High Performance Network Connections (HPNC)

Growing the Next Generation Network

Program Solicitation

NSF-02-073

DIRECTORATE FOR COMPUTER AND INFORMATION SCIENCE AND ENGINEERING
ADVANCED NETWORKING INFRASTRUCTURE AND RESEARCH

FULL PROPOSAL DEADLINE(S): May 22, 2002

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SUMMARY OF PROGRAM REQUIREMENTS

GENERAL INFORMATION

Program Title: High Performance Network Connections (HPNC)

Synopsis of Program: The purpose of this announcement is to encourage additional U.S. institutions of higher education and institutions with significant research and education missions to establish high performance Internet connections (at or above 45mbits per second) where required to facilitate cutting edge science and engineering research.

This announcement updates and replaces "Connections to the Internet" NSF 01-73.

Cognizant Program Officer(s):

- Dr. Gregory E. Monaco, Program Director, CISE, Advanced Networking Infrastructure & Research, 1175, telephone: 703-292-8948, e-mail: gmonaco@nsf.gov.

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

- 47.070 --- Computer and Information Science and Engineering

ELIGIBILITY INFORMATION

- **Organization Limit:** As outlined below.

- **PI Eligibility Limit:** None

- **Limit on Number of Proposals:** Only one proposal per eligible institution and only one proposal per principal investigator may be submitted.

AWARD INFORMATION

- **Anticipated Type of Award:** Standard Grant

- **Estimated Number of Awards:** 15

- **Anticipated Funding Amount:** Approximately $2.25 million will be available for this initiative in FY2002

PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

- **Full Proposals:** Supplemental Preparation Guidelines

    - The program announcement/solicitation contains supplements to the standard Grant Proposal Guide (GPG) proposal preparation guidelines. Please see the full program announcement/solicitation for further information.

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is required (Percentage).

- **Cost Sharing Level/Amount:** 100

- **Indirect Cost (F&A) Limitations:** NSF will not reimburse the awardee for any indirect costs associated with leased line costs and service provider fees. If the organization's normal practice is to include these costs in their indirect cost base, then the indirect cost amount will not be funded by NSF but may be used to meet the organization's cost sharing.

- **Other Budgetary Limitations:** Other budgetary limitations apply. Please see the full program announcement/solicitation for further information.

C. Deadline/Target Dates

- **Letters of Intent (*optional*):** None

- **Preliminary Proposals (*optional*):** None

- **Full Proposal Deadline Date(s):** May 22, 2002

D. FastLane Requirements

- **FastLane Submission:** Required

- **FastLane Contact(s):**

  - FastLane User Support, telephone: 800-673-6188, e-mail: fastlane@nsf.gov.

  - Priscilla Bezdek, CISE, ANIR, 1175, telephone: 703-292-8950, e-mail: pbezdek@nsf.gov.

PROPOSAL REVIEW INFORMATION

- **Merit Review Criteria:** National Science Board approved criteria. Additional merit review considerations apply. Please see the full program announcement/solicitation for further information.

AWARD ADMINISTRATION INFORMATION

- **Award Conditions:** Standard NSF award conditions apply.

- **Reporting Requirements:** Standard NSF reporting requirements apply.

I. INTRODUCTION

The purpose of this announcement is to encourage additional U.S. institutions of higher education and other institutions with significant research and education missions to establish high performance Internet connections where required to support cutting edge science and engineering research.

The NSF Division of Advanced Networking Infrastructure and Research (ANIR) has supported inter-institutional computer networking for research and education institutions since 1986 beginning with the NSFNET program. In 1995, ANIR further supported the creation of a national high performance backbone network service (vBNS) and in 1996 announced a high performance connections program to assist universities to connect to the vBNS (and later also to the Internet2 Abilene network). Because of these and other activities, a Next Generation Internet (NGI) environment now exists. Researchers needing communication and collaboration capabilities and/or needing access to remote information and computing resources are now utilizing this NGI environment extensively. By 2000, at the successful conclusion of the initial phase of this initiative, 174 universities and research facilities had received NSF high performance connections awards and were part of the NGI. An additional 22 institutions received awards in 2001.

It is projected that the number of researchers in the higher education community requiring access to high performance networks will continue to grow, and that they increasingly will need to conduct cutting edge science and engineering research by employing new high performance network services such as tele-collaboration, distributed high performance computing, data mining, and remote visualization and imaging.

This announcement updates and replaces Connections to the Internet NSF 01-73.

