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OFFICE OF THE DIRECTOR

November 5, 2007

MEMORANDUM

To: Dr. Christine C. Boesz
Inspector General, NSF

From: Dr. Arden L. Bement, Jr.
Director, NSF

Subject: Response to the Inspector General's Memorandum
Management Challenges for NSF in 2008

Thank you for your memorandum of October 17, 2007 regarding potential management challenges the National Science Foundation (NSF) faces during the remainder of Fiscal Year (FY) 2008, and for your acknowledgement of the significant progress NSF has made over this last fiscal year in meeting the FY 2007 management challenges as highlighted below. As in the past, your memorandum will be discussed in the Senior Management Round Table (SMaRT).

NSF has focused on continuing progress on implementation of the requirements of *Office of Management and Budget Circular A-123: Management's Responsibility for Internal Control,* the most recent implementing guidance for the *Federal Managers' Financial Integrity Act of 1982.* These internal controls are essential to ensuring compliance with laws and regulations, reliable financial reporting, and the efficiency and effectiveness of NSF operations. A summary of the Foundation's related activities and results are in this year's *Annual Financial Report* in the Management's Discussion and Analysis, "Management Assurances" discussion.

During this past year, NSF's accomplishments on these management challenges reflect significant progress for the Foundation on its ongoing commitment to excellence and results-oriented management. Once again, NSF has demonstrated its stewardship toward our national goals, and dedication and commitment for the agency's success. The Foundation has invested in essential business models, policies and practices essential to safeguarding public funds, and has continued to maintain a reputation for consistency, efficiency, and quality as we met a variety of challenges while experiencing growth in our budget and program activities.

Arden L. Bement, Jr.
Director

Attachment

cc: Chair, National Science Board

NATIONAL SCIENCE FOUNDATION
Progress during Fiscal Year 2007
On the OIG's 2007 Management Challenges

On October 16, 2006, the Office of Inspect General (OIG) issued a statement summarizing what the OIG considered to be the most serious management and performance challenges facing the National Science Foundation. These are shown on the table below. This report summarizes NSF actions on these management challenges.

OIG Management Challenges for FY 2007	
1. Award Administration	• Post-Award Administration > Cost Sharing • Large Infrastructure Projects • Contract Monitoring • Promoting Integrity
2. Human Capital	• Workforce Planning > NSF's Non-permanent Workforce • Administrative Infrastructure > Space Limitations > FedTraveler
3. Budget, Cost and Performance Integration	• Performance Reporting > Project Reporting • Cost Information
4. Information Technology	• Enterprise Architecture
5. U.S. Antarctic Program	• Long-term Planning
6. Merit Review	• Broadening Participation

Summary of NSF Actions on FY 2007 OIG Management Challenges

1. AWARD ADMINISTRATION

Post-Award Administration: NSF continues to refine its post-award financial and administrative monitoring program. Within the last three years, BFA has established the Division of Institution and Award Support to lead the Agency's cradle-to-grave award administration efforts; significantly increased staff and contractor expertise specifically dedicated to post-award activities; and continued to incorporate government-wide best practices throughout its efforts. Through a combined set of activities (on-site

reviews, business system reviews, desk reviews, transactional testing), NSF is confident in its ability to ensure exemplary stewardship of tax payer investment. Over the past several years we have worked diligently to develop a comprehensive and structured post-award monitoring program. The benefits of this program include the following:

- Using the sound and cost-beneficial approach of a risk assessment model allows us to focus monitoring resources on the 25 percent of NSF's awardees that manage 93 percent of the award dollars. In this way, we ensure stewardship over federal funding and manage burden on the community. We have used a mixed protocol of desk reviews, on-site visits, and financial transaction testing that further targets the Foundation's resources in this endeavor.
- NSF now detects potential problems earlier in the award life cycle, and we can assist organizations in addressing deficiencies that impact their ability to adequately manage Federal funds and thus possibly avoiding audit findings.
- With our more holistic perspective, we are able to mine monitoring results for "lessons learned" that help form both ours and the institutions' policies and practices around sound stewardship.

Our Award Monitoring and Business Assistance Program is increasingly recognized as a standard of excellence across the federal government, consistent with the Foundation's reputation for first-class management.

