

**Annual Audit Plan  
FY 2008**



**National Science Foundation  
Office of Inspector General  
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## AUTHORIZATION

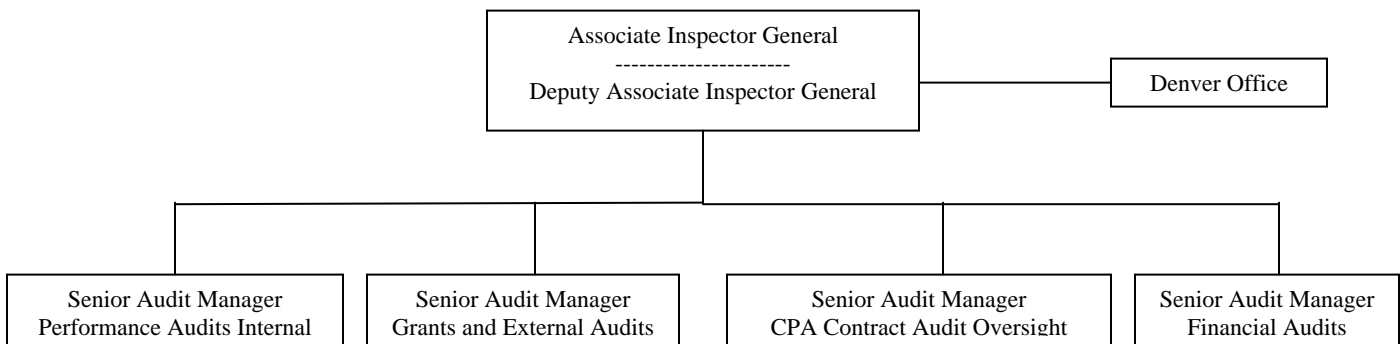
The Inspector General Act, as amended in 1988, authorizes an Office Inspector General (OIG) for the National Science Foundation (NSF). The OIG is independent of NSF and reports directly to Congress and the National Science Board (NSB). By statute the OIG conducts and supervises independent audits and investigations relating to agency programs and operations and recommends policies that promote effectiveness and efficiency and prevent and detect fraud and abuse in such programs and operations.

## OIG MISSION AND FUNCTION

Consistent with its statutory mandate and operational mission, the OIG performs an oversight role and does not engage in program operations. Its work is divided into two functional areas: investigations, which address allegations of serious wrongdoing, such as unauthorized use or theft of Federal funds and property, and audits and reviews, which assess the adequacy of business systems and processes, determine compliance with financial and Federal requirements, and identify ways to improve the effectiveness and efficiency of operations. In each area, the OIG strives to focus on substantive matters and work objectively and cooperatively without compromising its independence. The organizational units within OIG also collaborate. For example, auditors may examine alleged financial improprieties at early stages of investigations and auditors and investigators may work in teams on compliance issues. OIG scientists and auditors collaborate on performance reviews and auditors, investigators, and information technology staff work together on responses to alleged computer-security breaches.

## ORGANIZATION AND FUNCTION OF THE OFFICE OF AUDIT

The Office of Audit has an experienced audit and administrative staff led by the Associate Inspector General for Audit, the Deputy Associate Inspector General for Audit, and four Senior Audit Managers, as shown in the chart below:



The Office of Audit is responsible for annual audits of NSF's financial statements, which include evaluating the agency's controls over financial reporting and

information system security. The office also conducts internal and external performance audits and financial and compliance audits of grants, contracts, and cooperative agreements funded by NSF.

Internal performance audits assess specific NSF programs or operations, such as NSF's policies and procedures to ensure the confidentiality of personally identifiable information or to prepare for emergencies that disrupt normal operations. External performance audits have varied objectives, such as ensuring the adequacy of awardees' controls over NSF awards. Performance audits provide NSF management with independent and objective assessments of whether desired program results and objectives are achieved effectively and efficiently and in accordance with applicable laws, regulations, policies, or procedures. The audits are intended to assist NSF management and/or awardees in improving controls and business practices and to identify and manage program risks at an early stage.

Financial and compliance audits of grants determine whether costs claimed are allowable, reasonable, and properly allocated. They also may ascertain whether NSF awardees have adequate internal controls to administer, account for, and monitor NSF awards and to ensure compliance with NSF and Federal requirements. Furthermore, grant audits seek to identify practices at NSF and awardee institutions that may be modified so that funds can be used more effectively and efficiently for higher priority purposes.

Contract audits include audits of planned, current, or completed contract awards. Preaward contract audits determine if prospective contractors have adequate systems to manage and account for NSF funds and have submitted adequate cost and pricing data. They also determine if bidders' proposals are prepared in accordance with applicable Federal requirements and cost accounting standards and if their proposed costs are reasonable. Active-contract audits review whether incurred costs are allowable under the terms and conditions of the contract, as well as the adequacy of the accounting systems used to claim the costs. Closeout audits determine if costs incurred on expired contracts are allowable.

## THE AUDIT PROCESS

The audit process begins when the Office of Audit initiates a review planned by the OIG or requested by NSF management. Maintaining NSF management's involvement throughout the process ensures that the OIG adds value to NSF's operations. The Office strives to maintain an open channel of communication with NSF management to keep NSF informed of the audit progress during each phase of the review. The Office conducts all of its audits in accordance with the Comptroller General's *Government Auditing Standards*,<sup>1</sup> which are intended to ensure the integrity and competency of the audit process and the quality of the audit report. The steps in a typical audit are:

- **Engagement Letter** - Notify awardee and/or NSF management of the OIG's intention to perform an audit.
- **Survey** - Obtain an overall understanding of the entity, program or operation under audit in order to clarify audit objectives and develop a work plan.
- **Field Work** - Collect and analyze information to identify any appropriate audit findings. Review findings with auditee.
- **Exit Conference** - Inform awardee and/or NSF management of the results of the audit.
- **Reporting** - Communicate conclusions and recommendations to NSF and/or awardee management, the NSB and Congress.

