George E. Brown, Jr. Network for Earthquake Engineering Simulation Operations FY 2015-FY 2019 (NEES2 Ops)

PROGRAM SOLICITATION
NSF 13-537

REPLACES DOCUMENT(S):
NSF 08-574

National Science Foundation

Directorate for Engineering
Division of Civil, Mechanical and Manufacturing Innovation

Letter of Intent Due Date(s) ***(required)*** (due by 5 p.m. proposer's local time)*:*

March 22, 2013

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

May 24, 2013

IMPORTANT INFORMATION AND REVISION NOTES

A revised version of the ***NSF Proposal & Award Policies & Procedures Guide*** (PAPPG)**,** NSF 13-1, was issued on October 4, 2012 and is effective for proposals submitted, or due, on or after January 14, 2013. Please be advised that the guidelines contained in NSF 13-1 apply to proposals submitted in response to this funding opportunity. Proposers who opt to submit prior to January 14, 2013, must also follow the guidelines contained in NSF 13-1.

Please be aware that significant changes have been made to the PAPPG to implement revised merit review criteria based on the National Science Board (NSB) report, National Science Foundation's Merit Review Criteria: Review and Revisions. While the two merit review criteria remain unchanged (Intellectual Merit and Broader Impacts), guidance has been provided to clarify and improve the function of the criteria. Changes will affect the project summary and project description sections of proposals. Annual and final reports also will be affected.

A by-chapter summary of this and other significant changes is provided at the beginning of both the *Grant Proposal Guide* and the *Award & Administration Guide*.

Please note that this program solicitation may contain supplemental proposal preparation guidance and/or guidance that deviates from the guidelines established in the Grant Proposal Guide.

Major Revision Note: This solicitation is a major revision of NSF 08-574, George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES) Operations FY 2010-FY 2014, to recompete the provision, management, operations, and maintenance of multi-user, earthquake engineering research infrastructure for FY 2015-FY 2019, producing a “second generation” of the NEES infrastructure, hereinafter referred to as “NEES2."

Clarifying language has been added to the Eligibility Information section.

Informational Webcast/Webinar: NSF will hold an informational webcast/webinar in March 2013 prior to the due date for the Letter of Intent. The date and further information about the webcast/webinar will be distributed through NSF's "Get NSF Updates by Email" service.

Please note that this program solicitation contains supplemental proposal preparation guidance and/or guidance that deviates from the guidelines established in the Grant Proposal Guide.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

George E. Brown, Jr. Network for Earthquake Engineering Simulation Operations FY 2015-FY 2019 (NEES2 Ops)

Synopsis of Program:

The George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES) was established by the National Science Foundation (NSF) as a multi-user, research infrastructure for earthquake engineering research, innovation, and education through a facility construction phase during 2000-2004, followed by operations of the infrastructure to support research and education activities from October 2004 through September 2014. NEES is currently operated under a five-year NSF cooperative agreement award with Purdue University that expires on September 30, 2014. For more information about NEES, please see http://www.nees.org/.

Through this solicitation, NSF provides the opportunity for the earthquake engineering community to recompete to operate the "second generation" of NEES, hereinafter referred to in this solicitation as "NEES2." Proposals are solicited by NSF's Division of Civil, Mechanical and Manufacturing Innovation to provide, manage, operate, and maintain NEES2 to support frontier earthquake engineering research, innovation, education, and workforce development for the five-year period from October 1, 2014 to September 30, 2019 [i.e., fiscal year (FY) 2015-FY 2019]. Recompeted through this solicitation for NEES2 are the following components: (a) a network-wide NEES2 management office (NMO) with the Principal Investigator (PI)/Network Director located at the lead institution, (b) four to six experimental facilities that provide the most critical and technically advanced capabilities and data needed by the earthquake engineering research community for transformative research, plus a post-earthquake, rapid response research (PERRR) facility, (c) community-driven, production-quality cyberinfrastructure, and (d) education and community outreach activities. This solicitation does not separately compete the components. Instead, it requests proposals to integrate all these components into a cohesive earthquake engineering research infrastructure for FY 2015-FY 2019. NSF intends to award one cooperative agreement to a lead institution for NEES2 operations with a start date of October 1, 2014, and a duration of up to five years.

Cognizant Program Officer(s):

Please note that the following information is current at the time of publishing. See program website for any updates to the points of contact.

- Joy M. Pauschke, Program Director, Division of Civil, Mechanical and Manufacturing Innovation (Lead Cognizant Program Officer), telephone: (703) 292-7024, email: jpauschk@nsf.gov
- Anna-Lee Misiano, Grants and Agreements Specialist, Division of Acquisition and Cooperative Support, telephone: (703) 292-4339, email: amisiano@nsf.gov

Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 47.041 --- Engineering

Award Information

Anticipated Type of Award: Cooperative Agreement

Estimated Number of Awards: 1

Anticipated Funding Amount: $62,000,000 estimated total for up to five years. The amount available under the cooperative agreement will depend upon the annual budgets of NSF, the performance of the awardee, and the extent of utilization of NEES2 resources by NSF-supported awards. For the purpose of writing a proposal, assume that the funding available (i.e., annual budget) is up to $12,000,000 in year one, $13,000,000 in year two, $12,500,000 in year three, $12,500,000 in year four, and $12,000,000 in year five.

Eligibility Information

Organization Limit:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.

PI Limit:

The PI, who will serve as the Network Director, must be a full-time employee of the lead institution by the effective start date of the NSF cooperative agreement award.

Limit on Number of Proposals per Organization: 1

An academic institution may submit only one proposal as the lead institution; however, an academic institution may participate in more than one proposal as a non-lead institution. Full proposals involving more than one organization must be submitted as a single administrative package from the lead institution; collaborative full proposals with multiple administrative packages will not be accepted and will be returned without review. If the lead Principal Investigator (Network Director) leaves or transfers to another institution during the review process or after an award is made, the proposal/award remains with the lead institution. Additionally, the lead institution cannot be changed after submission of the full proposal. Non-academic U.S. institutions and organizations, including national laboratories and private-sector companies, as well as non-U.S. institutions, may participate in network activities using their own resources; however, this shall not be interpreted to prohibit purchases, services, or sales contracts/agreements with these entities. All NEES2 facility host institutions and facilities must be located in the United States to facilitate access by NSF-supported researchers.

Limit on Number of Proposals per PI: 1

The Principal Investigator (PI) may serve as PI/Network Director on only one proposal.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- Letters of Intent: Submission of Letters of Intent is required. Please see the full text of this solicitation for further information.
- Preliminary Proposal Submission: Not Applicable
- Full Proposals:
  - Full Proposals submitted via FastLane: NSF Proposal and Award Policies and Procedures Guide, Part I: 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/publications/pub_summ.jsp?ods_key=grantsgovguide)

B. Budgetary Information

- Cost Sharing Requirements: Inclusion of voluntary committed cost sharing is prohibited.
- Indirect Cost (F&A) Limitations: Not Applicable
- Other Budgetary Limitations: Other budgetary limitations apply. Please see the full text of this solicitation for further information.

C. Due Dates

- Letter of Intent Due Date(s) ***(required)*** (due by 5 p.m. proposer's local time)***:***

  March 22, 2013

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

  May 24, 2013

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

A. NEES Construction, Operations, and Research during FY 2000-FY 2014

The George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES) is authorized by the U.S. Congress under the interagency National Earthquake Hazards Reduction Program (NEHRP) (http://www.nehrp.gov/) and the award made under this solicitation will contribute to NSF's participation in NEHRP. NEES originally was the result of over a decade of planning by the earthquake engineering community, culminating in NEES approved by the National Science Board (NSB) for construction in November 1998. NEES was successfully created as envisaged and was NSF's flagship investment in major geographically distributed, cyber-enabled, networked research facilities. NSF supported construction of NEES during fiscal year (FY) 2000-FY 2004 for a total of $81,800,000 from a Major Research Equipment appropriation in FY 2000 and the Major Research Equipment and Facilities Construction appropriation, thereafter. An additional $1,100,000 was provided by NSF's Experimental Program to Stimulate Competitive Research in FY 2001. NEES started operations and support for research on October 1, 2004. FY 2013 marks the ninth year of NEES operations and research out of NSF's initially ten-year planned support for NEES.

NEES operations are currently managed through an NSF cooperative agreement with Purdue University, hereinafter referred to in this program solicitation as the "incumbent." NSF's cooperative agreement with the incumbent was effective on October 1, 2009 and expires on September 30, 2014. The NEES infrastructure supported by the incumbent is described at http://www.nees.org/. The incumbent's currently operated experimental infrastructure of 14 NEES facilities includes shake tables, geotechnical centrifuges, a tsunami wave basin, unique large-scale testing laboratory facilities, and mobile and permanently installed field equipment. The NEEShub cyberinfrastructure connects, via Internet2, the experimental facilities as well as provides telepresence; a curated data repository known as the Project Warehouse; computational, simulation, and visualization tools; collaborative tools for facilitating on-line planning, execution, and post-processing of experiments; hybrid and multi-site hybrid simulation tools; access to high performance computing; information and user manuals about NEES resources; facility policies and procedures; centralized facility schedules; and the NEES Academy for education, outreach, and training. The NEEShub, with the exception of the Project Warehouse, is built upon Purdue University's HUBzero® technology. NSF supports research to use NEES through separate awards made primarily through an annual NSF program solicitation for NEES Research (NEESR).

The current NEES experimental facilities and cyberinfrastructure have served as an integral and enabling resource, facilitating over 100 NSF-supported research awards for knowledge, discovery and innovation to improve the seismic design and performance of U.S. civil infrastructure. NEES has provided resources for investigators to participate in cutting edge research to advance fundamental knowledge; computational, simulation, and visualization tools; design strategies, practice, and codes in earthquake engineering; sustainable technologies for design, rehabilitation, and remediation; experimental simulation techniques and instrumentation; and sensor technology. In addition, NEES has had the agility to deploy sensors and data acquisition systems to capture large aftershock building response data following the 2010 Chile and 2010/2011 New Zealand earthquakes. The NEEShub Project Warehouse (http://nees.org/warehouse/welcome) archives experimental data from research conducted at the NEES facilities, and its data are a resource to spur new research, new computational models, and new strategies for earthquake hazard mitigation.

