

Appendix

October 16, 2009

MEMORANDUM

To: Dr. Steven C. Beering
Chair, National Science Board

Dr. Arden Bement
Director, National Science Foundation

From: Allison Lerner
Inspector General, National Science Foundation

Subject: Management Challenges for NSF in FY 2010

In accordance with the Reports Consolidation Act of 2000, I am submitting our annual statement summarizing what the Office of Inspector General (OIG) considers to be the most serious management and performance challenges facing the National Science Foundation (NSF). We have compiled this list based on our audit and investigative work, general knowledge of the agency's operations, and the evaluative reports of others, including the Government Accountability Office and NSF's various advisory committees, contractors, and staff.

This year we have taken a fresh look at the challenges that NSF faces and have focused on six issue areas that reflect fundamental program risk, and are likely to require management's attention for years to come. They include:

- Ensuring Proper Stewardship of Recovery Act Funds
- Improving Grant Administration
- Strengthening Contract Administration
- Becoming a Model Agency for Human Capital Management
- Encouraging Ethical Conduct of Research
- Effectively Managing Large Facilities and Instruments

If you have any questions or need additional information, please call me at 703-292-7100.

CHALLENGE: Ensuring Proper Stewardship of ARRA Funds

Overview: The American Recovery and Reinvestment Act (ARRA), enacted in February 2009 is intended to create and save jobs through investments for long-term economic growth. ARRA provided an additional \$3 billion for the National Science Foundation (NSF) in its three core appropriations accounts: Research and Related Activities, Education and Human Resources, and Major Research Equipment and Facilities Construction (MREFC). The Act also instituted reporting requirements intended to ensure transparency and accountability. The OIG received an additional \$2 million to conduct oversight of the use of these funds.

Challenge for the Agency: It will be a challenge for NSF to spend its ARRA funds expeditiously while ensuring accountability and that the twin goals of reinvestment and recovery are met. We have identified a number of risk areas that represent challenges to NSF in spending ARRA funds in accordance with the law's objectives while meeting increased reporting requirements and greater transparency. Following are examples of some of these challenges:

- Determining in advance that awards are appropriate for stimulus funding
- Making and monitoring ARRA awards, especially ones made to high-risk institutions
- Meeting the law's requirements for greater transparency by providing all required information on the Recovery.gov website
- Promoting timely, complete, and accurate reporting by awardees

Another major challenge for NSF is the area of job creation and retention. While it is clear how NSF will meet the Act's goal of reinvestment, it is less clear how the agency will promote the goal of economic recovery. The agency has not fully identified how NSF will address this key goal, and in particular the number of jobs created and/or retained in its ARRA-related metrics. While it is difficult to measure the economic benefits produced by basic research, stakeholders expect NSF to be able to provide information on the number of jobs created. Last spring, OIG presented NSF with an assessment of stakeholder expectations for meeting its ARRA goals.

Further, the agency's allocation of \$200 million of ARRA funds in support of the Academic Research Infrastructure Program, a program NSF has not been involved with for some time, poses a challenge. We believe that this program presents the same types of risk to NSF as a newly established program. In addition, \$400 million of the ARRA funds are for MREFC projects. We have consistently identified these large, complex infrastructure projects as more challenging for NSF.

OIG's Assessment of the Agency's Progress: NSF has taken important steps to address the challenges posed by the increased demands of ARRA. For example, NSF quickly developed programs to make awards, established methodology and put out implementing policies and procedures that include new award terms and conditions specific to ARRA awards. Generally, NSF is dealing well with ARRA's funding and reporting challenges and has stated that it will focus attention on risky programs.

At the agency's invitation, the OIG is participating in a number of teams created to grapple with issues related to ARRA implementation through which we are able to learn about the requirements associated with ARRA funds, and hear first-hand about how NSF is administering the funds. Our participation in these activities enables us to raise issues for NSF's consideration at an early stage in the process. In those meetings and in periodic reports to the agency, we have provided NSF with our assessment of key challenges such as potentially risky programs and awardees, and the agency has been responsive to the concerns we have raised.

