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Inspector General

National Science Foundation

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"Top Challenges for Science Agencies: Reports from the Inspectors General-Part 1"

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Mr. Chairman and Members of the Subcommittee, I appreciate this opportunity to discuss the Office of Inspector General's (OIG) work to promote the efficiency and effectiveness of the National Science Foundation's (NSF) programs and operations and to safeguard their integrity. My office is committed to providing rigorous, independent oversight of NSF, and I welcome the chance to discuss my office's work.

The OIG is an independent entity and reports directly to Congress and the National Science Board. Our mission is to conduct independent audits and investigations of National Science Foundation programs and operations and to recommend policies and corrective actions to promote effectiveness and efficiency and prevent and detect waste, fraud, and abuse. Consistent with our statutory mandate, the OIG has an oversight role and does not determine policy or engage in management activities involving the Foundation or program operations. Thus, my office is not responsible for managing any NSF programs, nor do we attempt to assess the scientific merit of research funded by the Foundation.

My office has identified eight top management challenges facing NSF. My testimony will focus on accountability over cooperative agreements for NSF's large facility construction projects, grant administration, and contract monitoring. These oversight issues have a direct impact on NSF's ability to carry out its mission of advancing scientific research, which is accomplished primarily through funding external awardees. I will also address the ethical conduct of research, another top management challenge.

Accountability over Cooperative Agreements

Over the past two years, my office has issued several audits that have raised serious questions about NSF's accountability over Cooperative Agreements (CAs) for high-risk, high-dollar projects. NSF currently has 685 open cooperative agreements, totaling nearly \$11 billion. Thirty-eight of these CAs are for over \$50 million each and comprise \$5.5 billion of the total amount of CAs. Among other things, NSF uses CAs for the construction, operation, and maintenance of its large facility research projects.

A CA is not subject to the same rigor and reporting mechanisms as a contract, and does not have the same level of transparency over expenditures as a contract. Since NSF has chosen to use CAs for the construction, operation and maintenance of high-risk, high-dollar large facility projects, it is imperative that it exercise strong cost surveillance controls over the lifecycle of such projects. In September of 2012 we issued an alert memo to NSF management outlining serious weaknesses in NSF's management of high-risk, high-dollar CAs.

At the pre-award phase of such projects, appropriate controls should include conducting audits of awardees' proposed budgets and accounting systems to ensure that awardees' cost estimates are fair and reasonable and that their accounting systems are adequate to bill the government properly and to manage funds in accordance with federal requirements. Although they are not required for CAs by law or regulation, such audits provide essential information that NSF can use to ensure that it funds only costs that are allowable and can be supported by adequate documentation. Obtaining such information at the pre-award stage of high-risk, high-dollar CAs is especially important as the proposed budget, once approved by NSF, creates the basis upon which awardees can draw down advanced funds over the course of the award for specific cost items.

NSF does not regularly obtain pre-award audits for its high-risk, high-dollar projects. Over the last two years, however, my office commissioned Defense Contract Audit Agency audits of the proposed construction budgets for three large facility awards valued at \$1.1 billion -- the Ocean Observatories Initiative, the Advanced Solar Technology Telescope, and the National Ecological Observatory Network. The findings were dramatic and underscored the need for such oversight. Specifically, DCAA questioned approximately \$305 million (almost 28 percent) in unallowable or unsupported costs, including \$223 million in unallowable contingency costs, including over \$54 million in Recovery Act funds.

It is worth pointing out that of the three proposal audits we commissioned, two of the awardees' proposals were initially found to be unacceptable for audit. After much work, one of the proposals was ultimately audited; the auditors rendered an adverse opinion, finding that the proposal did not constitute an acceptable basis for the negotiation of a fair and reasonable price. The auditors found that the accounting system used to prepare the second proposal was inadequate; therefore, that proposal remains unaudited. NSF needs a much more robust process to ensure that it obtains better cost information before funding its major CAs. Inadequate proposals that contain large amounts of unallowable and unsupported costs undermine NSF's ability to serve as a proper steward of NSF funds.