NEES is currently a science gateway under the Extreme Science and Engineering Discovery Environment (XSEDE) https://www.xsede.org/gateways-listing. Additionally, since 2005, NEES has leveraged and complemented its capabilities through partnership agreements with large testing facilities at foreign earthquake-related centers, laboratories, and institutions. The Japanese National Research Institute for Earth Science and Disaster Prevention's (NIED) 3-D Full-Scale Earthquake Testing Facility (E-Defense) in Miki, Japan, the world's largest shake table, became operational in 2005. To facilitate NEES/E-Defense collaboration, in September 2005, NSF and the Japanese Ministry of Education, Culture, Sports, Science, and Technology signed a memorandum concerning cooperation in the area of disaster prevention research. To facilitate joint use of experimental facilities and cyberinfrastructure, the incumbent has signed cooperative partnerships with NIED, the Canadian Seismic Research Network, and Tongji University, Shanghai, People's Republic of China.

NEES represents a major step in the evolution of the earthquake engineering discipline, from near-exclusive reliance on physical testing to increasing sophistication in computational and simulation capabilities. Physical testing, integrated with high performance computing and computational tools, however, remains a high priority for advancing research frontiers and innovations to create a more earthquake-resilient nation. The role of multi-user research infrastructure and the need for experimental and cyberinfrastructure resources for research in earthquake hazard mitigation are highlighted in the following documents:

- *Empowering the Nation through Discovery and Innovation, NSF Strategic Plan for Fiscal Years (FY) 2011-2016*, National Science Foundation, April 2011, NSF 11-047, http://www.nsf.gov/news/strategicplan/nsfstrategicplan_2011_2016.pdf.
- National Earthquake Hazards Reduction Program (NEHRP), *Strategic Plan for the National Earthquake Hazards Reduction Program, Fiscal Years 2009-2013*, October 2008, http://www.nehrp.gov/pdf/strategic_plan_2008.pdf.
- National Research Council, *National Earthquake Resilience: Research, Implementation, and Outreach*. Washington, DC: The National Academies Press, 2011, http://www.nap.edu/catalog.php?record_id=13092.
- National Research Council, *Grand Challenges in Earthquake Engineering Research: A Community Workshop Report*. Washington, DC: The National Academies Press, 2011, http://books.nap.edu/catalog.php?record_id=13167.
- Dyke, S. et al., *2020 Vision for Earthquake Engineering Research, Report on an OpenSpace Technology Workshop on the Future of Earthquake Engineering,* http://nees.org/resources/1637/download/Vision_2020__Final_Report.pdf.

B. NEES2 Operations and Research during FY 2015-FY 2019

Major experimental facilities and cyberinfrastructure are needed beyond the first decade of NSF's support for NEES. In accordance with the NSB Statement on Competition, Recompetition, and Renewal of NSF awards (NSB-08-16), available at http://www.nsf.gov/nsb/publications/2008/nsb0816_statement.pdf, this solicitation invites proposals for operations of a newly configured NEES2 infrastructure for the five-year period from October 1, 2014 through September 30, 2019 (FY 2015-FY 2019), as described below in Sections II.A through II.H. NSF intends to award one cooperative agreement for NEES2 operations as the outcome of this solicitation, hereinafter referred to as the "awardee." The awardee will not conduct research under this cooperative agreement; NSF will separately fund researchers and educators to use NEES2. The lead institution and all supported partner organizations are considered part of the "awardee" in executing and complying with the terms and conditions of the cooperative agreement for NEES2 operations.

NEES is, and NEES2 will be, part of the NSF-supported portfolio of large, multi-user facilities in operations. NSF 13-38, *Large Facilities Manual*, provides information about the development, construction, and operations of NSF-supported large facilities. Also available are the following supplementary modules to the *Large Facilities Manual*: *Roles and Responsibilities of NSF Staff Involved in the Management and Oversight of Large Facilities, Risk Management Guide, Guidelines for Reporting Requirements*, and *Guidelines for Financial Management*. NSF's *Large Facilities Manual* and the supporting supplementary modules are available at http://www.nsf.gov/bfa/lfo/lfo_documents.jsp.

II. PROGRAM DESCRIPTION

A. Overview of NEES2: Goals and Key Components

The goals for NEES2 operations are to:

- Provide national and international leadership for multi-user, research infrastructure management and operations to enable transformative research for earthquake hazard mitigation,
- Provide major earthquake engineering experimental facilities that openly support access by external users,
- Provide community-driven, production-quality cyberinfrastructure that can accelerate research to innovation through the integration of user support, testing, data, computation, simulation, visualization, collaboration, and long-term digital preservation,
- Provide a safe and secure experimental environment and cyberinfrastructure for users to conduct research and education activities,
- Implement effective education and community outreach (ECO) activities that lead to a broadly inclusive and active user base for NEES2 and next generation earthquake engineering workforce, and
- Build national and international partnerships that bring additional resources to NEES2 as well as to the partnering organizations.

To achieve these goals, NEES2 operations are to be guided by the NEES2 Science Plan, Strategic Plan and Performance Metrics, work breakdown structure (WBS) and its dictionary, and annual work plans. These plans are to guide operations of the following major NEES2 components:

- NEES2 management office (NMO),
- Four to six multi-user, earthquake engineering experimental facilities, plus an additional facility to support post-earthquake, rapid response research (PERRR),
- Cyberinfrastructure, and
- ECO activities.

A core strategy is broadening opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in science, technology, engineering, and mathematics (STEM) disciplines. NSF is committed to this strategy and deems it central to the programs, projects, and activities it supports. In all NEES2 staffing and organized activities, the awardee must annually provide evidence of participation by groups, institutions, and geographic regions underrepresented in STEM.

B. Strategic Plan and Performance Metrics

The Strategic Plan defines the vision, mission, goals, objectives, deliverables, key milestones, performance metrics, and targets for the metrics for entire NEES2 operations. Strategies for building a broadly inclusive user base and next generation earthquake engineering workforce and national and international partnerships must be part of the Strategic Plan. Performance metrics will be used during the award to aid the lead institution, NMO, external advisory committee, NSF, and NEES2 stakeholders in assessing performance.

C. NEES2 Science Plan

Strategy for Configuration of NEES2 Resources

The strategy for configuration of the NEES2 infrastructure, including the PERRR facility described in more detail in Section II.F, must derive from the proposer's NEES2 Science Plan. The NEES2 Science Plan must identify the community's highest priority grand challenges and key research questions to be addressed during FY 2015-FY 2019 and position NEES2 to enable exciting, visionary, transformative, multidisciplinary research for the earthquake engineering field. The Plan must identify the grand challenges and their associated key research questions in earthquake engineering, the experimental data products and cyberinfrastructure needed to address this research, the NEES2 resources for observation and experimentation that can produce the data products, and the anticipated data users. The NEES2 experimental facilities and cyberinfrastructure must: (a) have the capabilities to generate and archive the specific data products needed to address the research challenges outlined in the NEES2 Science Plan, (b) provide unique, technically advanced major equipment, experimental techniques, testing algorithms, and instrumentation that do not exist elsewhere in the United States at similar scale or capability, (c) as a portfolio, demonstrate complementary and synergistic experimental and cyberinfrastructure capabilities, and (d) demonstrate an active and inclusive user base beyond the host/provider institutions.

Experimental facilities proposed as part of NEES2 do not need to be limited to the 14 experimental facilities of the current NEES infrastructure. However, the cooperative agreement award, with the exception of the PERRR facility, will not support the construction of new experimental facilities nor major refurbishments or upgrades to existing experimental facilities included in the proposal. Facilities to support fire testing are not permitted as part of NEES2. While the primary experimental capabilities and use of NEES2 must be for earthquake hazard mitigation, there may be NEES2 facilities whose equipment has a secondary capability to support research for mitigation of other natural hazards. Such multi-hazard usage is permissible, and these experimental capabilities also should be identified in the NEES2 Science Plan to help potential researchers discover resources for multi-hazard mitigation.

Examples of Science Plans for other NSF-supported scientific communities with multi-user research infrastructure, which may be helpful to frame and convey the NEES2 Science Plan, may be found at:

- *2011 Science Strategy, Enabling Continental-Scale Ecological Forecasting*, Figure 3, "How the Grand Challenges translate into the five key questions and then into the data products and the required NEON systems for observations," available at http://www.neoninc.org/sites/default/files/NEON_Strategy_2011u2_0.pdf.
- *Ocean Observatories Initiative (OOI) Scientific Objectives and Network Design: A Closer Look*, Appendices A, Science Traceability Matrices, available at http://www.oceanleadership.org/files/Science_Prospectus_2007-10-10_lowres_0.pdf.

Market Analysis of Anticipated Users

The NEES2 Science Plan must include, for each facility and key cyberinfrastructure resource, a market analysis of the anticipated user base. Generally, the majority of NEES2 users are expected to be faculty and their students supported through separate NSF awards for earthquake engineering research and education. Users of the PERRR facility will be funded by NSF on an ad hoc basis immediately following a major earthquake, e.g., as NSF RAPID awards or as supplements to existing NSF awards. Priority for access to NEES2 resources must be given to awards supported by NSF. In addition, the awardee must implement activities to develop a

broadly inclusive and active user base for all NEES2 resources that expands the earthquake engineering user base significantly and welcomes researchers from other disciplines. While use of the NEES2 facilities through awards supported by other Federal agencies, State governments, nonprofit organizations, and the private sector is encouraged, support from the NEES2 operations award cannot be provided for such users, and they must pay all relevant user fees/recharge rates established by the facility's institution in order to access the facility. The NEES2 Science Plan is to be widely shared by the awardee with potential users of NEES2, and updated by the awardee, with community input, at least biennially.

The awardee will develop a WBS and its associated dictionary, which will be formed on the basis of the NEES2 Science Plan and Strategic Plan to define the entire scope of NEES2 operations and the more detailed scope for each NEES2 component. Annual work plans must be based on the Strategic Plan, WBS, performance metrics assessment, priorities, risk management (programmatic, technical, and business), resource utilization, and availability of NSF support.