CHALLENGE: Improving Grant Administration

Overview: Close monitoring and management attention from the pre-award stage through grant closeout is essential for effective grant management. The American Recovery and Reinvestment Act increases the need for effective grant management, as it will require NSF to manage an unprecedented influx of funds and resulting awards while meeting economic stimulus objectives and responding to increased reporting requirements .

An effective pre-award framework should include an assessment of financial risk to help ensure that potential awardees possess the financial capability to successfully perform under the award. Large dollar and complex awards may be more difficult to administer and may require more oversight. Pre-award financial reviews are also particularly important for new awardee institutions that may lack experience in handling government funds.

An effective post-award framework should integrate oversight of both financial and programmatic issues to ensure that awardees comply with terms, conditions, and regulations; achieve expected progress toward accomplishing project goals; and file accurate financial reports as required.

Awardees that pass through federal funds to subrecipients are required to monitor them by reviewing financial and performance reports, conducting site visits, and ensuring that subrecipients have adequate financial systems to properly manage the funds. Adequate controls over subrecipient monitoring are an important safeguard to ensure funds are spent properly.

NSF also needs to ensure that it takes action on known problems identified by OIG and Single Audits. NSF has a responsibility to follow up to correct internal control weaknesses to ensure that corrective actions are taken. Our recent review found that NSF lacks policies to do this.

Challenge for the Agency: Since 2002, we have recommended that NSF strengthen its post-award administration policies and practices. Over the past several years, NSF has improved its monitoring of financial performance, but refinements are needed to its processes for: documenting site visit reviews, ensuring cost sharing requirements are met, and approving payments for grantees known for having prior problems.

A continuing challenge for the agency is to improve monitoring of program performance. This is particularly important in light of the additional awards made with ARRA funding. To integrate the monitoring of both program and administrative performance, NSF needs to improve communication between staff engaged in program and financial oversight.

Our audit work continues to document deficiencies in subrecipient oversight. Specifically, in four audits completed in March 2009 of non-profit organizations with more than \$14 million of subawards, we found a consistent pattern of inadequate subrecipient oversight. One of the four audits that focused on costs claimed by a nonprofit organization that was established to provide cooperative research and development opportunities to scientists and engineers in the independent states of the former Soviet Union found significant internal control weaknesses in the process for overseeing hundreds of foreign subrecipients. As a result, there was an increased risk of fraud and of unallowable costs being charged to the NSF awards. Without appropriate oversight of subrecipient spending, NSF risks paying substantial subaward costs absent adequate assurance that these payments are permissible.

OIG's Assessment of the Agency's Progress: NSF has reported that it has taken a number of steps during the past year to improve grants administration. For example, the agency states that it has assessed the business performance of 30 percent of awardees administering 94 percent of NSF funds through advanced monitoring, including 30 site visits and 159 desk reviews. In addition, NSF has updated its *Proposal and Award Policies and Procedures Guide* and its *Proposal and Award Manual*. The agency states that it is planning to modify: grant conditions to require principal investigators to submit a new type of final report on project outcomes; and the research.gov website to include the capability of principal investigators to report at the end of the project on project outcomes.

CHALLENGE: Strengthening Contract Administration

Overview: NSF's financial statement auditors recommended a number of improvements to NSF's contract monitoring process in the management letter for the FY 2008 financial statement audit. The auditors have warned that if the problems persist, management cannot ensure the reasonableness and accuracy of costs incurred on high risk contracts, which amounted to \$205 million for FY 2008.

Effective contract administration is particularly important since NSF is in the midst of choosing a contractor to provide logistical support for the U.S. Antarctic Program over the next 13.5 years. The current contract, which is NSF's largest valued at \$1.2 billion over 10 years, was scheduled to expire in March of 2010 but has been extended for one year.