### Who Performs Audits?

#### OIG Staff

In conducting its audits, the OIG draws upon staff with varied educational and professional backgrounds. Professional staff include certified public accountants, attorneys, management analysts, scientists, investigators, and computer specialists. The OIG also relies on staff located in its Denver Office to provide expert assistance in key functional areas and the increased economy and efficiency of geographic diversity.

#### Independent Public Accountants

The OIG supplements its in-house staff with independent public accounting firms under contract to the office. The firms provide the expertise necessary to accomplish the OIG's many varied and unique audit projects. The OIG currently relies on independent

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<sup>1</sup>See GAO-07-731G, *Government Auditing Standards: July 2007 Revision*. IG Offices are required by statute to conduct audits under these standards.

public accounting firms to perform the annual audit of NSF's financial statements as required by the Chief Financial Officers Act and audits of recipients of NSF awards.

### A-133 Audits

Non-Federal entities that expend \$500,000 or more in a year in Federal awards are required, under the Single Audit Act of 1984, as amended, to have a Single Audit conducted for that year. Office of Management and Budget (OMB) Circular A-133, *Audits of States, Local Governments and Non-Profit Organizations*, provides the requirements under which these audits are conducted and sets forth standards for obtaining consistency and uniformity among Federal agencies and awardee institutions for the audit of states, local governments, and non-profit organizations expending Federal awards. Reports prepared by state auditors or independent public accountants in accordance with this Circular are referred to as A-133 or Single Audits and address both an institution's financial statements and compliance with award conditions. The purpose of these audits is to provide Federal agencies with information on how government funds are managed and spent.

To assess the quality of the A-133 audits the President's Council on Integrity and Efficiency (PCIE) and the Executive Council on Integrity and Efficiency (ECIE) initiated a study in 2003 in which they analyzed a statistical sample of 208 audits selected from a universe of more than 38,000 audits. In June 2007 they issued their findings and recommendations in the *Report on National Single Audit Sampling Project*. One of the report's findings was that for entities expending at least \$500,000 of Federal awards but less than \$50 million, only 48 percent of the A-133 audits were considered to be of acceptable quality. To improve the quality of A-133 audits, the report recommended that OMB work with the American Institute of Certified Public Accountants, the PCIE, ECIE, and other applicable parties to revise the criteria, standards, and guidance for A-133 audits, establish training requirements for auditors performing these audits, and develop more effective processes for addressing unacceptable audits. Because NSF relies extensively on A-133 audits to help assess the relative risk of NSF-funded entities, the NSF OIG supports the implementation of the report recommendations. The OIG also will continue to perform quality control reviews of A-133 audits of selected organizations receiving NSF funds.

## FY 2008 AUDITS

OIG audits focus on issues of substantial concern to the Congress, the Administration, and NSF. To identify these issues the Office of Audit researches a number of sources including applicable Federal statutes, Congressional documents, Executive branch guidance, and reports issued by other stakeholders. Additional sources of information include NSB meetings, NSF's strategic plan, reports by NSF's Committees of Visitors and Advisory Committees, and NSF's assessment of risky awards. The OIG also solicits audit ideas from NSF and the NSB annually. To develop the audit plan for FY 2008 specifically, the OIG referred to: 1) the America COMPETES Act of 2007, 2) the Administration's Research and Development Budget Priorities for FY 2009, 3) OIG's assessment of NSF's top management challenges,<sup>2</sup> and 4) OIG's analyses of NSF awards and awardees to assess the risk of mismanagement of NSF funds.

The analysis of these diverse sources of guidance and information resulted in four themes for the FY 2008 audits: return on taxpayer investment, security and privacy, emergency preparedness, and financial and programmatic accountability. These themes pertain to programmatic and financial/administrative functions at the preaward, active-award, and closeout stages of the award cycle and to NSF's infrastructure. By addressing these themes in the FY 2008 audits, the OIG will help NSF realize the vision and goals in its FY 2006-2011 strategic plan, *Investing in America's Future*, and align them with the Congressional and Administration priorities.

Return on investment includes comprehensive life-cycle analysis of projects, facilities, centers, and programs funded by NSF to ensure that performance goals and associated metrics to assess progress and final accomplishments are clearly stated at the outset; that interim and final performance are documented, analyzed and evaluated; and that the resulting evaluations are used to guide future investments. For example, OIG is reviewing NSF's large facilities program, for which in its FY 2008 budget request to Congress NSF requested \$1.2 billion for pre and post-construction expenses and \$245 million for acquisition, construction and commissioning costs.<sup>3</sup> In addition, OIG is reviewing NSF's management of its centers' program, for which in FY 2008 NSF requested \$268 million for approximately 100 centers.<sup>4</sup> Although the specifics of an analysis depend on whether the project is an award, program, large facility or center, the return on investment framework is comprehensive enough to apply to all types of investments in NSF's portfolio.

This framework includes planning, designing, selecting, constructing (if applicable), operating, managing, evaluating, and terminating projects, facilities, and programs. It also addresses the Administration's three criteria for all R&D programs --

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<sup>2</sup> This Plan referred to the challenges discussed in OIG's *Management Challenges for NSF in FY 2007*, issued October 16, 2006. The Management Challenges for FY 2008 will be issued in the upcoming OIG Semiannual Report to Congress for the period ending September 30, 2007.

<sup>3</sup> NSF requested the \$1.2 billion for its Research and Related Activities (R&RA) account and the \$245 million for its Major Research Equipment and Facilities Construction (MREFC) account.

<sup>4</sup> NSF utilizes centers to address complex research problems or to accommodate large scale projects that require collaboration by multiple institutions and disciplines.

quality, relevance, and performance -- and Congressional interest in program evaluation. Competitive, merit-based peer review helps ensure that projects, facilities, and programs will be of high quality; alignment with Federal R&D priorities helps ensure that investments of taxpayer funds will be relevant to national goals; and measurement of accomplishments against initial goals helps ensure that performance goals will be met. The return on investment framework also addresses three of the top NSF management challenges -- merit review; award administration; and budget, cost, and performance integration.

