National Earthquake Hazards Reduction Program (NEHRP)
Advisory Committee on Earthquake Hazards Reduction (ACEHR)

National Institute of Standards and Technology
Gaithersburg, Maryland
March 12-13, 2018

Meeting Summary

Meeting Attendance

Advisory Committee Members:

Laurie Johnson, Chair	Laurie Johnson Consulting
Jane Bullock	Bullock & Haddow LLC
Craig Davis	Los Angeles Department of Water & Power
Greg Deierlein	Stanford University
John Gillengerten**	Consulting Structural Engineer
James Goltz	CA Emergency Management Agency
Nathan Gould	ABS Consulting
Robert Herrmann	Saint Louis University
Ryan Kersting	Buehler & Buehler Structural Engineers, Inc.
Lisa Grant Ludwig *	University of California, Irvine
Ronald Lynn	Nevada State Contractors Board
Peter May**	University of Washington
Lori Peek	University of Colorado-Boulder
Glenn Rix	Geosyntec Consultants, Inc.
David Simpson	IRIS Consortium
Ralph Archuleta**	University of California, Santa Barbara; Ex-officio member of ACEHR as Chair of the U.S. Geological Survey (USGS) Scientific Earthquake Studies Advisory Committee (SESAC)

NEHRP ICC Member-Agency Representatives and NIST Support:

Kent Rochford	NIST, Associate Director for Laboratory Programs
Howard Harary	NIST, Engineering Laboratory (EL) Director and ACEHR Designated Federal Officer
Jason Averill	NIST/EL, Chief, Materials & Structural Systems Division (MSSD)
Steven McCabe	NIST/EL/MSSD, NEHRP Director
Michael Mahoney	DHS/FEMA, Senior Geophysicist
Luciana Astiz	NSF Program Director, Division of Earth Sciences
Joy Pauschke	NSF Program Director, Division of Civil, Mechanical & Manufacturing Innovation
Michael Blanpied*	USGS, Associate Coordinator, Earthquake Hazards Program
William Leith	USGS, Senior Science Advisor for Earthquake and Geologic Hazards
Therese McAllister	NIST/EL/MSSD, Community Resilience Program Group Leader

Tina Faecke	NIST/EL/MSSD, NEHRP Program and Management Analyst
Carmen Martinez	NIST/EL, Information Technology Support
Steve Potts	NIST/EL/MSSD, Program and Management Analyst

*Participated remotely
**Not in attendance

Summary of Discussions

I. Opening Remarks

Harary opened the meeting at 8:42 am. He welcomed the meeting participants and thanked them for traveling. He noted Ralph Archuleta's term is ending, and that NIST appreciated his participation. He also noted this might be Chair Laurie Johnson's last face-to-face meeting depending on when the next ACEHR meeting is scheduled. NIST sincerely thanked her for her service and excellent leadership. In 2018, three other members will complete their second three-year term.

Harary introduced Kent Rochford, NIST Associate Director for Laboratory Programs. Rochford stated that NIST Director Walter Copan sends regrets that he couldn't attend. Both Copan and Rochford appreciate the commitment and recommendations of the ACEHR. Rochford echoed Harary's thanks to Chair Johnson for her six years of dedication and outstanding leadership. She and the ACEHR indicated a need to revitalize the Interagency Coordinating Committee (ICC) to advance the program, and Rochford concurred. Topics recommended for the next ICC meeting include progress on implementing the Executive Order (EO) 13717 on establishing a federal earthquake risk management standard and work assigned to NIST by Congress on immediate occupancy.

Steve McCabe discussed the agenda and logistics for the meeting, then turned the meeting over to ACEHR Chair Johnson. Johnson stated the goals of the meeting were straightforward and announced that a facilitated discussion will be part of the format. She thanked Harary, McCabe and everyone at NIST for their continued support.

II. Agency Overviews and Updates

A. USGS – Bill Leith provided updates on the USGS Earthquake Program:

https://www.nehrp.gov/pdf/USGS%20Presentation%20to%20post%20for%20ACEHR%20Mar12.pdf

ACEHR discussed USGS activities related to earthquake early warning (EEW). USGS is working with the Alliance for Telecommunications Industry Solutions (ATIS), a consortium that coordinates all cell networks. They have known the early warning system is coming and recognize the magnitude of the investment.