Challenge for the Agency: The transition to a new USAP contract will severely test NSF's contract administration practices. The immediate challenge is to administer an effective and successful procurement process that results in the selection of a contractor that can meet the USAP's diverse needs while

providing value to the government. The process should assure that: all offerors receive the same information and opportunities, their proposals are carefully analyzed and compared, and critical information is verified. The closeout of the existing USAP contract will also pose a challenge, as NSF must resolve issues involving the contactor's accounting practices and subrecipient oversight that have lingered since 2000-2004, as well as obtain audits of incurred costs for later contract years. Auditors have identified specific areas needing improvement including the closeout of contracts, and reviews of incurred costs and contract expenditures.

The long-term challenge for NSF is to continue to strengthen its contract monitoring efforts once the new USAP contract is executed. In addition, in July OMB issued new guidance to strengthen and improve acquisition practices that calls on NSF and other federal agencies to achieve a number of ambitious goals. The challenges represented by the USAP contract transition, the need to correct NSF's existing contract administration deficiencies, and meeting the heightened expectations of the administration, are formidable and will require management's attention for years to come.

OIG's Assessment of Agency's Progress: During the past year, NSF developed and issued the Antarctic Support Contract solicitation and began evaluating proposals it received. OIG has offered advice to the agency on key areas of the cost proposals that should be verified through audits, including indirect and overhead rates and the adequacy of offerors' business systems and cost accounting practices.

The agency has advised us that due to a delay in evaluating proposals it plans to extend the current contract for one year. But NSF needs to obtain an audit of the contractor's disclosure statement, as well as the cost proposal for the extension, to complete the negotiations. The agency will also need audits of more recent contract costs incurred since 2004 before it can close out the contract. Meanwhile, a hiring freeze imposed by the agency earlier this year has prevented the Contracting Office from replacing departing personnel. Reductions in the number of acquisition staff during this critical period are a cause of concern and may impede NSF's progress in surmounting these challenges.

CHALLENGE: Becoming a Model Agency for Human Capital Management

Overview: Workforce planning and other issues such as the use of visiting scientists or "rotators", the development of management succession plans, and delays in the process of recruiting and hiring, have long been identified by OIG as management challenges. In FY 2008, NSF increased the number of program officers by 15 percent to 520 to help alleviate workload imbalances.²⁹ But workload pressures increased significantly last February when the agency received \$3 billion in ARRA funds, the bulk of which had to be expended before fiscal year-end. The disbursement of the ARRA funds for new grants during the

²⁹ According to the FY 2008 Merit Review Process Report, rotators comprise 59% of the total number of program officers.

last half of FY 2009 has increased workload by 40 to 50 percent for those staff engaged in processing new awards and will result in a commensurate increase in post-award workload.

In addition to these new and longstanding issues, the agency's response to a number of workplace misconduct incidents in 2008 raised questions from Congress and others about its personnel policies and practices, as well as the effectiveness of its Equal Employment Opportunity Office. After these inquiries, the NSF Director told the National Science Board last August that he was determined to make the agency a model of workforce management within the federal government.

Challenge for the Agency: To become a model agency, NSF must address several deficiencies in its workforce planning process. Primarily, it must develop an effective process for estimating future workload and for determining the appropriate number and skill set of the workforce required to administer it. In the past, both program officers and administrative staff have struggled to keep pace with their grant-making responsibilities and have not had adequate time to focus on post-award monitoring activities. The additional awards funded by the Recovery Act in 2009 are likely to exacerbate the situation as they mature over the next three years and require more oversight by NSF staff.

NSF must also define an appropriate role for its temporary professional staff or "rotators" that will fully utilize their expertise in science, education, and engineering while compensating for potential weaknesses in the areas of supervision, and the lack of institutional knowledge and long-term organizational perspective. The agency should determine what types of positions should be reserved for rotators as opposed to federal employees, and if rotators are appointed as managers it must ensure that they have the skills to be effective in that role.

Finally, NSF must continue to make progress in the areas of succession planning and improving the support it offers to managers engaged in recruiting and hiring new employees. A recent analysis of NSF's workforce indicates that 39 percent will be eligible to retire in 2011. Between the increasing number of agency managers eligible for retirement, and the rotational nature of a large segment of its program officer workforce (59%), ensuring that the appropriate planning and tools for the replenishment of NSF's program officers and managers is critical to the agency's success.