II. PROGRAM DESCRIPTION

Awards made under this program announcement are to support high performance connections to advanced Internet facilities (such as the vBNS or Abilene) for higher education institutions and facilities to enable identified cutting edge science and engineering research applications with special network requirements (such as high bandwidth and/or bounded latency) that cannot readily be met through commodity network service providers. Such advanced network connections will be at or above 45 Mbps.

If the high performance connection replaces an existing connection, only the costs above those of the existing connection will be considered for support. High performance connection support will normally be considered only for institutions that have demonstrated experience and success with existing Internet connections.

A high performance connection to the Internet should be interconnected with an appropriate local network infrastructure, and the proposing institution will be responsible for funding that local infrastructure without ANIR assistance. However, costs associated with upgrading limited special portions of the local campus infrastructure and/or costs associated with software development, any of which relate to enabling high performance access for the proposed research applications, may be counted as part of the required institutional cost sharing.

Techniques to guarantee end-to-end high performance service for the proposed research applications should be specified. For example, institutions might rely on some combination of separate networks for different classes of applications. On-campus traffic from the proposed research applications might be segregated from commodity traffic on separate links to avoid congestion. Similarly, separate paths could be established for commodity connections from the campus to a commercial network service provider and for high-performance connections to the providers of the high performance network.

Institutions may propose to connect their local network infrastructure to the national research network infrastructure by any appropriate technique, for example,

- acquiring services from a network service provider,
- connecting to a gigapop, or
- connecting to a university that already has a high performance connection.

Proposals should address the following:

- Proposals should focus on cutting edge research in science and/or engineering and may require a combination of tools and technologies of high performance networking. For example, research applications may require services such as distributed high performance computing, data mining, remote visualization and imaging, and/or tele-collaboration;

- Proposers should demonstrate that they are familiar with the requirements of the research and that they can document the need for an advanced network connection. NSF intends to continue to use a mix of disciplinary and networking reviewers to review proposals;

- The proposal must indicate clearly what end-to-end services are required by the proposed research applications and must indicate how these services will be provided. This includes the development or adaptation of any specialized hardware or software to conduct the proposed research;

- Scientists involved in the proposed research must be represented as co-PIs (principle investigators);

- Proposals must specify cost sharing and agree to continue to support the proposed advanced network access after the period of NSF support ends;

- Proposals should contain a plan to extend the use of the high performance network beyond early adopters;

- Proposals should contain a network engineering plan as described in Section V.A. -"Proposal Preparation and Submission Instructions". This plan should be placed in the project description section.

Proposers of projects other than research projects may wish to investigate network connection support from the Technology Opportunities Program (formerly TIIAP) of the National Telecommunications and Information Administration of the Department of Commerce. (See http://www.ntia.doc.gov/otiahome/top/grants/grants.htm).

III. ELIGIBILITY INFORMATION

Proposals may be submitted by universities and colleges, including US universities and two-and four-year colleges (including community colleges) acting on behalf of their faculty members as well as by non-profit, non-academic organizations, including independent museums, observatories, research laboratories, professional societies and similar organizations in the US that are directly associated with educational and research activities and are not currently connected to an advanced network (45mbps).

Synergistic collaboration among researchers and collaboration or partnerships with industry or government laboratories is encouraged when appropriate.

Proposals from groups of institutions, none of which has been previously funded by NSF for a high performance connection, are encouraged where the proposers can, in addition to meeting the other criteria outlined below, demonstrate a clear cost savings by connecting together rather than separately.

Due to the limited availability of funds, prospective applicants are urged to contact the Program Director listed at the end of this document for guidance.

IV. AWARD INFORMATION

NSF anticipates that $2.25 million will be available in FY 2002 for this announcement. NSF anticipates funding approximately 15 proposals with awards between $70,000 and $150,000 for two years. The final number of awards will be subject to availability of funds and the quality of the proposals.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal:

Proposals submitted in response to this program announcement/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 Web Site at: http://www.nsf.gov/cgi-bin/getpub?gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (301) 947-2722 or by e-mail from pubs@nsf.gov.

The proposal should contain a network engineering plan, prepared jointly by persons from the proposed research application areas, from campus local network provider organizations, and from involved wide area network service providers. This plan should indicate how the proposed connection would deliver the high-performance service "end to end":

- how the high performance network service will be delivered to the application, (not just to the campus);

- how the high performance network service relates to commodity networking at the campus and off-campus levels;

- how the high performance network service will be managed and operated.

This plan should be placed in the project description section.