Comments/Questions:

A Committee member asked why seismicity is reduced in the central US. Leith responded that seismicity increased in the central US around 2009-2016 due to disposal of wastewater from hydraulic fracturing processes during oil and gas exploration. When the price of oil dropped, production and injection also dropped, resulting in a decrease of induced seismicity near injection wells. A comment was made that we need to make sure everyone understands that natural seismicity risks still exist in the central US. FEMA plans to run a regional earthquake exercise.

Regarding the Earthquake Early Warning (EEW) pilot roll-out, Leith commented that AT&T has committed to delivering a system to distribute warnings; a Committee member asked what happens to

people who are not AT&T customers. Leith responded that USGS is working with a consortium that coordinates all cell networks, ATIS – they have known the early warning network is imminent and recognize the magnitude of the investment. USGS thinks that when AT&T says they can do it, others will too.

In reference to the USGS priority for the Alaska seismic hazard model update, a Committee member asked if seismicity would be influenced if regions in Alaska are open for oil exploration. Leith stated that in his opinion fracking and other methods of extracting extra oil are secondary recovery. He noted that Alaska relies on primary recovery, so they may not need much secondary recovery for oil production, but this needs to be looked into.

The ACEHR discussed the March 2018 USGS National Seismic Hazard Map (NSHM) Project Workshop. Modeling of basin effects show increased risk for taller structures. Basins underlie three of the largest cities on the west coast. There was some expectation of pushback by the design community, however, and USGS responded with certainty that any decisions will be scientifically defensible. A Committee member asked if the new landslide (ground failure) estimator only included those triggered by earthquakes, and Leith confirmed that it did.

There was a question about how the $8.1 million for the Puerto Rico Seismic Network Restoration will fit in with long term USGS budget projections. Leith responded that this is supplemental funding. In 2009-2011, USGS also had economic stimulus funding to build up networks. There are no operating funds for the long term. It was just approved mid-February and was not part of appropriated funds. Leith emphasized the Committee keep in mind that the funds are to replace lost assets, not to build new ones. Another member asked if there is any funding for the Puerto Rico Seismic Network Restoration in reference to the ShakeMaps scenario release. Leith responded there is not. He added that USGS has also done some earthquake impact scenarios for the Trans-Alaska Pipeline.

A question was posed to Leith about whether the ShakeMaps are used for specific scenarios. Leith responded that the ShakeMap pathway is to be run through HAZUS (https://www.fema.gov/hazus) and a fault model to estimate the impact on infrastructure. It will also be used for a planning exercise. USGS generates the scenario, then others do the loss modeling. There are several applications for risk management.

Committee members described how the aftershock forecast product can be of real value. In New Zealand there were a series of aftershocks. The product was useful for assessing damage for rebuild projects. Committee member Deierlein believes there is going to be a lot more interest in this product in the future.

The Committee discussed at length the risks from fire following earthquakes. The fires in CA in the last year were not forecast at that risk level. Committee members discussed whether enough effort is being made to train people for fire following earthquakes. Johnson added that while working on the Hay Wired Scenario, Charlie Scawthorne turned an earthquake exercise into a fire analysis. His analysis suggests scenarios where there is no water to fight the fires, so everything burns in heavily wood-framed neighborhoods. Johnson suggested that work to develop structural improvements to reduce fire needs to come into the program as a legitimate aspect of NEHRP. Deierlein added that combustible structures are the real issue. The proliferation of condominiums made primarily of wood have burned significantly during construction. Averill stated that the NIST Fire Research Division has initiated a study emphasizing structures with a lot of wood and where the sprinkler systems have not been set up. Johnson recommended enlisting the catastrophe modelers. The timing is good as they are doing their own research and getting more data.

B. NSF - Luciana Astiz presented updates on the NSF Earthquake Program:

https://www.nehrp.gov/pdf/NSF%20Presentation%20to%20post%20for%20ACEHR%203-12-18%20mtg%20final.pdf

The Committee asked NSF if they could support development of models and additional expertise in understanding the uncertainty involved in predicting fire and fire spread following earthquakes. Pauschke responded that if the proposed research falls within established areas of interest, NSF could support such research. Committee Chair Johnson recommended that this topic be considered by the NEHRP Program Coordination Working Group (PCWG).

C. NIST - Steve McCabe presented updates on the NIST Earthquake Engineering Program:

https://nehrp.gov/pdf/NIST%202EG%20Overview%20for%20March%202018%20ACEHR%20Mtg%2003092018.pdf

There were no questions, but Committee member Ryan Kersting commented that the work NIST is doing is extremely valuable.