Security includes the on-site and off-site physical and data security necessary to protect human life, physical assets, such as real property and equipment, and intangible assets, such as sensitive agency information, including personally identifiable information (PII). Privacy overlaps with security because security is a prerequisite for the privacy of PII such as social security numbers. Emergency preparedness includes planning for natural or man-made disasters that threaten human health or property or cause significant disruptions in operations. Ensuring security, protecting privacy, and adequately preparing for emergencies relate to the infrastructure section of the audit plan.

Accountability of NSF and its awardees is mandated by Federal requirements including the Budget and Accounting Procedures Act, the Federal Managers Financial Integrity Act, the Chief Financial Officer Act, the Federal Financial Management Improvement Act, and OMB Circulars A-123, A-110, A-21, A-122, and A-87. Conducting audits to evaluate financial and programmatic accountability is central to the OIG mission of promoting effectiveness, efficiency, and economy, and preventing and detecting fraud, waste, and abuse. Annual audits of NSF's financial statements assess its compliance with laws and regulations and other OIG audits evaluate financial or programmatic accountability at NSF and its awardees. For example, in FY 2008, OIG is continuing its audits of salaries and wages claimed by a statistically selected sample of universities, because labor effort accounts for about 1/3 of all NSF award funds.

## SUMMARY OF PLANNED PROJECTS FOR FY 2008

### 1. Preaward Phase

Preaward reviews help reduce NSF's risk of award management problems at the selection stage. Ensuring that an awardee has both the programmatic and financial capability to successfully perform under the award reduces NSF's risk that funds may not be properly spent or that the project may not achieve the intended results. Before grants, contracts, and cooperative agreements are approved, preaward processes need to assess the quality of the applicant's work plans, which provide the framework for award performance and accountability and its capability to account for Federal funds. R&D agencies are required to fund a significant majority of awards through the use of competitive merit-based peer review to ensure quality. At NSF about 96 percent of awards are selected through an external and internal merit review process.

#### Merit Review

About 440 program officers review more than 40,000 proposals that NSF receives each year. Program officers rely on outside experts chosen from a pool of more than 300,000 reviewers to evaluate proposals. NSF policy requires at least three external reviews for every award-or-decline recommendation, unless it waives this requirement. Program officers make decisions to award or decline proposals based on the experts' opinions, their own professional judgment, available funding, and the need for a balanced portfolio. Portfolio balance includes considerations such as potential contributions to math, science or engineering education and geographic, ethnic, and institutional diversity. Generally, NSF Division Directors make the final decision to approve or decline proposals.

Congress directed the NSB in September 2004 to review NSF's merit review process<sup>5</sup> and the NSB responded with a report that recommended improvements in the transparency and effectiveness of merit review while preserving program officers' ability to balance NSF's portfolio and identify the most innovative proposed research.<sup>6</sup> NSF also issues annual reports on the merit review process to the NSB and has established an internal Government Performance Results Act (GPRA) working group to assess stewardship, including merit-review. The group is developing metrics to evaluate the transparency and quality of merit review; informing principal investigators whose proposals were reviewed about the process and context of the award selection process; developing a website to disseminate effective merit-review practices; ensuring the inclusion of case studies on effective merit review processes in the Program Management Seminars for new program officers; and including a section on program officer training and mentoring in the annual NSF merit review reports to the NSB. The working group's evaluation of NSF's FY 2007 progress on merit review will be included in NSF's FY 2009 budget request to Congress.

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<sup>5</sup> H.R. Report 108-674, p. 144.

<sup>6</sup> NSB-05-119.

Scientific, geographical, institutional and demographic diversity of peer-review panels is critical to the quality of merit review. However, NSF does not know how diverse its reviewer pool is because only about 25 percent of reviewers (FY 2006) have reported demographic information. More fundamentally, because program officers, reviewers, and principal investigators tend to come from the same academic networks, professional associations, and institutional pools, there is a risk that institutions and principal investigators outside established networks are at a competitive disadvantage in the merit-review process. For example, from FY 2002 to FY 2006 about 75% of NSF awards went to research-intensive Ph.D. institutions.

Reviewer burnout can diminish the quality of merit review. Burnout is especially possible given the 44 percent increase in the number of proposals received since 2000. During FY 2006 approximately 46,000 reviewers served on panels, received a proposal for mail review, or both; and about 30,000 or 65 percent of these individuals had reviewed NSF proposals previously. NSF's GPRA working group has established broadening participation as one of its stewardship goals and is developing a plan to broaden the pool of reviewers.

Program officer overload can also diminish the quality of merit review. Although the number of program officers increased from 400 in FY 2005 to 438 in FY 2006, a nearly 10 percent increase, program officers have greater responsibilities in the merit review process because of the increased use of pre-proposals and the larger number of proposals that involve multiple disciplines and directorates. Past reports by Committees of Visitors frequently cited the burdens on program officers to conduct merit review under the funding constraints for the Agency Operations and Award Management (AOAM) account, formerly known as the Salaries and Expenses (SES) account.

Additionally, in response to Congressional concerns about the innovativeness of NSF's merit review processes, in May 2007 the NSB issued a report entitled *Enhancing Support of Transformative Research at the National Science Foundation*, with several recommendations, including development of a clear definition of "transformative research"<sup>7</sup> and a Foundation-wide Transformative Research Initiative (TRI) to incorporate TRI into NSF's core values. In response, NSF proposed three actions entitled Infuse, Learn, and Lead. NSF plans to infuse support for Potentially Transformative Research (PTR) throughout all NSF programs, conduct program officer training, and provide panel guidance on PTR. It plans to learn about ways to infuse TRI into NSF from an agency-wide advisory team of experienced program officers, include PTR as an area of research in its Science of Science and Innovation Policy, and assign

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<sup>7</sup> The NSB offered the following definition of transformative research: *Transformative research is defined as research driven by ideas that have the potential to radically change our understanding of an important existing scientific or engineering concept or leading to the creation of a new paradigm or field of science or engineering. Such research also is characterized by its challenge to current understanding or its pathway to new frontiers.*

responsibility for promoting and evaluating of the impact of innovation in support of PTR to the Office of the Director and senior management. NSF plans to lead the initiative for transformative research by providing funds for early-concept ideas.

