

2. A description of the initial suite of experiments that are proposed for inclusion in the construction project, including their scientific significance, timeline, and as much cost information as is presently available. Plans for the experiments will be developed more thoroughly as design work progresses, and are not expected to be presented at the same level of detail as that of the DUSEL infrastructure;
3. Suitability of the site for construction of a DUSEL and for expansion to meet requirements of future generations of DUSEL research, as defined in the report Deep Science (2006), available at www.dusel.org. Factors to be considered include, but are not limited to, the following: (a) existing infrastructure; (b) geological, geotechnical and hydrological characterization of the site, e.g., engineering properties of the rock and rock joints and their special variability; ground water conditions; thermal gradient; radioactivity; and quantity and quality of the boring logs/rock cores and/or geophysical data; (c) legal standing and terms of ownership or lease; (d) description and status of any other uses of property;
4. Qualifications of team for design and successful implementation of a DUSEL, including expertise in the multiple disciplines and professions required to develop a Preliminary Design;
5. Plan to address environmental assessments and requirements, permitting requirements, and local government and community relations, and to identify related cost drivers;
6. Health and safety plans to assure the safety of users, staff, and visitors to DUSEL, including innovative ideas to elevate the life-safety level above that in the mining industry to one appropriate for researchers, students and the public;
7. A Project Execution Plan (PEP), developed in accordance with the requirements listed in the Guidelines;
8. A transition plan from construction to operations, including costs and staffing assessments for commissioning the facility and experiments after construction;
9. An operations plan that includes an estimated operations cost profile for ten years of operations, and an updated plan for how DUSEL will be managed during operations, including the roles of all the partners in governance;
10. Management and organization plan for construction, commissioning, and operations, including specification of key departments of the DUSEL, rough staffing levels, and the nature of the proposed research or management entity, which must have academic character (e.g., consortium of regional and DUSEL-science-related R1 universities) and substantive experience in management of large scientific and engineering facilities (e.g., partnership between organization with proven management record and university consortium.) Plan should also contain specifications of advisory committees, program advisory committees, etc.;
11. Initial risk and risk-based contingency analyses, and associated risk mitigation plan, for DUSEL, plus plans to develop an appropriately detailed version of these project components for the proposed construction project. Risks and mitigation plans for the commissioning and operations phases should also be identified;
12. Plan for education, outreach, diversity, and regional programs, together with developing partnerships, both within the US and internationally, should be described;
13. Any other elements or considerations, identified by the proposing teams and not listed above, that is necessary to realize a successful DUSEL.

III. Plan for design development during the next three year period, which includes development of a Preliminary Design as defined in the Guidelines and Section II of this solicitation. This should include a resource-loaded schedule for this activity, budget, personnel needs (including scientific and technical personnel, any necessary consultants or contractors, etc.), project software and other tools, and other relevant information.

In addition to the material submitted via FastLane or Grants.gov for consideration by the review panel, the proposing teams may provide backup information relevant to the requirements listed above and to the DUSEL project more generally. High-level summaries of backup material should be included in the proposal itself in sufficient detail to allow peer review. This backup material may include resource-loaded project files containing the Work Breakdown Structure (WBS), the WBS dictionaries, Project Execution Plan, risk documentation, etc., and will be provided by the proposing team to the NSF, who will post it on a secured NSF web site. The NSF DUSEL Program Director in Physics will coordinate and serve as the NSF point of contact for this work. This backup material will be considered part of the record upon which the review panel will base its recommendations. It may be referred to by the proposing team to provide more complete answers to questions that arise during the review, and during possible site and reverse-site visits.

B. Budgetary Information

Cost Sharing: Cost sharing is not required by NSF in proposals submitted to the National Science Foundation.

C. Due Dates

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):

D. FastLane/Grants.gov Requirements

- **For Proposals Submitted Via FastLane:**

Detailed technical instructions regarding the technical aspects of preparation and submission via FastLane are available at: <https://www.fastlane.nsf.gov/a1/newstan.htm>. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

Submission of Electronically Signed Cover Sheets. The Authorized Organizational Representative (AOR) must electronically sign the proposal Cover Sheet to submit the required proposal certifications (see Chapter II, Section C of the Grant Proposal Guide for a listing of the certifications). The AOR must provide the required electronic certifications within five working days following the electronic submission of the proposal. Further instructions regarding this process are available on the FastLane Website at: <https://www.fastlane.nsf.gov/fastlane.jsp>.

- **For Proposals Submitted Via Grants.gov:**

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. The Grants.gov's Grant Community User Guide is a comprehensive reference document that provides technical information about Grants.gov. Proposers can download the User Guide as a Microsoft Word document or as a PDF document. The Grants.gov User Guide is available at: <http://www.grants.gov/CustomerSupport>. In addition, the NSF Grants.gov Application Guide provides additional technical guidance regarding preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

Submitting the Proposal: Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program and, if they meet NSF proposal preparation requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with the oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts with the proposer.

