

NEHRP¹ Agency Responses to May 2009 ACEHR² Report

ACEHR³ Recommendation 1: Change the agency responsible for leading post-earthquake investigations to NIST.

NEHRP⁴ Response:

The NEHRP agencies appreciate the thoughtful input made by the ACEHR regarding post-earthquake investigations. We agree that responsibility for post-earthquake investigations poses a challenge to NEHRP.

The US Geological Survey (USGS) leadership role in NEHRP post-earthquake investigations was established in statute by the 2000 reauthorization of NEHRP. Without a change in public law, USGS cannot unilaterally delegate or otherwise transfer this responsibility to another agency. The new NEHRP reauthorization that is being considered in Congress (HR 3820) would change the lead agency role for post-earthquake investigations from USGS to the National Institute of Standards and Technology (NIST), consistent with the ACEHR recommendation.

In considering the ACEHR- recommended change to transfer the lead for post-earthquake investigations to NIST, the NEHRP Interagency Coordinating Committee (ICC) believes that it is important to develop an understanding of the broader context of the issues related to the leadership and conduct of post-earthquake studies.

Current NEHRP funding for post-earthquake investigations is the aggregate of multiple agency-specific projects and contributions. Through its leadership role, the USGS redirects resources and personnel to its role in these investigations from its other statutory hazard responsibilities as available. However, other agencies also support these investigations. The National Science Foundation (NSF) supports the *Geo-Engineering Extreme Events Reconnaissance* (GEER), *Learning from Earthquakes* (LFE), and *Natural Hazards Center* post-earthquake reconnaissance efforts, as well as *ad hoc* reconnaissance efforts through Rapid Response Research (RAPID) awards. Both FEMA and NIST have also supported post-earthquake reconnaissance activities in the past. Regional clearinghouses are supported by all the NEHRP agencies for a wide variety of data.

NIST is not currently staffed for this leadership role. If the statutory change is made, then NIST would need to reallocate resources to implement its new role. This new role would complement other responsibilities assigned to NIST in other sections of HR 3820 and in

¹ National Earthquake Hazards Reduction Program (NEHRP).

² Advisory Committee on Earthquake Hazards Reduction (ACEHR).

³ The “ACEHR Recommendations” in this memorandum are those found in the May 4, 2009 ACEHR letter report to the NIST Director, *Reauthorization of the National Earthquake Hazards Reduction Program*. For brevity, only the specific recommendations are reiterated herein. Additional ACEHR discussion on each recommendation may be found in the ACEHR letter, which is posted at http://www.nehrp.gov/pdf/may_2009_letter2.pdf.

⁴ The “NEHRP Responses” in this memorandum are the coordinated responses of the NEHRP agencies to the ACEHR report.

separate legislation (National Construction Safety Team Act, the National Windstorm Impact Reduction Program, and the Federal Fire Prevention and Control Act). It is NIST's intention to support this change through an FY 2011 initiative on Disaster-Resilient Buildings and Infrastructure, which includes support for Disaster and Failure Event Studies within a multi-hazard context, including, but not limited to, earthquakes.

USGS is currently staffed to be better able to perform this task than is NIST. In addition to its existing authority under NEHRP authorization legislation, USGS has a number of earthquake responsibilities assigned under statute, including post-earthquake responsibilities that require immediate attention to field investigations,. The proposed shift in NEHRP lead coordination would not affect these existing USGS responsibilities in geologic emergencies.

Given this context, the ICC sees the following issues as critical to address prior to a change in the lead coordination agency for post-earthquake investigations:

- The roles and responsibilities of the lead agency.
- The interactions of lead agency efforts with those of the other Program agencies, especially in areas such as LFE and GEER that are already established.
- Determination of NEHRP actions for earthquakes inside the U.S. and outside the U.S. While seismological issues essentially have no bounds, issues related to construction practices and societal responses differ from nation to nation.
- The expected short- and long-term objectives and outcomes of post-earthquake investigations.
- Specific areas of study and research to be conducted in post-earthquake investigations, recommendations on how these activities should be carried out and supported, and estimates of levels and duration of support.
- The level of planning and types of planning exercises needed to ensure smooth, effective, and well-coordinated post-earthquake investigations.
- The conduct of the post-earthquake investigations relative to the proposed Post-Earthquake Information Management System (PIMS), and the role of the lead agency in the development of that system.
- The multi-hazard context of NEHRP post-earthquake investigations, including how to draw upon the experience and expertise gained from other natural disasters and how to set the stage for the eventual broadening of PIMS to address other hazards.