D. FEMA - Mike Mahoney provided updates on the FEMA Earthquake Program:

https://www.nehrp.gov/pdf/FEMA%20Presentation%20for%20ACEHR%203-12-18%20final.pdf

In response to questions, Mahoney described how FEMA is working with the International Code Council to develop training. Mahoney said that FEMA recognizes that building code officials are more likely to take a course from the International Code Council than a Federal government course. Also, FEMA is seeing more acceptance of the International Existing Building Code (IEBC), but there's a long way to go. FEMA says in their courses that most of the provisions for existing buildings is in the IEBC and recommends that it also be adopted.

E. NEHRP Overview - Steve McCabe provided an overview on the NEHRP:

https://nehrp.gov/pdf/NEHRP%20Overview%20for%20March%202018%20ACEHR%20Mtg%20030420 18%20-%20Final_tmf.pdf

Comments/Questions:

Committee member Ryan Kersting said that ACEHR's September 2017 report states that FEMA is doing a great job, but they wish FEMA could issue standards to reduce risk for existing buildings. He asked if there were any updates on what FEMA is doing in that area. Mahoney responded that FEMA is not a Standards Development Organization, but that we work with several (ACE, ICC, etc.) to have them develop standards where necessary. In terms of encouraging the state and local adoption of building codes, FEMA State Assistance Program funding is going to states for four or five allowable activities, and one of them is to support building codes. FEMA encourages State Earthquake Program Managers to reach out to their building code counterparts. FEMA has provided training to them on questions to ask about existing buildings. Every state is different, so no overall guidance is possible. FEMA would like to do more on existing code triggers, but that is a fuzzy part of the code anyway, (e.g. for buildings damaged more than 50% of its cost). Mahoney requested ACEHR to provide suggestions on what to do better.

Committee member Lisa Grant Ludwig asked all presenters if they have concerns about the NEHRP reauthorization bill that was introduced in the Senate, or thoughts about how it could be improved as it goes through the process. Leith responded that, for the USGS, the Senate efforts have been great. It's fantastic that it got bipartisan support. However, they set the authorization level for USGS funding at 2017 levels, which won't be enough to do what Congress wants USGS to do. Mahoney responded that

FEMA supports the language, as it addressed all of FEMA's concerns. The authorization, however, was set at the lowest it has ever been. If that lower authorization level remains, FEMA cannot do anything other than exactly what the bill asks them to do, e.g. we would not be able to work on resilient building codes.

Committee member Lori Peek commented that it is exciting to see the NIST Disaster Resilience Initiative Awards – they are obviously of great societal significance. She asked if NIST integrated anything like NSF's broader impacts criteria. McCabe responded that NIST is looking at existing building research regarding retrofits. There is a symposium scheduled for early to mid-August at NIST. Each of the recipients of the awards will have to give updates. NIST intends that it will be the first of an annual, 1.5-day public symposium.

One Committee member suggested that 2018 will be a banner year for adoptions that skipped the 2015 building code cycle. Many states are going on six-year cycles. Mahoney responded that FEMA has recently changed its policy on post-disaster funding. FEMA now requires any recipient of a post disaster grant to adopt the latest building code. This would have the added benefit of addressing the situation of states delaying adoption one or two code cycles.

Committee Chair Johnson commented that two recommendations weren't mentioned during the NEHRP overview: 1) building rating system and 2) lifelines. The NIST NEHRP and Community Resilience Group is working on lifelines, which are the basis for concerns regarding fires following an earthquake. McCabe said that NIST will consider sponsoring a workshop concerning building rating systems.

Committee member Ludwig asked about research into the probability of rupture. NSF responded that much of the basic research is being done by Southern California Earthquake Center (SCEC) scientists. There are some proposals on methodologies to simulate earthquakes like the one in Italy. A Committee member responded that SCEC does not do any work outside of southern CA and does not do much to address rupture probability which is essential for lifelines. ACEHR encourages NSF to consider funding this type of research. More people would submit research proposals if it were obvious how to apply for it. Another member added that this is both a technical issue, and a national security issue. As an example, if we consider liquefaction, two different techniques can be used to assess the same hazard, on the same infrastructure, and get different results. It's imperative that we have something the entire nation uses consistently. A Committee member added that we have building codes for new buildings but need a lot of work on existing buildings.

