

# A REVIEW OF RECOMMENDATIONS FOR NSF PROJECT MANAGEMENT REFORM

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## JOINT HEARING BEFORE THE SUBCOMMITTEE ON RESEARCH AND TECHNOLOGY & SUBCOMMITTEE ON OVERSIGHT COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY HOUSE OF REPRESENTATIVES ONE HUNDRED FOURTEENTH CONGRESS

FIRST SESSION

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# **A REVIEW OF RECOMMENDATIONS FOR NSF PROJECT MANAGEMENT REFORM**

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**THURSDAY, FEBRUARY 4, 2016**

HOUSE OF REPRESENTATIVES,  
SUBCOMMITTEE ON RESEARCH AND TECHNOLOGY &  
SUBCOMMITTEE ON OVERSIGHT,  
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY,  
*Washington, D.C.*

The Subcommittees met, pursuant to call, at 9:41 a.m., in Room 2318, Rayburn House Office Building, Hon. Barbara Comstock [Chairwoman of the Subcommittee on Research and Technology] presiding.

LAMAR S. SMITH, Texas  
CHAIRMAN

EDDIE BERNICE JOHNSON, Texas  
RANKING MEMBER

**Congress of the United States**  
**House of Representatives**

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

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Subcommittees on Research and Technology and Oversight

***A Review of Recommendations for NSF Project  
Management Reform***

Thursday, February 4, 2016  
9:30 a.m. –11:30 a.m.  
2318 Rayburn House Office Building

Witnesses

**Ms. Cynthia Heckmann**, Project Director, National Academy of Public Administration

**Dr. Richard Buckius**, Chief Operating Officer, National Science Foundation

**Ms. Allison Lerner**, Inspector General, National Science Foundation

**U.S. HOUSE OF REPRESENTATIVES  
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY**

**HEARING CHARTER**

*A Review of Recommendations for NSF Project Management Reform*

Thursday, February 4, 2016  
9:30 a.m. – 11:30 a.m.  
2318 Rayburn House Office Building

**Purpose**

On Thursday, February 4, 2016, the Research & Technology and Oversight Subcommittees will hold a joint hearing on recommendations made in a recent National Academy of Public Administration (NAPA) report *National Science Foundation Use of Cooperative Agreements to Support Large Scale Investment in Research*.<sup>1</sup> The hearing will review recommendations made by NAPA on reforming the National Science Foundation's (NSF) project management for large-scale projects as well as receive testimony from the NSF and NSF Inspector General on their response to these recommendations. On February 3, 2015, the Committee held a hearing on, "NSF's Oversight of the NEON Project and Other Major Research Facilities Developed Under Cooperative Agreements."<sup>2</sup>

**Witnesses**

- **Ms. Cynthia Heckmann**, Project Director, National Academy of Public Administration
- **Dr. Richard Buckius**, Chief Operating Officer, National Science Foundation
- **Ms. Allison Lerner**, Inspector General, National Science Foundation

**Background**

The National Science Foundation (NSF) is an independent federal agency established in 1950 "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes."<sup>3</sup> In support of that mission, the NSF frequently funds the development and construction of large-scale, multi-user scientific facilities through awards made under "cooperative agreements." Cooperative agreements are a form of financial assistance for projects that require substantial involvement of the awarding agency,

<sup>1</sup> "National Science Foundation Use of Cooperative Agreements to Support Large Scale Investment in Research," National Academy of Public Administration. Available at:

[http://napawash.org/images/reports/2015/NSF\\_Phase\\_2\\_Comprehensive\\_Report.pdf](http://napawash.org/images/reports/2015/NSF_Phase_2_Comprehensive_Report.pdf)

<sup>2</sup> "NSF's Oversight of the NEON Project and Other Major Research Facilities Developed Under Cooperative Agreements," <https://science.house.gov/legislation/hearings/subcommittee-oversight-and-subcommittee-research-and-technology-joint-hearing>

<sup>3</sup> NSF Legislative History, Available at: <https://www.nsf.gov/about/history/legislation.pdf>

beyond routine monitoring or technical assistance.<sup>4</sup> The NSF does not operate its own research facilities. The NSF is currently funding several cooperative agreements, including the construction of the Large Synoptic Survey Telescope, the Daniel K. Inouye Solar Telescope, and the National Ecological Observatory Network. These 5-10 year construction projects range from \$344 million to \$473 million in total project cost.<sup>5</sup>

In May 2015, the NSF and National Science Board (NSB) commissioned NAPA to conduct a study reviewing the NSF's use of cooperative agreements to support the development, construction and operations of large-scale research facilities. The NSF and NSB commissioned the report in response to concerns raised by Congress, the NSF OIG and other stakeholders regarding the NSF's management and oversight of cooperative agreements, and proper stewardship of federal funds.

In the study, the Academy was asked to: (1) assess how cooperative agreements are being used at NSF; (2) identify other funding mechanism options; and (3) determine how NSF can improve the mechanisms used to support large-scale investment in science and technology. The eight-month study also investigated how a small number of comparable agencies use cooperative agreements and other procurement instruments.<sup>6</sup>

On December 17, 2015, NAPA released its final report. The study committee found that while cooperative agreements are an appropriate mechanism for NSF to support large-scale research facilities, several reforms would strengthen the oversight of these projects. The panel found that the critical factor for the success of these types of projects is a combination of project management discipline, a rigorous review process, and capacity and capability of a skilled workforce to carry out and oversee project management responsibilities. The study panel analyzed practices at the National Aeronautics and Space Administration (NASA), Department of Energy (DOE) Office of Science to provide lessons learned and identify practices that could be adopted by NSF.

The study offered 13 specific recommendations that appear in chapters 3, 4, and 6 of the report:

*Business Practices: Cost Analysis, Contingency, and Management Fee*

The panel made four recommendations for bolstering NSF's ability to detect and address potential cost issues prior to release of award funds, strengthening internal controls of

<sup>4</sup> Federal Grant and Cooperative Agreement Act of 1978, Public Law 97-258

<sup>5</sup> FY2016 Major Research Equipment and Facilities Construction Budget Request. Available at: [https://www.nsf.gov/about/budget/fy2015/pdf/26\\_fy2015.pdf](https://www.nsf.gov/about/budget/fy2015/pdf/26_fy2015.pdf)

<sup>6</sup> "Work in Progress: National Science Foundation Use of Cooperative Agreements to Support Large Scale Investment in Research," National Academy of Public Administration. Available at: [http://napawash.org/images/WorkInProgress/NSF\\_Work\\_in\\_Progress.pdf](http://napawash.org/images/WorkInProgress/NSF_Work_in_Progress.pdf)



contingency funds, improving cost estimating and rigor in the process, and eliminating the potential for inappropriate use of federal funds through management fees.

- NSF should require that exceptions to the recommendations from pre-award cost analyses conducted by Cost Analysis and Audit Resolution, be reviewed by the Large Facilities Office (LFO) and forwarded to the Chief Financial Officer (CFO) for a final determination. The results of the CFO's decision should be documented in writing and shared with the Major Research Equipment and Facilities (MREFC) Panel prior to release of award funds. (3.1)
- NSF should retain control of a portion of an award recipient's contingency funds and distribute them with other incremental funds as needed. (4.1)
- NSF should change current language in the Large Facilities Manual so that it is clear that award recipients are expected to follow the guidance in the Government Accountability Office's Cost Estimating and Assessment Guide and Schedule Assessment Guide when developing cost and schedule estimates. (4.2)
- NSF should eliminate the practice of including a management fee in cooperative agreements in future projects. (4.3)

*Planning, Oversight, and Accountability: Roles and Responsibilities*

The panel made two recommendations for improving transparency and adding more rigor in how the NSF and NSB work together to enable mission accomplishment and perform management oversight, and to clarify and codify roles, responsibilities, and working relationships.

- NSF and NSB should establish and publish a joint NSF-NSB duties and responsibilities document institutionalizing roles and addressing key working relationships. (6.1)
- NSF should re-scope the role/duties of the MREFC Panel and amend the Panel's charge to include status update reviews of projects in the development and construction phases, focusing on cost, schedule, and performance. (6.2)

*Project Management Knowledge and Skills*

The panel made seven recommendations for ensuring that external review panels and the NSF Director are being advised by individuals with expertise in managing large projects and cost estimating, as well as bolstering the authority of the Large Facility Office (LFO) to help manage projects across the Foundation, and requiring that project managers have the skill capabilities to successfully manage projects.

- NSF should identify requirements for project management and financial management expertise related to large facilities projects and add the requirements to the criteria for selection of external reviewers. (6.3)
- NSF should establish a Federal Advisory Committee Act (FACA) advisory committee for the Director to use as a sounding board for objective insight on large research projects. (6.4)
- NSF Director should (1) authorize the LFO to hire two additional FTEs and (2) direct the MREFC Panel charter be revised to change the status of the Head of the LFO from a nonvoting member to a full member with voting rights on the Panel. (6.5)
- NSF should evaluate how it develops and uses the NSF Facility Plan (processes, form and format) and how it aligns with the agency's current budget and strategic planning processes. (6.6)
- NSF should identify project management skill requirements by role and develop/implement required corollary role-specific project management training/workshops to ensure that award recipients have the requisite project management experience and knowledge to lead a MREFC project. (6.7)
- NSF should require award recipient project managers be certified in project management. NSF should also specify the minimum project management experience thresholds for project positions in the terms and conditions of the cooperative agreement. (6.8)
- NSF should formally establish communities to share best practices and implement a "lessons learned" requirement for all MREFC projects. (6.9)

Chairwoman COMSTOCK. The Committee on Science, Space, and Technology will come to order.

Without objection, the Chair is authorized to declare recesses of the Committee at any time.

Welcome to today's hearing entitled "A Review of Recommendations for NSF Project Management Reform." I now recognize myself for five minutes for an opening statement.

Today, we will be reviewing recommendations made by the National Academy of Public Administration (NAPA) on how to improve the National Science Foundation's management of cooperative agreements to support the development and construction of large-scale research projects.

NSF and the National Science Board commissioned the study in response to concerns raised by this committee, the NSF Inspector General, and others regarding NSF's management and oversight of cooperative agreements and proper stewardship of federal funds. NAPA assembled a committee that conducted an eightmonth review of NSF's practices and looked at how other science funding agencies like NASA and the Department of Energy Office of Science manage similar projects.

One of our committee's most important responsibilities is to ensure that federal science agencies spend taxpayer dollars as effectively and efficiently as possible. Every dollar wasted on mismanagement is a dollar that could be spent on groundbreaking basic research or training future scientists.

Our committee has held two hearings over the last year on NSF's management of major projects like the National Ecological Observatory Network (NEON) and the LSST telescope. These hearings have revealed that NSF needs to do more to ensure that taxpayer funding is not wasted on mismanagement and abuse.

The NAPA study committee has provided 13 thoughtful recommendations for NSF. I look forward to hearing testimony on those ideas. I also look forward to hearing from NSF on how the Foundation plans to respond, and from the Inspector General on her thoughts about how some of these changes could prevent problems found in past audits of cooperative agreements.

Together, I hope we can work towards ensuring taxpayer dollars are well-managed. American leadership in science and innovation is the key to our nation's future economic prosperity, as well as our security. We want to be strong advocates for federal support of basic research that advances science in the national interest, but we can only invest more in research when taxpayers have faith and confidence that their money is being spent wisely.

[The prepared statement of Chairwoman Comstock follows:]

Subcommittee Chairwoman Barbara Comstock  
Subcommittees on Research and Technology & Oversight Hearing  
“A Review of Recommendations for NSF Project Management Reform”  
9:30 a.m. on Thursday, February 4, 2016  
**Opening Statement**

---

Good Morning. Today we will be reviewing recommendations made by the National Academy of Public Administration (NAPA) on how to improve the National Science Foundation’s management of cooperative agreements to support the development and construction of large-scale research projects.

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###

Chairwoman COMSTOCK. I thank you. And I now recognize the Ranking Member of the Research and Technology Subcommittee, the gentleman from Illinois, Mr. Lipinski, for an opening statement.

Mr. LIPINSKI. Thank you, Chairwoman Comstock. I want to thank you and Chairman Loudermilk for holding this hearing to review the recommendations for the National Science Foundation's project management reform.

In 1995, the NSF created an agency-wide budgetary account to promote effective planning and management in the Foundation's support for major research equipment and facilities construction, or MREFC. This account supports the acquisition, construction, and commissioning of major multiuser research facilities, which typically cost between \$100-\$500 million and may take a decade to complete from planning to the start of full operations.

In the early 2000s, this committee and the scientific community raised concerns over management and oversight of the MREFC account. In response, the NSF took a number of steps to strengthen their processes and cost controls. Over the next decade, the agency shepherded through many successful projects, which today remain important cutting-edge research facilities for the scientific committee.

In 2010, the NSF Office of Inspector General began raising new concerns about policies and practices for awarding and managing large construction projects. Since then, this committee has held a number of oversight hearings related to the MREFC account and specific projects. During this period, disagreement arose between NSF and the OIG over what constitutes appropriate and/or necessary policies and practices with no apparent resolution in sight. This committee proposed draft legislation, some of it on a bipartisan basis, in an effort to forge a path forward.

Then, as now, I feel that while this committee's prerogative is to exercise its oversight and legislative authority—this is very important—we must also be aware of the unintended consequences of micromanagement.

Afterwards, serious structural problems were discovered with the management of the National Ecological Observatory Network, or NEON. Since December of 2014, and largely in response to the failures with NEON, NSF has taken a number of additional steps to strengthen its business practices. But the OIG has continued to raise red flags.

Early last year, the National Science Board and NSF leadership commissioned a third-party independent review of the Foundation's use of cooperative agreements to support large projects, which would include benchmarking NSF's practices against those of other agencies with large scientific facilities.

The result was a report by the National Association of Public Administration that is the subject of today's hearing. By all accounts, the NAPA review is thorough, thoughtful, and balanced. The experts on the NAPA panel came down solidly in support of NSF continuing to use cooperative agreements rather than contracts to support MREFC projects. So in my view, we can probably dispense with that debate.

With respect to specific cost control policies and practices, NAPA largely agreed with NSF that their policies are not inconsistent with OMB guidelines but still urged them to implement stronger preventative cost controls.

NAPA also offered several recommendations for NSF to strengthen its project management procedures across the agency and to rethink roles and responsibilities for planning, management, and oversight of MREFC projects.

I understand that the IG supports the NAPA recommendations overall but would still urge NSF to take steps above and beyond those recommended in a NAPA report. I hope we will have a chance to discuss all this during the hearing.

Before I conclude, I want to make two points: First, I'm hopeful that this report will serve not just to strengthen NSF's businesses practices for large projects but also to smooth the way towards greater trust between OIG and NSF management, both of whom, I'm sure, have the best interest of the scientific community and taxpayers in mind.

Second, I want to highlight the very last section of the NAPA report entitled "The Cost of Increased Oversight." It would be irresponsible for us to ignore the reality that it will not be possible for NSF to implement NAPA's recommendations, let alone the IG's, without increased funding to support such oversight. I hope that the NSF requests enough funding in their budget to implement the NAPA recommendations.

In addition, I hope that all my colleagues would join me this spring in urging our appropriators to fully fund the agency's request for its management account.

With that, I thank the witnesses for being here this morning, and I yield back.

[The prepared statement of Mr. Lipinski follows:]



**OPENING STATEMENT**

Ranking Member Daniel Lipinski, Research & Technology Subcommittee

House Committee on Science, Space, and Technology

Subcommittee on Research & Technology

Subcommittee on Oversight

*"A Review of Recommendations for NSF Project Management Reform"*

February 4, 2016

Thank you Chairwoman Comstock and Chairman Loudermilk for holding this hearing to review recommendations for National Science Foundation project management reform.

In 1995, the NSF created an agency-wide budgetary account to promote effective planning and management in the Foundation's support for major research equipment and facilities construction, or MREFC. This account supports the acquisition, construction, and commissioning of major multi-user research facilities which typically cost between \$100 and \$500 million and may take a decade to complete from planning to the start of full operations.

In the early 2000's, this Committee and the scientific community raised concerns over management & oversight of the MREFC account. In response, the NSF took a number of steps to strengthen their processes and cost controls. Over the next decade, the agency shepherded through many successful projects which today remain important, cutting-edge research facilities for the scientific community.

In 2010, the NSF Office of Inspector General (OIG) began raising new concerns about policies and practices for awarding & managing large construction projects. Since then, this Committee has held a number of oversight hearings related to the MREFC account & specific projects. During this period, disagreement arose between NSF and the OIG over what constitutes appropriate and/or necessary policies & practices, with no apparent resolution in sight. This Committee proposed draft legislation, some of it on a bipartisan basis, in an effort to forge a path forward. Then, as now, I feel that while this Committee's prerogative to exercise its oversight & legislative authority is important, we must also be aware of the unintended consequences of micromanagement.