E. NEES2 Management Office (NMO)

The lead institution will provide the NMO, which will ensure that, within available resources, NEES2 sustains and advances the NEES2 Science Plan and is promoted through a culture of excellence, transparency, safety, security, and efficiency for service to its users. The NMO, in concert with relevant offices at the lead institution, must have the capability to administer an award of this scope, complexity, budget, and number of subaward partner organizations. The NMO must have adequate office and meeting space, office equipment, Internet and Internet2 connectivities, and videoteleconferencing capabilities.

More specifically, the NMO, with the lead institution, has the following responsibilities:

- *Leadership, oversight and responsibility for all aspects of NEES2 strategy, management, operations, and performance,* including the NEES2 Science Plan, Strategic Plan and Performance Metrics, WBS and dictionary, and quality of performance of facility and cyberinfrastructure operations and ECO activities.
- *Organizational structure and qualified staffing.* The NMO must be led by the Network Director, who must be a distinguished earthquake engineering researcher and experienced in large-scale project management. The Network Director may be assisted by a Deputy, Associate, and/or Assistant Director(s), who share(s) the management and administrative responsibilities. Key personnel responsible for facility operations, cyberinfrastructure operations, and ECO activities must have expertise and evidence of prior successful activities in appropriate areas and be full-time positions. The lead for financial administration must be full-time and have expertise and evidence of prior successful activities in financial management, audit control, subaward management, and procurement. Evidence of broadly inclusive staffing in project participants at the lead institution and partner organizations and in the external advisory committee membership is required.
- *Network-wide performance management system and performance metrics.*
- *External advisory structure,* with membership external to the awardee organizations and staffing, to provide independent guidance and oversight. The advisory committee membership, including the Chair position, is to be named after the award is made.
- *Active and broadly inclusive user base*, with evidence of significant utilization of NEES2 resources.
- *Development of annual work plans and associated budgets,* for each NEES2 component.
- *Formalized policies and procedures for NEES2 operations, user support, risk management, and financial management.*
- *Network-wide coordination of experimental facility operations* for the facility responsibilities listed below in Section II.F, "Experimental Facilities." In addition, the following facility coordination activities are required:
    - *Network-wide database of resources provided by each facility.*
    - *Network-wide coordinated scheduling protocol* for scheduling users at each facility transparently without prejudice, including prioritization and rescheduling due to delays or equipment damage, and web-posted facility schedules.
    - *Coordination, leveraging, and cooperation* among the NEES2 facilities.
    - *Network-wide technology plan* for maintenance, calibration, repair, software, hybrid simulation, and new sensor technologies.
    - *Network-wide environmental, health, and safety plan.* Paramount to NEES2 operations is the provision of a safe and secure testing environment for NEES2 staff and its users. The plan must provide that project staffing, users, the environment, and the general public are protected appropriately during operations and use through provision of appropriate safety equipment, policies, protocols and training. The plan must address any likely environmental permitting required for the NEES2 facilities, and include provision for periodic safety inspection of the NEES2 facilities and safety training for facility staff and users.
- *Network-wide Cyberinfrastructure,* in accordance with Section II.G, "Cyberinfrastructure."
- *Network-wide ECO,* in accordance with Section II.H, "Education and Community Outreach."
- *National Science Foundation Reporting and Reviews,* in accordance with Section VII.B, "Award Conditions."

F. Experimental Facilities

At the core of NEES2 are the multi-user experimental facilities that support an active and inclusive external user base. Each facility must provide the following:

- *Location:* All facility resources must be housed within the United States. However, resources may be operated outside the United States for short-term periods to support research. If the facility is part of a larger institutional laboratory complex and its associated budget and accounting, then the NEES2 facility personnel effort, resources, and budget must be accounted for and tracked separately from the larger laboratory administration.
- *Experimental resources to support users,* including equipment; instrumentation; sensors; testing algorithms and protocols; data management infrastructure; telepresence; remote equipment operations, as applicable for the equipment; Internet and Internet2 connectivities; safety equipment; cranes and other specimen handling equipment pertinent to the facility; specimen construction and staging areas; and other tools necessary for testing.
- *Management, operations, and maintenance* of all facility resources.
- *Organizational structure and qualified staffing*: Organizational chart for the facility, with the role and responsibilities of each position necessary for management and operations specific to the NEES2 facility, and qualified staffing to manage and operate facility resources. Each facility must have a designated safety officer and provide staff training.
- *Testing support* during all phases of planning, experimentation, and data processing, to include:
    - User and safety training workshops for prospective and NSF-supported researchers,
    - Facility user manual(s) that describe the facility's experimental and IT capabilities, available resources, testing algorithms, safety equipment and procedures, user fees/recharge rates, and standard experimental protocols and provide guides, tutorials, and example testing cases to help users benefit from use of the facility. (Users will be responsible for all costs associated with specimen construction and demolition.), and
    - Office and meeting space for visiting researchers and students.
- *Facility availability and utilization*: The NEES2 facility resources must be available to accommodate NSF-supported awards at least 80% annually, i.e., at least 200 days out of a 250-day year. Days for routine maintenance and calibration and user training to support NSF awards may be included within the 200-day period.
- *Physical laboratory/equipment security and cybersecurity,* in accordance with institutional and awardee established policies.
- *Environmental, safety and health (ES&H) plan*: Compliance with all university, government, and awardee required environmental, safety, and health standards, regulations, and monitoring requirements.

- *Network integration*: Implementation of a collegial, integrative, and productive working partnership with the NMO and all partner organizations for all aspects of operations; and facility information and/or participation provided to the NMO to meet NSF reporting and review requirements.
- *Informational web site, with the same format used by all NEES2 facilities*: A facility web site with information kept current for users that includes: (a) user fees/recharge rates associated with testing at the facility, (b) an itemized inventory of all facility resources, (c) facility personnel and safety officer contact information, (d) facility location and maps, (e) procedures for facility access and use, (f) user and safety manuals, (g) site availability/utilization schedules, (h) examples of recent research projects conducted at the facility, and (i) user training workshop dates and resources.
- *Education and community outreach*: Participation in the network-wide Research Experiences for Undergraduates (REU) site by hosting REU students at the facility and other activities that directly contribute to the awardee's Strategic Plan.

PERRR Facility: The goal of the PERRR facility is to provide the leadership, infrastructure, data management, operations, and maintenance to deploy resources for post-earthquake investigations nationally and internationally. The PERRR facility must be designed to meet the requirements listed above for a NEES2 experimental facility and work closely with the cyberinfrastructure to develop the associated data management infrastructure. Recent workshops and reports have identified the need for community resources to gather perishable data immediately following an earthquake event, share the data, and archive the data for longer-term research use:

- Earthquake Engineering Research Institute, *The 2010 Canterbury and the 2011 Christchurch New Zealand Earthquakes and the 2011 Tohoku Japan Earthquake: Emerging Research Needs and Opportunities, Workshop Report,* May 2012, https://www.eeri.org/wp-content/uploads/JAPAN_NZ_RAPID_Workshop_Final.pdf.
- National Research Council, *Grand Challenges in Earthquake Engineering Research: A Community Workshop Report*. Washington, DC: The National Academies Press, 2011, http://books.nap.edu/catalog.php?record_id=13167.
- Workshop on Quick-Response Disaster Reconnaissance, held June 12-13, 2012, National Science Foundation, Arlington, VA.

The NMO and PERRR Facility Director must work closely with the community to develop and make this facility operational by the end of the second year of the award. The annual budget for this facility must be allocated within the annual award budgets listed in Section III, "Award Information" and in Section V.B, "Budgetary Information." The PERRR Facility Director must have demonstrated expertise in post-earthquake investigations, deployment of field equipment, and use of information technology and social media tools in the field. Planning for this facility must address: identification of the user base and its disciplines, key research questions, facility requirements and staffing, procurement, commissioning, operations, data management infrastructure, and staff and user training. The NMO and PERRR Facility Director should form an external steering committee specifically for development of this facility, with the goal to transparently, efficiently, and effectively deploy facility resources following an earthquake.

The development and operations for this facility must meet the following milestones:

- Within the first three months of the award, an external steering committee formed and held its first meeting, and a facility-specific web site developed that is regularly updated during the facility planning and operational phases.
- By the end of year one, completion of the following documents: (a) a community-endorsed, comprehensive Facility Strategic Plan, with an updated WBS, dictionary and budget allocations for resource acquisition and an updated WBS, dictionary, and budget allocations for management, operations, and maintenance during years three through five; (b) the NEES2 Science Plan updated for this facility; (c) acquisition plan, procurement strategy, and commissioning process for facility resources in year two; and (d) a prototype post-earthquake data repository developed as part of the NEES2 data repository. These documents will undergo a merit review organized by NSF, and continued development of this facility in year two will be subject to NSF approval.
- By the end of year two: (a) all facility resources must have been procured, made operational, and commissioned, and formal community protocols for accessing and deploying facility resources following an earthquake and archiving field data must be vetted with the community, finalized, and posted on the NMO and PERRR facility web sites, and (b) the post-earthquake data repository must be operational as part of the NEES2 data repository, with associated documentation.
- By the end of year three, user and safety manuals for all facility resources posted on the NMO and PERRR facility web sites and community user training workshops have been initiated. Community training workshops must be conducted periodically.