As we worked with NSF to resolve the recommendations contained in the DCAA audits, we identified weaknesses in NSF's post-award monitoring processes for high-risk projects that compound our concern that unallowable costs could be charged to awards. In particular, we found that NSF does not routinely obtain incurred cost submissions or audits of direct or indirect costs claimed on its largest CAs to determine their allowability.

As with pre-award audits, incurred cost submissions and audits are not required for CAs by law or regulation, and we are not recommending that NSF obtain them for every CA. However, such submissions and audits are essential tools for ensuring accountability in high-risk, high-dollar projects. In their absence, unallowable costs charged to these awards may go undetected because

NSF lacks sufficient visibility over incurred costs. The failure to regularly obtain incurred cost submissions also has a negative impact on our office's ability to conduct incurred cost audits.

We have recommended that NSF, using a risk-based approach, develop end-to-end cost surveillance policies and procedures for its high-dollar, high-risk CAs to ensure adequate stewardship over federal funds. We have also recommended specific cost surveillance measures that could be undertaken at the pre-and post-award stages and that, at a minimum, NSF implement increased monitoring of CAs valued at over \$50 million.

As mentioned, DCAA found significant amounts of unallowable contingency amounts in the proposed budgets for the large facility projects it reviewed. Given the amount of funds involved and the recurring nature of this finding, we decided to gain a deeper insight into how contingencies were actually used in construction projects by auditing NSF's EarthScope award, a closed construction project. We found that proposed contingency amounts were not consistent with OMB cost principles, there was a lack of visibility over contingency expenditures, and NSF approved the use of contingencies for non-contingent events. The significant internal control problems made it all but impossible for us to determine if contingency amounts were ultimately used to purchase unallowable items or to hide cost or schedule overruns. The lack of visibility also deprived NSF of the ability to routinely ensure the appropriate use of contingency funds. Accordingly, NSF risked not having funds available for true contingencies when the need arose and forfeited the use of those funds for other important projects.

The work my office has done clearly demonstrates that NSF is faced with a much bigger problem than contingency alone. Given the results of our proposal audits and the lack of incurred cost submissions and audits, it is clear that there are significant weaknesses in NSF's cost surveillance measures for awarding and managing CAs. Until those processes are strengthened, the Foundation cannot ensure that it is not overpaying for large construction projects.

We are optimistic that NSF is moving in the right direction to address the systemic problems relating to oversight of cooperative agreements. In December 2012 the NSF director charged a senior advisor in his office with coordinating a major assessment of processes, policies, and mechanisms for supporting large research facilities from conception to construction to operation and sun-setting. The stated goal of this endeavor is to create a vision and framework with recommendations, pathways and timelines for NSF to foster the best research infrastructure for decades to come. The advisor's final report is supposed to be completed in March of 2013, and the charge includes interim milestones.

Some of the analysis conducted by the senior advisor will touch on issues raised in our alert memorandum on CAs and our contingency-focused audits. Among other things, the charge specifically states the importance of ensuring that the processes used to estimate and support costs associated with large facility projects are robust, and ascertaining that NSF has strong methods for continuously ensuring that funds provided for these projects are used in accordance with NSF and federal requirements. It further states that the analysis and recommendations should address, among other things, the impacts of existing NSF policies and whether modifications or new policies are needed (including the potential need for process improvements

to enable informed funding decisions and to ensure accountability of funds through post-award monitoring and incurred cost audits). In light of this focus, it is likely that the outcome of this review process will significantly impact how our recommendations are resolved. Accordingly, my office is paying close attention to NSF's progress in this endeavor and providing feedback, as appropriate, based on our recommendations. Because NSF uses CAs to fund its riskiest and most costly large facility projects, strengthening controls in this arena will have a profound and beneficial effect on the agency's ability to act as a strong steward of federal funds.

