August 5, 2004

Dr. John Brighton
Assistant Director
Engineering Directorate
National Science Foundation
Room 505N
4201 Wilson Blvd.
Arlington, VA 22230

Dear John:

It is my pleasure to report to you that the National Science Foundation (NSF) Advisory Committee on Engineering (AdCom) officially accepted the Committee of Visitors report for the Division of Civil and Mechanical Systems at the AdCom semi-annual meeting held May 19-20, 2004 at the NSF. During the discussion of the report, it was noted that approximately 50% of the projects within this Division were so-called "fenced projects." Funds for these research projects pre-committed and hence are not available to support our very best researchers and educators responding to open solicitations from the Foundation. This percentage is particularly challenging, as I believe the NSF-wide average for such fenced projects is 30%.

The report also found that the Division had a proposal success rate of 10% in 2004, compared with 15% in 2003, and a Directorate-wide average of 17%. As you appreciated at the meeting, such low odds of success (one in ten) are potentially demoralizing for faculty and administrators and may have an unintended backlash on the support and vibrancy of this field, and on our nation's economic well-being and safety.

We concur with a number of recommendations from the report, including:

1. The need to hire more staff to handle the 50% increase in proposals submitted to the Division over the time period from 2000 to 2003;

2. National Earthquake Engineering Systems (NEES) is not currently funded at a level that will sustain operations once the system is up and running. We enthusiastically recommend the Engineering Directorate request funds from the NSF central administration to ensure the long term success of NEES;

3. The need for increased funding for the CMS Division to support this important scientific and engineering community.

As always, we appreciate your hard work and focused efforts on behalf of Engineering and we are here to help you in any way that our advice and judgment can support your vision and direction for the Engineering Directorate at NSF.

Sincerely yours,

Kristina M. Johnson
Professor and Dean
Chair, NSF Engineering Advisory Committee

KMJ/ths

cc: T.D. O'Rourke
J.E. Bernard
J. Culbertson
L. Katehi

MEMORANDUM

TO:	John A. Brighton, Assistant Director, ENG
FROM:	A. Galip Ulsoy, Director, CMS
DATE:	October 5, 2004
SUBJECT:	Response to the Report of the Committee of Visitors for the CMS Division

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On behalf of the Division of Civil and Mechanical Systems (CMS), I thank the Committee of Visitors (CoV) for their thoughtful and thorough report covering FY2001-2003, and for the opportunities for improvement it provides the Division, the Directorate for Engineering (ENG) and the National Science Foundation (NSF). We are delighted that the CoV states: "Overall, the CoV finds that the CMS Division is doing a very good job in managing its programs. The Division has been successful in helping the Foundation to achieve desirable outcomes in its investments in people, ideas, and tools."

We are also pleased that in many of the suggested areas for improvement in the previous CMS CoV review in 2001 (covering FY1998-2000) substantial progress has been made. These improvements included better use of the broader impacts criterion, better mix of reviewers, reduced dwell times, larger award size and duration, more emphasis on high-risk and high-return projects, continued emphasis on diverse workforce, emphasis on environmental area, joint activities with the SBE Directorate, emphasis on co-funding and joint solicitations, internal strategic planning , priority on NEES, vision for earthquake engineering research, etc.

The CoV encouraged the proper balance between "fenced" and "unfenced" activities, to ensure a continued source of new innovative ideas from the research community. The CoV also noted the challenges posed by the increase in proposals, leading to increased workloads and reduced success rates. Certainly we need more resources, but we are also exploring other ways to address these issues.

The CoV highlighted the importance of the Network for Earthquake Engineering (NEES) cyberinfrastructure to CMS, ENG and NSF. We recognize the importance of NEES, and the leadership role for CMS, and have made this our main divisional priority. NEES is nearing successful completion, and we continue our efforts to ensure that the investment in NEES will be fully utilized to achieve important breakthroughs in earthquake engineering and in the emergence of cyberinfrastructures to support engineering research and education.