G. Cyberinfrastructure

Cyberinfrastructure underpins NEES2 as a virtual organization with community tools for collaboration and knowledge sharing to enable discovery, innovation, education, and community outreach. To support these users, the awardee must operate community-driven, production-quality cyberinfrastructure with near 100% uptime that provides the following baseline resources:

- *An interactive web site* that serves as the definitive "go to" source of information for all NEES2 activities. The web site should provide resources for users and information for the general public.
- *A fully operational, state-of-the-art, data management infrastructure and policies*, with the NEES2 data repository for archiving experimental and post-earthquake investigation data, that provides interoperability with other databases.
- *Robust data management tools* to allow facilities and users to upload metadata/experimental data directly to the NEES2 data repository during experimentation.
- *Hybrid and multi-site hybrid simulation capabilities.*
- *A full suite of visualization, simulation and computational tools* provided by the awardee, as well the capability for a community of collaborators to share tools and software on the NEES2 cyber platform.
- *Collaborative tools* for all stages of implementing a project using NEES2.
- *Facilitated access* to and use of campus and/or national high-performance computing resources.
- *Documentation of user requirements, to provide the rationale for the baseline, system architecture, and middleware, and implementation into the cyberinfrastructure,* to include identification of the user community and stakeholders; evidence of an active and broadly inclusive user base; and user manuals, training, and support.
- *Network-wide identity, trust, and cybersecurity protocols and systems,* including ongoing cybersecurity checks for NEES2 resources that utilize existing institutional procedures.
- *Organizational structure and qualified staffing.* Cyberinfrastructure leadership, management, and operations staffing must have demonstrated expertise and prior successful accomplishments in providing cyberinfrastructure for active user communities and in working with the earthquake engineering research community.
- *Software management strategy, policy and procedures*, including development, deployment, testing, validation, operations, maintenance, quality assurance, and usability. There must be metrics to measure success and failure of new software and the tasks necessary to take software from prototype to dissemination as a reusable software resource.

The NEES2 data repository must archive all experimental data generated by the NEES2 facilities and its users. The repository initially will be populated by all data currently in the incumbent's NEEShub Project Warehouse. The awardee must also curate and archive experimental data remaining from NSF-supported awards conducted during FY 2014 under the incumbent's operations and all experimental data generated under NSF-supported NEESR Planning Grant awards made under a separate NSF solicitation to be issued in FY 2013 entitled "George E. Brown, Jr. Network for Earthquake Engineering Simulation Research (NEESR) Planning Grants." Additionally, by the end of year two, the data management infrastructure must provide full capability for long-term digital

preservation of all experimental data generated by all earthquake engineering research awards supported by NSF, all data generated using PERRR facility resources, all data collected under NSF-supported post-earthquake investigation awards, legacy data sets identified as high priority data by the earthquake engineering community, and experimental data from global partners in support of such partnerships. NIST is currently developing a "Disaster and Failure Events Data Repository" to serve as a national archival data base of significant hazard events, such as earthquakes, tsunamis, hurricanes, tornadoes, and windstorms. The NEES2 data repository should be designed to interoperate with NIST's data repository. More information about NIST's data repository is available at http://www.nist.gov/el/disasterstudies/repository_home.cfm.

The NEES2 cyberinfrastructure should utilize/adapt the incumbent's NEEShub cyberinfrastructure content currently available on the NEEShub platform at http://www.nees.org to the new cyber platform as authors will permit. The NEES2 cyberinfrastructure's content, software, and tools must be integrated in a way that does not preclude their sharing and future porting and use across other platforms. If a transition to a different platform becomes necessary in the future, then the awardee will be responsible for ensuring that all content, software, and tools are fully transitioned to that platform without requiring renegotiation of proprietary agreements. In addition, the cyberinfrastructure must maximize the use of open source and commercial off the shelf (COTS) software and leverage investments made by NSF and other Federal agencies for data management infrastructure, campus and/or national computing resources, and other cyberinfrastructure and software tools. The overall design and operations of the NEES2 cyberinfrastructure should incorporate research and best practices in providing cyberinfrastructure for virtual organizations. In addition, the awardee should seek additional NSF funding opportunities to expand/enhance the cyberinfrastructure beyond the support provided under the NEES2 operations award.

H. Education and Community Outreach (ECO)

NEES2 provides the opportunity to integrate research with effective learning resources for K-12 and higher education communities, practitioners, and the public, and to broaden the STEM pipeline and next generation workforce for the earthquake field. All ECO activities supported through this award must use NEES2 resources to justify support under this award. The ECO component of NEES2 must encompass the following:

- *Organizational structure and qualified staffing*: ECO staffing must have expertise and prior successful accomplishments in (a) education and outreach for the targeted audiences and the subject matter content, (b) developing a broadly inclusive STEM user base, and (c) education and outreach assessment.
- *Capacity-building activities*, using the NEES2 facilities and cyberinfrastructure, to develop the next generation cohort of earthquake engineering researchers (i.e., early career faculty and graduate students).
- *A Research Experiences for Undergraduates (REU) site*, supported under the award, which follows the guidelines and student eligibility requirements in the NSF 12-569, Research Experiences for Undergraduates (REU) program solicitation http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5517&from=fund or its successor solicitations.
- *Annual NEES2 community meeting*, which may be held in conjunction with other national and international meetings and conferences, to enable broader participation, sharing, and dissemination.
- *Knowledge dissemination infrastructure,* to include:
    - *Proactive strategy, publications, and activities* to widely disseminate discoveries, innovations, and technologies that have been enabled by research utilizing NEES2,
    - *Informational publications* about NEES2 operations, both in printed and web-based formats, and
    - *Catalog* of journal and other publications describing research and educational outcomes enabled by the use of NEES2 resources.
- *Assessment mechanisms,* which document evidence-based outcomes, for all ECO activities across NEES2.

I. Year One Start-up and Transition

The year-one activities include all activities to implement start-up for the period from October 1, 2014 through March 31, 2015, accounting for a six-month transitional overlap in responsibility from the incumbent for cyberinfrastructure operations during this time period. NSF will provide separate funds to the incumbent, as needed, to operate cyberinfrastructure during this transition. High priority activities include subawards to partner organizations and the delivery and implementation of production-quality cyberinfrastructure, including end-to-end implementation of the NEES2 data repository. By the end of the first six months, the following activities must have been completed:

- By the end of the first week of the award, submission to NSF by the awardee, a letter from each facility host institution, with the exception of the PERRR facility, certifying that on the effective date of the award, all facility resources provided under this award are fully functional and operational for use by the earthquake engineering community.
- By the end of the first month of the award,
    - NMO informational web site for the user community that describes both available and planned resources and year-one user/training workshops for all NEES2 components.
    - Description of facility resources, facility safety plans, and user fees/recharge rates posted on each facility's and NMO's web sites.
- By the end of the third month of the award,
    - Lead institution's oversight policies and procedures.
    - Subawards to all partner organizations.
    - External advisory committee membership.
    - For the PERRR facility, an external steering committee formed and held its first meeting.
    - All facility web sites.
- By the end of the sixth month of the award,
    - NMO operating policies and procedures.
    - Submission to NSF for approval: updated Strategic Plan and Performance Metrics, WBS and dictionary, and Risk Management System.
    - Full staffing across NEES2, with staffing diversity benchmarked against national engineering averages.
    - Subaward monitoring protocols developed and implemented.
    - Network-wide performance management system implemented and performance metrics tracked.
    - Implementation of activities to develop an active and broadly inclusive user base for NEES2, and assessment of those activities.
    - For facility operations,
        - Network-wide facility scheduling protocol and implementation.
        - Network-wide environmental, health, and safety plan implemented.
        - Network-wide Major Equipment Repair Policy.
    - For cyberinfrastructure operations,
        - Informational "go to" web site for all NEES2 activities.
        - Baseline production-quality cyberinfrastructure made operational, including the NEES2 data repository, and user policies and procedures available on the web site.
        - Completion of the transfer of the data repository and other content from the incumbent, including transfer of responsibilities for operation of cyberinfrastructure.

Updated documentation of user requirements for cyberinfrastructure.
        - Network-wide data management protocols and information for users, including data sharing, archiving, and curation policy.
        - Network-wide identity and trust management and cybersecurity plans and implementation.
    - For ECO,
        - Implementation of the REU site program for year one, e.g., completion of student recruiting and selection.
        - Implementation of activities that provide effective learning resources and target broadly inclusive groups, and the awardee's assessment of those activities.
    - At least one meeting of the external advisory committee has been held.

J. General Information

For additional information on the current NEES infrastructure, this solicitation, and NSF policies, please contact the Lead Cognizant Program Officer listed in this solicitation.

Resource Library

As part of this solicitation, NSF will maintain a separate Resource Library for proposing Principal Investigators. Access to the Resource Library will be provided only to proposing institutions/Principal Investigators who have first submitted a complete Letter of Intent by the due date with all requested information and then make a request for access to the Resource Library to the Lead Cognizant Program Officer. Proposers who submit Letters of Intent but do not submit a full proposal will not have access to the Resource Library after the full proposal submission deadline. Proposers should review the following documents; any additional materials and information related to this solicitation, including NSF responses to Frequently Asked Questions, will be made available through the Resource Library:

- Incumbent's NEES Operations Annual Project Report and Work Plans
- Cooperative Agreement between NSF and Purdue University for the management and operations of NEES for FY 2010-FY 2014
- Incumbent's Subaward Monitoring Guidelines and Procedures
- Incumbent's Risk Management Protocol
- Incumbent's agreements with international organizations
- Incumbent's cyberinfrastructure requirements traceability matrix
- Incumbent's IT Product Contract up to NEEShub release 4.5

Informational Webcast/Webinar

NSF intends to hold an informational webcast/webinar prior to the due date of the Letter of Intent. The date and further information about the webcast/webinar will be distributed through NSF's regular "Get NSF Updates by Email" service.

III. AWARD INFORMATION

$62,000,000 estimated total for up to five years. The amount available under the cooperative agreement will depend upon the annual budgets of NSF, the performance of the awardee, and the extent of utilization of NEES2 resources by NSF-supported awards. For the purpose of writing a proposal, assume that the funding available (i.e., annual budget) is up to $12,000,000 in year one, $13,000,000 in year two, $12,500,000 in year three, $12,500,000 in year four, and $12,000,000 in year five.

IV. ELIGIBILITY INFORMATION

Organization Limit:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.

PI Limit:

The PI, who will serve as the Network Director, must be a full-time employee of the lead institution by the effective start date of the NSF cooperative agreement award.