Specific 2007 Achievements:

- Continued implementation and refinement of the Award Monitoring and Business Assistance Program (AMBAP); the program provides disciplined and comprehensive post-award monitoring for NSF's high-risk and medium-risk awards. In FY 2007, staff conducted 22 AMBAP site visits; in addition, 115 desk reviews were completed and 38 are in progress, as of September 26, 2007.
- A database system was developed to enhance the tracking of post-award monitoring site visit and desk review activities.
- Submission of Indirect Cost Rate proposals from potential awardees has been streamlined.
- NSF's first, unified set of standard operating procedures for post-award monitoring now includes upgrades of site visit protocols and templates designed to elicit consistent and comprehensive information. The desk review protocol has been developed and implemented. Protocols for follow-up activities have been completed and are currently being implemented for both site visits and desk reviews.

Future plans include full implementation of the database and analytical tools, analysis of the survey feedback, and continued assessment and refinement of the AMBAP activities.

Cost Sharing: The National Science Board eliminated program-specific cost sharing in October 2004. NSF has worked diligently to implement the Board's policy and communicate that there is no expectation by the Foundation that proposals submitted for funding will include a cost sharing component.

- Through its internal clearance processes, NSF continues to work diligently with all program offices to remove cost sharing requirements in remaining solicitations. The Foundation has ensured that no new solicitations have been issued that contain cost sharing since the Board changed the policy except as required by law, as noted below.
- Briefings and extensive back-up material have been provided to the Board summarizing the current status of cost sharing at NSF.
- All of the Foundation's major policy documents, both internal and external, have been revised to reflect elimination of program-specific cost sharing. The "Grant Proposal Guide," "Award & Administration Guide" and the "Proposal and Award Manual" all reflect this change, as well as elimination of the long-standing de minimus across-the-board statutory cost sharing requirement that is no longer included in NSF Appropriations language.

- The NSF Grant General Conditions (GC-1) and the Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) have also been updated to reflect these changes and the new terms and conditions are referenced in all award notices issued on or after June 1, 2007.
- BFA's formal and informal internal and external outreach programs include discussions of this policy change.
- Cost sharing, where still required on older awards, continues to be an important element in NSF's post award monitoring visits and any needed follow-up plans. A briefing to senior management in April 2007 highlighted the essential elements of the policy and included information to assist Program Officers in evaluating the annual notifications submitted by grantees whose awards contain cost sharing of $500,000 or more.
- Revised the Major Research Instrumentation program solicitation to incorporate the statutorily mandated cost sharing requirement imposed by the America Competes Act. A "Dear Colleague" Letter also was issued to announce this requirement to the research community.

Large Infrastructure Projects:

- The Large Facility Project Office (LFP) has increased the number of staff every year since 2004. Presently, there are four FTEs, including the Deputy Director, and one IPA.
- The "Large Facilities Manual" was released in May 2007. The manual provides guidance for NSF staff and awardees to carry out effective project planning, management, and oversight of large facilities. Supplemental modules are being developed during FY 2008.
- Tracking and reporting on facility obligations by lifecycle phase uses the existing Financial Award System (FAS) and the e-Jacket web-based system. Reports on obligation funding and expenditure spending can easily be run for a facility by fiscal year, lifecycle phase(s) and project. An obligation report provides each funding transaction that was made to an entity in a particular fiscal year. An expenditure report provides each transaction in which money is drawn down from an obligation by fiscal year. In FY 2008, the Large Facility staff will continue to discuss with NSF program directors of large facilities how to best capture the funding of obligations that is used to do research at a facility. Presently, we are relying on ad hoc reporting.
- Training is being developed on the Manual and also a new web-based training system is being developed on the financial and reporting tracking of obligations. This training will be offered to everyone at NSF. *Project Science Workshop* is designed specifically for large research facilities and is held annually. The workshop, held at the Beckman Center at the University of California, Irvine, October 16-19, 2007, provides discussion and best practices on project management from the project and agency personnel. This workshop is also attended by researchers supported by other agencies, such as the Department of Energy, and foreign governments.
- The Business System Review (BSR) Guide has been used for a number of site visits during 2007. A Facilities Subcommittee of the Business and Operations Advisory Committee met on March 28-29 at NSF to review and make recommendations on the guide. Their report will be forwarded to the Business and Operations Advisory Committee (B&O AC) in the Fall 2007.

Contract Monitoring: The Division of Acquisition and Cooperative Support (DACS) will continue to perform Quarterly Expenditure Report reviews as a risk mitigation mechanism for three of NSF's major advance payment contracts.