III. Facilitated Breakout Sessions

Each of the NEHRP member agencies (USGS, FEMA, NSF and NIST) had a facilitated discussion about their program. The Committee members were instructed to look for clarification or common understanding where issues arise, but not to work for specific outcomes.

A. FEMA Discussion

The group made the following recommendations:

- *Provide resources:* There was a $21 million authorization years ago, but the current authorization is only about $8 million. The group recommended using the original amount, adjusted for inflation. Currently, this work is buried under DHS, which has reduced its ability to be a priority, and thus its effectiveness. Earthquakes may be considered a catastrophe, but FEMA deals with floods every week
- *Make adoption of building codes a priority.* In addition, the ACEHR expressed the need for a national seismic rating system. The group considered whether insurance companies could help get a rating system started, but unfortunately that has not been successful yet.

- *Review responsibilities and prioritize seismic resilience.*

Comments/Questions:

A Committee member asked if the $8 million in Pre-Disaster Mitigation (PDM) funding is all that's available nationwide. Mahoney responded that it's not even available yet. Since the Disaster Mitigation Act passed, states pass plans, including those for mitigating building stock. The hope is to attract PDM funding that supports state plans. These programs have a state or local match requirement, and unless that is available, the plans sit there, and they have to wait for a disaster to ask for post-disaster money. This makes it hard to identify inventory and get pre-mitigation funding. This is a real challenge, and $8 million nationwide is not sufficient. The Committee discussed whether they could send a message to NEHRP and Congress that all these great tools and technologies have been developed that could be used to evaluate structures and populate databases.

B. NSF Discussion

The NSF group discussed how the engineering program realignment impacted earthquake research. One perspective was that it provided an opportunity to focus on emerging technologies in other areas that may have positive benefits for earthquake research. The "10 big ideas" process led to harnessing the data revolution (https://www.nsf.gov/news/special_reports/big_ideas/). The Committee encouraged NSF at the next opportunity to come back with a high-level synthesis of the impact that NSF's investments in research, and the technologies, have had on the program.

There were no questions.

C. NIST Discussion Group

The NIST group described their conversation about how different hazards need to be mapped in a consistent way regarding seismic performance for lifeline systems. Lifelines might cross all these hazards at different times. This is probably the least advanced in all the areas where we are trying to work. One of the questions is: How do we move forward with limited funding? We need a consensus document and could follow examples of the American Society of Civil Engineers (ASCE) or other standards organizations. It would be lots of work and needs to say something about lifeline performance objectives. An important question that NIST is working on is: How does compliance with wind loads relate to seismic performance of buildings, especially in the Central U.S.?

Comments/Questions:

The Committee discussed further how to move forward with improvements to seismic performance of lifelines. It was acknowledged that voluntary actions to build new structures above code is a very hard sell, especially since there is no immediate occupancy (IO) initiative. For those who are interested in a higher level of performance, FEMA P-58-1 (https://www.fema.gov/media-library-data/1396495019848-0c9252aac91dd1854dc378feb9e69216/FEMAP-58_Volume1_508.pdf) is providing some of that information. Some parts of the country are working toward that, other parts are not. It was noted, however, that motivating change is very difficult. Even when government is provided with options that will save lives of first responders, there is still resistance to change.

A suggestion was made to look at what the insurance industry is doing and work with them to understand IO. The idea was that we can be more successful by speaking the language they understand. Another member noted, however, getting the insurance community involved could be challenging. So first we should develop the tools, then make them usable, then go look for early adopters. There are different audiences, however, and we have to tailor our messages to each of them.

The Committee then discussed risk criteria, for example, for dam collapse, with an associated acceptance of a certain number of fatalities. One member noted that ASCE 7 has risk categories – most are risk category two, which has a 10% fatality probability. Some are risk category three, which are for larger buildings. Risk category four is the highest level, for police and fire stations. ASCE 7-16 was the first edition that put those in print. Right now, the building code has no requirements or guarantees about repairability, only life safety.

D. **USGS Discussion**

The USGS group organized their session around the four recommendations that ACEHR made for the USGS NEHRP component in their September 2017 report on "Effectiveness of the National Earthquake Hazards Reduction Program" (https://nehrp.gov/pdf/11Sept2017_Final_ACEHRReport%20pg11%20fixed.pdf).