Afterwards, serious structural problems were discovered with the management of the National Ecological Observatory Network, or NEON. Since the summer of 2014, and largely in response to the failures with NEON, NSF has taken a number of additional steps to strengthen its business practices. But the OIG has continued to raise red flags. Early last year, the National Science Board and NSF leadership commissioned a 3<sup>rd</sup> party independent review of the Foundation's use of cooperative agreements to support large projects, which would include benchmarking NSF's practices against those of other agencies with large scientific facilities. The result was the report by the National Association of Public Administration, or NAPA, that is the subject of today's hearing.

By all accounts, the NAPA review is thorough, thoughtful, and balanced. The experts on the NAPA panel came down solidly in support of NSF continuing to use cooperative agreements rather than contracts to support MREFC projects, so in my view we can probably dispense with that debate. With respect to specific cost control policies and practices, NAPA largely agreed with NSF that their policies are not inconsistent with OMB guidelines, but still urged them to implement stronger preventive cost controls. NAPA also offered several recommendations for NSF to strengthen its project management procedures across the agency and to rethink roles and responsibilities for planning, management, and oversight of MREFC projects.

I understand that the IG, Ms. Lerner, supports the NAPA recommendations overall, but would still urge NSF to take steps above and beyond those recommended in the NAPA report. I hope we will have the chance to discuss all of this during the hearing.

Before I conclude, I would like to make two points. First, I am hopeful that this report will serve not just to strengthen NSF's business practices for large projects, but also to smooth the way toward greater trust between the OIG & NSF management -- both of whom I'm sure have the best interests of the scientific community & taxpayers in mind.

Second, I want to highlight the very last section of the NAPA report entitled "The Cost of Increased Oversight." It would be irresponsible for us to ignore the reality that it will not be possible for NSF to implement NAPA's recommendations -- let alone the IG's -- without

increased funding to support such oversight. I hope that the NSF requests enough funding in their budget to implement the NAPA recommendations. In addition, I hope that all of my colleagues will join me this spring in urging our Appropriators to fully fund the agency's request for its management account.

With that, I thank the witnesses for being here this morning and I yield back.

Chairwoman COMSTOCK. Thank you, Mr. Lipinski.

And since this morning we had the National Prayer Breakfast, we have a number of our colleagues who are late or unavailable, so my apologies for, first, the delay on all of our parts, but that's what's going on. The traffic was pretty bad out there, too, as you probably experienced.

But now, let me introduce our witnesses. Our first witness today is Ms. Cynthia Heckmann, Project Director of the National Academy of Public Administration's review on the NSF's use of cooperative agreements to support the development, construction, and operations of state-of-the-art, large-scale, multiuser research facilities.

Prior to joining NAPA, Ms. Heckmann had an extensive career at the Government Accountability Office, as well as career experience about the executive branch and in state government. Ms. Heckmann received her master's of public administration from Northeastern University and her bachelor of arts from Simmons College.

Our second witness today is Dr. Richard Buckius. Dr. Buckius is the Chief Operating Officer for the National Science Foundation. He assumed the position of COO in October 2014, having previously been a Senior Policy Advisor for NSF. He is an author and coauthor of numerous publications on the topics of radiation heat transfer, numerical fluid mechanics, and combustion. He received his bachelor's, master's, and Ph.D. in mechanical engineering at the University of California Berkeley.

Our last witness today is Ms. Allison Lerner. Ms. Lerner is the Inspector General for the National Science Foundation. Before joining NSF in April 2009, Ms. Lerner served in many leadership positions at the Department of Commerce, including Counsel to the Inspector General. She has received several national awards for excellence and was selected to be a member of the Government Accountability and Transparency Board by the President in June 2011. Ms. Lerner received her law and undergraduate degrees from the University of Texas.

I now recognize Ms. Heckmann for five minutes to present her testimony.

**TESTIMONY OF MS. CYNTHIA HECKMANN,  
PROJECT DIRECTOR,  
NATIONAL ACADEMY OF PUBLIC ADMINISTRATION**

Ms. HECKMANN. Good morning, Chairwoman Comstock, Ranking Member Lipinski, and Members of the Subcommittee. Thank you for the invitation to discuss recommendations from the Academy's report on NSF's use of cooperative agreements to support the development, construction, and operations of state-of-the-art, large-scale, multiuser research facilities.

The NSF Director and National Science Board jointly requested this review with a focus on the agency's largest cooperative agreements of 100 million or more under the MREFC account. The Academy's panel and study team's review focused on agency's policies and practices governing the lifecycle of these projects, including issues raised by the Inspector General and Congressional concerns. We also looked at comparable agencies with large capital invest-

ment projects most analogous to NSF's for promising practices that might be transferable.

Overall, we found that the cooperative agreements are the appropriate mechanism to support these efforts. We also acknowledge the many recent efforts by NSF has undertaken to implement new policies and practices to address Inspector General and Congressional concerns.

Our recommendations are intended to support NSF and the board's commitment to improving core business practices and the agency's key performance goal of ensuring program integrity and responsible stewardship of major research facilities. We've included suggested implementation steps for each recommendation, and where appropriate in our text, highlighted other agencies' promising practices. Our recommendations provide a number of actions and options to strengthen oversight and enhance agency governance, practices, and processes.

For today, we are grouping the recommendations as follows: One, policies on cost estimating and cost analysis. NSF has a strengthened its methodological approach to cost estimating and analysis and updated its policies in the Large Facilities Manual to reflect these efforts. This includes a tightened control environment and improved cost surveillance strategies.

However, we identified some additional opportunities to bolster cost analysis requirements for award recipients and improve internal agency processes for detecting potential issues in proposals. In terms of cost estimating, we recommend that NSF change current language in the manual, making it clear that award recipients are expected, not just encouraged, to follow guidance in the GAO's Cost Estimating and Assessment Guide and Schedule Assessment Guide when developing those cost and schedule estimates.

In terms of cost analysis, we recommend that NSF require that decisions not to act on recommendations from the pre-award cost analyses conducted by their cost analysis and audit resolution branch be reviewed by the Large Facilities Office and forwarded to the Chief Financial Officer for a final determination. These decisions should be documented in writing and shared with the MREFC panel prior to the release of any award funds.

Two, managing budgeting contingency: The use of contingency is a commonly accepted business and project management risk mitigation practice for construction projects. NSF's position is that contingency funds should be retained and managed by the award recipients. However, the common federal agency practice is for the agency to hold either all or a majority percentage of the contingency funds. By holding at least a percentage of these funds, NSF could further strengthen internal controls and accountability. Therefore, we recommend NSF adopt the practice of retaining control of a portion of the award recipient's contingency funds and distributing them with other incremental funds as needed.

Three, management fee policies and processes: NSF includes a management fee in several of its cooperative agreements to cover business expenses related to construction or operations that would otherwise be non-reimbursable under governing cost principles. However, most of the examples provided to us appeared to be costs that would either be covered under indirect costs or contingency.

Despite recent changes NSF has made, it's been its policy to provide clearer guidance on appropriate and inappropriate uses of management fee. The IG continues to have concerns. Furthermore, OMB's efforts in the uniform guidance have not resulted in greater clarity on some of the most controversial aspects of management fee. We recommend NSF eliminate the practice of including management fee in cooperative agreements on future projects.

Four, governing for effective stewardship: Governing bodies, agency internal coordinating committees, and advisory review panels play important roles in governance, development, and execution of MREFC projects. We've offered recommendations for each of these groups to address ambiguity and further build on the agency's capacity to effectively manage these projects.

NSF and NSB roles and responsibilities, starting with them, the statutory joint leadership model of an appointed director and board is quite unique among federal agencies. The current working relationship appears to be working well. It's not always been the case, and we've recommended that they establish and publish a joint duties and responsibilities document to institutionalize the role.

The MREFC panel is only engaged right now in design review phases of an MREFC project. For more consistent and informed oversight, the panel should be involved throughout the lifecycle of a project's development and implementation, really reviewing project status on a set schedule.

In terms of advisory committees and review panels, the panels need to include experts with requisite project and financial management knowledge and experience, and we are recommending that NSF explicitly identify the requirements and add them to the selection criteria for those external reviewers. We also recommend that NSF establish a FACA committee for the director to use as a sounding board.

Large Facilities Office, the role and the placement of this office has been subject to debate. We concluded that the organizational placement is not as important as project management roles and responsibilities. Its current placement is also logical within the office of the CFO, as its focus is on strengthening project management assistance. We did make recommendations in terms of hiring two additional FTEs and directing the MREFC charter be revised to change the status of the LFO head from nonvoting to a full voting member.

In terms of planning and portfolio management process, we have a recommendation in terms of the annual facilities plan where there's some confusion over what its role is and ask that NSF evaluate it in terms of its agency's current planning and strategic planning processes.

Finally, project management skills are needed for effective oversight. NSF has strong—the folks have strong scientific credentials, not as likely to have the same corollary skills and experience in project management.

We have three recommendations for project management. First is to identify skill requirements for internal staff and develop corollary project management training for the staff; second, to require award recipient project managers be certified in project management and specified minimum project experience requirement

threshold in the actual terms and conditions; and lastly, establish formal communities of practice to share best practices and lessons learned, a requirement for all MREFC projects.

In closing, let me just reiterate NSF has undertaken a wide range of actions to improve the oversight of these MREFC projects. The efforts are a work in progress. They appear headed in the right direction. Given the initiatives underway and the culture change needed to socialize these changes, time will be needed. And from a continuous improvement perspective, time will be needed to see what is working and what requires further adjustments.

Thank you for the opportunity to share these views.

[The prepared statement of Ms. Heckmann follows:]



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**Written Testimony of Cynthia Heckmann**  
**Study Director, National Academy of Public Administration**

**Before the Committee on Science, Space, and Technology**  
**Subcommittee on Research and Technology**  
**U. S. House of Representatives**  
**February 4, 2016**



**Chairman Comstock, Ranking Member Lipinski, and Members of the Subcommittee:**

Thank you for the invitation to testify today to discuss recommendations from the National Academy of Public Administration's (the Academy's) report on the National Science Foundation's use of cooperative agreements (CAs) to support the development, construction, and operations of state-of-the-art large scale, multi-user research facilities.

Established in 1967 and chartered by Congress, the Academy is an independent, non-profit, and non-partisan organization dedicated to helping leaders address today's most critical and complex challenges. The Academy has a strong organizational assessment capacity; a thorough grasp of cutting-edge needs and solutions across the federal government; and unmatched independence, credibility, and expertise. Our organization consists of more than 800 Fellows—including former cabinet officers, Members of Congress, governors, mayors, and state legislators, as well as distinguished scholars, business executives, and public administrators. The Academy has a proven record of improving the quality, performance, and accountability of government at all levels.

Before summarizing the Academy Panel's findings and recommendations, I would like to note that the National Science Foundation (NSF) and National Science Board (NSB) provided the Panel and study team with all of the background materials necessary to complete a thorough and timely review. Interviewees were candid, cooperative, and eager to be of assistance.

Scope

The NSF Director and NSB jointly requested that the Academy conduct a review of NSF's use of cooperative agreements to support the development, construction, and operations of state-of-the-art large scale, multi-user research facilities. The Academy Panel and study team were asked to focus the review on the agency's largest CAs of \$100 million or more involving major research facility construction projects under the Major Research Equipment and Facilities Construction (MREFC) account.

The NSF Director and the National Science Board asked the Academy to review a number of issues related to findings in audits by the NSF Office of Inspector General (OIG), including NSF's cost surveillance approaches under CAs and the agency's oversight of contingency and management fee. Additional key considerations for the Academy's study came from recent congressional hearings and language removed from an earlier version of the America COMPETES Act of 2015 that would have codified a number of OIG recommendations. In reviewing the policies and practices covering the life cycle of large facility construction projects, specific study objectives were to:

- Assess how CAs are currently used at NSF examining the effectiveness of NSF's current CA policy including: (1) the legal and regulatory framework for CAs and when CAs are appropriate; (2) NSF's CA policies, procedures and practices in light of solicitation.

administration, oversight, and auditability and adequacy of accessibility to awardee records and documentation; and (3) contingency and management fee policies and practices.

- Compare cooperative agreements with other federal funding mechanisms.
- Ascertain how comparator scientific agencies manage similarly large, complex research facilities projects.
- Identify potential improvements to NSF's processes that support large-scale research facilities.

#### Methodology

The Academy assembled an expert Panel comprising five Fellows and one panel member recommended by the Foundation, with broad federal, executive leadership, and academic experience and knowledge in financial management, acquisition management, risk management, project management, accountability mechanisms and scientific inquiry, as well as experience or familiarity with the National Science Foundation and other federal science agencies that promote research. The Academy Panel provided ongoing guidance to a study team of six who carried out the review based on a structured methodology.

The study team performed extensive research in the form of both primary and secondary data collection and analysis. Specifically, the Academy study team examined NSF's use of cooperative agreements, reviewing relevant statutes, regulations and any pending legislation; Inspector General reports addressing CAs; previous internal and external studies on large facilities construction projects; and NSF internal and external guidance on CAs and other procurement and organizational documents/materials including NSF standard operating guides. In addition, the study team collected and analyzed government-wide guidance from the Office of Management and Budget such as OMB Circular A-11 and the Uniform Guidance, Government Accountability Office best practice guides on cost and schedule estimating for large capital projects and relevant audit reports, and records of congressional hearings and other documents that shed light on past congressional activity with respect to NSF's use of CAs. The team also performed a literature search and examined related materials on procurement, CAs, project management and earned value management (EVM). And, the study team reviewed documents and guidance from benchmark/comparable agencies including the National Aeronautics and Space Administration, Department of Energy, and Department of Defense to glean lessons learned and practices that might be instructive and transferable to NSF.

#### Results in Brief

Unlocking the secrets of science and pushing forward the frontiers of innovation are the visionary goals that guide the National Science Foundation in carrying out its mission. Created by the *National Science Foundation Act of 1950* (Public Law 81-507), the Foundation is an independent federal agency whose mission is to "promote the progress of science; to advance the

national health, prosperity, and welfare; to secure national defense; and for other purposes.” The 1950 Act creating NSF also established a National Science Board to set overall policies for the agency and advise the President and Congress on critical policy issues. Responsibility for day-to-day operations is vested in an appointed director who serves as the agency’s chief executive officer. The statutory joint leadership authority and accountability are quite unique among federal agencies.

State-of-the-art large facility construction projects are the highest profile efforts funded and supported by NSF and include the construction of such facilities as astronomical observatories, particle accelerators, and research vessels located worldwide. In addition to serving their primary purpose of supporting the scientific community, many of these projects have established the necessary infrastructure for other government agencies to achieve their missions, particularly with respect to national defense efforts. NSF does not operate these facilities, but supports their development, construction and operation with federal awards that are funded through cooperative agreements. NSF currently administers 33 CAs for large facility construction or operations totaling \$4.8 billion in obligations. Of these, 26 CAs are for large research facilities whose construction totaled over \$100 million each. As would be expected, these high dollar efforts are subject to significant attention from both the National Science Foundation Inspector General and Congress and have led to questions about the use of cooperative agreements to fund these projects and the adequacy of the management, oversight and accountability practices used to monitor them.

NSF is an agency in transition. An exemplar agency in promoting basic research following what is often referred to as the “Gold Standard in Merit Review” for assessing the merits of the scientific research, the agency is in the midst of a culture change shifting to a more management-oriented focus in how research projects are administered to add corollary management rigor and ensure proper stewardship of federal funds. In response to OIG and congressional concerns, NSF has undertaken a wide range of actions to improve project management and oversight under cooperative agreements, by strengthening or adding specific requirements that at a minimum, address the spirit, if not the letter, of previous recommendations. Additional actions are underway or planned; however, OIG has recently raised or reemphasized concerns in certain areas. The Academy Panel reviewed these concerns and offered recommendations and options to address those concerns—in particular, in the areas of contingency and management fee where oversight can be further strengthened.

Overall, the Academy Panel found that cooperative agreements are the appropriate mechanism to support large-scale research facilities. The mechanism is specifically designed to allow for substantial involvement on the part of the federal agency—and substantial involvement includes oversight. The critical success factor for these types of projects is the project management discipline—and the rigor of review processes—in place along with the capacity and capability of a skilled workforce to carry out and oversee project management responsibilities. The Panel’s

analysis of comparator agencies featured in the report provides lessons learned and identifies practices that can be adopted by NSF. In addition, the Panel identified NSF and NSB governance issues—in terms of both structure and practices—and offered a number of suggestions for strengthening agency management practices. NSF and NSB have considerable discretion in setting policy for the use of CAs.

The government-wide environment today is one of tight budgets and intensified oversight, a condition that is not likely to change in the near future. NSF will need to make some hard funding decisions that address the demand for more rigorous accountability systems balanced against the mission to advance science. In the long run, one does not necessarily have to be at the expense of the other—but there are likely to be short-term impacts as changes are implemented and institutionalized across the science community. The Academy Panel's recommendations provide a number of actions and options to strengthen the oversight of MREFC projects and to enhance agency governance practices and processes.