OIG's Assessment of Agency's Progress: The agency has taken a number of steps to improve workforce management, including hiring a permanent SES-level director of its EEO office. NSF has also formed teams of employees to identify areas for improving employee satisfaction and other areas affecting human capital. The announcement of the agency's goal to become a model of human capital management is a positive development, indicating an increased commitment on the part of NSF toward improving its human capital management.

The agency continues to make progress towards improving workforce planning. It states that it has taken a number of steps over the past year to address workforce planning issues, including evaluating and updating the workforce planning

systems, and improving its customer ratings for agency recruiting and hiring services. NSF reports that further efforts in the areas of staffing, management succession and the use of rotators are pending an upcoming comprehensive analysis of these issues early next year by OPM. Finally, in its FY 2010 budget, NSF has requested funds to contract for development of systems requirements for a workload analysis tool.³⁰

CHALLENGE: Encouraging the Ethical Conduct of Research

Overview: The opportunities and incentives for scientists to commit research misconduct or engage in questionable research practices have never been greater, due to the increasing amount of information stored on the internet, the development of more powerful search tools, the ubiquity of digital research data and the ease with which such data can be manipulated, and the availability of new stimulus-related research funds. In a recent survey of 2,500 scientists by the Pew Research Center, 11% of those polled indicated that the possibility of making a lot of money leads many in their specialty to violate ethical principles, while 26% reported that it leads their colleagues to cut corners on quality.³¹

Research collaborations between scientists and students from different nations continue to proliferate. Since there are often differences between the various science communities concerning their views on research ethics, and the reporting and compliance regime to which they are subject, it can often be unclear to individual researchers (and sometimes even their oversight officials) which set of rules applies. International organizations such as the OECD's Global Science Forum (GSF) recognize the problem and have taken steps to foster a discussion about these issues and attempt to develop one framework that will apply in the area of research misconduct.

Challenge for the Agency: NSF's challenge is to strengthen understanding and adherence to recognized standards of ethical research conduct by scientists in the U.S. and those who participate in international collaborations. One step to addressing the first part of the challenge was mandated by the America COMPETES Act (ACA), which required NSF to ensure that each institution that applies for NSF funds "describe in its grant proposal a plan to provide appropriate training and oversight in the responsible and ethical conduct of research to undergraduate students, graduate students, and postdoctoral researchers participating in the proposed research project."³²

The second part of the challenge pertains to NSF's responsibility to help lead international efforts to implement a single framework for the investigation and resolution of research misconduct allegations made against a participant in a multinational collaboration. In 2007 and in April 2009, the Global Science Forum issued reports that provide a basis for research integrity frameworks in projects involving international partners.³³

³⁰ OIG is currently conducting a review of the rotating director model, and is planning to perform an evaluation of workforce planning issues during the coming year.

³¹ "Public Praises Science; Scientists Fault Public, Media", Pew Research Center for the People and the Press, July 9, 2009.

³² 42 U.S.C. § 1862o-1.

³³ See <http://www.oecd.org/dataoecd/37/17/40188303.pdf> and <http://www.oecd.org/dataoecd/29/4/42713295.pdf>

OIG's Assessment of Agency's Progress: During the past year, NSF published in the Federal Register its implementation of the ACA requirement, incorporated the requirement into its proposal certifications and updated its Award & Administration Guide and Grant Proposal Guide. It has made two awards to support beta websites that provide resources on ethics education in science and engineering awards. With regard to international collaborations, NSF states that it will complete a white paper related to the GSF report by the end of the year that will specify the actions that it intends to take.

CHALLENGE: Effectively Managing Large Facilities and Instruments

Overview: In FY 2006, NSF spent more than \$1 billion for the operations phase of 16 large facilities including the National Center for Atmospheric Research and the Network for Earthquake Engineering Simulation. The operations phase for large facilities includes the day-to-day work required to support and conduct research and education activities and to ensure that the facility is operating efficiently and in a cost-effective manner. NSF typically awards five-year cooperative agreements to universities or to non-profit organizations to operate and maintain these large facilities. Under the cooperative agreements, the awardee is responsible for day-to-day operations at the facilities, and NSF is responsible for monitoring and overseeing the awardee's programmatic and financial performance. Cooperative agreements should contain clear performance metrics to help ensure fiscal accountability, stewardship of NSF assets, and compliance with laws and regulations.