Specifically, NSF is replacing Small Grants for Exploratory Research (SGERs) with Timely Grants for Urgent Research (TIGURs) that require fast processing (e.g., post-hurricane awards) and two tiers of EARly-concept Grants for Exploratory Research (EAGERs). Tier I grants will provide limited funding for internally reviewed proposals and tier two grants will provide larger amounts of funding for more extensively reviewed proposals that have potential for transformative research. In addition, in August 2007, the NSB approved an NSF-recommended change to NSF Merit Review Criterion I (the Intellectual Merit review criterion) that will include a specific review of the extent to which a proposal is “potentially transformative.” NSF will evaluate internally whether the changes it has instituted are effective in making NSF more receptive to transformative proposals and present its findings to the NSB.

Merit review is likely to receive continued public scrutiny. The 44 percent increase in proposals between 2000 and 2006 has resulted in increasingly lower success rates (33 percent in FY 2000 and 25 percent in FY 2006). As such, increasing numbers of unsuccessful researchers may question the fairness of the process. Adequately addressing concerns about merit review is critical to ensuring that Congress, the science and engineering communities, and the general public have confidence in this “cornerstone” of NSF’s work and the Foundation’s ability to independently select high quality, innovative projects.

#### *Business, Financial, and Policy Review*

NSF’s Grant General Conditions place full responsibility for the conduct of an NSF award and for adherence to the award terms and conditions on the awardee institution. Therefore, before making an award NSF must ensure that these institutions have adequate financial management and administrative systems to safeguard Federal funds. At NSF, the grants official is responsible for conducting such a preaward review.

If grants officers have concerns about a prospective awardee’s capability to account for its award(s), they refer their concerns to the NSF Cost Analysis and Audit Resolution (CAAR) Branch to perform preaward financial and business reviews. In addition, awardees new to NSF are required to complete and provide a “*Financial Management Systems Questionnaire*.” NSF needs to ensure that the information provided by the prospective awardee is accurate and complete.

Financial audit reports performed under OMB Circular A-133 are available on almost every NSF-funded institution. In addition, audits conducted by NSF OIG or the Government Accountability Office (GAO) may be available.

These audits can assist the grants officer in making funding decisions by identifying accounting and grant administration problems. However, to the extent NSF does not incorporate prior audit findings into its preaward reviews, it limits the scope of its assessments and risks funding awardees that may not have the ability to manage Federal funds.

To address risks to NSF at the preaward stage the following audits will discuss pre-award issues as part of their overall programmatic reviews.

<i><b>Program Area</b></i>	<i><b>Assignment</b></i>	<i><b>Focus</b></i>
<b>Preaward</b>		<b>Performance</b>
Foundation Wide	Audit of Large Facility Management Agreements*	Continuing series of audits to determine whether the terms and conditions included in NSF's cooperative agreements for the management and operation of its large facility projects are sufficient for NSF to provide stewardship over its programs and assets.
Foundation Wide	Audit of NSF's Financial and Programmatic Oversight of Center Programs*	Series of audits to examine how NSF assesses the programmatic and financial information it receives from projects funded by its eight research center programs and how NSF uses this information to monitor and oversee these programs.

\*Represents on-going work.

## Active Award Phase

Once grants, cooperative agreements, and contracts are awarded, it is important that NSF properly manage them. While recipients of NSF funds are responsible for overseeing programmatic and financial performance, NSF needs to oversee and monitor how well recipients fulfill this responsibility. NSF must ensure that award funds lead to the results expected when the award was made and are used for intended purposes in accordance with laws and regulations. As such, NSF needs to ensure programmatic results through performance monitoring and financial and administrative compliance through post-award monitoring. NSF also needs to ensure that primary recipients effectively monitor the programmatic performance and financial and administrative compliance of their subrecipients. The risks to NSF from the inadequate monitoring of program results during the active-award phase include suboptimal research results, missed opportunities to fund other research or educational opportunities that might have been more productive, and provision of deliverables at a lower quality than expected. The risks to NSF from the inadequate monitoring of financial and administrative compliance include erroneous payments, non-compliance with Federal and NSF grants requirements, and undetected misuse of taxpayer funds.

### Monitoring Programmatic Performance of Active Awards

NSF places the responsibility to review the programmatic progress of on-going awards on program officers. Accordingly, to execute this function effectively, program officers need adequate time, written guidance, appropriate training, and effective monitoring tools. Because program officers' primary responsibility is proposal review and award selection, they have less time for managing on-going awards. In addition, the monitoring process at NSF is divided between program staff and grants administrators. As such, program officers do not always receive the quarterly expenditure reports filed by NSF awardees to enable them to compare expected progress with claimed costs.

Also, NSF provides limited guidance to program officers, about half of whom are non-permanent or visiting personnel, on how to oversee the programmatic performance of awardees. For example, NSF offers no formal training to program officers on the administrative and financial requirements contained in OMB Circulars. Finally, a recent audit showed that over the five-year period from May 1, 1999 to May 31, 2004, more than 45,000 or 42 percent of required annual project reports on NSF awards had not been submitted. Without adequate time, training, guidance, and monitoring tools, program officers may not detect problems with project progress or performance on an award in time to ensure that planned program goals are met before the expiration of an award.