The ICC will task the PCWG to develop recommended approaches to these issues consistent with budgetary guidance and then seek ACEHR ideas and expectations about those recommendations.

ACEHR Recommendation 2: Enhance collaboration and advancements in lifeline engineering.

NEHRP Response:

The NEHRP agencies very much appreciate ACEHR concerns regarding the earthquake safety of the nation's lifeline systems. The ACEHR discussion of this topic falls into two general areas. First is the need for increased lifelines research and development activity, as well as oversight of those activities. Second is the need for national regulatory oversight of the nation's lifeline resilience.

The NEHRP agencies concur with the first ACEHR recommendation. The NEHRP Strategic Plan establishes, as a strategic priority, the need to Develop Earthquake-Resilient Lifeline Components and Systems, and the agencies fully intend to support this priority, as resources permit.

NSF has referenced the Strategic Plan in its current NEES research solicitations and welcomes basic research proposals in this area. The NEES facility at Cornell University was developed specifically to support lifelines/pipeline research and has been used to support basic research projects, with projects supported by the National Science Foundation and the San Francisco Public Utilities Commission. Equipment and instrumentation at several other NEES facilities, such as at Lehigh University; the University of Nevada, Reno; University of California, Davis; and University of California, Los Angeles have been/are being used to conduct research and projects on the seismic performance of bridge systems and components, supported by the National Science Foundation, the Federal Highway Administration (FHWA), the California Department of Transportation, State of Connecticut, and State of Pennsylvania.

Some lifelines activities have already been undertaken in cooperation with state and local interests. For example, working with TennDoT, the USGS has installed strong motion instruments in a Mississippi river bridge approach, and worked with the California Department of Transportation to provide early notification of earthquake shaking intensity at bridges and overpasses.

NEHRP will also work to engage the FHWA through invited participation in relevant meetings of the NEHRP Program Coordination Working Group (PCWG). Through this engagement, NEHRP will investigate means to tap the FHWA natural hazards professional community to "identify performance goals, best practices, and standards, define appropriate peer review procedures, and develop specific mitigation practices," as ACEHR recommends.

While the NEHRP agencies appreciate the second element of the ACEHR recommendation, the need for regulatory oversight of the resilience of nation's lifeline systems, exceeds the statutory responsibilities assigned to the NEHRP agencies by the authorizing legislation. Given the diversity of lifeline systems and the diffusion of responsibilities and interests in maintaining and strengthening these systems, this is a formidable task. Nevertheless, the issue needs to be addressed. NEHRP will pursue the issue through discussions with FHWA and FEMA and develop options, for ICC consideration, for bringing the issue to national attention.

ACEHR Recommendation 3: Promote synergistic activities.

NEHRP Response:

The NEHRP agencies fully concur with the ACEHR that synergies can and should be sought. For example, the ACEHR notes that other, non-NEHRP, Federal agencies sponsor earthquake-related research. The ACEHR suggests that the Interagency Committee on Seismic Safety in Construction (ICSSC), which has focused on seismic design and construction issues in the Federal government, be broadened to include research coordination, or that another interagency working group be formed to coordinate earthquake-related research activities.

At its inception in 2006, the NEHRP ICC recognized that non-NEHRP agencies perform research that contributes to national earthquake resilience. The ICC also recognizes that each Federal agency has core responsibilities and its own priorities, policies, and procedures as they relate to those responsibilities, making interagency coordination challenging. The ICC deemed that the four NEHRP agencies should strive to improve their interactions and coordination initially, before NEHRP attempts to broaden its interactions with other agencies.

The NEHRP agencies agree in principle with the ACEHR recommendation. As a first step in assessing what is achievable in this area, the NEHRP agencies will work through the National Science and Technology Council's Subcommittee on Disaster Reduction (SDR) to approach the nearly two dozen non-NEHRP Federal departments and agencies that are represented there regarding cooperative activities. SDR's reaction to this approach should be a clear indication of what may be achievable in establishing broader, voluntary agency interaction with NEHRP by non-NEHRP agencies. NEHRP has arranged with SDR to brief the SDR participants at the planned November 2009 SDR meeting.

ACEHR Recommendation 4: Charge the Office of Science and Technology Policy, Executive Office of the President, with soliciting support from other agencies for the George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES).

NEHRP Response:

The NEHRP agencies recognize the great potential of the NEES facilities for research in earthquake engineering and related topics. NEES facilities have been or are being utilized for research and projects supported by NSF, FHWA, USGS, FEMA, California Department of Transportation, San Francisco Public Utilities Commission, State of Connecticut, State of Pennsylvania, and private foundations. NEES facilities that are currently operating at or near capacity include: Oregon State University; University at Buffalo; University of California, Berkeley; University of California, Davis; University of California, Los Angeles; University of Illinois at Urbana-Champaign; University of Minnesota; University of Nevada, Reno; and University of Texas, Austin.