The NSF "Contracting Manual" has been updated to clearly establish a contract monitoring and oversight program. The revised "Contracting Manual" includes a clear delineation of contracting personnel's roles and responsibilities regarding the DACS oversight program. Furthermore, the manual includes a file check list and file review checklist to ensure that contractual files contain the appropriate documentation.

DACS has hired a designated acquisition workforce manager to coordinate the training of NSF employees responsible for maintaining and documenting receipt of contract deliverables, and increased its staffing to

include two procurement analysts to implement the oversight program, and is aggressively moving forward to filling additional vacancies.

Promoting Integrity: NSF's strategy to promote the integrity of scientific and engineering research has several dimensions:

> *Training of Future Scientists and Engineers*. Examples include:
- Ethics training for all Science and Technology Centers (STC) and Engineering Resource Centers (ERC).
- Integrative Graduate Education and Research Traineeship program requires projects to provide instruction in ethics and the responsible conduct of research.

> *Sessions with Institution and PI Community*. Examples include:
- Office of Inspector General conducts a session which highlights the importance of scientific integrity at all NSF Regional Grants Conferences.
- Continuing discussions regarding ethics are held at Federal Demonstration Partnership meetings.

> *NSF Program Officer Training*. Recognizing and handling of cases involving potential scientific misconduct are part of training included in NSF Program Management Seminar.

Merit Review Process. The NSF merit review process provides opportunities for critical attention to issues of integrity.

NSF's emphasis on this topic has translated into numerous web-based venues to provide education and training on ethics in science. For example, offerings developed through the STCs include a graduate on-line course (Kansas University), a web-based certification program (University of Washington), and a mandatory ethics seminar with webcast (University of Illinois at Urbana-Champaign). In addition, NSF supports a program called Ethics Education in Science and Engineering to improve ethics education in all of the fields of science and engineering that NSF supports, including in interdisciplinary or inter-institutional contexts. See http://www.nsf.gov/pubs/2007/nsf07541/nsf07541.htm

2. HUMAN CAPITAL

Workforce Planning: Progress continues to be made in the development and implementation of an effective workforce planning process, as evidenced by the following examples:

- A committee of senior management from each Directorate and Office designed and implemented an operating workforce planning process in FY 2006.
- A 3-year strategic workforce plan was documented in FY 2006. The draft plan is being updated this year to align with NSF's Strategic Plan, and will be reviewed and updated annually.
- Each Directorate/Office created staffing plans for FY 2006 and FY 2007 based upon the methodology developed in the workforce planning process. These plans aided NSF's staffing efforts for the last two years. FY 2008 staffing planning will begin in the fall.
- The Directorate for Computer and Information Science and Engineering (CISE) piloted a workload demand analysis process which will be made available for use throughout the Foundation in FY 2008. This process will aid in anticipating future workload and help determine the appropriate mix of staff within a Directorate/Office.

In addition, in FY 2007, NSF began a comprehensive succession planning process that will identify key succession planning strategies.

NSF's Non-Permanent Workforce: During 2003, the National Academy of Public Administration studied, among other things, NSF's use of "non-permanent" employees. That report noted that NSF uses its "rotating" workforce in an appropriate manner. It also noted that the NSF understands the challenges

of managing such a mixed workforce, part permanent-part temporary, and has managed this situation very well so far, and recommended no changes to the management of this situation.

NSF has always appreciated the ability and authority to recruit and hire the most capable scientists and engineers to oversee and manage its frontier science and engineering activities. NSF also understands the challenges that come with this authority, and continuously works to improve the orientation, the training, and the appreciation of associated responsibilities that come with federal employment and excellence in program management. One key to NSF's success is a continual and transparent exchange between the science community and the agency. NSF's ability to utilize rotators is essential to carrying out the agency mission.

Administrative Infrastructure: To address the issue of adequate Human Resource Management administrative systems to hire new staff, the following actions were undertaken in FY 2006-2007:

- Significantly expanded contract support to perform operational and processing work in order to focus permanent resources on strategic change and strategic partnerships.
- Created Human Resource service teams with specific customer account representatives to meet frequently with management officials in order to accurately define and meet recruitment needs.
- Established new "service agreement" approach to fill positions whereby the hiring office and HRM agree up front on recruiting steps and expected timeline to complete hiring action.
- Established and announced a number of open continuous positions to assure an ongoing supply of candidates for commonly filled positions.
- Implemented processes to improve the quality of questions used in Quick Hire announcements in order to make clearer distinctions between candidates.
- Established a new pay-setting policy that streamlined the pay calculation process for NSF Excepted Service positions and significantly reduced the number of requests for exceptions.

