



OFFICE OF
INSPECTOR GENERAL

**STATEMENT OF
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NATIONAL SCIENCE FOUNDATION
before the
U.S. SENATE
COMMITTEE ON APPROPRIATIONS
SUBCOMMITTEE ON VA, HUD, AND INDEPENDENT AGENCIES
April 3, 2003**

Chairman Bond, Senator Mikulski, and distinguished members of the Subcommittee, I am Dr. Christine Boesz, Inspector General at the National Science Foundation (NSF). I appreciate the opportunity, once again, to appear before you today as you consider NSF's fiscal year 2004 budget request. NSF's work over the past fifty-three years has had an extraordinary impact on scientific and engineering knowledge, laying the groundwork for technological advances that have shaped our society and fostered the progress needed to secure the Nation's future. Throughout, NSF has maintained a high level of innovation and dedication to American leadership in the discovery and development of new technologies across the frontiers of science and engineering.

As the nature of the scientific enterprise is constantly changing, however, NSF is continuously faced with new challenges to maintaining its leadership position. My office has and will continue to work closely with NSF management to identify and address issues that are important to the success of the National Science Board and NSF. Each year, my office focuses on those issues that pose the greatest challenge for NSF management. These management challenges are developed based on our ongoing work with and knowledge of NSF's operations and programs. Today I would like to highlight four of these challenges and tell you why we believe they are significant.

MANAGEMENT OF LARGE INFRASTRUCTURE PROJECTS

For the past three years, we have considered management of large facility and infrastructure projects to be one of NSF's top management challenges.¹ Over the past

¹ Memorandum from Christine C. Boesz, Inspector General, National Science Foundation, to Warren Washington, Chairman, National Science Board, and Rita R. Colwell, Director, National Science Foundation (Dec. 23, 2002) [hereinafter 2002 Management Challenges]; Memorandum from Christine C. Boesz, Inspector General, National Science Foundation, to Eamon M. Kelly, Chairman, National Science

decade, NSF has increased its investments in large infrastructure projects such as accelerators, telescopes, research vessels and aircraft, supercomputers, digital libraries, and earthquake simulators. Many of these projects are large in scale, require complex instrumentation, and involve partnerships with other Federal agencies, international science organizations, and foreign governments. Some, such as the new South Pole Station, present additional challenges because they are located in harsh and remote environments.

The management of these awards is inherently different from the bulk of awards that NSF makes. The majority of NSF awards are made to single investigators for individual research projects. In undertaking these “idea” projects, NSF researchers need to be given the freedom and autonomy to allow their research to evolve and move in new directions. In large facility and infrastructure projects, however, that same degree of freedom may sometimes be at odds with cost and schedule requirements. While overseeing the construction and management of these large facility projects and programs must always be sensitive to the scientific endeavor, it also requires a different management approach. It requires disciplined project management including close attention to meeting deadlines and budgets, and working hand-in-hand with scientists, engineers, project managers, and financial analysts. Furthermore, although NSF does not directly operate or manage these facilities, it is NSF that is ultimately responsible and accountable for their success. Consequently, it is vital that NSF exercise proper stewardship over the public funds invested in these large projects.

In December 2000, my office issued an audit of one of these large facilities, the Gemini Project, and made several recommendations to NSF management.² Primarily, our recommendations were aimed at increasing NSF’s level of oversight of these projects with particular attention on updating and developing policies and procedures to assist NSF managers in project administration. In response to our report, NSF developed, and my office approved, a corrective action plan designed to address our recommendations. The final milestone in the corrective action plan, by which time NSF expected to fully address the report’s recommendations and implement new policies and procedures, was December 2001.

Subsequent to issuing this audit report and at the request of this Subcommittee, my office conducted another audit focusing on all projects that NSF has funded through the recently renamed Major Research Equipment and Facilities Construction appropriation account.³ We reported that certain practices discovered during our first audit have also occurred in other large projects, reinforcing the need for increased oversight by NSF management. NSF responded to our report by stating its intent to

Board, and Rita R. Colwell, Director, National Science Foundation (Jan. 30, 2002) [hereinafter 2001 Management Challenges]; Letter from Christine C. Boesz, Inspector General, National Science Foundation, to Senator Fred Thompson, Chairman, Senate Committee on Governmental Affairs (Nov. 30, 2000) [hereinafter 2000 Management Challenges].