#### Panel Recommendations

The Academy Panel's recommendations are presented in chapters 3, 4, and 6 of the report. The first number for each of the thirteen recommendations listed below refers to the chapter in which it is located. Chapters 3 and 4 provide an overview of NSF policy and practices for cooperative agreements, contingency and management fee. Chapter 6 presents findings and recommendations on NSF and NSB governance and organizational issues.

#### **Panel Recommendation 3.1**

Objective: To bolster NSF's ability to detect and address potential cost proposal issues prior to the release of award funds.

Recommendation: NSF should require that exceptions to the recommendations from pre-award cost analyses conducted by the Cost Analysis and Audit Resolution branch be reviewed by the Large Facilities Office and forwarded to the CFO for a final determination. The results of the CFO's decision should be documented in writing and shared with the Major Research Equipment and Facilities Construction Panel prior to the release of award funds.

#### Implementation Steps:

- The responsible Office of Budget, Finance and Award Management (BFA) units should work together to establish the specific policy and procedures for implementing these additional requirements.

#### **Panel Recommendation 4.1**

Objective: To bolster internal controls for contingency by providing additional auditability and incentivizing project managers to use the funds judiciously and return unused funds for reallocation to other agency priorities.

Recommendation: NSF should retain control of a portion of an award recipient's contingency funds and distribute them with other incremental funds as needed.

Implementation Steps:

- NSF should (1) establish a trigger based on total project cost that will determine whether contingency will be held at three approval levels or two and (2) determine the appropriate percentage at each level based on a project's risk assessment. For projects over the threshold (e.g., projects totaling more than \$100 million), contingency should be held at the directorate, program, and project (award recipient) level. Under this model, for example, 35 percent of contingency could be held at both the directorate and program level and 30 percent could be held at the project level. For projects under the threshold, contingency would be held at only two levels with, for example, 50 percent held at the program level and 50 percent held at the project level.
- The responsible BFA office should coordinate with all offices responsible for the management, review, and approval of contingency fund expenditures to develop the policy and process for holding and distributing funds to the recipient and the attendant audit trail requirements for documenting requests and tracking use to the project's work breakdown structure.
- NSF should leverage current systems for managing funds to ensure that contingency funds can be distributed in a timely manner.

**Panel Recommendation 4.2**

Objective: To further strengthen NSF's policy on cost estimating and ensure rigor in the process.

Recommendation: NSF should change current language in the LFM so that it is clear that award recipients are expected to follow the guidance in GAO's Cost Estimating and Assessment Guide and Schedule Assessment Guide when developing cost and schedule estimates.

Implementation Steps:

- The LFO should work with stakeholders to identify and establish factors (e.g., risk, cost) that afford the flexibility to scope and scale the guidance based on what would be most appropriate for an individual project.

**Panel Recommendation 4.3**

Objective: To eliminate the additional management burdens and potential for funding inappropriate expenses posed by management fee.

Recommendation: NSF should eliminate the practice of including management fee in cooperative agreements in future projects.

Implementation Steps:

- The appropriate BFA office should develop NSF policy clarifying that management fee will no longer be included in federal awards.

**Panel Recommendation 6.1**

Objective: To improve transparency in how NSF and the Board work together to enable mission accomplishment and perform management oversight functions and to clarify and codify roles, responsibilities, and working relationships so that they are sustained beyond transitions that occur with leadership changes and expiration of Board members terms.

Recommendation: NSF and NSB should establish and publish a joint NSF-NSB duties and responsibilities document institutionalizing roles and addressing key working relationships.

Implementation Steps:

- NSF and Board leadership should develop a joint document highlighting key roles and responsibilities and delineating how they work together. Staff and stakeholder input should be solicited, as appropriate, prior to finalizing the document.
- The document should be shared with NSF and NSB staff and posted on both the NSF and NSB websites.
- The document should be reviewed annually and updated as necessary.

**Panel Recommendation 6.2**

Objective: To add more rigor to the process of reviewing MREFC project readiness and performance at varying stages.

Recommendation: NSF should re-scope the role and duties of the MREFC Panel and amend the Panel's charge to specifically include status update reviews of projects in the development and construction phases focusing on cost, schedule, and performance.

Implementation Steps:

- The LFO should work with the MREFC Panel to identify the staff support and information needs, including the analyses and assessments conducted by the Integrated Project Team (IPT), to execute its expanded duties.

**Panel Recommendation 6.3**

Objective: To help ensure that external review panels include experts with the requisite knowledge and experience to assess cost and schedule estimates and project performance on large facilities projects.

Recommendation: NSF should identify requirements for project management and financial management expertise related to large facilities projects and explicitly add the requirements to the criteria for selection of external reviewers. The criteria should be incorporated in both the Grant Proposal Guide and the Proposal and Award Manual.

Implementation Steps:

- The LFO should take the lead in developing the criteria based on lessons learned from past MREFC projects. The criteria should be vetted with all appropriate internal and external stakeholders.
- The Policy Office should incorporate the agreed-upon criteria in the Grant Proposal Guide and Proposal and Award Manual.

**Panel Recommendation 6.4**

Objective: To provide the NSF Director direct access to independent project and cost estimating expertise for reviewing MREFC projects.

Recommendation: NSF should establish a Federal Advisory Committee Act (FACA) advisory committee for the Director to use as a sounding board for objective insight on large research projects.

Implementation Steps:

- NSF should initiate the process for establishing a new federal advisory committee under FACA.

**Panel Recommendation 6.5**

Objective: To further build capacity in the Large Facilities Office and to clarify the role, authority and accountability of the Head of the Large Facilities Office on the MREFC Panel.

Recommendation: NSF Director should (1) authorize the LFO to hire two additional FTEs and (2) direct the MREFC Panel charter be revised changing the status of the LFO Head from a non-voting member to a full member with voting rights.

Implementation Steps: NSF should initiate the process for hiring additional LFO staff and revising the MREFC Panel charter.

**Panel Recommendation 6.6**

Objective: To reassess the need for a separate Facility Plan and only if validated, provide clarity on its: (1) purpose and uses, (2) target audience, and (3) key roles/responsibilities for its development.

Recommendation: NSF should evaluate how it develops and uses the NSF Facility Plan (processes, form and format) and how it aligns with the agency's current budget and strategic planning processes, assessing (1) the plan's value to both NSF and NSB decision-makers and key stakeholders, (2) whether a standalone plan is necessary or whether it can be incorporated into existing budget and strategic plans, and (3) if necessary as a standalone plan, who should be the lead for developing the plan.

Implementation Steps:

- The NSF Director and NSB Chair should establish a working group to analyze the current plan intent, key roles in the development process, and uses—and identify necessary adjustments.
- In assessing the NSF Facility Plan, the working group should validate who is the intended key customer(s) of the plan and seek input from both internal and external stakeholders.
- Assessment criteria should include determining the value (cost/benefit) of the plan and its relationship with other agency planning processes.
- Recommendations should be vetted with all appropriate internal and external stakeholders.

**Panel Recommendation 6.7**

Objective: To develop and strengthen project management skill capabilities across the agency.

Recommendation: NSF should identify project management skill requirements by role and develop/implement required corollary role-specific project management training/workshops.

Implementation Steps:

- The LFO should work with the NSF Academy to conduct a needs assessment to identify project management knowledge and skill requirements by role and use the results to develop and implement role-specific project management curricula.
- The LFO and NSF Academy should develop NSF-tailored seminars for senior leadership focused on their oversight responsibilities.
- The NSF Academy should explore arrangements with other federal agencies such as NASA and DOE to take advantage of established federal courses addressing project management principles for capital investments, EVM, work breakdown structure, cost estimating, and the like.

**Panel Recommendation 6.8**

Objective: To ensure that award recipients have the requisite project management experience and knowledge to successfully lead a MREFC project.



Recommendation: NSF should require award recipient project managers be certified in project management. NSF should also specify the minimum project management experience thresholds for project positions in the programmatic terms and conditions of the cooperative agreement.

Implementation Step:

- NSF program officers and Grants and Agreements Officers should work together to include project management certification and requisite experience requirements in cooperative agreements for MREFC projects.

**Panel Recommendation 6.9**

Objective: To facilitate project management knowledge sharing across the agency and with award recipients.

Recommendation: NSF should formally establish communities of practice to share best practices and implement a “lessons learned” requirement for all MREFC projects.

Implementation Steps:

- The NSF Academy should promote the formation of communities of practices and encourage staff participation.
- The LFO should develop a lessons learned process and template to capture instructive experiences from projects and to inform policies and practices to strengthen the management of future projects.

**Biography for Cynthia Heckmann**

Cynthia Heckmann served as Project Director on the National Academy of Public Administration's recent review of the National Science Foundation's use of cooperative agreements to support the development, construction, and operations of state-of-the-art large scale, multi-user research facilities. Ms. Heckmann previously served as Project Director on the Academy's reviews of the Department of Justice's Civil Rights Division and the Center for Disease Control (CDC) Human Resource Process Review. Her extensive career at the Government Accountability Office includes serving as the Chief Human Capital Officer (CHCO) and Deputy Chief Information Officer. She also has executive branch experience, as well as state government experience. She has served as a strategic advisor on research studies for the Partnership for Public Service and is a CHCO SAGE—Strategic Advisor for Government Executives—for the Partnership. Ms. Heckmann holds a Masters of Public Administration from Northeastern University and a Bachelor of Arts from Simmons College. She also attended the Executive Fellows Program at Harvard University's John F. Kennedy School of Government and Yale University's School of Organization and Management.

Chairwoman COMSTOCK. Okay. Thank you, Ms. Heckmann.  
And now, Dr. Buckius.

**TESTIMONY OF DR. RICHARD BUCKIUS,  
CHIEF OPERATING OFFICER,  
NATIONAL SCIENCE FOUNDATION**

Dr. BUCKIUS. Madam Chairwoman, Members of the Committee, thank you for the opportunity to discuss NSF's oversight of major research facility infrastructure projects and NSF's response to the recent NAPA report.

The National Science Foundation supports fundamental research in frontiers of knowledge across all fields of science and engineering. As part of that mission, NSF supports a broad array of 28 major transformative research facilities that are geographically distributed observatories, telescopes, mobile platforms such as research vessels and aircraft. In a total, the operational cost of NSF's entire portfolio of research infrastructure requires approximately 1.2 billion per year.

I'd like to start by thanking NAPA for its rigorous review of NSF's use of cooperative agreements to support large-scale investments in science and technology. The members of this committee, the Inspector General, and the experts at NAPA have all been exceptionally helpful to the Foundation in identifying areas where NSF can improve and make our oversight of critical facilities even stronger.

We appreciate the panel's overall conclusion that cooperative agreements are the appropriate mechanism for the agency to use for construction and operations of large facilities. In using this funding mechanism, the Foundation is committed to improving the rigor and oversight of its processes and deploying appropriate levels of internal projects, programmatic, and financial management expertise.

In order to respond to the report, the Director has created an implementation team to address each of the recommendations. And I will divide this conversation into two broad areas: first, business practices; and second, oversight, accountability, and stewardship.

Let me start by saying that NSF will implement all 13 recommendations in some form. In the case of the business practices, NSF will provide stronger requirements of cost estimating and adjudication of cost analysis findings, as recommended by the panel, and will revamp the processes of obligating and allocating contingency based on the project's level of risk. The panel's comparison with other agencies is extremely useful, and we will follow up with these agencies for more information detailing the process of partial withholding of contingency, while also ensuring NSF's continued compliance with uniform guidance.

With regard to management fee, the Foundation is continuing to implement the stringent policy we put in place last year, and we are currently considering the alternatives set forth in the panel's report. As I've previously testified before this committee, NSF acknowledges that some awardees should have shown better judgment in the use of their management fee even if they were not in violation of any law or regulation governing the use of these funds. The Foundation has learned a number of lessons about manage-

ment fees, and we have designed the policy around the lessons learned.

While many of the panel's recommendations are implementable within a relatively short time, I would note that we believe the management fee topic will likely take a more thorough analysis on the part of NSF and some of the other recommendations.

The panel's holistic view of NSF's oversight, accountability, and stewardship of large research facilities is welcomed by the Foundation. We are considering all the recommendations on the roles and responsibilities of the National Science Board, MREFC Panel, and the Office of the Director as a single endeavor. We plan to enhance the role of independent expertise in project and financial management, as well as the cross-agency sharing of best practices.

The National Science Board examined the panel's recommendations over the course of the last few days, and this is our first NSB meeting since the release of the report. We look forward to working together with the board to strengthen our oversight, accountability, and stewardship, as recommended by the panel.

NSF is committed to developing project management skills, experience, and training for both foundation staff and MREFC project managers.

I'd like to clarify for the Committee that any changes NSF undertakes can and will apply to existing—not just new—cooperative agreements. As the Foundation improves its processes, we can revise, as appropriate, existing agreements to strengthen oversight.

In closing, I'd like to reiterate how much NSF welcomes the NAPA report and its recommendations. It is only with strong support from the inspector general, external experts like NAPA, and Congress that complete oversight of taxpayer resources can be achieved, and we appreciate all these efforts.

Thank you again for the opportunity to testify, and I will be pleased to answer any of your questions.

[The prepared statement of Dr. Buckius follows:]



Testimony of

Dr. Richard O. Buckius  
Chief Operating Officer  
National Science Foundation

Before the

U.S. House of Representatives  
Committee on Science, Space and Technology

Subcommittee on Research and Technology, and the  
Subcommittee on Oversight

on

*A Review of Recommendations for NSF Project Management Reform*

February 4, 2016

Madam Chairwoman, Mr. Chairman and Members of the Committee, thank you for this opportunity to discuss NSF's oversight of major research facility infrastructure projects and the NSF response to a recent National Academy of Public Administration report on this topic.

The National Science Foundation (NSF) supports fundamental research at the frontiers of knowledge across all fields of science and engineering. NSF serves the national interest as stated by NSF's mission to promote the progress of science; to advance the national health, prosperity and welfare; to secure the national defense; and for other purposes; and we do so through our investment in a portfolio of more than 42,000 active awards.

As part of our mission, NSF supports high-risk, potentially transformative projects that generate path-breaking discoveries and help to prepare the science and engineering workforce of the future. Among these high-risk projects are large-scale, multiuser scientific facilities. NSF supports a broad array of 28 major research facilities which individually cost between \$100M and \$500M each to construct. These facilities include geographically-distributed observatories, telescopes, colliders, detectors and mobile platforms such as research vessels and aircraft. NSF supports an even more extensive array of smaller, but equally sophisticated research infrastructure, many of which are increasingly cyber-enabled. In total, the operational cost of NSF's entire portfolio of research infrastructure cost \$1.2B per year to operate. As a result, NSF

takes oversight of this critical national investment seriously. NEON, the National Ecological Observatory Network, which has been a subject of great discussion lately, is only one facility within this portfolio that NSF needs to consider when looking at its policies and procedures related to proper oversight.

I would like to start by thanking the National Academy of Public Administration (NAPA) Panel (the Panel) for its rigorous review of NSF's use of Cooperative Agreements to support large-scale investments in science and technology. The Members of this Committee, the NSF Inspector General, and the experts at NAPA have all been exceptionally helpful to the Foundation in identifying areas where NSF can improve and make our oversight of critical science-support facilities even stronger.

The NAPA report emphasizes the need for heightened accountability and oversight, particularly with respect to large-scale research infrastructure, as NSF pursues its mission to support basic research at the frontiers of science and engineering. We appreciate the Panel's overall conclusion that Cooperative Agreements are the appropriate mechanism for the agency to use for the construction and operation of large research facilities. In using this funding mechanism, the Foundation is committed to improving the rigor and oversight of its processes and deploying appropriate levels of internal project, programmatic, and financial management expertise.

NSF is in general agreement with the Panel's recommendations. In order to respond to the report, the NSF Director has created an implementation team to address each of the recommendations. I will divide the NSF response into two broad topic areas identified in the NAPA report:

- Business Practices, and
- Oversight, Accountability, and Stewardship.

#### **Business Practices**

NSF will provide stronger requirements on cost estimating and adjudication of cost analysis findings, as recommended by the Panel, and to revamp the process of obligating and allocating contingency, based on the project's level of risk. The Panel's comparison with other agencies is very useful, and we will follow up with these agencies for more information detailing the process of partial withholding of contingency while also ensuring NSF's continued compliance with the Uniform Guidance.

With regard to management fee, the Foundation is continuing to implement the stringent policy we put into place last year, and we are currently considering the alternatives set forth in the Panel's report. As I have previously testified before this Committee, NSF acknowledges that some awardees should have shown better judgment in the use of their management fee – even if they were not in violation of any law or regulation governing the use of those funds. The Foundation has learned a number of lessons about management fees, and we designed the policy around those lessons learned.

Our new policy – which clarifies inappropriate uses of management fee, among other things – was established over a year ago, and subsequently updated after considering public comment. Recognizing the Panel recommends eliminating the use of management fee in future projects, we are in the process of doing two things: assessing how our updated policies have impacted existing cooperative agreements, and determining if there are other appropriate cost categories to cover some expenditures currently considered under management fee, per the Panel’s recommendation. While many of the Panel’s recommendations are implementable within a relatively short time frame, I would note that we believe this topic will likely take a more thorough analysis on the part of NSF than some of the other recommendations.