As a result of these efforts, NSF reduced total time-to-hire for all NSF recruitments by an average of more than 30 percent from 2006 to 2007.

Space Limitations: The problem of inadequate space and space limitations as well as the ability to obtain space for panels and meetings is being addressed in a number of ways:

- NSF management is working closely with Tishman Speyer, the new owners of Stafford Place and Stafford II, to identify new space that may become available.
- NSF is working with GSA to allow various lease arrangements as the new space comes available so that we will have flexibility in obtaining leased office space.
- Since 2006, NSF has moved 61 staff to Stafford II. Currently, office space construction is taking place to build 67 new offices for space that was recently acquired in Stafford II.
- NSF expects more space to come available over the next three years in Stafford II and is planning accordingly based on various space scenarios.
- NSF management determined that much of the problem finding space for panels and meetings stems from staff who reserve rooms and fail to cancel them when not needed. The conference services staff is addressing this problem by contacting meeting coordinators in advance to confirm they will need the rooms. We have found that several meeting rooms are made available each week simply by releasing rooms that will not be used and thus making them available for use by other staff. Although this is somewhat labor intensive, it has been effective in relieving the problem of inadequate numbers of available meeting rooms.

FedTraveler:

- NSF worked closely with an inter-agency group and GSA to outline FedTraveler system problems that were cited as hampering staff members in their attempts to make travel arrangements. A letter

of cure to EDS, the FedTraveler provider, listed all known defects in the system. GSA monitored the resolution of the issues, and determined that EDS satisfactorily met all the conditions in the letter.

- EDS worked with user groups to make the navigation of the FedTraveler system more user-friendly, resulting in many system changes over the past 18 months.
- In July of 2007, NSF worked with EDS to integrate FedTraveler with the NSF finance system. Full integration of the two systems has enhanced the functionality of the travel and reimbursement system. For example, when the final approval of a travel plan is done in the FedTraveler system, the NSF finance system immediately obligates the travel funds, thus ensuring that the ticketing agent at Sato Travel issues the ticket for the traveler.
- A new FedTraveler wizard style interface prototype has been developed by EDS based on user feedback, and is expected to enhance ease of use for staff. The new interface is currently being shown to customer agencies and is expected to be ready for release within 6 to 12 months.

3. Budget, Cost, and Performance Integration

Performance Reporting: The Advisory Committee for GPRA Performance Assessment (AC/GPA) recommended in their 2006 Report that program highlights (formerly called "nuggets") include more specific information on desired activities and outcomes. In response, NSF revised the process by which program officers write and categorize highlights for the AC/GPA's use. Program officers were asked to explain how the particular highlight addressed one of the strategic outcome goals (Discovery, Learning, or Research Infrastructure) as described in the NSF Strategic Plan for FY 2006-2011. In addition, program officers were asked whether the highlight represented transformative research and if so, why. After reviewing more than 1,100 highlights, AC/GPA members determined that NSF had demonstrated significant achievement for its strategic outcome goals, but recommended in their 2007 Report that "specific criteria for each of the strategic goals" be designated to assist the Committee in its assessment the following year. NSF will implement this recommendation for the Committee's review of FY 2007 highlights.

Project Reporting: NSF continues to advance its capabilities for the receipt, submission, and monitoring of annual and final project reports through IT enhancements, as well as upgrades to its external and internal policy documents.

Specific achievements:

- In November 2006, NSF implemented its first data-driven, web-based project reporting and notification system for annual and final project reports. Incorporated into FastLane, this system is comprised of a module accessible through NSF's internal eJacket system and complemented by a plethora of tools explicitly designed to benefit both NSF's external research community and its internal scientific staff.
- Business rules reflecting NSF policies and appropriate edits supporting these rules were incorporated into NSF's back office corporate IT systems (i.e., Proposal and Reviewer System, Award System).
- Clarifications to the roles and responsibilities for project reporting by institutional awardees, Principal Investigators/co-Principal Investigators, and NSF Program Officers have been incorporated into recent updates of the "Proposal and Award Policies and Procedures Guide and the Proposal and Award Manual".
- Implementation of this re-engineering of processes for tracking and notification completes resolution of all outstanding findings identified under the OIG Audit Report of December 13, 2004.