² OFFICE OF INSPECTOR GENERAL, NATIONAL SCIENCE FOUNDATION, AUDIT OF THE FINANCIAL MANAGEMENT OF THE GEMINI PROJECT, Report No. 01-2001 (Dec. 15, 2000).

³ OFFICE OF INSPECTOR GENERAL, NATIONAL SCIENCE FOUNDATION, AUDIT OF FUNDING FOR MAJOR RESEARCH EQUIPMENT AND FACILITIES, Report No. 02-2007 (May 1, 2002).

combine management improvements recommended by this audit with its efforts to respond to our previous Gemini audit.

As we will be reporting in our semiannual report to the Congress for the six-month period ending March 31, 2003, NSF has taken steps to address approximately half of the report recommendations. However, key recommendations from both of these reports on developing new project and financial management policies and procedures remain unresolved by NSF management.

The unifying feature of NSF's corrective action plan was the development of a Facilities Management and Oversight Plan.⁴ NSF staff has devoted substantial time and effort to develop this Plan. The Plan has four major goals: (1) to address organizational needs within NSF to effectively manage large facility projects; (2) to implement guidelines and procedures for all aspects of facilities planning, management, and oversight; (3) to improve the process for reviewing and approving large facility projects; and (4) to properly oversee facility projects to ensure their success. A large component of meeting these goals, especially the second and fourth, is the development of a Facilities Management and Oversight Guide, which is still in draft form.

We have been pleased to provide NSF with comments on various iterations of the Guide. Most recently, we reviewed and provided feedback on the November 8, 2002 draft. As we expressed to NSF, and will report in our upcoming semiannual report, our primary concerns with the Guide are (1) that its focus is too high level to provide NSF staff with the practical guidance necessary to effectively manage this complex portion of NSF's portfolio and (2) that it does not yet address recording and tracking the full cost of these facilities within NSF's financial system. Among the unresolved issues that we hope to see addressed in the final version of the Guide are the authority of the new Deputy for Large Facility Projects and his Project Advisory Teams, and the level of responsibility and autonomy of the individual program officers managing these projects. The Guide lays out general requirements that will need to be fleshed out in order to implement a successful management program. It also needs to address contingency issues, such as those arising with international partnerships, in more detail.

It has been over two years since our first audit report recommending improvements in NSF's management of large facility and infrastructure projects. Because of increased funding in this area, this issue needs to become one of greater urgency for NSF management. Some of this delay may have been due to the lengthy search for the new Deputy for Large Facility Projects. NSF announced last month that it has filled this position and the new Deputy will assume his duties on June 9, 2003. We are hopeful, with the new Deputy in place, NSF will be able to focus on the corrective actions and provide the resources necessary to fully implement the Facilities

⁴ NATIONAL SCIENCE FOUNDATION, LARGE FACILITY PROJECTS MANAGEMENT & OVERSIGHT PLAN NSB-01-153 (Sept. 2001).

Management and Oversight Plan in order to resolve the outstanding issues in these two audits.

ANTARCTIC INFRASTRUCTURE PLANNING

Another of NSF's continuing management challenges relates to the operation and management of the United States Antarctic Program (USAP).⁵ The USAP is the United States' national program for scientific research and geopolitical presence in Antarctica, the world's seventh and southernmost continent. Conditions in the Antarctic are remote and harsh. Temperatures at the USAP's three year-round research stations range from an average high of 2 degrees Centigrade at Palmer Station to an average low of minus 28 degrees Centigrade at South Pole Station. These conditions require much more support resources from NSF management than is required with other NSF-funded programs. As stated in NSF's FY 2004 budget request, "[a]ll life support is provided by NSF, including facilities infrastructure, communications, utilities (water and power), logistics to, from, and within Antarctica and all related infrastructure – aircraft, runways, communications, passenger movement, baggage handling."⁶ Consequently, one of the critical challenges for NSF management is to ensure the safety and health of USAP personnel and researchers.