Grants Management

NSF makes more than 11,000 awards annually, valued at approximately \$7 billion, to about 2,000 institutions. Because NSF accomplishes its mission primarily through grants to individual researchers and institutions, robust oversight of grants management is essential for proper accountability over federal tax dollars intended to advance the progress in science. Undertaking such oversight can be challenging: unlike contractors, grant recipients request payments as an aggregate dollar amount and are not required to present supporting documentation, such as invoices and receipts, to receive payment from the agency.

Oversight and management of awards that is sufficient to safeguard federal funds invested in scientific research has been an ongoing challenge for NSF. The Foundation's FY 2011 financial statement audit noted several areas of concern about its processes for awarding and administering grants, including a lack of follow-up to determine whether awardees acted to correct problems identified in desk reviews and delays in resolving open audit recommendations. The FY 2012 audit stated that while improvements had been made in this area, improvements in internal controls over processing grant transactions were necessary and follow-up remained a concern. Previously, NSF has indicated that staffing constraints have caused it to reduce the number of site visits to monitor high-risk awardees and that increased workload has hampered its ability to resolve audit recommendations in a timely manner, but the agency reported that it completed the 30 site visits it planned to conduct in FY 2012.

For our part, in the face of these oversight challenges, the OIG is using automated techniques, which enhance our oversight and permit us to:

- Better identify high-risk awardees
- Expand audit coverage to 100 percent of expenditures
- Focus our limited audit resources on questionable expenditures.

Using automated techniques enables us to obtain data from multiple financial and program databases, which we can compare and analyze to identify anomalies in cost data and in award-expenditure patterns. These techniques provide a level of transparency over recipient spending well beyond that available from traditional methods. Examples of some of the data sources we can now use include funding payments, the System for Award Management (formerly the Excluded Parties List System), NSF award data, and general ledger data. Because these techniques are relatively new to the university community and to NSF, we have communicated extensively with NSF and with the university audit community about how we are using these tools in our work.

It is important to note that automated techniques are a starting point, not an end point and that they *complement, but do not replace*, traditional audit techniques. We will continue to use traditional audit tools including interviews, request for support for transactions, and discussions to request additional material as we conduct our work.

Our recent audit of a university which is among the top 30 largest NSF award recipients shows the impact of our new approach in that job. Analytics allowed us to look at more than 280,000 transactions posted to the 604 NSF awards the university had during our 3-year audit period. We also used analytics tools to cross check data from financial records and NSF data systems and to merge those two databases into a single database we could use for analysis.

Using this approach, university records told us, among other things, when equipment was purchased and how much was charged so we could identify whether items were allowable under the award and had been purchased after the grant expired. We also were able to quickly identify additional items for testing or new areas to perform tests as items came to our attention during audit work. We ultimately identified over \$6 million in questionable expenditures. Our findings illustrate the value of using these techniques to provide a higher level of accountability over the billions of dollars in NSF awards.

Our audits of NSF awards have repeatedly questioned costs as result of internal control deficiencies such as unsupported cost sharing, unallowable labor costs, and charges for expenses unrelated to the NSF award, among other things. Automated techniques have significantly expanded our oversight capacity and given us a more robust method to determine whether awardees are using funds appropriately. It is important for NSF to take prompt action to address recommendations and to act swiftly to recover funds when they are found to be unallowable.

Contract Monitoring

Cost reimbursement (CR) contracts are inherently risky because the government assumes much of the risk that poor performance on the part of the contractor will result in cost overruns. In FY 2012, NSF obligated \$402 million for all contracts. Of that amount, \$282 million was for CR contracts, including \$123 million in advance payments issued before work was done.