A. NSF Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board (NSB)-approved merit review criteria: intellectual merit and the broader impacts of the proposed effort. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two NSB-approved merit review criteria are listed below. The criteria include considerations that help define them. These considerations are suggestions and not all will apply to any given proposal. While proposers must address both merit review

criteria, reviewers will be asked to address only those considerations that are relevant to the proposal being considered and for which the reviewer is qualified to make judgements.

What is the intellectual merit of the proposed activity?

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

What are the broader impacts of the proposed activity?

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

NSF staff will give careful consideration to the following in making funding decisions:

Integration of Research and Education

One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learning perspectives.

Integrating Diversity into NSF Programs, Projects, and Activities

Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities -- is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

Additional Review Criteria:

In addition to the standard NSF review criteria of Intellectual Merit and Broader Impacts, proposals will also be reviewed against the following additional review criteria:

The requirements for a CDR detailed in the Guidelines document (Section V.A.I), the DUSEL-specific information specified in Section V.A.II, and the plan for technical design work (Section V.A.III) contain the main list of ingredients expected in a DUSEL Conceptual Design. The contents of these reports will be evaluated for depth, detail, quality, realism, and comprehensiveness by an expert panel.

Potential for developing a comprehensive, reliable plan for a world-leading DUSEL, referenced to the required elements enumerated in Section II, at the best cost/risk value to the government.

Feasibility of the proposing teams to develop a sound, well-documented technical design in the allotted time, while minimizing unresolved issues and risk.

Depth, detail, quality, realism and comprehensiveness of the plan in its ability to handle the externalities of a DUSEL, e.g., relations with property owner(s), environmental compliance and indemnification issues, community and regional relations, provision of utilities, access by users, local housing, food services, etc.

Quality of the connections with the multidisciplinary communities and the international communities that are the potential users and collaborators with a DUSEL.

Commitment to, and breadth and quality of the plans for, leveraging an investment in a DUSEL for education, diversity, and public outreach benefits.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Panel Review or Site Visit Review or Reverse Site Review.

The proposals submitted in response to this solicitation will be competitively peer-reviewed by a panel of experts selected to provide experienced judgment in all of the areas described in the review criteria listed above. The review process may involve a site visit and a reverse site visit and any other review mechanism that becomes necessary to effect a well-justified basis upon which to select one site and proposing team to prepare the single Preliminary Design to be considered by the NSF management and MREFC Panel for advancement to the Readiness Phase and subsequent planning steps in the MREFC process.

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the date of receipt. The interval ends when the Division Director accepts the Program Officer's recommendation.

A summary rating and accompanying narrative will be completed and submitted by the panel. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Acquisition and Cooperative Support for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Acquisition and Cooperative Support. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI.B. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (GC-1); * or Federal Demonstration Partnership (FDP) Terms and Conditions * and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/awards/managing/general_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpm.

Special Award Conditions: The award associated with this solicitation will be a Cooperative Agreement that will fund DUSEL design at a single site for a period of up to three years, at a funding level of up to \$5,000,000 per year. It will not be a standard grant.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period. (Some programs or awards require more frequent project reports). Within 90 days after expiration of a grant, the PI also is required to submit a final project report.

Failure to provide the required annual or final project reports will delay NSF review and processing of any future funding increments as well as any pending proposals for that PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through FastLane, for preparation and submission of annual and final project reports. Such reports provide information on activities and findings, project participants (individual and organizational) publications; and, other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system. Submission of the report via FastLane constitutes certification by the PI that the contents of the report are accurate and complete.

In addition to the reporting requirements described above, monthly status reports, describing progress on the design and other material relevant to DUSEL development, will be required. The Principal Investigator of the chosen site will be responsible for composing and transmitting these reports to the NSF DUSEL Program Directors.

VIII. AGENCY CONTACTS

General inquiries regarding this program should be made to:

- Jonathan Kotcher, telephone: (703) 292-8235, email: jkotcher@nsf.gov
- Richard Fragaszy, telephone: (703) 292-8360, email: rfragasz@nsf.gov
- David Lambert, telephone: (703) 292-8558, email: dlambert@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.
- Ramona Winkelbauer, telephone: (703) 292-7390, email: rwinkelb@nsf.gov

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

IX. OTHER INFORMATION

The NSF Website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this Website by potential proposers is strongly encouraged. In addition, MyNSF (formerly the Custom News Service) is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF Regional Grants Conferences. Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. MyNSF also is available on NSF's Website at <http://www.nsf.gov/mynsf/>.

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this new mechanism. Further information on Grants.gov may be obtained at <http://www.grants.gov>.

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

NSF funds research and education in most fields of science and engineering. It does this through grants and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the US. The Foundation accounts for about one-fourth of Federal support to academic institutions for basic research.

NSF receives approximately 40,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Facilitation Awards for Scientists and Engineers with Disabilities provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See Grant Proposal Guide Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at <http://www.nsf.gov>

- **Location:** 4201 Wilson Blvd. Arlington, VA 22230
- **For General Information** (NSF Information Center): (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**

Send an e-mail to: pubs@nsf.gov

or telephone: (703) 292-7827

• **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004), and NSF-51, "Reviewer/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

Suzanne H. Plimpton
Reports Clearance Officer
Division of Administrative Services
National Science Foundation
Arlington, VA 22230

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