- *Recommendation 1 – Use Advisory Panels (APs*). One idea was to use the Scientific Earthquake Studies Advisory Committee (SESAC) Advisory Panel (https://earthquake.usgs.gov/aboutus/sesac/). USGS responded that AP's are for long-term strategic guidance. The process works by looking two years out. USGS is now thinking about the FY20 budget.
- *Recommendation 2 - USGS should have strong internal and external research programs*. A Committee member noted that at a recent SESAC meeting, some of the information presented was not available, and they wanted to know how the external program has fared over the last 10 years. Leith responded that the external program has been very helpful by developing young scientists, but that funding for research grants has declined in the past two decades.
- *Recommendation 3 - Continue developing the products provided by USGS.* The group unanimously agreed that USGS products are very helpful – especially EEW, operations earthquake forecasting, and public outreach and education about these products.
- *Recommendation 4 – Purposely develop the evolving roles for agency education and outreach*. The group noted that FEMA has a primary education and outreach program (https://www.fema.gov/individual-and-community-preparedness-division), and discussed whether USGS should develop more education and outreach like FEMA, e.g. telling people how to use their products. Leith said that it is a challenge to develop scientists, when retirement positions are not replaced, and when the mechanism for bringing in post-docs is being cut.
  He elaborated that the proposed 20% budget reduction for FY19 will have a significant impact, especially on EEW. The USGS plan, however, seems reasonable given the current budget environment, and the state of the science.

Comments/Questions:

There were some questions from Committee members about USGS products. One member asked if there is a decision on continuing to support the public interface with design maps, and mapping tools. USGS responded that they will continue to support the generation of data, but not the web interface. The webpages will host the after-shock product, and that for any event, USGS will have a webpage. USGS is working on the design with a social scientist to develop the wording to go along with the statistics. It will include a matrix of time and magnitude, so it provides the probability of an earthquake occurring. As time passes, the page gets updated, and the statistics change.

IV. ACEHR Discussion

A. Review of Facilitated Sessions

Johnson asked the agencies how the discussions went; whether they liked the idea of having this time to explain things, and whether we should continue this practice. All commenters responded the sessions were worthwhile. There was a suggestion to work proactively to come back and reconcile the important accomplishments, so the 2019 Committee report can champion those. There was a second suggestion to criticize the state of the budget and lack of reauthorization, so that when a big earthquake occurs, the NEHRP agencies can point to that assessment and emphasize they were working diligently with the resources available. In addition, the 2019 report should be more forward-looking and resolve some issues in advance of the report. Other comments indicated that this format should be continued, although not at every meeting, and the discussion and report writing group members should be rotated so that different perspectives are heard on all topics.

B. 2019 Biennial Report

Committee Vice-chair Rix presented some ideas to the ACEHR about the 2019 Biennial Report. He indicated much of the September 2017 report was focused on the reauthorization of NEHRP. It's still a work in progress, and the next high-level recommendation is for an assessment of the nation's risk reduction progress to date. We would then like to turn our attention to what the future would look like for NEHRP. He reiterated a point that many had made during the day, that there is a persistent budget concern. While it's not clear what impact the ACEHR can have, it can continue to emphasize the impact of funding issues. For example, it's a setback to lose the USGS interface on the mapping program. He suggested the ACEHR needs to continue to explain the impacts of budget erosion. Rix also expressed concern about the workforce brain-drain issues, particularly for USGS, which has the largest amount of staff in these areas. He also suggested several technical issues that are worthy of pursuing:

- Risk mitigation for existing buildings;
- Lifelines and bringing parity in terms of how they are treated in terms of earthquake risk mitigation;
- Building rating systems; and
- Fire following earthquakes.

C. Other Topics

The Committee discussed the NEHRP reauthorization language. McCabe stated his opinion is that the people who drafted the legislation read the ACEHR report carefully and incorporated a number of the recommendations into it. It requests an independent assessment, separate from the NEHRP agencies. Johnson encouraged NIST to continue to think about how to move into this new world of resilience and multi-hazard preparedness and accomplish some of the things the ACEHR has previously recommended. The Committee discussed whether there was any utility, and opportunity to do a quick assessment of the national condition of existing buildings while the re-authorization is being developed. One suggestion was that ACEHR could request GAO to do the study because they are independent. Ideally the assessment would incorporate lifelines and create some typology of existing buildings of advanced age using something like HAZUS to figure out ranges for buildings under code.