The OIG evaluates NSF's contracting practices primarily through the annual audit of the Foundation's Financial Statements. The FY 2010 financial statement audit repeated the FY 2009 findings of a significant deficiency in NSF's monitoring of cost reimbursement contracts. The FY 2010 financial statement audit contained seven recommendations focused on contracts, including that NSF continue to obtain incurred cost audits for cost reimbursable contracts, and that it obtain Cost Accounting Standards (CAS) disclosure statements from contractors and ensure that they are audited and approved in a timely manner. An incurred cost audit is an important tool which enables management to assess a contractor's compliance with the financial terms and conditions of a contract. An approved CAS disclosure statement is essential to establish how the contractor classifies and bills its costs and is a critical tool for conducting an incurred cost audit.

While NSF's most recent financial statement audit for FY 2012 no longer cited monitoring of cost reimbursement contracts as a significant deficiency as a result of strengthened procedures, it

stated that NSF management must continue to implement corrective actions to ensure that it maintains adequate control over such contracts. The FY 2012 audit noted two primary areas of ongoing concern with regard to monitoring of cost reimbursable contracts.

The first concern pertained to delays in completing incurred cost audits and the lack of approved CAS disclosure statements. The audit recommended that NSF continue to identify cost reimbursable contracts for incurred cost audits in order to ensure that costs billed to NSF are valid. The second concern cited incomplete oversight procedures with regard to the timely receipt of incurred cost submissions and the adequacy of contractors' accounting systems as well as the need to fully implement the recent changes to its Acquisition Manual. The audit made several recommendations to address these issues.

Ethical Conduct of Research

Research misconduct (defined as fabrication, falsification, or plagiarism at the federal level) damages the scientific enterprise, is a misuse of public funds, and undermines the trust of citizens in science and in government. For these reasons, pursuing allegations of research misconduct by NSF-funded researchers continues to be a focus of our investigative work. In recent years, we have seen a significant rise in the number of substantive allegations of misconduct associated with NSF proposals and awards. It is imperative to the integrity of research funded with taxpayer dollars that we ensure that NSF Principal Investigators carry out their projects with the highest ethical standards.

At a time when opinion surveys indicate that an increasing number of Americans are becoming distrustful of science, it is more important than ever that the conduct of scientific research not be tainted by instances of misrepresentation or cheating. Recent surveys suggest that 75% of high school students and 50% of college students admit to cheating, and 30% of researchers admit to engaging in questionable research practices. Consistent with these survey results, OIG has seen a dramatic increase in substantive allegations of plagiarism and data fabrication, especially with respect to junior faculty members and graduate students. Over the past 10 years, the number of allegations received by our office has more than tripled, as has the number of findings of research misconduct NSF has made based on OIG investigation reports.

Our research misconduct investigations follow NSF's Research Misconduct regulation, which is based on the government wide policy promulgated by the Office of Science and Technology Policy. Within our office, investigative scientists with Ph.Ds in chemistry, biology, and other scientific disciplines conduct these highly technical, complex investigations.

When we receive a research misconduct allegation, we first conduct a confidential inquiry to establish whether the allegation is substantive. This inquiry often involves confidential communication between our office and the accused subject and does not involve the subject's institution. If the subject provides an adequate explanation to dispel the allegation, our inquiry closes and only the subject is aware that the matter was brought to our attention. This protects the subject's reputation from being unjustly tarnished by frivolous or minor allegations.

If the allegation appears to have substance, we move into the investigation phase, which normally involves referring the case to the subject's institution for investigation. If the institution receives the allegation in the first instance, it conducts an inquiry and notifies OIG if it

determines an investigation is warranted. The institution conducts an investigation and provides us with its investigation report, which we review for fairness, accuracy, and completeness. If the institution's report is thorough and adequate for our purposes, we use it as the basis for our independent investigation; if the university did not fully address all of the issues, we conduct additional investigation ourselves.