Limit on Number of Proposals per Organization: 1

An academic institution may submit only one proposal as the lead institution; however, an academic institution may participate in more than one proposal as a non-lead institution. Full proposals involving more than one organization must be submitted as a single administrative package from the lead institution; collaborative full proposals with multiple administrative packages will not be accepted and will be returned without review. If the lead Principal Investigator (Network Director) leaves or transfers to another institution during the review process or after an award is made, the proposal/award remains with the lead institution. Additionally, the lead institution cannot be changed after submission of the full proposal. Non-academic U.S. institutions and organizations, including national laboratories and private-sector companies, as well as non-U.S. institutions, may participate in network activities using their own resources; however, this shall not be interpreted to prohibit purchases, services, or sales contracts/agreements with these entities. All NEES2 facility host institutions and facilities must be located in the United States to facilitate access by NSF-supported researchers.

Limit on Number of Proposals per PI: 1

The Principal Investigator (PI) may serve as PI/Network Director on only one proposal.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Letters of Intent***(required):***

Letter of Intent Preparation Instructions:

A Letter of Intent (LOI), up to six pages, is required to facilitate the NSF review process. All lead institutions planning to submit a full proposal must complete the LOI submission in the following two ways by the LOI due date: (1) FastLane LOI Submission and (2) PDF LOI Submission via email to the Lead Cognizant Program Officer. NSF will use the LOI only to prepare for the proposal merit review process. The PDF version of the LOI must include the FastLane LOI ID Number provided upon submission. NSF will provide via email to the Principal Investigator an acknowledgment of receipt of the LOI.

Both versions of the LOI require the following information (note that there is a FastLane restriction on the maximum number of characters allowed, including counting spaces, for some of the categories below):

- Project Title: The title must be "NEES2 Ops: FY 2015-FY 2019."
- Synopsis: Provide brief statements of the vision, goals, and features to be proposed for NEES2. Include the following information when describing the features: (a) name of lead institution, (b) names of all partner facility institutions, location of the facility if not on the host institution's main campus, and major experimental equipment and capabilities to be provided for each facility (maximum three-sentence description per facility), (c) names of all partner organizations providing cyberinfrastructure resources, and (d) names of all partner organizations providing ECO resources.
- Other Comments: Continue Synopsis, if needed, in this section.
- Organizational Attribute: Select the appropriate organizational attribute for the lead institution from the drop down list.
- Key Participants: Names, departmental affiliations, organizations, and locations (city, state, country) for Key Personnel for the NMO, experimental facilities, cyberinfrastructure providers, ECO providers, and any other key staff members. This does not include the PI and Co-PI's, who should be identified in the "Senior Project Personnel" section below.
- Key Participants Continued: Continue the list of "Key Participants (people)" as needed.
- Key Point of Contact for NSF Inquiries: Insert Lead PI name.
- Project PI Information: Lead PI's contact information.
- Senior Project Personnel (maximum of five official Co-PIs): PI and up to four additional Co-PIs. The coversheet only allows a total of five PIs.
- Participating Organizations: List all participating organizations, including the lead institution. Participating organizations include ones that request support in the proposal and ones that do not request support in the proposal but will be named in the proposal. For each organization, include the name and location (city, state, and country). Each entry can have up to 76 characters (including spaces).

Letter of Intent Preparation Instructions:

When submitting a Letter of Intent through FastLane in response to this Program Solicitation please note the conditions outlined below:

- Sponsored Projects Office (SPO) Submission is required when submitting Letters of Intent
- A Minimum of 0 and Maximum of 4 Other Senior Project Personnel are allowed
- A Minimum of 0 and Maximum of 30 Other Participating Organizations are allowed
- Key Participants is required when submitting Letters of Intent
- Key Point of Contact for NSF Inquiries is required when submitting Letters of Intent
- Project PI Information is required when submitting Letters of Intent
- Submission of multiple Letters of Intent is not allowed

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 nsfpubs@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 nsfpubs@nsf.gov.

Important Proposal Preparation Information: FastLane will check for required sections of the proposal, in accordance with *Grant Proposal Guide* (GPG) instructions described in Chapter II.C.2. The GPG requires submission of: Project Summary; Project Description; References Cited; Biographical Sketch(es); Budget; Budget Justification; Current and Pending Support; Facilities, Equipment & Other Resources; Data Management Plan; and Postdoctoral Mentoring Plan, if applicable. If a required section is missing, FastLane will not accept the proposal.

Please note that the proposal preparation instructions provided in this program solicitation may deviate from the GPG instructions. If the solicitation instructions do not require a GPG-required section to be included in the proposal, insert text or upload a document in

that section of the proposal that states, "Not Applicable for this Program Solicitation." Doing so will enable FastLane to accept your proposal.

Full proposals may be submitted only by lead institutions that have submitted a complete LOI by the LOI due date. Full proposals submitted from organizations that have not submitted a LOI by the due date will be returned without review. Due to the complexity of the proposals being submitted, use of FastLane to prepare and submit full proposals is strongly encouraged.

For planning purposes, October 1, 2014 should be shown as the start date on the Cover Sheet.

The full proposal must conform to the guidelines specified in the NSF Grant Proposal Guide (GPG) or the NSF Grants.gov Application Guide (as discussed above), and the additional full proposal preparation instructions below, which include deviations from the NSF GPG and the NSF Grants.gov Application Guide as follows:

- The project description length must not exceed 90 pages.
- The project description has a specified format and section headings that must be followed.
- The postdoctoral mentoring plan is not required, since postdoctoral researchers may not be supported.
- Additional information is specified for inclusion in the Facilities, Equipment, and Other Resources section.
- Additional information is specified for inclusion in the Special Information and Supplementary Documentation section.
- Additional Single Copy Documents must be provided.

Year-one work plans and organizational charts, when requested in the Project Description, must use the following formats:

- ***Year-one work plans*** must be presented in tabular format with the following column headings: WBS element, strategic goal, objective, brief activity description, deliverable, milestone, target performance metric, and responsible organization/staff.
- ***Organizational charts*** must show full first and last names, organizational affiliation, position title/role within NEES2 operations, lines of authority, and year-one, full-time equivalent (FTE) person-month effort (e.g., two months). Indicate existing personnel and personnel to be hired after the award is made.

Tables and lists in the project description may be in a smaller type but proposers are responsible for ensuring that the type is readable when the page is printed out.

For all software provided by NEES2 components that is open source, identify the open source license to be used when describing that software.

The Project Description section of the full proposal must contain the information specified below, in the order listed, using the section headings numbered 1-11 shown below. Section 1, "Summary Tables," is not included within the Project Description maximum page limit.

Section 1. Summary Tables

At the top of the project description, provide the following three tables (do not include any introductory paragraphs preceding these three tables in the Project Description):

- Table 1, "List of Participating Organizations," listing all organizations participating in NEES2 operations (including consultant organizations), whether or not requesting support. The table must have the following four columns: name of organization, location (city, state, and country only if not in the U.S.), Internet domain name (e.g., abcxyz.edu), and total year-one requested support (if none, then state "none"). Proposals that include participating organizational names anywhere within the proposal and do not list these organizations in Table 1 will be returned without review and will not receive further consideration. Proposers are cautioned to carefully review the proposal for compliance with this section prior to proposal submission and by the published proposal date and time deadline; revisions to proposals to correct non-compliance with the above will not be permitted after the full proposal deadline.
- Table 2, "List of Supported Project Personnel," listing all project personnel who request support (whether at the lead institution or at a partner organization). Use the following column headings: full name (last, first), professional title, organizational (and departmental, where applicable) affiliation, organizational Internet domain name (e.g., abcxyz.edu), project title and role, key personnel (state "yes" or "no"), and year-one FTE person-month effort. Identify all positions that constitute "Key Personnel" that will be named in the cooperative agreement if an award is made. As a minimum, Key Personnel must include, but is not limited to, the following: PI/Network Director; all co-PIs; all Deputy, Associate, and/or Assistant Directors; all Facility Directors (up to seven); and lead staff for facility operations, cyberinfrastructure, and ECO activities. If the name of an individual to fill a non-Key Personnel position is not known at the time of proposal submission, enter "To Be Determined" in the table and the date when the individual for that position will be hired. Do not include in the table the names of secretarial staff and external advisory committee members and chair, as all committees, including the PERRR steering committee, are to be populated after the award is made by NSF. Proposals that do not identify the names for all Key Personnel positions, include names of individuals to be supported in the proposal but do not list these names in Table 2, or include names of external advisory committee and PERRR steering committee members and chairs, will be returned without review and will not receive further consideration. Proposers are cautioned to carefully review the proposal for compliance with this section prior to full proposal submission and by the full proposal deadline; revisions to proposals to correct non-compliance with the above will not be permitted after the full proposal deadline.
- Table 3, "List of Other Project Personnel," listing all project personnel participating in the award but not requesting support. Use the following column headings: full name (last, first), professional title, organizational (and departmental, where applicable) affiliation, organizational Internet domain name (e.g., abcxyz.edu), and role in NEES2 operations. Proposals that include other project personnel names within the proposal text and do not list these names in Table 3 will be returned without review and will not receive further consideration. Proposers are cautioned to carefully review the proposal for compliance with this section prior to full proposal submission and by the full proposal deadline; revisions to proposals to correct non-compliance with the above will not be permitted after the full proposal deadline.

Section 2: NEES2 Science Plan

- Present a NEES2 Science Plan outlining the vision, major grand challenges, and key transformative research questions that can only be addressed by the NEES2 infrastructure requesting support.
- Provide a table for NEES2 that provides for each facility (by major equipment component for each facility) and each key cyberinfrastructure resource: its role in enabling the key transformative research, the data products that it can generate for research, and its market analysis (anticipated user base).
- Position the NEES2 infrastructure within the state-of-the-art in both earthquake engineering research infrastructure and cyberinfrastructure and in both national and global contexts.

Resources that will be provided by U.S. or international partners who are not requesting support may be named in the Plan, but the

specific role and contribution to NEES2 must be described in the Facilities, Equipment, and Other Resources section.

Section 3. Strategic Plan and Performance Metrics (up to five pages)

Present a network-wide Strategic Plan and Performance Metrics that show the strategy and metrics to be used to lead, manage, operate, and assess NEES2 operations.