Last month, my office issued a report on health and safety in the USAP.⁷ We were pleased to report that the programs put in place and managed by NSF's USAP logistics contractor do protect the overall health and safety of the USAP participants. However, we did report on occupational health and safety issues related to aging facilities and infrastructure in Antarctica. They need to be addressed by NSF management through a capital asset management planning and budgeting process. This is an issue that has also been raised to NSF management by the Office of Polar Programs' Committee of Visitors.⁸

The Antarctic facilities are different from other large facilities funded by NSF in that they are critical to the safety and health of researchers and their support personnel. Ongoing maintenance and upgrading of these facilities are necessary to prevent health and safety crises and to protect the personnel stationed in this harsh environment. We are pleased to see that NSF, in its FY 2004 budget request, is recognizing the need to plan for these crucial infrastructure needs. We are still concerned, however, over the funding of and planning for these projects. We have recommended that NSF develop life cycle planning of these USAP assets to serve as a basis for a capital asset management plan. In addition, to provide dedicated funding for these projects that does

⁵ 2002 Management Challenges, 2001 Management Challenges, and 2000 Management Challenges, *supra* note 1.

⁶ National Science Foundation Fiscal Year 2004 Budget Request to Congress.

⁷ OFFICE OF INSPECTOR GENERAL, NATIONAL SCIENCE FOUNDATION, AUDIT OF THE OCCUPATIONAL HEALTH & SAFETY AND MEDICAL PROGRAMS IN THE UNITED STATES ANTARCTIC PROGRAM, Report No. 03-2003 (Mar. 17, 2003).

⁸ *Committee of Visitors Report on the Polar Research Support Section* for the review period 1998, 1999, and 2000.

not compete with day-to-day USAP operations or scientific research, we recommended that NSF establish a separate line item within its budget for funding this plan. NSF prefers the current practice of using research funds in a flexible manner. I believe a long-term, line-item approach would more clearly identify resources necessary to assure continued safe operations.

AWARD ADMINISTRATION

A third ongoing management challenge to NSF is the administration of research and education grants and cooperative agreements.⁹ In a given year, NSF spends roughly ninety percent of its appropriated funds on awards for research and education activities. NSF recently reported that it received more than 35,000 proposals in FY 2002 and made more than 10,400 awards to about 1,800 institutions.¹⁰ This was accomplished with a staffing level that has remained relatively flat during the past decade, even in the face of large budget increases.

NSF is under pressure to process increasing numbers of proposals and to make awards. Many of these proposals are also more complex. This increase is leading to a resource drain. Because NSF's proposal processing system is not yet entirely electronic, incoming proposals need to be printed for distribution during the proposal review process. During January and February alone of this year, NSF received over 14,000 proposals, representing forty percent of the normal twelve-month total. The enormous volume of proposals has led to a backlog in printing. Resources to develop and implement a fully electronic system are needed to meet the increasing number and complexity of proposals.

An even more important challenge for NSF is the way in which it administers and monitors these awards. Administering the public funds that are entrusted to it is an inherent function of any government entity. Federal agencies are responsible for monitoring the awards that they fund to provide reasonable assurances that (1) adequate progress is being made toward achieving the project's goals, objectives, and targets; (2) Federal funds are being expended appropriately; and (3) Federal funds are being used responsibly. This is the essence of providing stewardship over Federal taxpayer dollars.

To date, NSF has not had a comprehensive and cohesive program for monitoring its awards once they have been funded. Rather, NSF has devoted most of its resources to the pre-award and award phases. In each of the past two years, this gap in NSF's award management has led to a reportable condition in the annual audits of

⁹ 2002 Management Challenges, 2001 Management Challenges, 2000 Management Challenges, *supra* note 1.

¹⁰ NATIONAL SCIENCE FOUNDATION, FY 2002 MANAGEMENT AND PERFORMANCE HIGHLIGHTS 5 (Feb. 2003).