The CoV recognized the significant role that CMS has played in the NSF response to the terrorist attacks of September 11, 2001 and encouraged CMS to continue its role in supporting the nation's security needs. Our strength in multi-hazard mitigation makes this a natural direction

for CMS, and we will certainly follow this advice to capitalize on that strength.

The detailed response to the CoV report below is organized in terms of the major topics highlighted in the Executive Summary of the CoV report. It includes a brief synopsis of those topics, and a brief response from the CMS division.

Topic In Executive Summary	CMS Response
The CoV finds the Division to be effective in assuring the integrity and achieving efficiency in its program processes and management. Proposals selected for funding are of high quality. In spite of continuing increases in the number of proposals handled, average dwell time has decreased to less than six months. It is an average 5.4 months, which is an excellent record.	Systems such as FastLane and e Jacket have helped achieve these results despite rapidly increasing proposal loads. CMS staff are extremely conscientious, yet we need to find ways to increase staff or limit the number of proposals. We have already gone to one deadline per year, and are considering other measures (e.g., limit number of proposals per Principal Investigator) to limit proposals.
The documentation in the jackets is very good. CMS uses the panel review process, supplemented with mail reviews. This process has been implemented effectively and fairly, and a good distribution of reviewers has been achieved in terms of geographic location, gender, and minority representation. Likewise, the CMS portfolio of funded projects has an appropriate distribution in terms of geography, gender, and minority representation.	With implementation of e Jacket, we have further enhanced the consistency and content of documentation in the jackets. We will continue our efforts, as well as to participate in ENG and NSF efforts, to improve reviewer databases and to encourage diversity.
The use of the broader impacts criterion improved over the three-year period of CoV evaluation. The reviewers now appear to be cognizant of the importance of broader impacts and use the criterion in their assessments. The interpretation of the meaning of broad impact varies significantly among the panels. It is therefore desirable to seek a more consistent understanding and application of the criterion in future panel reviews.	We use a one-page description of the merit criteria, and Program Directors go over that with the panels. They often use a plane with the two criteria as the two axes to summarize the ranking of proposals in the panel. We also routinely return proposals that do not address both criteria in the summary and the proposal itself.
In general, it was difficult to assess the expertise and qualifications of reviewers on the basis of the information provided in the jackets. The CoV recommends that reviewers be asked to provide short biographical sketches, and that this information be included in the jackets.	We are participating in efforts in ENG and NSF to improve the reviewer database. Currently, the SBIR and CTS divisions in ENG have implemented pilots. This issue would be addressed as part of those efforts.
The CoV judges that CMS has been successful in meeting the outcome goals in people, ideas, and tools. Specific examples illustrating the Division's success in each of these areas are given in the report.	These successes often become most evident decades after the funding of the research, and we will continue our efforts to document the long-term impact of the CMS research funding.
The Program Directors are commended for supporting first time researchers. Approximately 30% of CMS funding has been directed to first time researchers, thus providing the entrance and experience base for those seeking careers with a strong component of research. Especially noteworthy is CMS support of CAREER awards, which constitute about 50%	We will continue our priority on developing the next generation of researchers nationally in the areas relevant to CMS.