Section 4. Work Breakdown Structure (WBS) and Budget Allocations (up to two pages)

Present the WBS to level 3 (i.e., 1.2.3) that covers, for year one, all aspects of NEES2 operations and associated budget for each WBS element when the project is at full operations and has exited from the start-up and transition phase. Include both direct and indirect costs for each WBS element; do not separate out direct and indirect costs. The budget allocations must total to the year-one FastLane requested budget. The more detailed WBS for the entire project, associated dictionary, and budget allocations must be provided in the Special Information and Supplementary Documentation section.

Section 5. NEES2 Management Office (NMO)

Describe the NMO and how it addresses the responsibilities outlined in Section II.E, "NEES2 Management Office." Additionally, include the information requested below. (Note: Any resource to be provided that is not requesting support may be named in this section for completeness, but the description of that resource must be included in the Facilities, Equipment, and Other Resources section.)

- Present the organizational structure for entire NEES2 operations, showing the lead institution; NMO; facility, cyberinfrastructure, and ECO providers; and advisory committee structure, and all partner organizations. Succinctly describe the roles, responsibilities, and lines of authority for all partner organizations. Discuss why the organizational structure was selected.
- Present an organizational chart showing the position of the NMO within the lead institution and the offices within the lead institution that will provide oversight for NEES2 operations.
- Present an organizational chart showing the structure of the NMO office with all Key Personnel and other staff positions. Describe the NMO, its function and activities, and why its structure was selected. Describe the qualifications and prior accomplishments of the Key Personnel to serve in their positions.
- Describe the external advisory committee structure, its role in guidance and oversight across NEES2, and the types of expertise that will comprise advisory committee membership. Do not provide specific names or organizations to serve on the committee or as Chair.
- Provide the year-one work plan for the NMO, not to exceed two pages, excluding more detailed transition-specific activities that will be provided in the Special Information and Supplementary Documentation section.
- Present a risk matrix table for the entire NEES2 operations, not to exceed one page, demonstrating that the lead institution and NMO understand the major risks for NEES2 operations.
- If relevant to the technology proposed and/or the NEES2 resources that will be available to provide access to a broad group of users, indicate awareness and compliance with the International Traffic in Arms Regulations (ITAR) and Export Administration Regulations (EAR). If this section is not applicable, then so indicate.

Section 6. Experimental Facilities (up to six pages per facility)

At the start of this section, include two summary tables for all facilities, except the PERRR facility:

- Prospective table, with the rows to be the facility name and each major equipment component and the column headings to be the schedule planned for year one for each major equipment (based on a 250-day year): the number of days allocated for use by NSF-supported awards; number of days allocated for use by sources other than NSF; number of days allocated for routine maintenance and calibration; and number of days allocated for user training.
- Retrospective table, with the rows to be the facility name and each major equipment component, and the column headings to be by year, for each of the past three years (based on a 250-day year), the number of days that each major equipment: (a) was used for specimen construction, instrumentation, testing, and demolition by all sources, (b) underwent routine maintenance and calibration, (c) underwent repair/replacement, and (d) was not in use.

Describe each NEES2 facility, including the PERRR facility, and how it addresses the responsibilities outlined in Section II.F, "Experimental Facilities." Additionally, include the information requested below for each facility. Additional information for each facility will be provided in the Facilities, Equipment, and Other Resources section of the proposal. The order of information provided for each facility must be consistent for all proposed facilities. (Note: Any resource to be provided that is not requesting support may be named in this section for completeness, but the description of that resource must be included in the Facilities, Equipment, and Other Resources section.)

- State the name and location of the host institution and the location of the facility. If the facility is part of a larger campus laboratory or laboratory cost center, provide information on how the NEES2 facility will have a separate budget and accounting structure for reporting under NEES2 operations.
- In one paragraph, provide the rationale for why the host institution and the facility desire to be part of NEES2. Present two examples of the facility's accomplishments in supporting an external user base for research and education within the past three years.
- Describe the resources and experimental capabilities to be provided as a NEES2 facility. For software, indicate if it is proprietary, commercial, or publicly available open source. Describe the Internet and Internet2 connectivities within the facility and to the relevant equipment. Highlight the experimental capabilities unique to the facility and those synergistic with other NEES2 facilities. Discuss if testing at the facility will require custom, project-specific software to be developed, e.g., controller or hybrid simulation software, and how the facility will accommodate that development within the facility's experimental protocol, project throughput, and user scheduling. Describe the data management infrastructure and cybersecurity to be provided, including provisions for data curation at the time of testing and data uploads directly to the NEES2 data repository. Using an example project that might be conducted at the facility, describe the end-to-end data management workflow and associated user support.
- Discuss maintenance and calibration that will be done internally and by external vendors. Describe major equipment failures or losses within the past three years exceeding $20,000 in total for clean-up and repair/replacement, the total cost for each failure/loss, sources of support for all costs, and the duration of time lost from damage/failure to restored functionality.
- Provide the year-one work plan, not to exceed one page, excluding more detailed transition-specific activities that are provided in the Special Information and Supplementary Documentation section.
- Provide the facility's organizational chart, including all relevant institutional offices that will provide facility oversight and project staffing.
- Describe the strategies and activities that will be used to develop an active and broadly external user base for the facility; the user support to be provided during all phases of experimentation; facility's informational web site; and process that will be used, together with the NMO, to schedule users without prejudice.
- Describe the plan for annual facility availability to NSF-supported users. Describe any challenges in scheduling the major

equipment for use by NSF-supported awards at least 80% annually (i.e., 200 days out of a 250-day year).

Section 7. Cyberinfrastructure

Describe the cyberinfrastructure operations and how it addresses the responsibilities outlined in Section II.G, "Cyberinfrastructure." Additionally, include the information requested below. (Note: Any resource to be provided that is not requesting support may be named in this section for completeness, but the description of that resource must be included in the Facilities, Equipment, and Other Resources section.)

- Describe the resources, services, and deliverables provided as the baseline production-quality cyberinfrastructure. In tabular format for the deliverables, identify those that can be transitioned directly from the incumbent or the software tool's author and those that are new and either will require development or can be leveraged directly from other resources. Include the milestone date for when each deliverable will be available for use by the NEES2 community. Identify those deliverables that will require negotiation with the authors of those tools for use in NEES2.
- Describe the data management infrastructure, NEES2 data repository, and end-to-end data work flow. Include milestones dates for the following: all data from the incumbent's NEEShub Project Warehouse transitioned, completion of curation of projects completing testing under the incumbent's operations during FY 2014, completion of the prototype and final PERRR facility data repository, full functionality for archiving experimental data generated at NEES2 facilities and other facilities under NSF-supported awards, and full functionality to archive data from NSF-supported post-earthquake investigation awards.
- Position the NEES2 cyberinfrastructure in the context of ongoing cyberinfrastructure and large facility projects supported by NSF and other Federal agencies. Discuss how the NEES2 cyberinfrastructure incorporates research and best practices for providing cyberinfrastructure for virtual organizations.
- Describe the NEES2 cyberinfrastructure user community, and how the cyberinfrastructure is designed to serve those users. Present the user requirements that guide the selection of the baseline, system architecture, and middleware. Describe how the project will develop and support an active and inclusive user base and ensure that the cyberinfrastructure best reflects the evolving needs and priorities of its stakeholders.
- Provide the cyberinfrastructure organizational chart. Discuss qualifications of the staffing and prior successful accomplishments in providing cyberinfrastructure for research communities, with data on the size of the user base served and the metrics used to track usage, user demographics, and user satisfaction.
- Present the year-one work plan, not to exceed two pages, excluding more detailed transition-specific activities that will be provided in the Special Information and Supplementary Documentation section.

Section 8. Education and Community Outreach (ECO)

Describe how the project will meet the requirements listed in Section II.H, "Education and Community Outreach." Additionally, include the information requested below. (Note: Any resource to be provided that is not requesting support may be named in this section for completeness, but the description of that resource must be included in the Facilities, Equipment, and Other Resources section.)

- Provide the organizational chart for ECO activities. Discuss qualifications of the staffing and prior successful accomplishments in education, outreach, and assessment.
- Present the year-one work plan, not to exceed two pages, excluding more detailed transition-specific activities that will be provided in the Special Information and Supplementary Documentation section.

Section 9. Diversity Strategic Plan for NEES2 Operations Staffing

Provide the diversity strategic plan. The plan must not include quantitative targets. Describe any existing barriers to achieving a strong and diverse candidate pool for staffing all positions across the project, and how those barriers will be overcome in the recruiting process. Include a table (sample format below), using numbers only to show the current diversity of the proposed staffing who have been identified to participate in and receive support under NEES2 operations. The proposal must not include actual names. These data must include only numbers for project team members who are U.S. Citizens and U.S. Permanent Residents. Note: Submission of the information on this table is voluntary.

	Total #	Male	Female	African American	Native American, Pacific Islander	Hispanic American	Persons with Disabilities*
Key Personnel (across entire project) listed in Table 2 who are U.S. citizens and U.S. permanent residents							
Other staffing listed in Table 2 who are U.S. citizens and permanent residents							
Totals							

*A person with a disability is an individual who has one or more impairments that affects substantially one or more activities of daily living that is/are not completely correctable with assistive devices.

Section 10. Results from Prior NSF Support, for the Principal Investigator and co-Principal Investigators only, in accordance with the NSF GPG or NSF Grants.gov Application Guide.

Section 11. Other Supporting Information (optional - up to two pages)

Provide any additional information that the lead institution believes will be of assistance in evaluating the proposal but does not fit into any of the sections defined above or in the Facilities, Equipment, and Other Resources and Special Information and Supplementary Documentation sections.

Facilities, Equipment, and Other Resources

Include the descriptions below; however, the descriptions must not include any quantifiable financial information about the resources that will be made available for NEES2 operations during FY 2015-FY 2019.

- Description of the NMO office meeting space and other resources provided at the lead institution, including Internet and Internet2 capabilities.
- Description of experimental facility resources that are not requesting support.