Monitoring Financial Status of Active Awards

NSF also faces challenges in monitoring its awardees' compliance with the financial requirements of the awards. As of March 31, 2007, there were \$62 million of unresolved questioned costs reported in 23 audit reports. In addition, the FY 2006 Financial Statement Audit<sup>8</sup> found that NSF needed to continue to improve its post-award administration and better monitor the financial performance of its high-risk awardees. Beginning in FY 2004 NSF has taken a number of corrective actions, including conducting on-site evaluations at more than 100 of its grantee institutions and performing quarterly audits of a sample of its largest contractor billings. However, the adequacy and effectiveness of the new procedures are still being assessed. In addition, recent audits continue to identify problems with how primary awardees manage and monitor the approximately 12 percent of NSF award funds passed through to subawardees, which can lack experience, financial systems, and training to manage their subawards. Therefore, risk remains for potential erroneous payments, non-compliance with NSF grants requirements, and undetected misuse of taxpayer funds.

In order to address risks related to the programmatic and financial performance of awards, the following audits are planned for FY 2008.

<i><b>Program Area</b></i>	<i><b>Assignment</b></i>	<i><b>Focus</b></i>
<b>Active Award</b>		<b>Performance</b>
Office of Integrative Activities	Survey of EPSCoR Program	Survey will document risk areas of the EPSCoR program and how the program is addressing these risks.
<b>Active Award</b>		<b>Financial/Administrative</b>
Office of International Science and Engineering	Audit of U.S. Civilian R&D Foundation for the Newly Independent States of the Former Soviet Union*	Audit will determine whether costs charged to NSF are allowable and in compliance with Federal grant requirements.
Foundation Wide	Audit of labor effort reporting at major universities*	Audit will examine major recipients of NSF funding for compliance with requirements related to time and effort reporting.
Geosciences	Audit of University Corporation for Atmospheric Research (UCAR)*	Audit will examine internal controls associated with accounting for Federal funds, purchasing practices, and time and effort reporting.

\*Represents on-going work

<sup>8</sup> The findings of the FY 2007 Financial Statement Audit were not available at the time this Audit Plan was prepared. The FY 2007 Financial Statement Audit Report will be publicly available November 15, 2007.

<i>Program Area</i>	<i>Assignment</i>	<i>Focus</i>
<b>Active Award</b>		<b>Financial/Administrative</b>
Foundation Wide	Audit of NSF awards to various universities, non-profits, and for-profit entities	New and continuing audits will determine whether awardees have adequate systems to safeguard and properly account for NSF funds and comply with Federal and NSF award requirements.
Foundation Wide	Audit of various NSF contracts	Audits of NSF contracts with for-profits, non-profits, or universities will determine if contractors have complied with their disclosed accounting practices, have reasonable indirect cost rates, have claimed allowable costs in accordance with Federal and NSF's requirements, and have adequate accounting systems to manage NSF funds.
Foundation Wide	Quality Control Review (QCR) of a Single Audit	QCR of a Single Audit of an institution will determine the quality of the audit in accordance with Government Auditing Standards and OMB Circular A-133.

#### 4. Close-Out Administration

Evaluating the programmatic and financial results of its research programs provides important feedback for NSF. High-level decision makers, such as the NSF Director, the NSB, OMB and Congress, need to know whether NSF funds were properly spent, and which programs are and are not achieving their goals and objectives, in order to make budget allocation decisions.

##### Assessing Program Performance

Awardees are required to report to NSF on the accomplishments of their projects in final project reports. Special reports unique to a given award may also be required at close-out. NSF program staff are responsible for reviewing these final reports, which are important in deciding whether a particular principal investigator will continue to receive NSF funds.

However, an OIG audit in 2004 showed that out of 43,000 required final project reports, over 26,000 reports were either not timely or not submitted at all.<sup>9</sup> Further, contrary to NSF policy that requires the submission of final project reports from principal investigators before they can receive new funding, there were 74 cases in which principal investigators who had not submitted final project reports did receive new NSF funding. In 2008 OIG will follow up on NSF's implementation of corrective action plans to address the findings in the 2004 project reporting audit.

NSF also relies on Committees of Visitors, and more generally, Advisory Committees to assess how NSF research programs contribute to NSF's mission and goals. NSF needs to ensure the quality and completeness of these assessments and act on reported conclusions and recommendations. Additionally, the Administration has signaled that R&D funding agencies such as NSF need to develop evaluation processes for programs and facilities that include metrics to measure performance results. In response, one of the goals of NSF's Science of Science Innovation Policy awards is to evaluate returns from investment in science and engineering research. NSF could presumably use the results of this research to evaluate the social and economic outcomes of its portfolio. If NSF does not successfully measure results of its own programs, where feasible, it risks losing funding for programs that do not demonstrate "merit, quality, importance and consistency with national priorities."

##### Assessing Financial Performance

Grantees are required to report on final cash disbursements during the close-out phase on a Federal Cash Transactions Report (FCTR). However, final disbursement reporting involves inherent risks that NSF needs to manage. OIG

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<sup>9</sup> *Audit of Project Reporting for NSF Awards*, OIG Report No. 05-2-006 (December 13, 2004), p. 8.

audits continue to demonstrate that NSF grantees, including colleges and universities, vary significantly in their financial management capabilities. One recent OIG audit at a nationally-ranked research university found that officials approved and signed effort reports for 48 percent of its salary and wage expenses charged to NSF awards without adequate evidence that the costs were allocable to these awards.<sup>10</sup> Another university audit found that three faculty members did not report time voluntarily pledged to Federal awards in their labor effort reports.<sup>11</sup>

Further, on the FCTRs awardees report only summary rather than detailed expenditure information at the budget line item level, thus making it difficult for program and grants officials to identify expenditures that are not consistent with the project’s goals and objectives. Therefore, NSF must have timely and effective risk assessment, award monitoring and closeout procedures to ensure that awardees are capable of administering NSF funds and that the grant expenditures reported on the FCTRs are valid, accurate, allowable, and consistent with the project’s goals and objectives. Without timely and effective award monitoring and closeout procedures, there is a risk that awardees may not be in compliance with Federal and NSF grants requirements, or that NSF may make erroneous payments or fail to detect misuse of taxpayer funds.