Proposers are reminded to identify the program solicitation number (NSF-02-073) in the program announcement/solicitation block on the proposal Cover Sheet. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

B. Budgetary Information

Cost sharing at a level of 100 percent of the requested total amount of NSF funds is required for all proposals submitted in response to this solicitation. The proposed cost sharing must be shown on Line M on the proposal budget. Documentation of the availability of cost sharing must be included in the proposal. Only items which would be allowable under the applicable cost principles, if charged to the project, may be included in the awardee's contribution to cost sharing. Contributions may be made from any non-Federal source, including non-Federal grants or contracts, and may be cash or in kind (see OMB Circular A-110, Section 23). It should be noted that contributions counted as cost sharing toward projects of another Federal agency may not be counted towards meeting the specific cost sharing requirements of the NSF award. All cost sharing amounts are subject to audit. Failure to provide the level of cost sharing reflected in the approved award budget may result in termination of the NSF award, disallowance of award costs and/or refund of award funds to NSF.

Indirect Cost (F&A) Limitations: NSF will not reimburse the awardee for any indirect costs associated with leased line costs and service provider fees. If the organization's normal practice is to include these costs in their indirect cost base, then the indirect cost amount will not be funded by NSF but may be used to meet the organization's cost sharing.

Other Budgetary Limitations: The total average award amount for 2 years is expected to be between $70,000 and $150,000 or approximately $35,000 to $75,000 per year for proposals submitted in response to this announcement. If the high performance connection replaces an existing connection, only the costs above those of the existing connection will be considered for support.

Eligible NSF grant expenses include:

- costs of the high performance connection itself (e.g. circuit costs, circuit installation charges), and

- software/equipment costs needed to interface campus network infrastructure to the external high performance connection (e.g., border routers or switches).

Eligible cost sharing expenses include all of the above, appropriate project personnel costs, such as salary, benefits, travel, etc., and expenses associated with upgrading limited portions of the local campus infrastructure that may be required to enable high performance access for the proposed research application(s), and research application development costs.

Membership fees, participation fees and bundled costs are not eligible NSF grant expenses.

C. Deadline/Target Dates

Proposals must be submitted by the following date(s):

Full Proposals *by 5:00 PM local time*: May 22, 2002

D. FastLane Requirements

Proposers are required to prepare and submit all proposals for this Program Solicitation through the FastLane system. Detailed instructions for proposal preparation and submission via FastLane are available at: http://www.fastlane.nsf.gov/a1/newstan.htm. For FastLane user support, call 1-800-673-6188 or e-mail fastlane@nsf.gov.

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 certifications within five working days following the electronic submission of the proposal. Further instructions regarding this process are available on the FastLane website at: http://www.fastlane.nsf.gov.

VI. PROPOSAL REVIEW INFORMATION

A. NSF Proposal Review Process

Reviews of proposals submitted to NSF are solicited from peers with expertise in the substantive area of the proposed research or education project. These reviewers are selected by Program Officers charged with the oversight of the review process. NSF invites the proposer to suggest, at the time of submission, the names of appropriate or inappropriate reviewers. Care is taken to ensure that reviewers have no conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority-serving institutions, or adjacent disciplines to that principally addressed in the proposal.

The two merit review criteria are listed below. The criteria include considerations that help define them. These considerations are suggestions and not all will apply to any given proposal. While proposers must address both merit review criteria, reviewers will be asked to address only those considerations that are relevant to the proposal being considered and for which he/she is qualified to make judgements.

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

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

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

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

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

Additional Review Criteria
The following additional criteria will be used in the review process:

1. Quality of the proposed research application(s) that require the high performance connection;

2. Clear evidence that the motivation for submission of the proposal derives from the needs and interests of the researchers responsible for the proposed applications;

3. Network engineering planning process, planning participants, and resulting plan;

4. Quality of proposed local network infrastructure, particularly as represented by the ability of the institution to deliver access to the advanced network service to the desktops and facilities of the intended end users;

5. Clear involvement of appropriate technical expertise in computer networking, if not provided by local professionals, then available through arrangements with appropriate third parties (e.g., gigapop operators, network service providers, relationships with other campuses, or access to regional support teams);

6. Coordination of procedures with proposed network service providers;

7. Committment to provide for the future continuing support of the proposed network connections as indicated by letters of commitment from appropriate institutional officials;

8. Plan to extend the reach of the proposed connection beyond the group of early adopters; and

9. Cost-effectiveness of the proposed network connection; evidence of thoroughness of effort to obtain cost-effective connection.

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 identities of reviewers, are sent to the Principal Investigator/Project Director by the Program Director. In addition, the proposer will receive an explanation of the decision to award or decline funding.