Based on the university's report and any additional investigation on our part, if we conclude that the subject committed research misconduct under NSF's definition, we write an investigation report and provide the subject an opportunity to comment on our assessment of the evidence and recommended actions. After reviewing the subject's comments, we finalize the report and send it to NSF's Deputy Director for adjudication. If the Deputy Director concludes that the subject committed research misconduct and imposes actions, the subject can appeal the decision to NSF's Director, whose decision is final.

Research misconduct investigations can take anywhere from a year to several years. A number of factors, such as whether we have to refer the matter to a university, how long the university takes to complete its investigation, and the adequacy of that investigation, affect how long it takes to complete an investigation. Currently, we have 110 open cases and six staff, and we are seeing an increase in cases each month.

Since 2003, our investigations have resulted in 120 findings of research misconduct, more than 80 percent of which found plagiarism. Eighty nine percent of plagiarism allegations involved faculty while only 11 percent involved graduate students/post docs. In contrast, 53 percent of falsification/fabrication allegations involved graduate students/post docs, and 47 percent involved faculty. In the past two years, we have had 24 allegations of data manipulation involving students and post docs, which is equal to the number of similar allegations received from 2003-2010.

While NSF has been responsive to the recommendations contained in our research misconduct investigation reports, the actions it takes address incidents after the fact. Extrapolating the number of allegations OIG has received across the 45,000 proposals NSF receives annually, suggests 1300 proposals could contain plagiarism and 450-900 proposals could contain problematic data. Affirmative steps are necessary to counter the trends of increasing integrity-related violations. Since NSF funds research in virtually every non-medical research discipline, the agency is in a unique position to lead the government response to addressing these disturbing trends at all levels of education.

Congress passed the America COMPETES Act in 2007 to increase innovation through research and development, and to improve the competitiveness of the United States in the world economy. For NSF, the Act mandates new requirements to advance the professional and ethical development of young scientists, such as mentoring plans for all postdoctoral positions, and plans to provide training on the responsible conduct of research to undergraduates, graduate students, and postdoctoral researchers funded by NSF. NSF responded to the America COMPETES Act by instituting requirements that grantees submit mentoring plans for all NSF-supported "post-docs" and have RCR training plans for NSF-funded students. The NSF guidance

as to what these plans should consist of was limited and offered great flexibility to grantee institutions to develop plans tailored to their needs.

Our staff have observed a great deal of variety in grantee RCR programs, which range from high quality mentoring programs to ones that simply refer students to web-based or computer-based training. In addition, information collected from our site visits and investigations suggests that some institutions are not taking these requirements seriously, thereby potentially undermining the public's confidence in the research enterprise and placing NSF funds at risk. Accordingly, our office is developing a process to examine how awardees have established RCR training programs now that sufficient time has passed for the research community to implement the America COMPETES RCR requirements. We plan to assess institutions' commitment to the program (including resources) and how expectations for the program are communicated to faculty and students. We also plan to examine, among other things, course structure and content, participation requirements and options, faculty participation, and oversight. We are currently working with the Office of Management and Budget to obtain approval to begin this review in FY 2013.

Conclusion

My office values, and is firmly committed to, its mission to detect and prevent fraud, waste, and abuse within NSF or by those who receive NSF funding. These are challenging times to be in federal public service. Yet every day I witness the commitment of OIG auditors, investigators, and others to doing work that leads to recommendations to improve NSF's ability to exercise strong stewardship over the taxpayer dollars intended to advance scientific research.

Taxpayers expect government managers to be prudent custodians of agency funds in both good times and bad, but expectations are even higher when federal deficits are large and budgets are tight. We will continue to target our work and to direct our resources to areas that pose the highest risk of misuse of taxpayer dollars and can lead to funds used inappropriately being returned to the government. Our work reflects my office's sustained commitment to helping NSF be an effective steward of taxpayer dollars and benefits from the support of NSF management across the Foundation. We look forward to our continued partnership with NSF and the Congress to this end.

This concludes my statement; I would be happy to answer any questions.