In addition to OIG performed audits, the OIG also performs desk reviews of A-133 audits of NSF awardees and refers the audit findings and recommendations to NSF for audit resolution and follow-up. For these A-133 audits and all OIG audits, NSF implements the requirements of Revised OMB Circular A-50 on *Audit Followup*. The OIG works with NSF staff to resolve internal control, compliance, and questioned cost findings contained in these audits and to ensure awardees implement corrective action plans to address the audit findings. However, ensuring effective implementation of proposed corrective actions remains challenging, given resource constraints and the number of NSF awardees.

In order to address risks related to the assessment of program and financial performance of awards, the following audits are planned for FY 2008.

<i><b>Program Area</b></i>	<i><b>Assignment</b></i>	<i><b>Focus</b></i>
<b>Close-out</b>		<b>Performance</b>
Office of Budget, Finance and Award Management	Audit of NSF’s audit resolution process	Audit will determine whether NSF has adequate procedures and has taken effective corrective action to resolve grantee audit report findings and recommendations.

<sup>10</sup> *Audit of University of Pennsylvania Effort Reporting System*, OIG Report No. 06-1-012 (June 8, 2006) p. 6.

<sup>11</sup> As a result, this time was excluded from the university’s research base, thus increasing the indirect costs the Federal Government paid to this institution. *Audit of Payroll Distribution Systems California Institute of Technology Pasadena, California*, OIG Report No. 07-1-013, p. i.

<i>Program Area</i>	<i>Assignment</i>	<i>Focus</i>
<b>Close-out</b>		<b>Performance</b>
Foundation Wide	Project Reporting Implementation Audit	Audit will follow up on NSF's implementation of corrective actions taken in response to recommendations in the Audit of Project Reporting for NSF Awards (OIG report No. 05-2-006)
<b>Closeout</b>		<b>Financial/Administrative</b>
Foundation Wide	Desk reviews of Single Audits	Auditors will perform desk reviews of A-133 audit reports on organizations for which NSF has cognizance.

## 5. Infrastructure

NSF's award making and monitoring processes require a highly sophisticated infrastructure consisting of people, systems, information technology, and physical plant and equipment. For example, in order for NSF to conduct panel reviews of proposals, it must have systems in place to allow panelists to travel to NSF, enter the buildings and find their assigned rooms, and even connect their laptops to NSF's computer network. Ongoing award monitoring requires a highly trained staff, which must travel to awardee locations. All phases of the award process depend upon intricate financial accounting and reporting systems, which in turn depend upon NSF having an advanced and secure information technology substructure. An effective infrastructure is what allows NSF to accomplish its mission. Consequently, this infrastructure must operate effectively and be protected and maintained.

For audit planning purposes, we have grouped NSF's infrastructure into five broad categories: (1) Financial Management, (2) Human Capital, (3) Physical Plant and Property, (4) Information Technology, and (5) Acquisition.

### Financial Management

Improving financial management is a significant issue throughout the Federal Government. The Chief Financial Officers Act of 1990 (CFO Act), as amended, establishes the legal framework for improved Federal financial management. The CFO Act requires agencies to prepare financial statements and the OIG (or an independent public accounting firm selected by the OIG) to audit these statements.

Since FY 2002,<sup>12</sup> audits of NSF's financial statements have identified a reportable condition related to the agency's post-award monitoring of grantee institutions for compliance with the financial terms and conditions of NSF's awards. More recently, the audits have identified a reportable condition related to NSF's contract monitoring. A timely and effective post-award monitoring program for all awards, including grants, cooperative agreements, and contracts, is necessary to accurately report expenditures on NSF's financial statements and to ensure that the awardees are expending their NSF funds in accordance with their award agreements and that they are making adequate progress toward achieving award goals, objectives and targets. To monitor grants and cooperative agreements, NSF promulgated *Standard Operating Guidance*,<sup>13</sup> which specifies baseline and advanced post-award monitoring responsibilities within the Foundation. The adequacy and completeness of the monitoring procedures and the effectiveness of NSF's implementation of its monitoring programs are currently being assessed.

NSF is also responsible for an annual review of its accounting systems and internal controls in accordance with the *Federal Managers Financial Integrity Act* (FMFIA) of 1982. In 2004, in light of the new internal control requirements for publicly-

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<sup>12</sup> See footnote 8 above.

<sup>13</sup> *Standard Operating Guidance*, BFA-2007-1 (February 9, 2007).

traded organizations in the Sarbanes–Oxley Act of 2002, OMB revised Circular A-123, *Management’s Responsibility for Internal Control*, to strengthen requirements for management’s assessment of internal controls over financial reporting. Appendix A of the Circular specifically requires the NSF Director to provide a separate assurance statement on the adequacy of controls over financial reporting. Because of the amount of time needed to understand the new requirements and to conduct necessary control testing, NSF requested and OMB granted the agency a three-year period to conduct the necessary control testing underlying the assurance statements. In February 2007 NSF provided OMB with details of its FY 2007 A-123 Implementation Plan, and OIG audits of NSF’s financial statements will continue to monitor NSF’s implementation of the revised Circular A-123 requirements.

NSF also faces a risk in identifying the extent of its improper payments under the Improper Payments Information Act of 2002, Public Law 107-300 (the Act). The Act requires that Federal agencies provide OMB a statistically valid estimate of improper payments for all susceptible programs and activities. However, if any agency documents that in two consecutive years it had improper payments of less than \$10 million annually, it can request relief from the yearly reporting requirement. NSF requested this relief and in October 2006 OMB granted it because it found that NSF had met the required threshold for Research and Education Grants and Cooperative Agreements in both FY 2004 and FY 2005. Thus, the next year NSF must report on these programs is FY 2009. However, the Management Letter Reports issued in connection with the FY 2005 and FY 2006 Financial Statement Audits found that in NSF’s estimate of improper payments reported to OMB, NSF had narrowly defined improper payments as those that are “expressly unallowable,” thus excluding unreasonable or unallowable costs as defined by the Act. Because of the limited scope of the test results, there is a risk that NSF has not identified all of its improper payments.