### **Oversight, Accountability, and Stewardship**

The Panel’s holistic view of NSF’s oversight, accountability, and stewardship of large research facilities is welcomed by the Foundation. We are considering all of the recommendations on the roles and responsibilities of the National Science Board (NSB), the Major Research Equipment and Facilities Construction (MREFC) Panel, and the Office of the Director, as a single endeavor. Our existing oversight system was put into place over a decade ago, and the NAPA Panel recommendations give us clear guidance. We plan to enhance the role of independent expertise in project and financial management as well as the cross-agency sharing of best practices.

The NSB examined the Panel’s recommendations over the course of the past two days, and this was our first NSB meeting since the release of the report. We look forward to working together with the Board to strengthen our oversight, accountability, and stewardship, as recommended by the Panel.

Project management expertise and prior experience in leading large infrastructure projects are key requirements for success. NSF is committed to developing project management skills, experience, and training for both Foundation staff and MREFC project managers. In addition, we plan to expand our “community of practice” and a lessons-learned library, including implementation of those lessons-learned, for all MREFC projects.

I would like to clarify for the Committee that any changes NSF undertakes can and will apply to existing – not just new – cooperative agreements. One of the benefits of the agreement vehicle is that it allows flexibility to NSF, as well as the awardee, to move a project forward in a dynamic way. As the Foundation improves its processes, we can revise, as appropriate, existing agreements to strengthen oversight. As a result, any changes in policy are able to be effected in the near term.

In closing, I would like to reiterate how much NSF welcomes the NAPA report and its recommendations. The Panel’s attention to the details of cost surveillance, contingency, management fee, as well as the organizational structure and functions of the Foundation, provides a roadmap toward strengthened policies and practices for the NSF. This, in turn, will help us to provide our science and engineering communities with continued access to world-class research infrastructure. The Panel produced a high-quality, independent product on a very short timeline and for that the Foundation is grateful.

It is only with the strong support of the Inspector General, external experts like NAPA, and Congress that complete oversight of taxpayer resources can be ultimately achieved, and we are appreciative of those efforts. The Foundation looks forward to working with the Committee and with our Office of Inspector General as we implement these changes in order to best serve science and technology in the national interest.

Thank you again for the opportunity to testify. I would be pleased to answer your questions.



**Richard O. Buckius**

Chief Operating Officer  
 Senior Science Advisor  
 National Science Foundation, Washington, DC, USA

and

Professor of Mechanical Engineering  
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Dr. Richard Buckius has been at the National Science Foundation as a Senior Science Advisor since June of 2014 and Chief Operating Officer since October of 2014. Recently, he was the Vice President for Research and is Professor of Mechanical Engineering at Purdue University (2008-14). Previously, he was Head of the Department of Mechanical and Industrial Engineering (1998-05), Associate Vice Chancellor for Research (1988-91), and Richard W. Kritzer Professor (1992-97) at the University of Illinois at Urbana-Champaign (UIUC). Dr. Buckius also served as the National Science Foundation's Assistant Director for Engineering (2006-08), Director for the Engineering Directorate's Division of Chemical and Transport Systems (2004-05), and Program Director of the Thermal Systems and Engineering Program (1987-88).

Dr. Buckius is author/co-author of numerous publications, books and invited talks and articles in the areas of radiation heat transfer, numerical fluid mechanics, and combustion. He co-authored a textbook titled *Fundamentals of Engineering Thermodynamics* (Mc-Graw-Hill) which was published in English, Spanish and international versions. He is a member of the editorial boards of *Nanoscale and Microscale Thermophysical Engineering*, *Heat Transfer Research*, and *Heat Transfer-Asian Research*. He was Associate Technical Editor for the American Society of Mechanical Engineers (ASME) *Journal of Heat Transfer*.

Among his honors include ASME's Richards Memorial Award, ASME's Potter Gold Medal, Heat Transfer Division 75<sup>th</sup> Anniversary Medal, and American Society for Engineering Education Ralph Coats Roe Award. He has received numerous teaching awards, including UIUC Campus Award for Excellence in Undergraduate Teaching and six Mechanical Engineering Alumni Teaching awards.

Dr. Buckius received his bachelor's and master's degrees and PhD in mechanical engineering at the University of California, Berkeley, in 1972, 1973 and 1975, respectively.

Chairwoman COMSTOCK. I now recognize Ms. Lerner for five minutes.

**TESTIMONY OF MS. ALLISON LERNER,  
INSPECTOR GENERAL,  
NATIONAL SCIENCE FOUNDATION**

Ms. LERNER. Thank you, Madam Chairwoman, and Members of the Subcommittee. I appreciate the opportunity to discuss my office's views on the National Academy of Public Administration's report on NSF's use of cooperative agreements to support large-scale investment in research.

Since 2010, my office has issued 28 reports containing more than 80 recommendations that relate to NSF's management of cooperative agreements for large-facility projects. Beginning with our audits of over \$1.1 billion in proposal costs for three construction projects, the issues we identified have occurred at multiple facilities and ultimately contributed to the decision to procure the NAPA report. I commend Drs. Cordova and David for their vision in commissioning this effort, as well as the NAPA panel and staff who conducted the review and prepared the outstanding final product.

The report sets forth practical recommendations that, if implemented by the agency in a timely fashion, will significantly improve NSF's ability to ensure accountability over these high-risk, high-dollar projects, and thus go a long way toward addressing many of the issues my office has raised.

Our office supports all of the NAPA report's recommendations, and I'll briefly discuss six of them. First, the report recommended that NSF require review of exceptions to recommendations from pre-award cost analyses conducted by the Foundation's in-house analyst, or CAAR. Because our work has identified instances in which CAAR's important concerns have not been addressed in a timely fashion, we share NAPA's belief that actions necessary to ensure that the critical issues CAAR identifies are brought to the attention of senior officials and panelists and resolved. A similar process should be followed for other important internal analyses and for the findings of the incurred cost audits NSF will soon be procuring.

We wholeheartedly agree with, NAPA's recommendation that NSF should retain control over a portion of awardees' contingency funds. Our previous audits have found that construction budgets for NSF's large-facility projects contained tens of millions of dollars in unsupported contingency costs. The risk of misuse of these funds is heightened because NSF does not require awardees to track expenditure of funds in their accounting systems, which makes it all but impossible for us to audit these significant expenditures.

With respect to the panel's recommendation to eliminate the use of management fee, our September 2015 Alert Memo documented positive steps NSF has taken to strengthen its fee policy and noted improvements that are needed to determine if management fee is necessary for an awardee's financial viability. If NSF decides to continue providing such fees, it should consider and address the issues noted in our Alert Memo.

OIG also agrees with three recommendations that focus on the need for NSF to strengthen business and project management

skills within the agency and at its awardees. The culture change needed to implement these recommendations is clearly warranted because, as the NEON project has illustrated, deficiencies in a project's business processes have the potential to undermine its scientific goals if the project must be de-scoped due to cost or schedule overruns.

Finally, I'd like to note three areas that were not covered by the NAPA recommendations but which are still critical to NSF's ability to manage large-facility projects. First, our recent work has found that NSF does not require the earned value management systems for its large-facility projects to be certified or the data they contain to be verified. The poor quality of the information in these reports for the NEON project was one of the reasons why the cost overrun for that project was undetected for so long. NSF is currently evaluating what actions it should take to ensure the quality of EVM data.

Second, our office has repeatedly recommended that NSF require annual incurred cost submissions for projects over \$50 million. Such submissions provide critical information about how an awardee has spent federal funds and are essential tools for both NSF and the OIG. In two very recent reviews, however, auditors found the submissions for two large construction projects were not adequate to initiate an audit because so much important information was missing from them. NSF is currently seeking OMB clearance related to such submissions.

Finally, many of our reports have stressed the need for annual incurred cost audits of large-facility recipients. Such audits provide NSF with the best evidence of how awardees are actually expending federal funds. While we commend NSF for deciding to require incurred cost audits at project completion, by waiting until the end to obtain an audit, NSF will miss opportunities to identify and correct problematic expenditures in the project's early days. Given the level of risk we've identified with these projects, annual or at least biannual audits are clearly warranted.

In closing, NSF's swift and decisive implementation of the NAPA report's recommendation will have a significant positive impact on the Foundation's ability to manage high-dollar, high-risk, large-facility projects. I look forward to continuing to work with Congress, the Foundation, and the National Science Board toward this goal.

And I'd be happy to answer any questions.

[The prepared statement of Ms. Lerner follows:]

**Statement of Allison C. Lerner**

**Inspector General**

**National Science Foundation**

**Committee on Science, Space, and Technology**

**Subcommittee on Research and Technology**

**United States House of Representatives**

**A Review of Recommendations for NSF Project Management Reform**

**February 4, 2016**

Mr. Chairman and Members of the Subcommittee, I appreciate this opportunity to discuss the National Science Foundation Office of Inspector General (OIG) views on the National Academy of Public Administration's report on NSF's use of cooperative agreements to support large scale investment in research.

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.

Since 2010, my office has issued 28 reports containing more than 80 recommendations that relate to NSF's use and management of cooperative agreements for the construction and operation of high-dollar, high-risk research facilities. In that time frame I have also testified on this topic three times. The matter of NSF's oversight of such cooperative agreements is therefore an issue that we at NSF OIG take very seriously.

In light of our office's longstanding interest in this area, we were intrigued when the NSF Director and the Chair of the National Science Board's Audit and Oversight Committee proposed the idea of having the National Academy of Public Administration examine NSF's use of cooperative agreements and benchmark the agency's policies and practices against similarly situated federal scientific agencies. I want to commend Drs. Cordova and David for their vision in commissioning this report, as well as the NAPA panel and staff who conducted the review and prepared the final product. The report does an outstanding job of setting forth the historical context in which these issues arose, of articulating the audit history and the differing views on specific issues held by the agency and my office, and of identifying practices at other federal agencies that NSF should emulate. Most importantly, it sets forth practical recommendations

that, if implemented by the agency, will significantly improve NSF's ability to ensure accountability over these high-risk, high-dollar projects.

I have been asked to identify the recommendations NSF OIG supports, as well as those it does not, to note any recommendations our office has made that were not addressed in the report, and to comment on the extent to which implementation of NAPA's recommendations would address issues previously raised in my office's audits and reviews. Let me begin by saying that OIG supports all of the report's recommendations, each of which is the result of thoughtful analysis and reflects NAPA's in-depth understanding of the challenges NSF is facing. Implementation of these recommendations will significantly enhance NSF's ability to award and oversee large facility projects, and will thus go a long way toward addressing many of the issues my office has raised to date.

Based on our office's work in this area, there are six recommendations that I will discuss in more detail. I will address these recommendations in the order in which they appear in the report. I will also discuss three additional matters that were not the subject of a NAPA recommendation but are nonetheless critical to NSF's management and oversight of large facility projects.

#### **OIG Responses to Specific NAPA Recommendations**

**Recommendation 3.1:** NSF should require that exceptions to the recommendations from pre-award cost analyses conducted by Cost Analysis and Audit Resolution, be reviewed by the Large Facilities Office and forwarded to the Chief Financial Officer for a final determination. The results of the CFO's determination should be documented in writing and shared with the Major Research Equipment and Facilities Construction (MREFC) Panel prior to the release of award funds.

In its review, NAPA noted that NSF has a group of in-house accountants and analysts in the Cost Analysis and Audit Resolution (CAAR) branch of the Division of Institution and Award Support who conduct pre-award cost analyses of proposals pending before the agency, including those for large facilities. NAPA also noted that CAAR's reports and analyses, which identify areas of concern prior to award, are advisory only and do not have to be accepted by the grants and agreements officer (GA/O). NAPA made recommendation 3.1 in order to promote transparency and require higher level review of disagreements between CAAR and the GA/O. If followed, NAPA believes that the process it outlined in recommendation 3.1 would provide NSF with an additional tool for ensuring accountability, as well as a clear audit trail.

OIG agrees with NAPA that there is great value in the analyses CAAR performs. Our September 2014 alert memo on NSF's management of costs proposed for the Large Synoptic Survey Telescope (LSST) construction project,<sup>1</sup> discussed a June 2013 pre-award review performed by CAAR at the preliminary design review stage in great detail. Among other things, the CAAR reviewers found that they could not independently verify costs for any of the 136 proposed expenditures sampled, including approximately \$145 million in direct materials, nearly \$20 million for contingencies and more than \$6 million in direct labor costs. CAAR reported that,

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<sup>1</sup> NSF OIG Alert Memo Report No. 14-3-002, *NSF's Management of Costs Proposed for the Large Synoptic Survey Telescope Construction Project*, September 30, 2014.

without further documentation, it was unable to determine if the methodology used to estimate the cost is appropriate, consistently applied, or reasonable.

CAAR also performs post-award assessments. Our December 2015 review of NSF's oversight of the LSST construction project<sup>2</sup> noted that CAAR had identified several areas of concern during its indirect cost rate negotiations for fiscal year 2014 with the Association of Universities for Research in Astronomy, Inc. (AURA), the entity that manages the LSST project. CAAR found that AURA's indirect cost rate structure was extremely complicated, which could make errors more likely and lead to overcharges to the government. Based on its review of general ledger details for costs incurred in 20 expense categories considered most likely to include potentially unallowable costs, CAAR also identified some costs that were questionable, as well as others that were not adequately supported.

Finally, CAAR expressed concern with the fact that the AURA corporate office did not appear to have a leading role in the oversight and approval of corporate expenses, noting that this could potentially constitute an internal control weakness in AURA's expenditure monitoring process. As a result of these and other concerns, the GA/O concluded that an incurred cost audit of the LSST project after the first year of the award was warranted. He indicated that he would evaluate performing an audit on an annual basis based on the results of the first incurred cost audit. Among other things, such audits would identify misallocations of indirect costs or inequitable indirect rates.

We share NAPA's belief that action is necessary to ensure that the important issues CAAR identifies are brought to the attention of the senior officials and panels charged with oversight of large facility construction projects. In the absence of such transparency, we have found instances in which CAAR's important concerns have not been addressed in a timely fashion. Using the CAAR review discussed in our first LSST memo as an example, we found that many of the significant issues CAAR had identified in June of 2013 had not been addressed before the project was funded during the summer of 2014. OIG therefore finds recommendation 3.1's focus on transparency and higher-level review of any disagreements between CAAR and the GA/O to be well-founded. We also believe that the recommendation should be extended to require the same review and analysis for post-award assessments conducted by CAAR.

Finally, we note that in addition to the work done by CAAR, other reviews available to NSF, such as grants officer reviews, business system reviews, panel reviews, and site visit reviews, contain similar pre- and post-award analysis and recommendations. NSF is also currently working to develop a procurement vehicle that will enable it to contract out for incurred cost audits and audits of cost estimates for its large facilities. NSF should ensure that the findings and recommendations from these reviews and audits are subject to the same review and analysis process outlined in recommendation 3.1 and are addressed in a timely manner. In particular, in the future any recommendations from audits of cost estimates should be resolved prior to award.

**Recommendation 4.1:** NSF should retain control of a portion of an award recipient's contingency funds and distribute them with other incremental funds as needed.

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<sup>2</sup> *NSF's Oversight of the Large Synoptic Survey Telescope Construction Project*, Report No. 16-3-001, December 10, 2015.

In its report, NAPA noted that at NSF contingency is managed by MREFC award recipients and access to those funds is governed by a Change Control Board run by the recipient's senior managers. In contrast, at the two comparator agencies NAPA used (the Department of Energy (DoE) Office of Science and the National Aeronautics and Space Administration (NASA)), contingency (or its equivalent<sup>3</sup>) is held completely or primarily by the agency, and the decision to release such funds is made by the agency.

NAPA concluded that by holding a percentage of contingency funds, NSF would have an additional and significant accountability measure in place for managing such funds. It noted that the agency's current practice of releasing control of all contingency funds does not provide recipients with a compelling incentive to preserve contingency funding. By adopting a process similar to NASA's (where a percentage of contingency is held at the directorate, program and project levels), NSF would signal that these funds are intended to be spent judiciously. NAPA noted that NSF has systems in place to hold contingency funds, the capacity to release them in a timely fashion, and past experience holding contingency when warranted.

OIG wholeheartedly concurs with this recommendation. Our previous audit work has found that construction budgets for NSF's large facility projects included millions of dollars for contingencies which lacked adequate supporting documentation. The risk of misuse of these funds is heightened because of the control NSF allows recipients to exert over contingency funds, and the lack of clarity that exists over how amounts for contingencies are actually expended. If NSF maintains control over the majority of these funds and provides them to awardees only after they have demonstrated a *bona fide* need for contingency funds that is supported by verifiable cost data, this risk will be significantly mitigated. We sincerely hope that for construction projects valued in excess of \$100 million, NSF will retain control over the majority of contingency funds at the directorate and program level.