Committee member Simpson expressed concern that when we talk about actions two years in the future, there is potential for a big earthquake to occur that will impact the Federal Government. He asked if there is a precedent for an advisory committee in the short term of disaster response. Johnson added that she is on the Earthquake Engineering Research Institute (EERI) Oral History Committee – which talked about the NEHRP 40th anniversary, going across oral histories and looking at the formation of NEHRP. The

government appoints groups like the ACEHR to look at damage and what should be done. If this group is already together and making recommendations – would you rather see some other group assembled, or push this group forward to Congress saying they are ready to go? She suggested NIST might want to think about that as a discussion at PCWG. Deierlein stated the whole reauthorization is an issue because we pushed for it. Harary added it is still in public law. Davis stated there was discouragement among the Committee members at various times, but one thing that helped was the idea that we have to carry forward because there is a role, regardless of whether Congress agrees with our recommendations.

V. Public Comment Period

There were no members of the public registered to participate in the public comment session, and no public input was offered when the opportunity to provide it was made.

VI. Immediate Occupancy - Steve McCabe provided an update on the IO Report:

https://nehrp.gov/pdf/2EG%20Immediate%20Occupancy%20ACEHR%20March2018-%20Final%20(002)%20tmf.pdf

Comments/Questions:

The Committee discussed the origins and intent of the report. McCabe informed the Committee that NIST got the assignment from the Senate in the final FY 2016 appropriation. McCabe elaborated that stakeholders included the National Homebuilders Association, the gas industry, and the International Code Council among others. There was concern about: how to do this; how to pay for it; whether it would be voluntary or mandatory, and whether there would be different approaches for someone who owned the building for 50 years, or owned it for five and planned to sell it. GSA has a real challenge because they are out working in communities with privately owned office space subject to the local building codes. Herrmann commented that it's not an engineering issue, but a social science and public policy issue now. It gives us more flexibility in providing a range of performance for a type of building. The concern for new construction is the immediate cost. As much as we talk about societal savings, builders are building on first dollar costs. We are trying to make it make sense to people. The engineering challenges are easier than the policy questions. Kersting suggested the Committee reach out to some of the project owners who are going for design build and find out why they decided to do it this way; what they learned, and the obstacles they encountered and overcame. McCabe confirmed this is part of the report's recommendations. Kersting added further that people have a lot of good information on how they convinced their management to agree, and how they convinced the design folks to design to that level. It's a big step from risk management to design and construction. It will take someone at a very high level with a lot of motivation to make it happen. McCabe responded that we're going to travel to different geographic regions and hold different conversations based on each geographical area.

Peek said that embedded in this is the implication that we've achieved life safety, but we haven't done that across all segments. We need to think about who the priorities are in different cities. They will be different, so NIST needs to consider that when talking to different people and communities. Many people will be reluctant to be forced into an IO framework if they are still working to meet the current building code.

VII. ACEHR Discussion (continued)

Committee Chair Johnson proposed, after reflecting on the conversations on Day 1, the Committee work on a brief interim letter that is addressed to the NIST Director. It would express the Committee's recommendations to the ICC about what to talk about when they meet. She proposed a re-emphasis of the two overarching recommendations from the September 2017 report[i], and specific matters from yesterday's discussion with the USGS that the Committee wants members to be aware of. She proposed

the Committee get back into the same facilitated session groups they were in yesterday, and work on their key message.

After the breakout groups met for an hour and a half, they returned together as a full Committee and each group presented their key messages which were combined into a draft Committee interim letter, and then edited by the Committee. The group consensus was for Committee Chair Johnson to make final edits to the letter prior to submitting it to the NIST Director. There was a quorum present including Lisa Grant Ludwig on the phone.

VIII. Adjournment

Harary thanked the Committee for their hard work over the last day and a half. He presented Committee Chair Johnson with a Committee photo signed by the members present at this meeting, in appreciation for her hard work and leadership.

The meeting adjourned at 12:37 p.m. Eastern Time.

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[i] The two overarching recommendations from the September 2017 ACEHR report on "Effectiveness of the National Earthquake Hazards Reduction Program" are: 1) Congressional reauthorization of the Earthquake Hazards Reduction Act, and 2) conduct an assessment of the nation's earthquake risk reduction progress to date in order to guide future direction and funding levels for improving national earthquake resilience.