of the funding for first time researches, or 15% of the research portfolio.	
The COV notes that about half of CMS funding is pre-committed to research initiatives and other mandated projects, or "fenced". Combined with budget reductions, the net result is that the success rate for proposals within the CMS core competencies may fall to less than 10% for FY 2004. We advise carefully monitoring the ratio of fenced funds to total funds to ensure enough funds remain available for flexible use. We recommend that a proper balance be maintained between fenced initiatives and the funding of core competencies.	We agree that it is important to maintain balance in this regard. The unsolicited proposals are a constant source of new ideas and innovation. Adequate funding for such proposals allows us to adapt to changing priorities and to rapidly pursue new opportunities.
To meet the challenge of increasing numbers of proposals, the COV recommends that additional staff be assigned to CMS at both the PD and support staff levels. Additional funds are also sorely needed to support the many worthy projects that are proposed, but unable to be funded. The COV recognizes significant increases in funding may not be available in the near term. Therefore, it may be necessary to deal with increasing proposal loads under the assumption of relatively flat funding. Options include, but are not limited to, restricting the number of proposals from a single PI and readjusting the levels of support provided for various activities.	We do need additional staff, and will also look for other ways to restrict the number of proposals in order to maintain high quality.
NEES should be a top priority at the division, directorate, and upper management levels of NSF. This project provides the opportunity to explore the use of the cyberinfrastructure in its application to geographically distributed experimental facilities for cost-effective investments in large scale experimentation through shared-use facilities and experiments and more efficient utilization of major research equipment. NEES also provides unique opportunities with respect to database management and retrieval, advanced computational modeling, and linkage with the research, academic, industrial, and K-12 communities. It involves not only significant technical challenges, but entails social and cultural challenges as members of the civil engineering and computer science communities work together at an unprecedented level of collaboration. The potential payoff is very high. Much can be learned and applied from NEES that is relevant to future projects at NSF. It is in the interest of all to ensure the success of NEES.	NEES is a top priority for CMS, as well as ENG and NSF, and is an exciting new venture, which will require all our support over the coming years. We plan to develop partnerships, with other directorates and agencies, and with international partners, to fully utilize the investment that has been made in NEES.
Large-scale research programs such as NEES place a heavy burden on NSF professional and support staff. It is vital that PDs have adequate resources to perform their work effectively. In particular, they should receive the necessary travel assistance to visit equipment and research sites on a regular basis, and to	We agree. The lack of Program Director time and travel funds continue to be a concern.

maintain close contact with key individuals within the research and user communities.	
It appears that resources are not sufficient within CMS and the Engineering Directorate to realize the full potential of NEES. Furthermore, funds will be reallocated from other programs at the division and directorate levels just to support NEES with a resource base significantly below its capabilities. The COV does not believe that NEES should drain resources from other programs in CMS and the Engineering Directorate. Because of the importance of this project for NSF, the COV strongly recommends exploring with NSF upper management ways to obtain additional funds for NEES as a supplement to the Engineering Directorate budget.	We agree, and will work hard to leverage these available resources via partnerships (e.g., international partners such as Japan and Europe, interagency partnerships, as well as partnerships within NSF).
There is an excellent opportunity for CMS to take a continuing lead role in developing and directing NSF research in the area of homeland security. The Division has distinguished itself to date by undertaking a major research effort on the effects of September 11, 2001, which culminated in a special publication and press conference dealing with the research results. The COV recommends that CMS pursue research on homeland security issues and continue to pursue leadership position in this area.	We agree, and will continue to build upon our past activities in this area.
It would be advantageous to have a mechanism for division-level strategic advice. The COV is not well suited to this mission. Its charge is to assess program-level technical and managerial matters pertaining to program decisions. Moreover, the advice provided by the Engineering Advisory Committee to the Engineering Directorate is generally at a strategic level that addresses cross-cutting divisional issues and areas of broader NSF policy. The COV therefore recommends that consideration be given to establishing a division-level advisory committee composed of external experts from universities, industry, and government. It is likely that this recommendation applies to other divisions as well.	We would welcome strategic advice from the CoV members. We note that rotators, which constitute approximately half of CMS program directors, do also provide an ongoing mechanism for input and fresh ideas from the research community.

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August 17, 2004

Dr. Kristina M. Johnson (Chair)
Dean, School of Engineering
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Durham, NC 27708-0271

Dear Dr. Johnson:

Thank you for transmitting the CMS COV Report. I share your concerns about success rates and the need to protect funding for core activities. We are addressing these important issues in our current review of ENG investments and priorities.

I have attached a response to the recommendations in the CMS COV report that was prepared by Galip Ulsoy, the DD for the CMS Division. I concur with this document and adopt it as the official response of the Directorate for Engineering.

I wish to express my appreciation to the individuals who participated in the COV review. This process is critical to the management of the Directorate and will help to guide our future decision-making.

Sincerely,

John A. Brighton

John A. Brighton
Assistant Director for Engineering