Even if NAPA had recommended that NSF retain control over all contingency funds, given the lack of supporting data for those costs at the proposal stage we would still be concerned about the fact that awardees are not required to track contingency expenditures in their accounting systems. Absent such a requirement, it is almost impossible to audit the use of contingency funds to determine if they were used consistently with the purpose for which they were provided. Although the NAPA report reflects OIG's concerns about this issue, the panel did not make a recommendation on this point, noting that neither NSF, the comparator agencies examined, nor the Office of Management and Budget (OMB) require such tracking. NAPA indicated that while NSF does not track contingency expenditures separately, its policy requires monthly reporting of a summary table of contingency allocations and a clear tie to the work breakdown structure (WBS) and realized risk. NAPA stated that NSF needs to ensure it is monitoring compliance with these requirements closely.

A recent letter of observations<sup>4</sup> on the need for NSF to require the tracking of contingency expenditures on construction projects illustrates why tracking just to the budgetary WBS level is not sufficient and why tracking and comparing budget to actual contingency expenditures is

<sup>3</sup> NAPA noted that at NASA contingency is referred to as unallocated future expenses.

<sup>4</sup> *The Defense Contract Audit Agency's Letter of Observations on the Need for NSF to Require the Tracking of Contingency Expenditure on Construction Projects*, Report No. 15-6-004, September 30, 2015.

critical. In that letter, auditors for the Defense Contract Audit Agency (DCAA) indicated that on examining an awardee's budget system they found that \$19.6 million in actual budgeted contingency use differed significantly from what was requested and from what NSF approved in six of the seven cases they reviewed. As a result, based on the information it possessed NSF could not tell if the awardee was properly accounting for contingency or if contingency funds were used without approval for cost overruns, unapproved increases, or other unauthorized purposes. The DCAA auditors also concluded that the awardee's budgeted use of contingencies varied often and significantly, to such an extent that there was not a direct correlation between contingency requested and approved by NSF and actual budgeted contingency use.

These findings underscore why it is important to track how contingency funds are actually spent, and why NSF, as a steward of federal funds, should require visibility and accountability over those expenditures. Given the tens of millions of dollars in contingencies usually provided for large facility construction projects and the lack of support OIG has identified for such amounts at the proposal stage, it is especially important to have visibility into how those funds are expended to ensure that they are not used without approval for inappropriate purposes. For this reason, OIG agrees with DCAA that NSF should require its awardees to separately track the use of contingency in their accounting systems.

**Recommendation 4.3:** NSF should eliminate the practice of including management fee in cooperative agreements in future projects.

The NAPA report does an excellent job of explaining the historical context and current use of management fees within the federal government as a whole and at NSF in particular. It ultimately recommends that NSF end its use of such fees in cooperative agreements as a means of eliminating the additional management burdens associated with monitoring the award and use of such fees, and because of the potential that inappropriate expenses will be funded by such fees.

NSF has indicated that it is evaluating its current policy and investigating alternatives to management fee, such as those mentioned in the panel's report. If NSF decides to continue the use of management fee in cooperative agreements, it should consider and address the concerns raised in our September 2015 alert memorandum on NSF's management fee policy.<sup>5</sup> In that document, which details the many positive steps NSF took to strengthen its draft fee policy, OIG notes several areas in which further improvement is warranted.

One area of particular concern is the fact that NSF's final policy omits any consideration of other sources of income available to an awardee in determining the amount of the fee award, thereby moving away from the principle that an awardee should only receive a fee based on its demonstrated need to maintain financial viability. In this regard, the final version of the policy differs from the draft version, which had stated that "the proposal must also include a schedule of all federal, non-federal, and other sources of income to justify that alternative sources are not available to address potential needs covered in the proposal."

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<sup>5</sup> *NSF's Management Fee Policy*, September 11, 2015.



Our November 2014 white paper on management fees<sup>6</sup> noted that in fiscal year 2013, each of the seven awardees that received management fee from NSF had at least one other income source, indicating that an analysis of this type of data should provide information useful in determining if the awardee's sources of revenue are sufficiently limited to require the payment of management fee to maintain financial viability.

**Recommendation 6.3:** NSF should identify requirements for project management and financial management expertise related to large facilities projects and explicitly add the requirements to the criteria for selection of external reviewers.

**Recommendation 6.7:** NSF should identify project management skill requirements by role and develop/implement required corollary role-specific project management training/workshops.

**Recommendation 6.8:** NSF should require award recipient project managers be certified in project management. NSF should also specify the minimum project management experience thresholds for project positions in the programmatic terms and conditions of the cooperative agreement.

I have highlighted these recommendations as they reflect NAPA's determination that NSF needs to take swift, decisive action to improve its internal project and financial management capability, as well as the project management capability of its awardees. OIG concurs with the findings and recommendations that flow from this conclusion and recognizes that the actions required to implement these recommendations will require culture change within the agency and at its awardees. Such change is clearly warranted, because as the NEON project has recently illustrated, deficiencies in business processes have the potential to undermine scientific goals if a project must be de-scoped due to cost and/or schedule overruns resulting from inadequate project management.<sup>7</sup>

#### **Additional Matters That Are Critical to NSF's Management and Oversight of Large Facility Projects**

I would like to conclude by focusing on three areas in which NAPA did not make a recommendation. The first concerns earned value management (EVM) systems. According to the NAPA report, an EVM system provides an integrated approach for tracking and measuring project costs and schedule performance, as well as for identifying potential issues and project risks. As such, a robust EVM system provides critical information about a project's status to its stakeholders.

The NAPA report notes that NSF, DoE and NASA require that projects develop and implement EVM systems. It found that both DoE and NASA have well-developed EVM policies and processes in place:

At DOE, projects over \$20 million are required to start implementing EVM in the preliminary design phase. EVM must comply with federal standards and be certified by

<sup>6</sup> *White Paper on Management Fees*, November 24, 2014.

<sup>7</sup> *NSF's Management of Potential \$80 Million Cost Overrun for NEON*, Report No. 15-3-001, September 15, 2015.

the agency. An EVM surveillance review is performed biannually by the agency and annually by the awardee after the projects enters the construction phase. Similarly, NASA requires the use of EVM which must be in compliance with federal standards for projects valued at more than \$20 million and for all single-project programs, (NASA projects most analogous to NSF projects). The agency validates EVM compliance for contracts over \$50 million. Projects (and contractors) are required to submit their EVM data on a monthly basis, and the agency conducts annual surveillance reviews to monitor the use of EVM.<sup>8</sup>

NAPA found that NSF is in the process of developing policies and guidance to standardize the use of EVM across projects.

Our recent reviews of two of NSF's largest, riskiest construction projects noted issues with EVM. In our September 2015 review of NSF's management of the potential \$80 million cost overrun for the NEON project, we found that the EVM reports provided by NEON did not give accurate figures for the cost to complete the project until NEON was prompted by NSF based on declining scheduled variance.<sup>9</sup> As a result, based on NEON's EVM and monthly progress reports, NSF was unable to identify the magnitude of the potential budget overrun or the precise reason for the schedule variance.

In our December 2015 review of NSF's oversight of the LSST construction project, we found that while NSF receives EVM reports for LSST, which it uses to measure project schedule and costs, NSF does not verify the data LSST provides in its reports.<sup>10</sup> Compounding this concern, we learned that NSF did not certify the EVM system for LSST. Certification of an EVM system, including supporting data, is conducted by the Defense Contract Management Agency to ensure that an awardee maintains an acceptable EVM system, which includes data to support scheduling of work and interim progress measures, among other things.

In addition to the thresholds the NAPA report noted for DoE and NASA, our examination of the thresholds other federal agencies use when determining whether an awardee's EVM system should be certified found that the Health and Human Services requires such certification for projects over \$10 million, while the General Services Administration requires certification for projects over \$20 million. The \$473 million LSST award--and the other NSF large facility construction projects--substantially exceed the thresholds other federal agencies use in determining when to require certification of the EVM system.

In light of the importance of accurate EVM data, we recommended that NSF obtain certification of the LSST EVM system and that it validate that data. In its response to our draft report, NSF indicated that it will validate the EVM data for LSST as part of the 2016 annual review process. The agency also indicated that it has begun evaluating the benefits of EVM system certification as a requirement for large scale facilities and mid-scale infrastructure projects and that it is investigating establishing thresholds for EVMS certification on all facilities projects. In light of the critical insights robust EVM data can provide those managing and overseeing projects, NSF

<sup>8</sup> *National Science Foundation: Use of Cooperative Agreements to Support Large Scale Investment in Research*, National Academy of Public Administration (December 2015), pp. 59-60.

<sup>9</sup> *NSF's Management of Potential \$80 Million Cost Overrun for NEON*, Report No. 15-3-001, *op cit*.

<sup>10</sup> *NSF's Oversight of the Large Synoptic Survey Telescope Construction Project*, Report No. 16-3-001, *op. cit*.

should conclude its evaluation as swiftly as possible and take decisive action to ensure the quality of EVM data on all its large construction projects.

The last topics I would like to address are incurred cost submissions and incurred cost audits. The NAPA report notes that OIG has repeatedly recommended that NSF require annual incurred cost submissions and incurred cost audits for cooperative agreements totaling a minimum of \$50 million.<sup>11</sup> In response to these recommendations, the report states that NSF has, among other things, indicated that it will now conduct, at a minimum, a cost incurred audit at project completion for large facility construction projects valued in excess of \$100 million. It will also complete an annual review of awards valued over \$100 million to determine if an incurred cost audit may be necessary during performance based on risk. The NAPA report also noted that NSF is developing a draft award provision specifying the format and detail of incurred cost information to be maintained by award recipients, and is in the process of seeking OMB clearance for these new reporting requirements.<sup>12</sup> Finally, NSF is currently working to develop a contractual vehicle that will enable it to have incurred cost audits performed by independent accounting firms.

Although the NAPA report did not include recommendations focused on these aspects of OIG's work, I note OIG's recommendations here because of their extreme importance in the effort to ensure accountability over large facility projects. Incurred cost submissions, which include certified schedules of direct costs by award (identified by cost element) and applied indirect expenses, provide information that is critical for NSF to properly discharge its administrative and fiduciary responsibilities as a steward of federal funds. They are also essential tools for the conduct of an incurred cost audit. In some cases, the absence of properly prepared incurred cost submissions has added months and even years to the time required for audits being conducted by my office.

The continued relevance of our incurred cost submission recommendations was underscored by two very recent reviews conducted by the Defense Contract Audit Agency.<sup>13</sup> In those cases, DCAA auditors performed adequacy reviews of two large facility awardees' incurred cost submissions to determine if they included all of the information necessary to facilitate timely completion of an audit. In both cases the auditors found the submissions were inadequate, identifying a number of problems requiring corrective action before an audit could be initiated. These reports illustrate the importance of the actions NSF is taking in this area and the need to finalize those actions as quickly as possible.

Finally, incurred cost audits of large facility recipients provide NSF and its stakeholders with the best evidence of how awardees are expending the federal funds entrusted to them. While not required by law or regulation, such 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. While we commend NSF for deciding to require incurred cost audits at project completion, by waiting until the end of a

<sup>11</sup> OIG has made clear that it is willing to consider a higher dollar threshold.

<sup>12</sup> NAPA report, p. 25.

<sup>13</sup> *Inadequate Incurred Cost Submissions for Fiscal Years 2010 and 2011*, National Ecological Observatory Network, Inc., (NEON), Report No. 16-6-003, January 29, 2016; *Inadequate Incurred Cost Submissions for Fiscal Years 2011-2013*, Associated Universities, Inc. (AUI), Report No. 16-6-004, January 29, 2016.

project to obtain real insights on how funds are being expended NSF will miss opportunities to identify and correct problematic expenditures in the early days of the project. Given the level of risk we have identified with NSF's current large facility construction projects, we believe that annual or at least bi-annual audits are clearly warranted for all such projects.

### **Conclusion**

At the very start of its report, the NAPA panel articulates the fundamental challenge that NSF is currently grappling with:

It is clear that, in the past, NSF has prioritized the innovative scientific aspects of large facility construction projects; the agency now needs to apply equal emphasis on increased internal management of the business practices critical to enhanced oversight and project success. In doing so, the Panel believes that NSF and NSB will enhance the agency's ability to fulfill its mission of supporting groundbreaking science.<sup>14</sup>

OIG concurs with this conclusion. Through our extensive body of audit work in this area, we have identified ways for NSF to strengthen the management and oversight of its costliest and riskiest large facility projects. The NAPA report reinforced many of our recommendations and, in some instances, endorsed more stringent measures. NSF's swift and decisive implementation of the report's recommendations will have a significant, positive impact on the Foundation's ability to manage and oversee these high-risk, high-dollar projects.

Our work reflects my office's sustained commitment to helping NSF be an effective steward of taxpayer dollars, and we look forward to our continued partnership with NSF and the Congress to this end.

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<sup>14</sup> *National Science Foundation: Use of Cooperative Agreements to Support Large Scale Investment in Research*, National Academy of Public Administration (December 2015), pp. 6-7.

Allison C. Lerner, Inspector General, National Science Foundation

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Allison C. Lerner assumed the duties as Inspector General of the National Science Foundation (NSF) in April 2009. As head of the Office of Inspector General she recommends policies for promoting economy, efficiency and effectiveness of NSF programs and operations. She leads efforts to prevent and detect fraud, waste, and abuse; improve the integrity of NSF programs and operations; and investigate allegations of misconduct in science. Prior to becoming Inspector General at NSF, Ms. Lerner served in leadership positions at the Department of Commerce, including Counsel to the Inspector General.

In January 2015, Ms. Lerner was appointed to serve as Vice Chairperson for the Council of Inspectors General on Integrity and Efficiency (CIGIE). The Council is an independent Federal entity whose mission is to address integrity, economy, and effectiveness issues that transcend individual Government agencies. To accomplish its mission, CIGIE continually identifies, reviews, and discusses areas of vulnerability in Federal programs and operations with respect to fraud, waste, and abuse.

Ms. Lerner has received several national awards for excellence, and in June 2011 she was selected by the President to be a member of the Government Accountability and Transparency Board. Ms. Lerner received her law degree and her undergraduate degree from the University of Texas.

Chairwoman COMSTOCK. Thank you. I now recognize myself for five minutes for questions. I thank the witnesses.

And I did want to let you know we got word that our colleagues are stuck on a bus trying to get back from the prayer breakfast, so again, our apologies for our other colleagues who aren't here this morning. I guess no good deed goes unpunished, right?

Okay, Ms. Lerner, do you believe that the recommendations made by NAPA on how NSF should handle cost proposal analyses and audits goes far enough to fix cost problems that you have found in your audit work of large-scale projects?

Ms. LERNER. Thank you. We are pleased that NSF is committed to undertaking one of the eight actions noted in GAO's cost estimating guide. We're concerned, however, that for the large, high-dollar, high-risk projects, that some of those options, as a GAO notes in the guide itself—are not rigorous enough to provide the information that's necessary. And we would recommend that, for the high-dollar, high-risk construction projects, that either a pre-award audit be done or an independent cost estimate be obtained and that some of the less rigorous options like a sufficiency review, which was used for the LSST project, not be pursued.

Chairwoman COMSTOCK. Thank you. And, Ms. Heckmann, the IG testified that one issue the NAPA report did not make a recommendation on that she considers critical—she was talking about in her testimony is the use of an earned value management system for tracking and measuring project cost and schedule performance. The NAPA report did note the Department of Energy and NASA have well-developed EVM policies in place. Why did this study panel stop short of making a recommendation on using a certified EVM system for projects?

Ms. HECKMANN. At the time of our review, we understood that the National Science Foundation was in the midst of reviewing its EVM policies and processes and working to standardize the processes and be sure to adopt the standards that are federal standards. So what we did in terms of looking at other agencies' practices was point out the promising practices that we felt were transferable rather than really focusing a great deal of time on the EVM. It was clear to us that they were committed to using EVM.

What we also felt was important was that their staff—again, getting back to the project management perspective—needed to understand what EVM really is and how to read EVM charts, et cetera, and how to really do the oversight that's necessary for an EVM. So the bottom line there is that we saw it as kind of a work in progress, and we were not at a point to really make a recommendation further. We would really need to see what in fact they have done.

Chairwoman COMSTOCK. Okay. Thank you.

And, Doctor, would you like to address that also?

Dr. BUCKIUS. Ms. Heckmann is exactly right. We are in the midst of evaluating all aspects of EVM. I'd go so far to say, though, that it's important, I think, to look at the validation. That certification is one aspect, and we're going to consider that, but the validation is the key because that's where you get the answers. And so, I think the recommendation is well-placed and we're taking it very seriously.

Chairwoman COMSTOCK. All right. Thank you.

Ms. Lerner, did you want to add anything to that or—

Ms. LERNER. [Nonverbal response.]

Chairwoman COMSTOCK. Okay. Thank you.

And I will now yield to my colleague, Mr. Lipinski.

Mr. LIPINSKI. Thank you. As they sometimes say, you need to spend money to make money. You also have to spend some money in order to save money when we're talking about making some of these changes and having the proper oversight when it comes to MREFC.