NSF's financial statements.¹¹ The auditors have found that NSF's post-award monitoring system is not systematic, risk-based, documented in writing, or consistently applied. As a result, the auditors found that awardees' use of Federal funds may not be consistent with the objectives of the awards; programs and resources may not be protected from waste, fraud, and mismanagement; laws and regulations may not be followed; and reliable and timely information may not be obtained, maintained, reported, or used for decision-making. As a result of these findings, the auditors have recommended that NSF establish a comprehensive risk-based award monitoring program and develop the tools necessary to carry out this program.

NSF has recognized the need to create a risk-based award monitoring program and has begun to address this issue. The agency has developed a draft policy for conducting this level of award oversight, and we have been pleased to provide comments on that policy and anticipate that the final version will address our concerns. One of the biggest challenges that NSF will face in implementing this policy is the growing strain on its resources. The increased emphasis on award monitoring may require additional staffing and more resources for training, travel, and equipment. To meet all of its responsibilities, NSF management will have to show a greater commitment to this program. It may need to reevaluate its current business processes to ensure that its oversight responsibilities are fully integrated into them.

STRATEGIC MANAGEMENT OF HUMAN CAPITAL

As in the case of most Federal agencies, NSF is facing human capital needs and challenges. Forty percent of NSF's permanent workforce is currently eligible for either voluntary retirement or early out, and that number will grow to nearly sixty percent by 2007. Additionally, despite an increasing workload and a budget that has grown from \$1 billion to over \$5 billion over the past twenty years, the number of full-time equivalent positions at NSF has remained relatively static.¹² While NSF has been supplementing its permanent staff with temporary staff, or "rotators," this increase has also placed a significantly greater burden on the agency, particularly its office of Human Resource Management, to continually recruit and train personnel. Finding them suitable office space has also become a challenge - space has become a rare and precious commodity at NSF. Because of these concerns, I have identified strategic management of human capital as a top management challenge for NSF over the past few years.

Two years ago, this Subcommittee requested that my office analyze the adequacy of the agency's staffing and management plans in light of the efforts to expand NSF's budget of the next five years.¹³ As I reported to you last year, NSF's

¹¹ Auditor's Report, Fiscal Year 2002 National Science Foundation Financial Statement Audit (Jan. 29, 2003); Auditor's Report, Fiscal Year 2001 National Science Foundation Financial Statement Audit (Jan. 18, 2002).

¹² Compare NSF's FY 1983 Budget Request to Congress with NSF's FY 2004 Budget Request to Congress.

¹³ S. REP. NO. 107-43 (2001).

workforce planning falls short of an actionable plan, which requires specific objectives, clearly assigned responsibilities, well-defined milestones for discrete actions, and practical measures of effectiveness for accountability. However, at that time, I also reported to you that NSF was in the process of contracting for a multi-year business analysis of its operations that will include a human capital management plan identifying its future workforce requirements.

Last June, NSF awarded a contract for a comprehensive, \$14.8 million, three to four-year business analysis, including a component on future workforce requirements. The contractor appears to be focusing on the workforce portion of the business analysis during the early phases of the project. One of the contractor's teams has been conducting focus groups to develop core competencies at NSF and another team is gathering information on individual office staffing, workloads, and priorities. OIG management has met with both of these teams to discuss OIG core competencies and workloads.

The first draft of the human capital management plan is due from the contractor in early 2004. However, the final plan is not due until the end of 2005. We are looking forward to seeing substantial and concrete results from this effort, but wonder how NSF will manage its valuable human capital assets in the meantime. Along with being a principal component of the President's Management Agenda, this is a management challenge that NSF has been facing for several years. Consequently, human capital issues demand urgent attention. NSF needs to develop a short-term plan that identifies its immediate human capital needs and the specific resources required to support them (e.g., training, space, and equipment). It is clear that NSF needs resources to support its infrastructure as its budget expands and the workload increases.

Chairman Bond, this concludes my statement. I would be happy to answer any questions you or other members of the Subcommittee may have, or to elaborate on any of the issues that I have addressed today.

CONTACT INFORMATION

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