### *Human Capital*

Since FY 2001, OIG has identified workforce planning and training as one of NSF’s top management challenges; and if NSF’s budget is doubled over the next 7-10 years, this challenge will increase. According to NSF’s Workforce Plan, NSF could expect to lose 717 or 54 percent of its 1,318<sup>14</sup> employees between 2006 and 2010. In addition, approximately 50 percent of NSF’s program staff are “rotators,” temporary employees who return to their home institutions or agencies after a few years at NSF.

Although visiting personnel allow NSF to keep abreast of cutting-edge research, they present a challenge, because frequent turnover increases the need for recruitment, hiring, processing, and training. Adding to these challenges, NSF received 42,352 proposals in FY 2006, up 44 percent since FY 2000. During the same time period the number of program officers increased only about 10 percent and the type of proposals received became increasingly multidisciplinary and complex. In addition, program officers are responsible for monitoring over 30,000 active awards at any given time. As a

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<sup>14</sup> This number was as of July 2005.

result of workload requirements and high turnover, there is an increased risk that programmatic goals are not being accomplished effectively.

In 2002, NSF entered into an \$11.5 million business-analysis contract with an outside consulting firm, which analyzed several NSF business processes, including human capital. The consultant assisted NSF in aligning staffing levels with anticipated future workloads and establishing alternative career opportunities for administrative support staff. Due in part to the contractor's work, NSF received its first "green" score for human capital management on the President's Executive Branch Management Scorecard in June 2005. However, in June 2007 NSF's score for human capital was downgraded to "yellow" because it did not deliver a skill gap assessment for all mission-critical occupations to the Office of Personnel Management (OPM).<sup>15</sup> NSF has subsequently worked with OMB and OPM to revise the list of future deliverables and expects to recover its "green" status for human capital within the next two quarters. Still, NSF acknowledges that it has remaining human capital challenges, including distributing administrative functions more effectively, developing and implementing a succession plan, finalizing and implementing its workforce plan, and completing a new Human Capital Management Plan. If NSF does not successfully meet these challenges, it risks having an insufficient workforce and/or a suboptimal distribution of skills to effectively meet its mission goals in the future.

#### Physical Plant and Property

The most visible facets of NSF's infrastructure are its buildings and physical property. Thousands of employees, contractors, and visitors enter NSF's buildings each day and use the physical property contained therein. NSF must ensure that its physical environment is not only adequate to support its needs but also safe and secure. Real and/or tangible assets in the United States, France, Japan, and China, and in the Antarctic as well as those at research facilities must be protected. NSF must prevent against unauthorized acquisition, use, or disposition of its assets.

Physical security for Federal office buildings has been a government-wide concern since the 1995 bombing of the Alfred P. Murrah Federal Building in Oklahoma City, Oklahoma, and has continued following the events of September 11, 2001. In June 1995, the Department of Justice issued a report entitled *Vulnerability Assessment of Federal Facilities*, which designated security levels I through V into which Federal office buildings could be categorized and identified minimum-security standards for each of the five security levels. These standards covered perimeter, entry and interior security, and security planning. Fifty-two minimum standards were established with level I having 18 minimum standards and level V having 39 minimum standards. Examples of minimum standards include lighting with emergency power backup for all buildings (perimeter

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<sup>15</sup> NSF had performed the assessment for human resource, Information Technology, and administrative positions, but not for other positions, such as program officers, because the assessment required IT tools that NSF did not have and could not afford. It also required time-consuming focus groups and surveys of these employees, and NSF concluded that program officers were already too overworked to subject them to this large additional burden.

security); intrusion detection systems for building levels III through V (entry security); visitor control systems for building levels II through V (interior security); and standard armed and unarmed guard qualifications/training requirements in all buildings (security planning). [REDACTED]

In May 1998, Presidential Decision Directive PDD-63 was issued to eliminate any significant vulnerability to both physical and cyber attacks on the Federal Government's critical infrastructure. Although this Directive makes every Federal department and agency responsible for protecting its own critical physical infrastructure, NSF determined that it did not meet the PDD-63 definition of critical infrastructure. However, NSF has developed a Continuity of Operations (COOP) Plan to ensure continuity of essential functions in the event of an emergency. NSF formulated this Plan even though it determined that NSF does not have "essential functions," as they are defined in the *Federal Preparedness Circular (FPC) 65*, which requires Federal agencies to develop COOP Plans for "essential functions."<sup>16</sup>

In addition, Homeland Security Presidential Initiative (HSPD)-12 requires that all agencies implement a single government-wide standard for "secure and reliable" forms of identification for all employees and for contractors with access to Federal facilities and information technology systems. By October 27, 2008, NSF plans to issue these new Federal identity cards, which will include a photograph and fingerprints, to about 2,000 employees, rotators, and contractors. The risks to NSF from inadequate security over physical plant and property include potential loss of life, bodily harm, destruction of or damage to assets, and disruption of operations.

### Information Technology

Information technology (IT) is critical to NSF's operations and in its FY 2008 budget request NSF requested \$42 million for IT. The largest component of the request was for systems infrastructure and maintenance (\$18 million), followed by next-generation grants management and E-Government Initiatives (\$11 million) for upgrades to NSF's web-based system that provides award information; for electronic initiatives such as E-Authentication, E-Travel, E-Payroll, and the Human Resources Line of Business initiative; and for the dissemination of publications citations and related reports that result from NSF-funded research. Investments in infrastructure and in next-generation grants management and E-Government initiatives are important to ensure that NSF achieves its mission effectively and efficiently and in conformity with Administration goals. However, despite NSF's redundancy and recovery capabilities, electronic systems increase the risk of major disruptions in operations during power outages and the loss, theft, or corruption of data and information.