There are a lot of good recommendations in the NAPA report, and we know some of them will cost more than others to implement. And the Inspector General would like to see the NSF go much further on some fronts than NAPA recommended. So I just want to ask all three of you, given the cost of implementing some of the recommended reforms, how do you think NSF should prioritize the various recommendations and ensure that the enhanced oversight does not impede NSF's scientific mission? We sure would like to see them all done as, you know, quickly as possible, but we know that there's probably going to have to be some prioritization done in terms of which ones are done first. So I'll start with Ms. Heckmann.

Ms. HECKMANN. Thank you. I—we think it's really critical that they develop the project management expertise internally to be able to really perform the stewardship responsibilities that are necessary. So in terms of the role of the LFO and what it is doing to ensure that there's consistency across the organization and the practices, as well as providing the support and the assurance that's necessary for stewardship, we feel that those are very critical.

Obviously, in the area of contingency and management fees, management fee—I agree with Dr. Buckius—will take longer. It's a more complicated issue and there's no great guidance out there that's really—kind of sets the stage for where to go in the future. I mean, that will take some time. And in fact we made a recommendation—we—in the text of our report, we decide that if there's some specific requirements that NSF projects have that do not really fit the current definitions, it may make sense to really identify those and seek special legislative authority there.

Bottom line, in terms of balance, it is a balancing act. Budgets are tight. There's been a lot of initiatives underway. NSF will need to really step back and do detailed workload and workforce analyses to determine what the next steps are. But, you know, dealing with contingency issues, dealing with the—how they manage—the MREFC panel I think is one that's a very easy fix, wouldn't require a lot of time, effort, or cost, and would really help them in terms of ensuring that they have processes in place as well for monitoring and really shoring up their oversight processes.

Mr. LIPINSKI. Okay. Let me go to Ms. Lerner, and then we'll go to Dr. Buckius.

Ms. LERNER. I certainly agree that there are—the human capital investment that needs to be made in ensuring that NSF and its awardees have necessary program management expertise is critical. In terms of financial investments, I do believe that investments in strong pre-award and post-award audits will pay divi-

dends in the information that they provide NSF managers about how the funds plan to be used and are actually being used. When you look at the cost of some of these projects which are, you know, 350 to almost \$500 million, investing a couple hundred thousand dollars in an audit seems a very appropriate thing to do because, especially since it's one of the only ways NSF post-award can actually see how its funds are being used.

Mr. LIPINSKI. Thank you. Dr. Buckius?

Dr. BUCKIUS. Well, thank you for this question. It is a balance. So we've got 13 recommendations here. A number of them can be implemented with relatively low cost. Modifying text and ensuring that our awardees are responding, I think, you know—I would argue that's moderate.

Regarding the expertise, I think we've already made some steps in that direction by our most recent hires under the existing LFO allocation—Large Facility Office, excuse me—we are allocating two more positions to that. It's already been done. They're going to be posted.

Our attitude is, in the case of LFO, they've been understaffed, I would argue, for a number of years, and so it's time for us to actually make that happen. This comes out of our AOAM, administration operations account, and I think you'll read in the '16 and '17 budget it's a strained account already, but this is necessary.

The comments on the MREFC and—are interesting because they also don't require a lot of cost from the point of view of people. They're going to require a lot of cost in terms of time, though, because we now believe—and I think the NAPA report clearly showed—we need to do complete lifecycle analysis. We've been doing gate analysis and we've been focusing on when things move from one gate to another. We need to ensure continuous oversight. So that'll be time, time is money, and so that'll cost us in the long run, but I think it's absolutely necessary.

So as you've noted, it's going to be a balance to ensure that we actually get the right oversight, right care, and obviously to balance our budgets that we have to do. Thank you for the question.

Mr. LIPINSKI. Thank you. I'm out of time so I'll yield back.

Chairwoman COMSTOCK. We are short of members if you'd like a second round.

Mr. LIPINSKI. Well, let me very quickly—Dr. Buckius, I don't know if you'll be able to answer this, you know, five days before the budget request is released, but can we expect to see an increased request for the NSF management account in order to pay for some of this reform?

Dr. BUCKIUS. The request we got in front of you will help us a lot in order to make sure that we're making progress. I'm thinking long-term '18, '19, I think that those are the areas that we're going to have to spend a lot more care regarding these kinds of people issues. 'Seventeen is on the mark.

Mr. LIPINSKI. Thank you. One other thing if I could ask you, Dr. Buckius, I understand NSF is taking under consideration the NAPA recommendation to eliminate management fee and is initiating an evaluation of alternatives. Is there any kind of preview you can give us at this early date? Do you have any time frame in mind, including the analysis?



Dr. BUCKIUS. Sure. Let me—this is the issue that we talked about in my last testimony. So we implemented what I would call an extremely strict policy on management fees. We write—or we ask now for the positive; that is, what are you going to do with it, and we also indicate what you can't do with it. We implemented this in June of '15. We're in the midst of now assessing what the impact has been by that strict policy. Our deadline there is May, and we're going to work towards May in order to make the assessment of how that particular policy that was implemented in June has impacted the folks that actually are using it.

The NAPA report also makes a number of recommendations, as you just heard from Ms. Heckmann. Some of those I think we really need to consider and see how we can actually use other mechanisms in order to be able to get these kinds of resources in the hands of the folks that we—so remember the whole goal here. The whole goal is to provide agencies, organizations the opportunity to compete for these awards. We need competing proposals if we're going to fund these kinds of entities. And so the management fee permits them to do certain things that they need to do.

So we need to assess, as the NAPA report has indicated, how we can figure—how—what other mechanisms we can possibly use other than management fee. So our goal is to try to do that over the—so we've got these two issues. Our goal is to try to do that over the next months. We have to work with our National Science Board, though, to ensure that they're on board.

Mr. LIPINSKI. Very good. Thank you. I yield back again.

Chairwoman COMSTOCK. Okay. And I now recognize Ms. Bonamici.

Ms. BONAMICI. Thank you very much, Madam Chair.

I want to start—even though Chairman Smith isn't here yet, I just wanted to start by thanking him on the record for organizing a trip with Dr. Cordova a little more than a year ago to Antarctica and some of the—with some of the NSF staff and Dr. Cordova. And I come to this discussion with that background because—going on that trip, which was really an enlightening experience and fascinating—understanding not only the importance of NSF investments and facilities but also the challenges. And if you want to go to a place where there are challenges with NSF facilities, it's a place like Antarctica. So that brought to the other committee members who went on that trip, I think, a perspective of appreciation of some of the challenges but also the importance.

So Ms. Heckmann described in her testimony NSF will need to make some hard funding decisions that address the demand for more rigorous accountability systems balanced against the mission to advance science. Obviously, there are many good recommendations in the NAPA report, and some will cost more than others to implement, as we've heard, and the IG would like to see NSF go farther in some areas than NAPA recommends. I don't think anyone would argue that it's important to have appropriate oversight, but obviously, there need to be priorities set.

So I want to ask you, Dr. Buckius—are we saying your name right? Close?

Dr. BUCKIUS. You can call me Richard. It's Buckius.

Ms. BONAMICI. Buckius, thank you. To expand a little bit, we've had some discussion about this already, but given the cost of implementing some of the recommended reforms, how should NSF go through the prioritization process of all the various recommendations while you're also trying to ensure that the enhanced oversight does not impede NSF scientific missions? So could you talk a little bit about that process and how you're making the decisions, the priority decisions?

Dr. BUCKIUS. Yes, so let me try—first of all, your trip to Antarctica probably demonstrated a lot of the facility issues that we deal with—

Ms. BONAMICI. Right.

Dr. BUCKIUS. —on a regular basis. I mean it's—that particular facility has almost everything exaggerated from the point of view of difficulties.

Ms. BONAMICI. Right.

Dr. BUCKIUS. And yet the science that we're doing there and the leadership for this country in Antarctica is tremendous. So our approach has been on a number of these audit recommendations is to look at the risk and try to balance the audits related to risk so that we aren't going in and proposing to audit, say, incurred cost audits on every single proposal. I mean, that just isn't—it won't ever happen. It's impossible. So what we do is we try to assess the level of risk in a project, and then we try to look at those that have the largest dollar value. So we've set limits in the case of incurred costs at 100 million, and then assess the risk of those, and then go and take a look at what we need to do. We propose to do them at the end of the award.

If necessary, though, if we see a risky issue, we can jump in and audit those earlier. So that's the approach we want to take so that we don't burden ourselves overly with an audit process that might not give us the necessary information that we need.

So remember, though, we are—say in the comment that Ms. Lerner made regarding EVM, we annually look at this, okay? We look at them monthly, so it's not like we're not paying attention to it. Her recommendation, which is the one we have to look at, on certification and validation, we probably can do some better in the validation setting. And so that's kind of our goal. Our goal is to try to go in and look at the most risky issues, try to look at the biggest projects, and invest in those areas. So that's our objective.

Ms. BONAMICI. Thank you. And could you also expand a little bit on the timeline and that process of developing the comprehensive organizational chart to incorporate the recommendations? You mentioned LFO and additional investment needed there. But what is the process of going through that timeline? Give us a little more details about that and what if any outside expertise will help you through this process of the timeline and developing the recommendations?

Dr. BUCKIUS. I would argue we meet on this subject every week as a group with the Director, maybe every other week, depending upon travel. So this is an urgent issue. We are going to implement as many of these recommendations as we can as soon as we can.

Now, let's talk a little bit about the FACA committee. We think that's an excellent recommendation. We are trying to figure out

how to do that in a stepwise process. So we're at this point talking about trying to use a subcommittee of one of our current ACs so that we can get that moving ASAP with the idea in the long run of creating a separate committee.

So again, the idea—we want to implement these as fast as we possibly can because we realize this is going to be helpful to all of us. At the same time, in order to set up a FACA committee, it takes a fair amount of work, okay, in order to be able to get that all constructed. And so we want to do that, but we've got to figure out ways to get there first.

The LFO issue—Matt Hawkins is our LFO head, and I'm sure he would tell you the same thing—we were understaffed, I would argue, 3, four years ago in that area, okay? And so, like you've heard, I was here in the last year-and-a-half or so, and we're staffing that up, okay? It has to be a priority, and so we're going to do it. And so, like I said, we've already got two more postings coming on in that. And these are the kind of investments that the agency has to make. And so the cost is one thing. Implementation is as fast as we can.

Now, the management fee is the one that's probably going to be the slowest because we've got to take a look at how we're going to ensure that we have competitors. And we just don't want to have some unintended consequences by implementation of a policy that would actually alienate or give us the inability to have proposers in these areas.

Ms. BONAMICI. Terrific. Well, thank you. And I see that I'm out of time, but I just want to say that we appreciate the progress made to date and appreciate the Director's and your willingness to come back and report to us, so thank you.

I yield back. Thank you, Madam Chair.

Chairwoman COMSTOCK. Thank you. And I'm just going to ask an additional question.

Ms. Lerner, in Dr. Buckius's testimony, he notes that NSF manages 28 major research facilities, and that NEON is only one facility within this portfolio that NSF needs to consider when looking at its policies and procedures related to proper oversight. This implies that many of the oversight management issues identified are isolated to NEON. In your audits and reviews of all the major research facilities in NSF's portfolio, have you found similar issues in the oversight and management of other projects?

Ms. LERNER. As I noted at the start of my remarks, you know, we've done 28 reports with 80 recommendations, and those findings are not limited to NEON. We've also found issues and concerns at the LSST project, at the DKIST project when it was called ATST, and with the OOI project, and most recently, with incurred cost submissions for the AUI project. So the issues and the challenges that we've identified are not limited.

Chairwoman COMSTOCK. Okay. Well, the bus apparently is still en route, so again, my apologies. If my colleagues have any additional question, I'd be happy to yield to them.

But we'll keep the record open for additional questions. I appreciate your testimony here this morning and helping us in moving forward on these issues. And we look forward to continuing to work with you.

And, yes, the record will remain open for two weeks for additional written comments and written questions from our Members who both are here and those who weren't able to join us. So thank you. And the meeting is now adjourned.

Dr. BUCKIUS. Thank you.

[Whereupon, at 10:30 a.m., the Subcommittees were adjourned.]

## Appendix I

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### ANSWERS TO POST-HEARING QUESTIONS

## ANSWERS TO POST-HEARING QUESTIONS

*Responses by Ms. Cynthia Heckmann*



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**Responses to QFRs from Cynthia Heckmann, Project Director,  
National Academy of Public Administration**

**Questions submitted by Chairwoman Barbara Comstock, Subcommittee on Research and  
Technology**

**1. Did you identify any recommendations in your report that required legislative changes or new legislative authority for NSF to implement?**

One recommendation may require new legislative authority for NSF to implement. The Academy Panel recommends that NSF eliminate the practice of including management fee in cooperative agreements in future projects (Panel Recommendation 4.3). The rationale for this recommendation is addressed below in our response to question 3. Further, as noted in the report, most examples of costs covered by management fee that NSF provided could be covered under indirect costs or contingency. If NSF determines that recipients encounter business expenses that do not qualify as indirect costs or contingency, the agency should identify the categories of expenses and seek specific legislative authority for including funds in its awards to cover such costs.

**2. Did the study panel consider whether NSF should be conducting cost-proposal audits on all large-scale projects over \$100 million before releasing the award funds?**

NSF has undertaken an ambitious approach to strengthen its cost review policies for large facility project proposals. Similar to DOE and NASA, NSF requires proposers to use a probabilistic approach to develop project cost estimates. The agency has adopted a tiered review approach to review proposed cost estimates. The cost estimates are reviewed by NSF staff at the end of each phase of the design stage. Additionally, the proposed budget is also subject to an independent review conducted by external contractors. The contractor is required to use one of the eight types of cost estimate reviews identified by GAO's *Cost Estimating Guide*. The cost estimates and NSF's review/analysis are documented in the *Cost Proposal Review Document*.

NSF's recent initiatives and actions appear headed in the right direction to improve oversight and accountability. Because these efforts are still a work-in-progress, and the study team was not at a point to assess whether the new policies/requirements are working and whether they require further adjustments.

**3a. Can you explain why the Panel made the recommendation to eliminate management fees?**

The Panel's rationale for this recommendation is based primarily on extensive research by the study team on management fee, including information gathered from interviews with comparator federal science agencies, federal award recipients, OMB and CRS. These interviews revealed that NSF is the only federal agency that includes "management fee" in cooperative agreements and that federal guidance on the use of management fee in federal awards is lacking. There are no provisions in the Uniform Guidance governing cooperative agreements that reference either the types of fees recognized by the FAR or "management fee." The absence of explicit government-wide guidelines specific to management fee in cooperative agreements is a major reason for continued debate as to its allowability, and a significant basis for recommending that NSF no longer incorporate its use. Furthermore, despite recent changes that NSF has made to its policy to provide greater clarity on appropriate and inappropriate uses of management fee, NSF OIG continues to have concerns. For all of these reasons, the Panel determined that NSF should end its use of management fee to eliminate the additional management burdens and potential for funding inappropriate expenses that accompany this practice.

**3b. What alternatives does the study committee suggest NSF consider for funding legitimate business expenses associated with carrying out a cooperative agreement?**

The Panel believes that the indirect cost category and other non-federal sources of funding, if appropriate, could provide the necessary flexibility for recipients to cover many of the expenditures for which management fee is currently being used. In fact, most examples of costs covered by management fee that NSF and award recipients have provided seemed to be costs that could be covered under indirect costs or contingency. However, should NSF determine that award recipients encounter significant ordinary and necessary business expenses that do not clearly qualify as indirect costs, the Panel recommended that the agency identify these categories of expenses and seek specific legislative authority for including funds for such costs in its federal awards.

**4. Is NASA a good comparative model for NSF? Is NASA's policy effective in providing increased transparency in how taxpayer dollars are being spent?**

The information regarding NASA's policy on management fee was intended to illustrate that other federal science agencies appear to be opting out of the practice of including it in federal awards. Representatives of both NASA Headquarters and the IG's office explained that NASA's policy change on management fee was due in part to the additional scrutiny that the practice invites.

It is worth noting that NASA more commonly uses federal procurement contracts rather than cooperative agreements for large facility construction projects. The

Federal Acquisition Regulation (FAR) expressly authorizes the payment of fees—as an allowance for profit—to contractors working under cost-reimbursement contracts. Once the fee (profit) is earned on a federal procurement contract, these funds are no longer subject to tracking by the federal government. An assessment of whether NASA's current practice has increased transparency to taxpayers was outside the scope of the Academy's study.

5. **The NAPA report does not make any specific recommendations on annual incurred cost submissions and audits, although this has been a recommendation the Inspector General has repeatedly made. Why did the study committee not make a recommendation on this issue? Did you look at what other science agencies do in terms of annual incurred cost reviews?**

The Panel was charged with assessing whether cooperative agreements were the appropriate funding mechanism for large facility construction projects and identifying additional strategies for bolstering core business practices and processes that support large scale research facilities. The purpose of the Panel's review of NSF OIG's concerns regarding cooperative agreements was to address these broader issues and NSF's actions taken to address OIG concerns and recommendations.