The NEHRP Director will discuss this topic during the November briefing to the SDR to ensure that the agency representatives at the SDR are aware of research opportunities at the NEES facilities. In addition, NIST is committed to performing any experimental research that it undertakes at the NEES facilities.

Finally, the FY 2011 Administration budget requests \$22.5 million for NEES, up \$500,000 from the FY 2010 enacted budget.

ACEHR Recommendation 5: Charge NEHRP agencies to support interdisciplinary research activities.

NEHRP Response:

The NEHRP agencies agree with the ACEHR observations about the positive value of interdisciplinary and multidisciplinary research.

This ACEHR recommendation has two primary components. The first is a global suggestion for more conscious inclusion of multidisciplinary and interdisciplinary research activities in NEHRP. The second more specifically focuses on the suitability of the three Earthquake Engineering Research Centers (EERCs) that were supported by NSF through the end of FY 2007.

NSF currently leads NEHRP-related activities in this area. NSF offers a number of programs for submitting proposals to support interdisciplinary and multidisciplinary research related to natural hazards, as well as programs that support the individual investigator, curiosity-driven basic research. It is the hazards community's responsibility to respond to these initiatives in order to be supported, since NSF relies on the merit review process to determine research support. The earthquake community is welcome and strongly encouraged to apply to all relevant NSF programs. Some of the recent, relevant NSF funding opportunities for interdisciplinary and multidisciplinary research include:

- The NSF Engineering Directorate funding opportunity on *Interdisciplinary Research* (IDR) at <http://nsf.gov/eng/general/IDR/index.jsp>. The Division of Civil, Mechanical and Manufacturing Innovation (CMMI), which funds earthquake engineering research, participates in this program.
- NSF Program Solicitation 09-545, Engineering Research Centers (ERC), has a set-aside competition for *Complex, Coupled Physical Civil Infrastructure Systems under Stress*, posted at <http://www.nsf.gov/pubs/2009/nsf09545/nsf09545.pdf>. In addition to the set-aside, investigators may propose an ERC addressing their own topic of choice, including hazard-related topics.
- Science and Technology Centers (STC)⁵.
- Cyber-Enabled Discovery and Innovation (CDI).
- Integrative Graduate Education and Research Traineeships (IGERT).
- Research Experiences for Undergraduates (REU) sites.
- Dynamics of Coupled Natural and Human Systems (CNH).
- Human and Social Dynamics (funded for five years; no longer a priority area).
- Partnerships for International Research and Education (PIRE).

⁵ The Southern California Earthquake Center (SCEC) was originally funded through this mechanism.

- Within the Division of Civil, Mechanical and Manufacturing Innovation, an unsolicited proposal program on Infrastructure Management and Extreme Events.

Researchers at the EERCs are involved in past, ongoing, and planned NIST research projects through the auspices of its indefinite delivery, indefinite quantity (task order) contract with the NEHRP Consultants Joint Venture. NIST plans for future involvement of its Office of Applied Economics in its research projects.

ACEHR Recommendation 6: Continue the development and sponsorship of multi-hazard demonstration projects.

NEHRP Response:

The NEHRP agencies agree with and support the ACEHR observation that the multi-hazard demonstration projects have been successful and should be continued. In particular, USGS agrees with the sentiment of the recommendation, which aligns with recommendations made by the USGS Scientific Earthquake Studies Advisory Committee (SESAC) in its NEHRP-authorized capacity as a source of external advice and guidance to the USGS Earthquake Hazards Program.

USGS launched a Multi-Hazards Demonstration Project in Southern California in 2007 with a goal of improving the delivery of hazard information to emergency managers and other key stakeholders. USGS carried out this project working closely with FEMA and with the university community supported by NSF, especially the joint NSF-USGS funded Southern California Earthquake Center (SCEC). A flagship product of this demonstration project was the scenario of impacts from a major earthquake on the Southern San Andreas Fault, which was used in the largest public preparedness exercise in US history: *The Great Southern California ShakeOut*.

New pilot multi-hazard demonstration projects were begun in the Pacific Northwest and Central U.S. in 2008 – those efforts are expected to continue. Where appropriations support such demonstration projects, USGS will continue to build on these efforts and look for ways to leverage against the activities of the other NEHRP agencies as well as state and local government, academia, and the private sector.