IT security and privacy are high priorities at NSF and in 2006 Congress rated NSF's Computer security program an A+, a considerable improvement from some of its

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<sup>16</sup> The *Federal Preparedness Circular (FPC) 65* was issued by the Federal Emergency Management Agency in 1999 and updated in 2004.

past ratings.<sup>17</sup> However, the 2007 Federal Information Security Management Act (FISMA) evaluation required by the E-Government Act of 2002, found six areas in which NSF needs to improve computer security, including three areas in its U.S. Antarctic Program. Without timely, effective corrective action, these security weaknesses could significantly reduce NSF's ability to carry out its mission.

Further, in June 2006, in the wake of losses of sensitive personal information at Federal offices such as the Department of Veteran Affairs, the OMB issued Memorandum M-06-16, which instructed all agencies to utilize a security checklist provided by the National Institute of Standards and Technology to protect remote information and to take four additional actions, including encrypting all sensitive agency information on mobile devices. By the end of FY 2007 NSF stated that it had encrypted most of NSF laptops but still needed to encrypt other mobile devices such as NSF Blackberries and memory sticks; had completed the two-factor identification requirement; and had eliminated the use of social security numbers except where needed for payment (and those were encrypted). However, NSF reported difficulty in erasing all computer-readable extracts from databases holding sensitive information within 90 days (unless its use was still required). OMB has instructed every OIG to assess its organization's controls over sensitive information and the NSF OIG continues to monitor NSF's compliance with M-06-16.

Telework increases the need for IT security and training. As of September 2007, [REDACTED] percent of NSF employees had telework agreements. To reduce security risks, prior to starting to telework, employees are required to complete a specially designed telework course, which includes a security component. However, according to the General Services Administration,<sup>18</sup> [REDACTED]

Another important component of Information Technology is IT Management, including enterprise architecture. In its FY 2008 budget request to Congress, NSF requested \$.73 million for IT management. Although the Government Accountability Office found in August 2006 that NSF "has plans that do not demonstrate an awareness of the value of having and using an architecture," NSF has made progress since then. In April 2007, OMB reviewed NSF's self-assessment of its enterprise architecture and concluded that the agency earned a "green" rating. However, due to severe funding constraints, there is a risk that NSF will not be able to implement its enterprise

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<sup>17</sup> Since 2001, Congress has rated NSF's computer security program as follows: 2001-B+; 2002-D-; 2003-A-; 2004-C+, 2005-A and 2006-A+.

<sup>18</sup> See General Services Administration, *Telework Technology Cost Study* (May 2006), p.1.

architecture, increasing the risk of duplicative, poorly integrated systems that are ineffective and expensive to maintain.

### Acquisition

Acquisition continues to be a significant process supporting all of NSF's functions, as well as its overall mission. In FY 2006, NSF obligated approximately \$ 397 million for products and services from outside contractors, including an estimated \$ 270 million obligated through advance payments to three contractors. Through contracts, NSF purchases IT services and software, statistical services for specialized reports, and basic business equipment such as desks, computers, and office supplies.

The three contractors that receive advance payments submit quarterly expenditure reports (QERs) on their contracts to NSF, which uses the QERs to reconcile the amounts advanced to the amounts expended on the contracts. However, prior Financial Statement Audits found that NSF did not adequately review the QERs to ensure that reported expenditures were consistent with the contract or accurate; and as a result, expenditure misstatements might not be detected. The amounts at issue are potentially substantial. For example, recent OIG audits of one of these contractors questioned a total of \$55.5 million of claimed costs.

In response to the Financial Statement findings NSF hired the Defense Contract Audit Agency (DCAA) to review QERs submitted by the three contractors. However, the FY 2006 the Financial Statement Audit found that although DCAA had reviewed the QERs for the three contractors for four quarters, the reviews were limited in scope and might not identify unallowable costs. DCAA is now reviewing an additional four quarters of QERs for these three contractors and the Financial Statement Audit for FY 2007, due in November 2007, will evaluate the adequacy of these new reviews.

Acquisition also involves internal purchases with their own inherent risks. For example, the use of credit cards decentralizes an agency's purchasing function and gives purchasing authority to a greater number of staff. Decentralization also increases the risks of unauthorized purchases, excessive payments, or sub-optimal performance. In a given year, NSF cardholders make thousands of purchases worth millions of dollars with government purchase cards. Additionally, as more purchases are made electronically, the risks increase and NSF must address issues such as security, access, and authentication to ensure the integrity of the acquisition process.

In order to address risks related to infrastructure, the following audits are planned for FY 2008.

<i><b>Program Area</b></i>	<i><b>Assignment</b></i>	<i><b>Focus</b></i>
<b>Infrastructure</b>		<b>Performance</b>
Foundation Wide	Audit of NSF Controls over Collection, Storage, Access and Use of Personally Identifiable Information*	Audit will assess NSF business process to identify potential risks and assess the adequacy of controls NSF has in place to protect the personal information of its employees, visitors, primary investigators, and reviewers.
Office of Information and Resource Management	Audit of NSF's Continuity of Operations Plan (COOP)	Audit will determine if NSF has an effective plan for carrying out essential functions during any emergency or situation that may disrupt normal agency operations.
<b>Infrastructure</b>		<b>Financial/Administrative</b>
Foundation Wide	Oversight of FY 2008 CFO Audit	Oversight of the audit of NSF's agency-wide financial statements, which will be performed by an independent public accounting firm under contract to the OIG. The audit is mandated under the Chief Financial Officers Act of 1990.
Foundation Wide	FY 2008 FISMA Review and FISCAM Audit	Annual evaluation of NSF's information system security program and practices as required by the Federal Information Security Management Act of 2002 (FISMA). Evaluation performed as part of the FY 2008 CFO Audit.

\*Represents on-going work