- Description of cyberinfrastructure resources that are not requesting support.
- Description of ECO resources that are not requesting support.
- For each proposed NEES2 facility, with the exception of the PERRR facility, provide the following information as pertinent to the facility:
    - One-page floor or site plan of the laboratory with dimensions showing the location of major experimental and safety equipment, secured storage areas, specimen staging areas, doorways, loading docks, cranes and/or other specimen handling equipment, control room, perimeter security, and meeting and office space. If the facility is part of a larger laboratory space, clearly indicate this on the plan.
    - Up to eight photos of the proposed NEES2 facility, not to exceed two pages, showing the facility resources to be provided for NEES2 operations, and, as pertinent, specimen construction/staging areas. Annotate the photos as needed to define the laboratory/site space and highlight safety and security equipment and features.
    - Facility network diagram, including Internet and Internet2 connections and data flow from source to local repository and from source to NEES2 data repository.
    - Facility Inventory Table (one table for each facility, excluding the PERRR facility), with the rows to be the "Facility Resources" itemized for all equipment/experimental resources and personnel (e.g., laboratory technician) that will be available to NEES2 users and the column to be "Source of Support" for each facility resource (indicate either "NEES2 Ops Award" or "Institutional User Fees/Recharge Rates").
    - Facility Data Summary Table (one table for each facility, excluding the PERRR facility), using the following format:

1	Facility Name	
2	Host institution name	
3	Facility location (campus building/location and/or off-site location)	
4	Facility PI/Director Name	
5	Total number of facility staff FTE person-months, year one	
6	Facility requested budget, five-year total	
7	Facility requested budget, year one	
8	List of major equipment to be supported, with year of procurement and year of initial operations	
9	Estimated remaining useful life (in years) of major equipment and the source(s) of estimate	
10	Telepresence equipment and capabilities	
11	Major facility-specific software (e.g., data management, controller algorithms, hybrid simulation, data visualization tools, etc.)	
12	Number of NSF awards that tested using the major equipment within the past three years, by major equipment	
13	Number of internal users within the past three years (list by major equipment and year)	
14	Number of external users within the past three years (list by major equipment and year)	
15	List of major equipment that is likely to need major overhaul or replacement during the five-year award period	
16	Date(s) of most recent laboratory safety and inspection and major equipment condition assessment report(s) and summary of findings	
17	Date(s) of most recent equipment, sensor and instrumentation calibrations	
18	Date(s) of most recent technology refresh, including sensors, data acquisition, computers, and servers	
19	Number and types of facility accidents within the past three years and summary of corrective safety actions taken to prevent future occurrences	
20	Date of most recent user training workshop and number of attendees	
21	Any other data that the facility would like to provide	

Special Information and Supplementary Documentation

Include the information requested below, with the headings as shown:

A. Complete Work Breakdown Structure (WBS), Dictionary, and Budget Allocations (not to exceed eight pages)

In support of the information provided in the Project Description, provide in this Appendix the complete project WBS, WBS dictionary, and budget allocated to each WBS element for NEES2 operations in year one, when NEES2 is at full operations. The dictionary should define the full scope of NEES2 operations. Using the WBS, provide the budget allocation for each WBS element, rolling up the budget at each level. Include both direct and indirect costs for each WBS element; do not separate out direct and indirect costs. The budget allocations must total to the year-one FastLane requested budget.

B. Year One Start-up and Transition Plan (not to exceed eight pages)

Present all start-up and transition activities (lead institution, NMO, facilities, cyberinfrastructure, and ECO) in a six-month work plan in tabular format (use the year-one work plan format described above), including the deadlines listed in Section II.I, "Year-One Start-up and Transition." Indicate resources that will be transitioned from the incumbent and resources that must be developed during the transition period. Describe the management of the start-up and transition, how continuity of service in cyberinfrastructure operations will be provided, and the criteria that will be used, in addition to the completion of the deliverables in Section II.I, to report to NSF the exit from start-up and transition to full operations.

C. Evidence of Lead Institution Capability (not to exceed five pages, exclusive of the CASB)

Provide documentation of the lead institution's internal business, financial, and human resources capability to manage NEES2 operations within the lead institution and oversee subawards to partner organizations.

- Oversight lines of authority: Describe the role of NEES2 operations and the reporting lines of authority of the Principal Investigator and the NMO within the lead institution, referencing the organizational structure presented in the Project Description for lead institution oversight. Describe how these lines of authority will be used to provide awardee oversight of all aspects of the project, including subaward management and procurement.
- Business and financial management and audit control: Provide the structure and plan for implementing and monitoring business systems and internal controls across the entire project for financial management, accounting, property standards, equipment standards, procurement standards, reporting, and records. Include prior evidence of ability to execute and monitor a complex project with multiple subawards.
- Human resources: Describe the human resource system(s) that will be used by the lead institution for recruiting NMO personnel, evaluation of its employees on the project, and evaluation of the subawardees' performance under this award. Provide the lead institution's minimum qualifications for selection of all Key Personnel positions, regardless of the employer of the individual that will fill that project position.
- Conflict of interest of lead institution: If the lead institution is providing and operating one of the NEES2 facilities and/or the lead on cyberinfrastructure, describe the process that the lead institution will use to obtain annual independent assessments of its own project performance and plans for these components.
- Current Cost Accounting Standards Board (CASB) Disclosure Statement, if applicable.

D. Environmental Considerations

If a proposed facility might have an environmental impact, provide sufficient information to assist NSF officials in assessing the environmental consequences of supporting the facility. Provide a table that lists for each proposed NEES2 facility, whether or not there are environmental considerations, the nature of the environmental considerations, and if permits might be needed, a short description of the types of permits that may needed. If this information is not pertinent for a given facility, then state "none."

E. Letters of Collaborative Arrangements

Include letters of collaborative arrangements from individuals or organizations that are integral parts of the proposed project but are not requesting support. This would include a subset of organizations named in Table 1, "List of Participating Organizations," and the collaborators listed in Table 3, "List of Other Project Personnel," in the Project Description. Letters of collaboration should focus solely on affirming that the individual or organization is willing to collaborate on the project as described in the Facilities, Equipment, and Other Resources section. No additional text may be included. The template that must be used for the preparation of letters of collaboration is provided below.

Letters of collaboration must not be provided from any individual designated as a Principal Investigator, Key Personnel, or senior personnel. Letters of collaboration must not be submitted from any organization that requests financial support.

Each letter of collaboration must be signed by the designated collaborator. Requests to collaborators for letters of collaboration should be made by the PI well in advance of the proposal submission deadline, because they must be included at the time of the proposal submission. They must not be sent directly to NSF, as NSF will not add them to the proposal or include them in the merit review process. ***Letters deviating from this template will not be accepted and may result in the proposal being returned without review.***

Template to be used for Letters of Collaboration

To: NSF Program Solicitation NEES2 Operations FY 2015-FY 2019

From: _____
(*Printed name of the individual collaborator or name of the organization and name and position of the official submitting this memo*)

By signing below (or transmitting electronically), I acknowledge that I am listed as a collaborator on this proposal, entitled "NEES2 Operations FY2015-FY 2019" with _____(*PI name*) as the Principal Investigator. I agree to undertake the tasks assigned to me or my organization, as described in the Project Description or Facilities, Equipment, and Other Resources section of the proposal, and I commit to provide or make available the resources specified therein.

Signed: _____
Organization: _____
Date: _____

Please note that letters of support from individuals or organizations who are not named in Tables 1 or 3 in the Project Description are not allowed. Inclusion of such letters will result in the proposal being returned without review.

F. Biographical Sketches of Additional Project Personnel (Up to 10 additional project personnel)

Two-page biographical sketches, following the NSF GPG format, for up to ten additional project personnel requesting support, may be included in this section.

Single Copy Documents. Provide the following as single copy documents:

- Lists of Participating Organizations and Project Personnel. Submit the "List of Participating Organizations" (Table 1 in the Project Description), "List of Supported Project Personnel" (Table 2 in the Project Description) and "List of Other Project Personnel" (Table 3 in the Project Description) together as a text-searchable single Portable Document Format (PDF) file in FastLane in the single copy section of the full proposal.
- Conflict of Interest List. Provide a list, in a single alphabetized table, alphabetized by last name, with the full first and full last names and organizational affiliations of all individuals with conflicts of interest for all project personnel who request financial support in year one. Conflicts to be identified are the following: (1) Ph.D. dissertation advisors and advisees, (2) collaborators or co-authors, including postdoctoral researchers, for the past 48 months, (3) co-editors within the past 24 months, (4) spouse or other relatives, and (5) any other individuals with whom, or institutions with which the PI(s), co-PI(s), Key Personnel, and other senior personnel have financial ties, including advisory committees (specify type), boards of

directors, or prospective employees. Provide this table as a text-searchable single Portable Document Format (PDF) file in FastLane in the single copy section of the full proposal.

B. Budgetary Information

Cost Sharing: Inclusion of voluntary committed cost sharing is prohibited

Other Budgetary Limitations:

Proposers should prepare annual budgets in accordance with Section III, "Award Information," and the budgetary limitations listed below:

1. The year-one budget includes all costs for start-up and transition from October 1, 2014 through March 31, 2015.
2. The year-two budget includes a one-time increase of up to $1,000,000 for resource procurement for the PERRR facility.
3. Annual budgets include:
    - A major equipment repair budget of $500,000, which provides support for major equipment repairs across the NEES2 facilities.
    - Travel funds for staff from the lead institution and NMO to visit each NEES2 facility and other major subawards at periodic intervals.
    - Travel funds to participate in up to three annual meetings for NSF-supported large facilities.
    - Participant support costs, not to exceed $100,000 annually, for travel support for potential users to attend facility and cyberinfrastructure training workshops, who do not have current NSF support.
    - Participant support costs for REU site students.
4. Funds from this award cannot be used to provide severance, retention, or bonus packages for any project personnel supported by this award.
5. Postdoctoral researchers may not receive support under this award.
6. Undergraduate students who are U.S. citizens, U.S. nationals, or permanent residents of the United States may be supported at the NEES2 facilities in an amount not to exceed $12,000 in total annually for all undergraduate students per facility; this limit does not include the REU site students. Other undergraduate students may not be supported.
7. Graduate students who are U.S. citizens, U.S. nationals, or permanent residents of the United States may be supported to assist with the REU site program, or if approved by the cognizant NSF Program Officer, to support other NEES2 operations activities. Other graduate students may not be supported.