B. Review Protocol and Associated Customer Service Standard

All proposals are carefully reviewed by at least three other persons outside NSF who are experts in the particular field represented by the proposal. Proposals submitted in response to this announcement/solicitation will be reviewed by Mail and/or Panel Review.

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.

In most cases, proposers will be contacted by the Program Officer after his or her recommendation to award or decline funding has been approved by the Division Director. This informal notification is not a guarantee of an eventual 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 closing date of an announcement/solicitation or the date of proposal receipt (whichever is later). The interval ends when the Division Director accepts the Program Officer's recommendation.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements 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 one's 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 Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program Division 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.A. 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 (NSF-GC-1)* or Federal Demonstration Partnership (FDP) Terms and Conditions;* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreement awards also are administered in accordance with NSF Cooperative Agreement Terms and Conditions (CA-1). Electronic mail notification is the preferred way to transmit NSF awards to organizations that have electronic mail capabilities and have requested such notification from the Division of Grants and Agreements.

*These documents may be accessed electronically on NSF's Web site at http://www.nsf.gov/home/grants/grants_gac.htm. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (301) 947-2722 or by e-mail from pubs@nsf.gov.

More comprehensive information on NSF Award Conditions is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Web site at http://www.nsf.gov/cgi-bin/getpub?gpm. The GPM is also for sale through the Superintendent of Documents, Government Printing Office (GPO), Washington, DC 20402. The telephone number at GPO for subscription information is (202) 512-1800. The GPM may be ordered through the GPO Web site at http://www.gpo.gov.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the PI must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period.

Within 90 days after the expiration of an award, the PI also is required to submit a final project report. Approximately 30 days before expiration, NSF will send a notice to remind the PI of the requirement to file the final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for that PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

NSF has implemented an electronic project reporting system, available through FastLane. This system permits electronic submission and updating of project reports, including information on project participants (individual and organizational), activities and findings, publications, and other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system.

VIII. CONTACTS FOR ADDITIONAL INFORMATION

General inquiries regarding High Performance Network Connections should be made to:

- Dr. Gregory E. Monaco, Program Director, CISE, Advanced Networking Infrastructure & Research, 1175, telephone: 703-292-8948, e-mail: gmonaco@nsf.gov.

For questions related to the use of FastLane, contact:

- FastLane User Support, telephone: 800-673-6188, e-mail: fastlane@nsf.gov.

- Priscilla Bezdek, CISE, ANIR, 1175, telephone: 703-292-8950, e-mail: pbezdek@nsf.gov.

IX. OTHER PROGRAMS OF INTEREST

The NSF *Guide to Programs* is a compilation of funding for research and education in science, mathematics, and engineering. The NSF *Guide to Programs* is available electronically at http://www.nsf.gov/cgi-bin/getpub?gp. General descriptions of NSF programs, research areas, and eligibility information for proposal submission are provided in each chapter.

Many NSF programs offer announcements or solicitations concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSF program offices. Any changes in NSF's fiscal year programs occurring after press time for the *Guide to Programs* will be announced in the NSF E-Bulletin, which is updated daily on the NSF web site at http://www.nsf.gov/home/ebulletin, and in individual program announcements/solicitations. Subscribers can also sign up for NSF's Custom News Service (http://www.nsf.gov/home/cns/start.htm) to be notified of new funding opportunities that become available.

For other Advanced Networking Infrastructure and Research programs see http://www.cise.nsf.gov/anir. For the cross-cutting ITR program, see http://www.itr.nsf.gov.

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Awardees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities and persons with disabilities to compete fully in its programs. In accordance with Federal statutes, regulations and NSF policies, no person on grounds of race, color, age, sex, national origin or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF (unless otherwise specified in the eligibility requirements for a particular program).

Facilitation Awards for Scientists and Engineers with Disabilities (FASED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the program announcement/solicitation for further information.

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, FIRS at 1-800-877-8339.

The National Science Foundation is committed to making all of the information we publish easy to understand. If you have a suggestion about how to improve the clarity of this document or other NSF-published materials, please contact us at plainlanguage@nsf.gov.

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; 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 applicant 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 needing information as part of the review process or in order to coordinate programs; 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," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

Pursuant to 5 CFR 1320.5(b), an agency may not conduct or sponsor, and a person is not required to respond to an information collection unless it displays a valid 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 this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to: Suzanne Plimpton, Reports Clearance Officer, Division of Administrative Services, National Science Foundation, Arlington, VA 22230, or to Office of Information and Regulatory Affairs of OMB, Attention: Desk Officer for National Science Foundation (3145-0058), 725 17th Street, N.W. Room 10235, Washington, D.C. 20503.

OMB control number: 3145-0058.