As discussed in our report, NSF recently revised its policy guidance on the use of incurred cost audits for large facility projects. For example, NSF requires a final incurred cost review upon project completion for facility projects over \$100 million. In addition, the agency will conduct an annual risk review to determine whether additional incurred cost audits are needed during a project's lifecycle. At the time of our study, NSF conducted a benchmarking study to identify cost reporting practices of other agencies and was in the process of developing new cost reporting requirements.

Upon review of these actions, the Panel felt that NSF was committed to strengthening cost surveillance over large facility projects while also recognizing that NSF actions were still a work-in-progress and time would be needed to implement the changes and assess the effectiveness of the revised policies in practice. Accordingly, the Panel was not in a position to make further recommendations on incurred cost submission and audits.

The Panel reviewed DOE and NASA's requirements on cost reviews and identified a number of promising practices in the report that may be transferable to NSF. Both DOE and NASA require regular cost reviews to monitor project performance. For example, DOE conducts departmental-level independent cost estimates and reviews for projects over \$100 million at various points in a project's lifecycle. Within the Office of Science, project cost estimates/performance is regularly evaluated as part of independent project reviews. At NASA, cost and schedule estimates and performance are assessed as part of project lifecycle reviews and three management council reviews in each project lifecycle phase.



**Question submitted by Ranking Member Daniel Lipinski, Subcommittee on Research and Technology and Ranking Member Don Meyer, Subcommittee on Oversight**

**1. Please elaborate on the process and rationale for the NAPA recommendation on management fees, including consideration of impact on eligible and/or willing competitors.**

The Panel relied on its combined expertise in financial management, acquisition management, risk management, project management, accountability mechanisms and scientific inquiry to assess the extensive research of the study team on all facets of management fee in cooperative agreements. This included data from study team interviews with comparator federal science agencies (NASA, DOE, and DoD), federal award recipients, OMB and CRS. These interviews revealed that NSF is the only federal agency that includes “management fee” in cooperative agreements and that federal guidance on the use of management fee in federal awards is lacking. There are no provisions in the Uniform Guidance governing cooperative agreements that reference either the types of fees recognized by the FAR or “management fee.” Underscoring the absence of robust guidance, the Office of Executive Councils, Chief Financial Officers Council issued a “Controller Alert” in February 2015 urging federal awarding agencies to carefully consider whether there is an appropriate justification for allowing management fee or profit in the terms and conditions of a federal award. The absence of explicit government-wide guidelines specific to management fee in cooperative agreements is a major reason for continued debate as to its allowability, and a significant basis for recommending that NSF no longer incorporate its use. Furthermore, despite recent changes that NSF has made to its policy to provide greater clarity on appropriate and inappropriate uses of management fee, the NSF OIG continues to have concerns.

The Panel did consider the impact removing management fee would have on eligible/willing competitors for federal awards. However, the examples of costs covered by management fee that NSF and award recipients provided the Panel seemed to be costs that could be covered under indirect costs or contingency. Therefore, the Panel concluded that the indirect cost category and other non-federal sources of funding, if appropriate, could provide the necessary flexibility for recipients to cover many of the expenditures for which management fee is currently being used. Should NSF determine that award recipients encounter significant ordinary and necessary business expenses that do not clearly qualify as indirect costs, the Panel recommended that the agency identify these categories of expenses and seek specific legislative authority for including funds for such costs in its federal awards.

*Responses by Dr. Richard Buckius*

**Questions for the Record**  
**House Committee on Science, Space and Technology**  
**Subcommittees on Research and Technology and Oversight and Investigations Hearing**  
**“A Review of Recommendations for NSF Project Management Reform”**  
**February 4, 2016**

**From Rep. Barbara Comstock:**

1. Exceptions to CAAR findings signed off by the CFO: Do you commit to the Foundation implementing this recommendation as soon as possible? If yes, when? If not, why?

*NSF Response: Yes; existing cost analysis operating guidance has been modified to incorporate this requirement. It was finalized and in effect as of March 1, 2016.*

2. Elimination of Management Fee:

- a. This seems like a straightforward recommendation, why do you believe it will take more time to analyze?

*NSF Response: Over the last year, NSF has implemented a more stringent management fee policy based on lessons learned. Since the new policy was only implemented in 2015, time is required to evaluate its effect on awardees. Although additional analysis is required, NSF plans to complete a preliminary analysis over the next 60 days for consultation with the National Science Board (NSB) at its May 2016 Meeting. NSF intends to implement any resulting determination by September 15, 2016.*

- b. What would be an appropriate use of taxpayer dollars that could not be covered under allowable costs for direct and indirect funds?

*NSF Response: NSF closely paralleled its current management fee policy on policy from the Department of Defense, including identification of three accepted areas for fee use. These areas include working capital, facilities capital and other ordinary and necessary expenses for business operations that are not otherwise reimbursable under the governing cost principles. Such expenses may be necessary to provide a reasonable allowance for management initiative and investments that directly or indirectly benefit the NSF-funded activity. Examples of potential appropriate needs include but are not limited to expenses related to contract terminations and losses, and certain appropriate educational and public outreach activities.*

- c. Should NSF take into account organizations' outside income for covering general business operating expenses when determining a management fee, or alternative?

*NSF Response: Pursuant to the NAPA report recommendation, NSF is reviewing our management fee policy and possible alternatives. Currently the policy does not include review of outside income. In this review, we will examine whether outside income should be a consideration in determining management fee.*

## 3. Holding a portion of the contingency funds:

- a. Do you commit to NSF adopting this recommendation?

*NSF Response: Yes; NSF is now in the process of developing internal guidance on the obligation and allocation of budget contingency which will result in NSF holding a portion of the contingency.*

- b. Do you commit to adopting new contingency controls for current NSF construction projects?

*NSF Response: Yes; NSF will apply the guidance on contingency to projects currently in construction.*

## 4. Incurred cost audits: Once funds are misspent, do taxpayers have any hope of recovering that money?

*NSF Response: Yes. Typical actions to recover unallowable costs include direct cost recovery. NSF has committed to an incurred cost audit at the end of major large facility construction and operations projects AND a potential incurred cost audit during construction based on the results of an annual, portfolio-wide risk assessment.*

**From Rep. Daniel Lipinski:**

## 1. EVM Certification:

- a. Please explain the difference between certification and validation for EVM systems.

*NSF Response: **Certification** indicates that the EVM System tools and documented processes are in compliance with the American National Standards Institute (ANSI; 478) criteria as determined by certified reviewers. Certification takes place only once before construction begins, so it does not provide on-going confidence in how the systems are actually used in practice, once the project is in construction.*

***Validation** also looks at compliance with ANSI standards, but is more concerned with EVM implementation to support proper management and a successful project outcome. Validation looks at the **quality** of the execution of EVM during construction, which is what NSF believes is more important for supporting proper oversight. NSF also believes this approach to be more cost-effective.*

- b. Why do other agencies have, and why is NSF proposing, a risk-based approach to EVM certification?

*NSF Response: NSF is considering a tiered approach for EVM certification and/or validation of EVM Systems based on total project cost similar to other*

agencies. We're currently in the process of conducting a benchmarking study against other agencies, both with regard to current policy and "lessons learned." Our current view is that validation of the EVM System during the annual review process offers more value than certification.

- c. What gives NSF confidence, for example, in AURA's EVM system for the Large Synoptic Survey Telescope (LSST), which the IG has recommended that NSF certify? According to AURA, NASA has validated their EVM system. Does this factor into your own decision-making?

*NSF Response:* We have confidence in AURA as an experienced, high performing organization and that includes their use of EVM. NSF also contracted for an independent validation of the LSST EVM System in conjunction with its annual review in February 2016. The results were highly favorable.

Yes; if an awardee has an already validated EVM system, then NSF would take that into account.

2. New incurred cost reporting tool: Please expand on this new reporting tool under development and how NSF believes it is responsive to the IG's concern about transparency and accountability in expenditures under large cooperative agreements.

*NSF Response:* The new incurred cost reporting tool was developed to provide additional transparency and accountability in expenditures under Large Facility Cooperative Agreements. In developing the tool, NSF engaged contractor support to conduct a study to provide the following: (1) an evaluation of the regulatory environment and guidance in the area of incurred cost audits; (2) benchmarking of other agencies' financial data collection practices; and (3) an analysis of NSF's financial data. Based upon the results of this study, an incurred cost reporting tool has been developed that will require awardees to use the tool to maintain incurred cost information under the project. This requirement will be implemented as a provision in the awardee's cooperative agreement. NSF has shared the draft tool with the OIG and NSF is considering feedback received from OIG staff as the tool is finalized.

**From Rep. Paul Tonko:**

1. Can you discuss in more detail what it means to re-compete the management of a facility like CHESS that is embedded in a university and occupies university-owned buildings? And do you think there are any alternate processes that may be better suited than re-competition?

*NSF Response:* At its November 2015 meeting, the National Science Board (NSB) issued a statement about re-competition (NSB-CPP-2015-38). In it the NSB references the January 2012 report of the Subcommittee on Re-competition of Major Research Facilities from the NSF's Business and Operations Advisory Committee (BOAC). That

*report recognizes the complications that may result from the integration of a user facility into the research and education fabric of a university. These complications are just one of the many factors that must be considered at the appropriate decision points in the life cycle of the facility as an NSF-supported activity.*

*At each of these decision points, usually related to the award anniversary date, the renewal or re-competition decision will be made only after an assessment of whether continued operation of the facility itself continues to be a top priority both for the nation's research community and for NSF. Only then will consideration be given to the mechanism of that continued operation. Should continuing operation be judged a top priority through the Foundation's merit review process, there are established mechanisms other than re-competition that may be used to effect any necessary management improvements or changes of direction.*

2. Cost Submissions for Large Facility Cooperative Agreements (page 105, footnote 150):  
Would this replace current reporting requirements? Or will it be a new requirement in addition to what currently must be reported? And when do you expect this process to be complete?

*NSF Response: The incurred cost reporting tool for Large Facility Cooperative Agreements will be a new additional requirement that will provide NSF with information tracking actual cost expenditures. The reporting tool will serve as a complement to existing oversight procedures. NSF is in the final stages of developing the tool and plans to pilot it prior to the end of FY 2016.*

*Responses by Ms. Allison Lerner*

**HOUSE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY  
SUBCOMMITTEE ON RESEARCH AND TECHNOLOGY  
SUBCOMMITTEE ON OVERSIGHT**

“A Review of Recommendations for NSF Project Management Reform”

Ms. Allison Lerner, Inspector General, National Science Foundation

Questions submitted by Rep. Barbara Comstock, Chairwoman, Subcommittee on Research and Technology

1. In Dr. Buckius’s testimony he notes that NSF manages 28 major research facilities, and that NEON is only “one facility within this portfolio that NSF needs to consider when looking at its policies and procedures related to proper oversight.” This implies that many of the oversight management issues identified are isolated to NEON
  - In your audits and reviews of all of the major research facilities in NSF’s portfolio, have you found similar issues in the oversight and management of other projects, and if so, can you provide a couple of examples?

The oversight and management weaknesses our office has identified through an extensive body of audit work over nearly five years are not isolated to NEON, as described in the examples below. In addition to the work on NEON, our work on three of NSF’s other high-risk, high-dollar cooperative agreements for large construction projects has identified similar oversight and management problems, which could lead to cost overruns, schedule delays, and diminished scientific capability.

We found that NSF approved proposed budgets for four major projects (OOI, NEON, DKIST, LSST), totaling more than \$1.4 billion (including NEON), although significant questions existed as to the adequacy of the proposed budgets. As a result, while NSF knows what it will spend on these projects, it is not clear whether it knows what they should cost. It is essential for cost information for proposed budgets to be accurate, current, and adequately supported because the budget is basis for charging costs to NSF.

As an example of the problems we identified at the proposal stage, NSF’s own internal review for the proposed costs for the \$467.7 million Large Synoptic Survey Telescope (LSST), could not find support for *any* of the 136 transactions it sampled, which included labor charges, fringe benefits, and contingencies. Although strong oversight measures such as an obtaining an independent cost estimate were warranted after this critical report, NSF had a contractor conduct a sufficiency review, which did not look at information in sufficient detail to determine if the problems identified in NSF’s internal review had been remedied. The cost proposal for LSST has never been audited to ensure that costs to the government are reasonable and allowable.

We also found that there is a heightened risk because the project is being constructed in Chile and NSF’s review of sampled expenditures found that supporting documentation was provided solely in Spanish, which make oversight of expenses more difficult. Finally, while NSF receives

Earned Value Management reports for LSST used to measure schedule and costs, it does not verify the data LSST provides for these reports to help ensure that it is accurate.

In another example, beginning in 2010, auditors identified serious flaws in the proposed budget for the Daniel K. Inouye Solar Telescope (DKIST).<sup>[1]</sup> Two attempts to audit the original \$298 million proposed budget found the cost proposal was inadequate for audit. The first inadequacy memo, in March 2010, cited four major deficiencies unsupported estimates and outdated vendor quotes; lack of support for labor costs; lack of support for indirect costs; and unallowable contingencies and concluded that the budget proposal was unacceptable for audit. The second inadequacy memo, in October 2010, found that none of the four deficiencies had been corrected and again concluded that the proposal was unacceptable for audit.

In August 2013, the National Science Board approved a re-baselined \$344 million award to construct the DKIST project. Auditors began attempting to audit the re-baselined cost proposal April 2014 and in September 2014, auditors disclaimed an opinion on the re-baselined proposal stating that the data provided was so significantly flawed that the proposal could not be audited. Therefore, as with the LSST project, the cost proposal for DKIST has not been audited to ensure that costs to government are reasonable and allowable.

Finally, in another example, starting in 2010 attempts to audit the \$386.4 million proposed budget for the Ocean Observatories Initiative found \$88 million of questioned contingency costs that could not be supported adequately after 17 months of audit work.

We have also identified post-award issues with projects other than NEON. For example, following NSF's internal review of LSST project costs, in December 2015 my office issued an alert memo on NSF's oversight and management of the LSST project, which found additional problems including the complexity of the project's indirect cost rate, which could make errors more likely and lead to overcharges to the government, and insufficient detail in monthly project reports, which makes it more difficult for NSF to know with certainty how project funds were spent. More detail about this report and the agency's response can be found at: <http://www.nsf.gov/oig/pdf/16-3-001-lsst.pdf>. We are also examining the DKIST project and expect to issue a report with our concerns about that project in the near term.

We have been urging NSF for the past four years to strengthen oversight and accountability over its high-dollar, high-risk cooperative agreements for its large facility construction projects. NSF applies its highest level of attention and scrutiny to determine the scientific merit of the projects it decides to fund. It is imperative that NSF apply the same rigorous attention and scrutiny to its financial management of these projects, prior to requesting NSB approval for award.

The stakes are too high for the Foundation to continue its current practice of requesting National Science Board approval and making awards before it ensures that project costs are reasonable, are supported by adequate documentation, and will use taxpayer dollars efficiently.

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<sup>[1]</sup> DKIST was formerly called the Advanced Technology Solar Telescope.

**HOUSE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY  
SUBCOMMITTEE ON RESEARCH AND TECHNOLOGY  
SUBCOMMITTEE ON OVERSIGHT**

“A Review of Recommendations for NSF Project Management Reform”

Ms. Allison Lerner, Inspector General, National Science Foundation

Questions submitted by Rep. Barry Loudermilk, Chairman, Subcommittee on Oversight

1. The NAPA report recommends that as an alternative to management fees, expenditures that are traditionally covered by management fees could be covered instead under indirect costs.
  - If expenditures covered by management fees are shifted to indirect costs, do you believe NSF has the necessary internal controls in place to ensure that the agency could provide sufficient oversight of these costs?

Management fees have long been provided to Federally Funded Research and Development Centers (and at NSF, the fee has been used in other very limited situations when working with specialized nonprofit research organizations on large scale projects) based on a recognition that these entities -- typically non-profit entities almost wholly dependent on government funding -- might need to incur costs that could not be reimbursed by the government. The fee was designed as a mechanism or tool to ensure that such an entity's “ordinary and necessary” but otherwise nonreimbursable business expenses would be covered to maintain its financial viability.

The NAPA report recommended that NSF discontinue the practice of including management fee in federal awards and stated that the indirect cost category could provide the necessary flexibility for recipients to cover many of the expenditures for which management fee used for currently.

It is not clear to us which expenses NSF currently covers with management fee that NAPA believes could appropriately be paid out of an indirect cost pool. By their very nature, costs eligible to be covered by management fee are unallowable. As unallowable costs are excluded from indirect cost pools, it would seem that NAPA's proposal to move costs would not work. If in fact some of the expenses NSF awardees had been covering with management fees are allowable, therefore capable of being included in the indirect cost pool, we would be concerned about NSF's ability to provide adequate oversight with respect to charging indirect costs.