Budget Preparation Instructions:

The full proposal must include a budget for each of the five years. FastLane and Grants.gov will automatically provide a cumulative budget.

Include separate budgets for subawards/subcontracts that are $100,000 or greater annually. For subawards/subcontracts less than $100,000 annually, include the costs aggregated on the subaward line of the annual budget. In the budget justification, provide a list of all organizations that will receive less than $100,000 annually and the annual support provided to each organization.

C. Due Dates

- Letter of Intent Due Date(s) ***(required)*** (due by 5 p.m. proposer's local time)***:***

  March 22, 2013

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

  May 24, 2013

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. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: http://www07.grants.gov/applicants/app_help_reso.jsp. 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 for acknowledgement and, if they meet NSF 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 either as *ad hoc* reviewers, panelists, or both, who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with 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 of interest with the proposal. In addition, Program Officers may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in the GPG as Exhibit III-1.

A comprehensive description of the Foundation's merit review process is available on the NSF website at: http://www.nsf.gov/bfa/dias/policy/meritreview/.

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Empowering the Nation Through Discovery and Innovation: NSF Strategic Plan for Fiscal Years (FY) 2011-2016*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the core strategies in support of NSF's mission 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 variety of learning perspectives.

Another core strategy in support of NSF's mission is broadening opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in STEM disciplines, which 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.

A. Merit Review Principles and Criteria

The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These "Broader Impacts" may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. Both criteria are to be given full consideration during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. (GPG Chapter II.C.2.d.i. contains additional information for use by proposers in development of the Project Description section of the proposal.) Reviewers are strongly encouraged to review the criteria, including GPG Chapter II.C.2.d.i., prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- Intellectual Merit: The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- Broader Impacts: The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to
    a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
    b. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

Proposers are reminded that reviewers will also be asked to review the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

Additional Solicitation Specific Review Criteria

Reviewers will be asked to evaluate the proposal using the following additional merit review criteria:

- Degree to which NEES2 Science Plan provides the vision and resources to enable transformative research for earthquake hazard mitigation.
- Quality and comprehensiveness of the Strategic Plan and performance metrics to guide NEES2 operations.
- Effectiveness of the lead institution and NEES2 Management Office (NMO) structure and its key personnel to provide leadership, management, oversight, and responsibility for the operations and performance of NEES2.
- Comprehensiveness of the plan for performance management and assessment across NEES2.
- Quality and comprehensiveness of the work breakdown structure (WBS) and its associated dictionary to fully define NEES2 operations scope.
- Extent to which each individual experimental facility provides high quality experimental and data management infrastructure, maintenance and operations, safety, staffing, and user services, and sufficient annual availability for use by NSF-supported awards.
- Extent to which the cyberinfrastructure provides community-driven and production-quality resources, including the NEES2 data repository, to enable transformative research in earthquake engineering, and and qualifications of the staffing.
- Quality and appropriateness of the education and community outreach (ECO) activities for the intended audiences, and qualifications of the staffing.
- Appropriateness of the budget and sufficiency of the budget justification.
- Likelihood that an active and broadly inclusive user base will utilize NEES2 resources.
- Quality of the external advisory committee structure and the likelihood that structure will be an effective resource for guiding and overseeing NEES2 operations.
- Quality of the six-month start-up and transition plan, including capability of the NMO to assume full responsibility for cyberinfrastructure operations upon completion of the transition period without degradation of high quality services.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review and/or Panel Review, Site Visit Review, or Reverse Site Review.

Proposals will be reviewed in accordance with standard NSF external merit review policy, which may consist of a combination of panel and ad hoc mail review. Selected proposals may be further reviewed by site visits and reverse site visits. Dates for site visits will be communicated to selected PIs as early in the review process as practicable. These dates will be non-negotiable, and it is expected that key personnel will be available on the scheduled dates. It is the responsibility of the PI to assure that contact information for the scheduling of these meetings is correct. Travel and other costs incurred by proposers for this review process will be the responsibility of the proposers. All PIs will receive documentation regarding the review process, including reviews and panel summaries, upon completion of the 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 deadline or target date, or receipt date, whichever is later. 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 each reviewer. 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 Research 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/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

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

Special Award Conditions:

The cooperative agreement will be administered by the Division of Civil, Mechanical and Manufacturing Innovation in the Directorate for Engineering and the Division of Acquisition and Cooperative Support in the Office of Budget, Finance, and Award Management.

NSF oversight of the cooperative agreement will include the following:

Award-Specific Programmatic Terms and Conditions:

- Review and/or approval of the following:
  - Review and approval of Annual and Final Project Reports.
  - Review of Quarterly Interim Reports.
  - Review and approval of changes in Key Personnel positions. Approval from NSF is required before a change is implemented.
  - Review and approval of the Strategic Plan and Performance Metrics.
  - Review and approval of Annual Work Plans.
  - Review and approval of the Risk Management System.
  - Review and approval of the documents completed at the end of year one for the PERRR facility.
  - Review and approval of requests to support graduate students to participate in NEES2 operations activities other than the REU site activity.
  - Review and, if required, approval of notifications to NSF about incidents related to environmental, health, and safety requirements; equipment damage/failure; and cybersecurity.
  - Awardee-proposed national and international partnerships that require the awardee signature on a Memorandum of Understanding or similar documents.
- Site visit merit reviews
  - Transition Site Visit, to be conducted at the end of the six-month transition period, organized by NSF, with external reviewers.
  - Annual Operations Management Site Visits, organized by NSF, with external reviewers.
  - Site Visits of Individual Facility Operations, organized by NSF, with external reviewers, at the facility's host institution or equipment location, approximately three annually.
- NSF Business Systems Review, typically scheduled once during the five-year award period, with the review to be conducted within the first two years of the award date.

Award-Specific Financial/Administrative Terms and Conditions:

Budgetary Requirements

- Review and/or approval of the following:
  - New subawards not approved as part of the original award with a direct cost of more than $100,000.
  - Rebudgeting of $100,000 or greater by the awardee or a subaward.

Use of unobligated carryover funds from the prior budget year not intended to be applied to support the next year's annual operating budget.
    - Equipment repair/replacement exceeding the funds available in the Major Equipment Repair Budget. The awardee annual budgets listed in Section III, "Award Information," include up to $500,000 for major equipment repair. If the cost to repair or replace damaged equipment exceeds the funds available under this award, then any additional NSF support to restore functionality would be based upon the cause of damage, prior equipment utilization history, remaining useful life of the equipment if repaired, future planned use of the equipment by NSF-supported projects, total cost of repair or replacement, quality of maintenance based on historical records, date and nature of original acquisition of the equipment, and availability of NSF funds.
- If a facility is utilized for NSF-supported awards at least 200 days annually (i.e., 80% based on a 250-day year), including routine maintenance and calibration time supported by the award, then the facility's institution may retain the program income earned during the remaining time to specifically further the NEES2 facility, per NSF approval. If the facility has more than 50 days of annual utilization by awards not supported by NSF, then NSF may require the use of program income to offset the NSF support.

- The award will not repair/replace equipment that was damaged or not operational for its intended use prior to the effective start date of the award.

Standard Cooperative Agreement Terms and Conditions, including supplements for managers of Large Facilities, are available at http://www.nsf.gov/awards/managing/co-op_conditions.jsp?org=NSF.

Termination: If the lead institution, NEES2 facility, and any other supported partner organizations are found to be inadequately performing, then NSF reserves the right to recommend termination of the award, a NEES2 facility, or any other supported partner organization.

Programmatic and financial/administrative terms and conditions not listed above will be negotiated at the time of award.

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 prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). Within 90 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report, will delay NSF review and processing of any future funding increments as well as any pending proposals for all identified PIs and co-PIs on a given award. 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 Research.gov, for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via Research.gov constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

More comprehensive information on NSF Reporting Requirements and other important information on the administration of NSF awards is contained in the NSF *Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

Prior to each annual operations management site visit review by a panel of external experts, the awardee must submit a comprehensive annual project report to NSF containing a summary of the progress during the current year against the performance metrics and the work plan and budget for the next-year's funding increment. Quarterly interim reports will be submitted to track progress throughout the current year.

VIII. AGENCY CONTACTS

Please note that the program contact information is current at the time of publishing. See program website for any updates to the points of contact.

General inquiries regarding this program should be made to:

- Joy M. Pauschke, Program Director, Division of Civil, Mechanical and Manufacturing Innovation (Lead Cognizant Program Officer), telephone: (703) 292-7024, email: jpauschk@nsf.gov

- Anna-Lee Misiano, Grants and Agreements Specialist, Division of Acquisition and Cooperative Support, telephone: (703) 292-4339, email: amisiano@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@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, National Science Foundation Update is a free e-mail subscription service 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 when new publications are issued that match their identified interests. Users can subscribe to this service by clicking the "Get NSF Updates by Email" link on the NSF web site.

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.

Additional suggested sources of information, in addition to those provided in the program solicitation above, which may be helpful to proposers (not an exhaustive list):

Cyberinfrastructure Framework for 21st Century Science and Engineering (CIF21), http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504730

DataWay, http://www.nsf.gov/mps/dataway/dataway.jsp

EarthCube, http://www.nsf.gov/geo/earthcube/index.jsp

Hyogo Earthquake Engineering Research Center - 3-D Full-Scale Earthquake Testing Facility (E-Defense Shake Table), http://www.bosai.go.jp/hyogo/ehyogo/

nanoHUB, http://www.nanohub.org/

National Ecological Observatory Network, http://www.neoninc.org/

National Science Foundation Large Facilities Workshop, April 2011, http://www.magnet.fsu.edu/mediacenter/seminars/lfw/

National Science Foundation 12-113, *A Vision and Strategy for Software for Science, Engineering, and Education,* http://www.nsf.gov/pubs/2012/nsf12113/nsf12113.pdf

National Science Foundation, Office of Cyberinfrastructure (publications, awards, funding opportunities), http://www.nsf.gov/od/oci/about.jsp

National Science Foundation, Software Infrastructure for Sustained Innovation-S2I2, http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503489&org=OCI&from=home

Ocean Observatories Network, http://www.oceanobservatories.org/

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 55,000 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 Arctic 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: nsfpubs@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:

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