Cost Information: NSF maintains costs of its operations at the highest and lowest levels. NSF monitors costs of its operations at a very detailed level in its Budget Execution Plans. NSF also tracks costs of its operations at the highest levels for our strategic goals and our appropriations. NSF has determined that process oriented cost information would be of limited utility to agency management. The agency instead

relies upon efficiency measures that focus on process and performance, which are more meaningful and useful than measures that focus strictly on cost.

- In conjunction with the PART review and implementation of the Budget and Performance Integration Initiative, NSF has adopted efficiency goals that constantly challenge the staff to develop and implement the most efficient work processes and operations. As an example, the agency is currently undertaking an Administrative Functions pilot to better align and streamline staff functions and responsibilities.
- NSF administrative costs are presented in the agency Budget and tracked via the Statement of Net Cost. Because about 95 percent of NSF's funding goes directly to programmatic investments, detailed information on administrative costs is of limited utility to NSF program managers. To adopt a system for tracking costs at detailed levels of the organization would in itself undermine the efficiency of NSF's operations and the cost of such a system would be grossly disproportionate to the benefits.

4. Information Technology

Enterprise Architecture: NSF's Enterprise Architecture (EA) is evaluated annually by the Office of Management and Budget (OMB) and periodically by the General Accountability Office (GAO) to assess the completion of EA work products, use of EA to drive improved decision-making, and results achieved from using EA. NSF has taken the following actions in response to the GAO EA report:

- Established an agency policy for EA development, maintenance, and compliance.
- Formally established the CIO Advisory Group (CIOAG) as the group representing the agency that is responsible for directing, overseeing, and approving EA.
- Obtained CIOAG approval of the current version of EA.
- Periodically measured and reported progress against EA plans to the CIOAG.
- Expanded our EA methodology to include steps for EA development.

Also, NSF received high ratings from OMB for the quality of our Enterprise Architecture efforts.

5. The United States Antarctic Program

Long-Term Planning: NSF was directed by Presidential Memorandum 6646 (February 5, 1982) to fund and manage the U.S. Antarctic Program as a single package. As such, NSF funds forefront scientific research, secures and manages the associated logistics support and infrastructure that makes this research possible, and protects the Antarctic environment as well as the health and safety of Program participants.

OPP tasked an external group of experts to advise on the logistics and infrastructure needed to sustain the high priority research program and to consider modifications that would enable research in new geographical regions or on new subjects. Funding to begin implementing the resulting recommendations was requested in the FY 2007 budget to Congress and work on these efforts continues.

The USAP is part of the agency-wide IT Security Program that encompasses all aspects of information security, including policies, procedures and plans; security assessments; audits and controls; security awareness training; certification and accreditation; intrusion detection and computer incident response team (CIRT); and vulnerability assessment and penetration tests. The Antarctic support contractor recently submitted proposals to implement a disaster recovery program and to replace the software systems currently in use. Management is considering these proposals, as well as their priority relative to other USAP needs.

6. MERIT REVIEW

Broadening Participation: The goal of broadening participation of underrepresented groups in the sciences and engineering has long been a priority at NSF, and is embedded as a core value in the Strategic Plan. Proposals from women and minorities increased by 3.2 percent in FY 2006 as compared to FY 2005; the overall increase in proposal submissions was only 1.6 percent. This suggests that some progress is being made in attracting more applicants from underrepresented groups. However over time, there has been an increased tendency of NSF proposers to not report demographic information. With respect to reviewers, in FY 2006, 25 percent of reviewers reported demographic information, 36 percent of which were members of underrepresented groups. Both of these numbers represent an increase over the previous year. NSF continues to ask proposers and reviewers to volunteer information about their ethnicity, gender, or disability status. Nonetheless, since providing this information is not mandatory, tracking progress in increasing the participation of underrepresented groups continues to be a challenge.

To address this challenge, in FY 2007 NSF has:

- Formed an NSF-wide working group on Broadening Participation, whose charge is to: 1) develop a plan to increase participation in NSF programs from underrepresented groups, which includes defining existing baseline data; and 2) develop a plan to broaden the pool of reviewers for NSF proposals. The working group presented a draft report with specific recommendations to NSF Senior Management in mid-September, 2007.
- Begun conceptual analysis of an integrated and dynamic Reviewer Management System.