Challenge for the Agency: Management of its large facilities presents several challenges for NSF. Because it lacks an overarching policy to ensure that large facility agreements contain terms and conditions to address performance evaluation and measurement, it is a challenge for NSF to make difficult funding decisions between competing priorities. Only two of the six large facility agreements reviewed by the OIG in 2008 included terms and conditions addressing the primary components of a robust program evaluation and measurement system. Given NSF's \$1 billion annual funding for large facilities, all large facility agreements should contain performance components. Absent these components NSF cannot be assured that the facilities it funds are operating effectively and efficiently and achieving intended goals.

OIG's Assessment of the Agency's Progress: NSF agreed with our recommendations to: strengthen its cooperative agreements by adding authority and resources to NSF's Large Facilities Office, and training NSF staff on the use of performance evaluation and measurement in connection with all large facilities. In its response to last year's management challenges letter, NSF reported that it has issued a requirement for all operational facilities to have performance measures established in the cooperative agreements and reported annually. The agency also reported that it conducted its second Large Facilities Workshop on Best Practices for awardees and NSF staff. Additionally, NSF stated that it revised supplementary materials to the Large Facilities Manual and conducted training on the Manual for NSF program staff. Further, NSF has increased the number of personnel assigned to the Large Facilities Office.

Acronyms

AD	NSF Assistant Director
AIG	Associate Inspector General
ARRA	American Recovery and Reinvestment
CAREER	Faculty Early Career Development Program
CAS	Cost Accounting Standards
CBA	Collective Bargaining Agreement
CIGIE	Council of Inspectors General on Integrity and Efficiency
CISE	Computer and Information Science and Engineering Directorate
COI	Conflict of Interest
COV	Committee of Visitors
DACS	Division of Acquisition and Cost Support
DCAA	Defense Contract Audit Agency
DD	Deputy Director
DGA	Division of Grants and Agreements
DIAS	Division of Institution and Award Support
DoD	Department of Defense
DoE	Department of Energy
DoJ	Department of Justice
ECIE	Executive Council of Integrity and Efficiency
EPSCoR	Experimental Program to Stimulate Competitive Research
FFRDC	Federally Funded Research and Development Centers
FISMA	Federal Information Security Management Act
GAO	Government Accountability Office
GAS	Government Auditing Standards
GPRA	Government Performance and Results Act
HHS	Department of Health and Human Services
IG	Inspector General
MIRWG	Misconduct in Research Working Group
MREFC	Major Research Equipment and Facilities Construction
NIH	National Institute of Health
NSB	National Science Board
NSF	National Science Foundation
OEOP	Office of Equal Opportunity Programs
OIG	Office of Inspector General
OMB	Office of Management and Budget
OPP	Office of Polar Programs
OPM	Office of Personnel Management
PCIE	President's Council on Integrity and Efficiency
PI	Principal Investigator
PFCRA	Program Fraud Civil Remedies Act
SBIR	Small Business Innovation Research
STC	Science and Technology Centers
USAP	United States Antarctic Program

Reporting Requirements

Under the Inspector General Act, we report to the Congress every six months on the following activities:


Reports issued, significant problems identified, the value of questioned costs and recommendations that funds be put to better use, and NSF's decisions in response (or, if none, an explanation of why and a desired timetable for such decisions). (See pp. 5, 7, 35)

Matters referred to prosecutors, and the resulting prosecutions and convictions. (See pp. 21, 46)

Revisions to significant management decisions on previously reported recommendations, and significant recommendations for which NSF has not completed its response. (See pp. 18, 45)

OIG disagreement with any significant decision by NSF management. (None)

Any matter in which the agency unreasonably refused to provide us with information or assistance. (None)



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