NSF's internal review of proposed costs for large facility projects including LSST and DKIST, which are being constructed under a cooperative agreement with the Association of Universities for Research in Astronomy, Inc. (AURA) raised concerns about indirect cost rates. The review found that AURA's indirect cost rate structure was very complicated, which could make errors more likely and lead to overcharges to the government. The review also found that the complex rate structure caused AURA to submit proposed budgets that used different combinations of rates and bases. As a result, it is difficult for both NSF and AURA to consistently apply and interpret the different rates and bases. As noted by NSF's Cost Analysis and Audit Resolution Branch



with respect to AURA's indirect cost rate structure, there is "no single organizational contact at either AURA or NSF that has complete organizational knowledge of the entire rate structure or its history.

Finally, a 2013 NSF Business System Review noted concerns with the rate structure and stated that it was often difficult for a single NSF reviewer to adequately understand and verify the rates and bases for them.

**HOUSE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY  
SUBCOMMITTEE ON RESEARCH AND TECHNOLOGY  
SUBCOMMITTEE ON OVERSIGHT**

"A Review of Recommendations for NSF Project Management Reform"

Ms. Allison Lerner, Inspector General, National Science Foundation

Questions submitted by Rep. Lamar Smith, Chairman, House Committee on Science, Space, and Technology

1. The thorough, timely and persistent work of the NSF Office of the Inspector General was crucial to the House Committee on Science, Space and Technology investigations into the development and problems of the National Ecological Observatory Network (NEON).

The Committee was also fortunate to be able to rely on official whistleblower disclosures by Mr. J. Kirk McGill, Senior Federal Auditor, of the Rocky Mountain Branch Office, Defense Contract Audit Agency (DCAA), who was the auditor-in-charge for the most recent DCAA audit of NEON and NEON, Inc. commissioned by your office.

As we know now, DCAA determined to omit critical information about NEON and NEON, Inc. from the final audit submitted to your office. Mr. McGill elected to report the omitted information directly to your office and our Committee, including evidence of gross mismanagement, waste of millions of dollars, non-compliance with the terms of the NSF grant agreements, and multiple insufficiencies, mistakes, and violations by NEON, Inc.

From the information supplied by the whistleblower, we learned NEON, Inc. spent tens of millions of taxpayer dollars allocated by NSF to construction contingency without any financial controls or records. We also know NEON, Inc. improperly spent millions of taxpayer dollars on parties, foreign travel, and illegal lobbying. After more than one year of denying there were serious problems, NEON, Inc. finally apprised NSF, your office and the Committee that the project had fallen 18 months behind schedule and was on a glide path to exceed its \$433 million construction budget by \$80 million.

NSF was forced to take emergency actions to save the project: firing and replacing NEON, Inc. and deleting some of the project's important scientific features in order to

avert the \$80 million overrun. NSF also expedited new regulations that explicitly prohibited certain improper expenditures, reformed some of its internal rules, and initiated a thorough review of its project management procedures by the National Academy of Public Administrators. In addition, the Committee and the full House of Representatives approved legislation to address some of the problems brought to light by oversight of the NEON project, and more legislation is being contemplated.

The Committee regards the whistleblower assistance with its NEON investigations as an essential catalyst without which the NEON and NEON, Inc. problems might have festered for months longer, putting the project and millions more taxpayer dollars at risk. Do you agree with this assessment in terms of the Office of the Inspector General's efforts?

Our examination of NEON began with an attempt in 2011 to audit the project's proposed \$433.7 million budget. Auditors concluded that the proposed budget could not be audited because none of the proposed cost elements for labor, overhead, equipment, and other items reconciled to supporting data. Further, the proposal included more than \$74 million in unallowable contingency costs. In 2012, NEON submitted a revised budget proposal. An adverse opinion was issued on the revised budget, which contained total of \$154.4 million (nearly 36 percent of the proposed \$433.7 million budget) in questioned and unsupported costs.

As result, my office had been aware of serious problems with NEON before the whistleblower's actions and had recommended that NSF require NEON to submit a revised budget with adequate supporting documentation of all proposed costs; have that proposal audited; and remove unallowable contingencies from the proposed budget.

Despite the serious deficiencies in the proposed budget, NSF proceeded with the \$433.7 million construction award to NEON. Therefore, we commissioned DCAA to audit NEON's accounting system. The purpose of the audit was to determine if the accounting system complied with the grant terms.

As OIG monitors communicated with DCAA during this audit as part of our oversight responsibility, in April 2014, a whistleblower informed our office that the DCAA Deputy Director had informed DCAA's Denver Branch Office, which was conducting the audit, that the regional office had concluded that the audit work by the Denver Branch was not sufficient to support the eight conditions cited in the draft report. Therefore, DCAA did not provide the draft report with eight conditions to my office. DCAA's final report, provided to OIG on October 3, 2014, included only one finding, which related to NEON's timekeeping practices.

The whistleblower's information and assistance were important factors in our request for DCAA to give us a separate document to explain two of the most significant issues raised in the draft—contingency expenditures and management fees. In November 2014, DCAA issued a report to NSF with observations about management fees and contingency which warranted the agency's attention and action.

Do you agree that but for the whistleblower's actions the redacted version of the DCAA audit submitted to your office would have hampered your efforts and delayed corrective actions?

NEON project risks originated with the construction budget, which included \$154 million (nearly 36 percent of the total proposed budget) in questioned and unsupported costs, as identified by OIG audits. Our September 2015 alert memo identified other problems including the lack of sufficient, reliable information need for NSF to adequately manage NEON. In addition, NEON is not yet able to provide NSF the accurate information it needs to monitor the project's progress and NSF does not yet have accurate information about how much it will cost to complete the project.

Since 2011, we have been urging NSF to strengthen its management and oversight of NEON. The whistleblower's actions were important in focusing attention on NEON, as the information he provided about the eight original findings in the Denver Branch Office's report brought the disagreement on these issues within DCAA to our attention, thereby enabling us to push DCAA to provide a letter of observations that brought significant concerns to NSF's attention. Our knowledge of the original findings strengthened our ability to obtain that letter and to ensure that NSF was provided with critical information about problems associated with this project.



## Appendix II

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ADDITIONAL MATERIAL FOR THE RECORD

STATEMENT SUBMITTED BY SUBCOMMITTEE ON OVERSIGHT  
 CHAIRMAN BARRY LOUDERMILK  
 U.S. House of Representatives  
 Committee on Science, Space, and Technology  
 Subcommittee on Oversight  
 Subcommittee on Research & Technology

*A Review of Recommendations for NSF Project Management Reform*

Thursday, February 4, 2016  
 9:30 a.m. – 11:30 a.m.  
 2318 Rayburn House Office Building

Statement by Chairman Barry Loudermilk

Good morning. First I want to thank our witnesses for being here today. I am looking forward to hearing from each of you on this very important matter.

We are here today to discuss the National Science Foundation's (NSF) oversight of major research facilities developed under cooperative agreements and recommendations made by the National Academy of Public Administration (NAPA).

The NSF funds a variety of large research projects, including multi-user research facilities, tools for research and education, and instrumentation networks. Last February, this Committee held a hearing regarding one of these large research projects, the NEON Project, after learning about the mismanagement of appropriated funds. Specifically, the hearing discussed the findings of two financial audits of NEON conducted by the National Science Foundation's (NSF) Office of Inspector General (OIG) and the Defense Contract Audit Agency (DCAA). One of those audits discovered that NEON was allowed to use federal money for explicitly unallowable costs, including liquor, lobbying, and a lavish holiday party.

Both audits of the NEON Project were initiated by the NSF Office of the Inspector General due to concerns about the lack of NSF's review of costs and accounting financial controls of major research facilities prior to entering into cooperative agreements. Today we will hear from the Inspector General who once again raised concerns about NSF's management of cooperative agreements and proper stewardship of federal funds. This in turn resulted in NAPA conducting a commissioned review of NSF's cooperative agreements to support the development, construction and operations of large-scale research facilities.

These NSF funded cooperative agreements include the construction of the Large Synoptic Survey Telescope, the Daniel K. Inouye Solar Telescope, and the National Ecological Observatory Network. These 5-10 year construction projects range from \$344 million to \$473 million in total project cost. Proper stewardship of taxpayer dollars is paramount when executing projects of this magnitude.

As a small business owner and former director of a non-profit, I wholeheartedly understand the importance of accountability. The fact that NSF is mishandling American taxpayer dollars, with little consequence is absolutely inexcusable. What is even more inexcusable is that NSF has received warnings about this kind of irresponsible spending over the past four years, and it has not taken adequate measures to resolve the matter.

I am not only interested in learning about how the federal government can -- and needs to -- do a better job with transparency and accountability, but also how we can ensure that this kind of negligence is not occurring with other cooperative agreements. I look forward to today's hearing, and hope that today will help inform us on how to provide better oversight and management of federally-funded research projects to ensure that taxpayers can trust us with their money and know that it will be spent in the manner intended.

STATEMENT SUBMITTED BY SUBCOMMITTEE ON OVERSIGHT  
RANKING MINORITY MEMBER DON BEYER

OPENING STATEMENT

Ranking Member Don Beyer, Oversight Subcommittee

House Committee on Science, Space, and Technology  
Subcommittee on Research & Technology  
Subcommittee on Oversight

*"A Review of Recommendations for NSF Project Management Reform"*

February 4, 2016

Chairwoman Comstock and Chairman Loudermilk, thank you for holding this hearing today and the opportunity to discuss this important issue.

I am a strong advocate of the National Science Foundation (NSF) and their efforts to identify and discover new scientific innovations. The NSF is in my district, and I have seen their scientists and engineers help make our nation more competitive globally, and their scientific breakthroughs and engineering advances help to create more jobs domestically. The NSF's scientific pursuits broaden our understanding of the natural world and they help to uncover our impact on the environment. They also expand our abilities to confront difficult medical, public health, technological, and national security challenges.

These efforts are not free. We invest more than \$7 billion per year in the National Science Foundation, with a significant portion of that investment going towards the construction of large research facilities that are managed by cooperative agreements with non-profit organizations and institutions. I believe these investments return significant value to the American taxpayer, helping us to sustain and enhance our competitive edge and maintain a strong national defense.

But the pursuit of these cutting-edge scientific endeavors needs to be managed effectively and efficiently. Large programs deserve substantial oversight and financial management to help keep key projects on track and moving forward as planned.

Managing costs and schedules on large projects can be a difficult and challenging task. But there is much room for improvement in NSF's planning and oversight of its large scale construction projects. Last year, our Committee held hearings on the NSF's management of its National Ecological Observatories Network (NEON), an ongoing project that went off-track and was headed toward an \$80 million cost overrun. To its credit, in December, NSF terminated the cooperative agreement with the organization managing this project, NEON, Inc., because of serious concerns with the capacity of that organization to reset NEON on a better path.

Late last year the NSF Office of Inspector General (OIG) also issued an "Alert Memorandum" on NSF's oversight of the Large Synoptic Survey Telescope (LSST), being constructed in Chile under a \$473 cooperative agreement with the Association of Universities for Research and Astronomy, Inc. (AURA). The IG memo raised concerns about oversight of the project's indirect costs, and recommended enhanced oversight in a number of areas, including an annual audit of incurred costs and better supporting documentation to justify some project expenditures.

Some of these issues were initially identified by NSF's Cost Analysis and Audit Resolution Branch (CAAR) which led to the IG review and the issuance of the IG's Alert Memorandum. I commend NSF's management for uncovering these issues of concern and the IG's office for recommending steps to improve oversight of this project moving forward.

In December, the National Academy of Public Administration (NAPA) issued a report on NSF's "Use of Cooperative Agreements to Support Large Scale Investment in Research." This was a balanced, thorough review that offers some sensible management solutions to help improve the NSF's oversight of its important large scale investments in scientific research projects. I look forward to hearing more about NAPA's recommendations for NSF from our NAPA witness today and I also look forward to hearing from the NSF IG, as well as from the NSF Chief Operating Officer.

I believe that NSF is a critical national asset, and that the cutting-edge, multi-user research facilities NSF supports are central to the agency's mission. I am hopeful that the recommendations provided by the IG's office and NAPA will help NSF improve its management and oversight of its large scale investments in scientific research facilities for the benefit of science and the taxpayer.

I look forward to today's discussion, and I yield back.



STATEMENT SUBMITTED BY COMMITTEE  
CHAIRMAN LAMAR SMITH

**Statement from Science Committee Chairman Lamar Smith  
Research & Technology and Oversight Subcommittee Hearing  
“A Review of Recommendations for NSF  
Project Management Reform”  
Thursday, February 4 - 9:30 a.m.**

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This morning's hearing focuses on an issue that has been of great concern to the Science Committee for the last two years – the National Science Foundation's (NSF's) management of major research facility projects.

The Committee seeks to ensure that taxpayer dollars are not wasted on mismanagement and questionable costs. Today's hearing will help achieve this goal and address what steps the NSF should take to reform its oversight and management of large-scale projects.

Last year, with the support of a whistleblower and the work of the Inspector General (IG), the Committee initiated a broad review of how NSF manages these projects.

In response, NSF Director France Córdova agreed to commission a study by the National Academy of Public Administration (NAPA) to take a closer look at how NSF could better manage large-scale projects.

Today we will hear from the NAPA study committee's project director about the results of the 8-month study and the 13 recommendations NAPA made to improve NSF's management and oversight of cooperative agreements.

We also are fortunate to have the Chief Operating Officer of NSF, Dr. Richard Buckius, and Inspector General Allison Lerner with us.

We will hear how the NSF intends to respond to the recommendations and how implementing the suggested reforms would or would not address issues the IG's office has uncovered in recent audits of cooperative agreements.

We must work together to ensure that no current or future large-scale project faces the same financial mismanagement that has plagued the National Ecological Observatory Network (NEON).

This Committee held several hearings on the mismanagement of NEON. This includes last September when we learned that the project was on track to be \$80 million over budget and 18 months behind schedule.

It was a problem that we saw coming, and the NSF should have too.

In the first NEON hearing the Committee held in December 2014, we learned that the Inspector General's independent audit of NEON's cost proposal identified more than \$150 million in unsupported or questionable costs. Yet NSF went ahead, made the award, and did not resolve these issues.

A second audit of NEON's accounting system revealed a number of inappropriate expenditures, which include lobbying, parties, and travel. All of these activities were financed by the management fee NSF agreed to

pay NEON for ordinary and essential business expenses. And all these dollars came from taxpayers.

For its part, the NSF finally seems to be taking steps to more closely manage and take control over the costs of NEON.

It is time for NSF to make systematic changes across the Foundation for all of its major projects, guided by the thoughtful recommendations and expertise of NAPA. If necessary, the Committee will follow-up with legislative action so that the mismanagement of taxpayer funds will not continue.

The NSF, as well as its grantees and contractors, need to be held accountable for how they spend taxpayers' hard-earned dollars. The basic responsibility of any government agency is to act in the national interest.

I hope we can work together to ensure that the misuse of federal funds does not happen again.

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STATEMENT SUBMITTED BY COMMITTEE RANKING MEMBER

EDDIE BERNICE JOHNSON

**OPENING STATEMENT**

Ranking Member Eddie Bernice Johnson

House Committee on Science, Space, and Technology

Subcommittee on Research & Technology

Subcommittee on Oversight

*"A Review of Recommendations for NSF Project Management Reform"*

February 4, 2016

Good morning. Thank you Chairwoman Comstock and Chairman Loudermilk for holding this hearing, and thank you to the panel for being here. This hearing is a good example of legitimate oversight that is in the best interest of both science and the taxpayer.

I believe we can all agree that planning, building, and managing large, complex, one-of-a-kind research facilities is a challenging task for even the most experienced organizations and project managers. However, such facilities are central to the National Science Foundation's mission, "to promote the progress of science; to advance the national health, prosperity, and welfare; and to secure the national defense."

NSF is a precious resource for this nation. The merit-review process they use to select projects is emulated the world over. Therefore, we can have the highest level of confidence that the projects they fund, from telescopes and ecological observing networks, down to a \$50,000 grant to support a graduate student's thesis, are all worthy of federal funding.

The purpose of today's hearing is to discuss the best policies and practices to ensure success in NSF's largest, most complex construction projects. NSF management and the NSF Inspector General have had many disagreements about what these best policies and practices may be. Such disagreements have played out before this Committee several times in the last few years. Overall, it is a healthy process to publicly air reasonable disagreements between reasonable people who all have good intentions. I applaud the IG for raising some important issues, and NSF for implementing several important reforms in response to the IG's concerns.

However, I grew concerned that the back-and-forth was becoming less productive. Therefore, I was very supportive last year when Dr. Córdova collaborated with the National Science Board to commission an independent 3<sup>rd</sup> party review by the National Academy of Public Administration, or NAPA. The NAPA report represents a very thoughtful and thorough review of NSF's use of cooperative agreements for large-scale investments. This morning we have an opportunity to hear from both NAPA and the NSF IG about their specific recommendations to enhance the agency's oversight. We will also hear from NSF about their plans to continue to implement reforms to make the agency even more effective and efficient in carrying out its critical mission of scientific discovery and technological innovation.

Thank you, and I yield back.