



State Of California

ALFRED E. ALQUIST SEISMIC SAFETY COMMISSION



Governor Edmund G. Brown Jr.

Minutes of Regular Meeting
State Capitol, Room 437
Sacramento, California
January 14, 2016

Members Present

Michael Gardner, Acting Chairman
Greg Beroza
Anthony Cannella
Ken Cooley (arrived at 10:41)
Randall Goodwin
Peggy Hellweg
Kit Miyamoto (arrived at 10:35 a.m.)
Ian Parkinson
David Rabbitt
Mark Wheatley
Elizabeth Hess

Members Absent

Timothy Strack, Chairman
Tracy Johnson, Vice Chair
Greg Beroza
Anthony Cannella
Mark Ghilarducci
Fuad Sweiss
Chet Widom

Staff Present

Richard McCarthy, Executive Director
Lena Daniel, Administrative Officer
Robert Anderson, Engineering Geologist
Fred Turner, Senior Structural Engineer
Salina Valencia, Legislative Director

I.

CALL TO ORDER AND ROLL CALL

Acting Chairman Michael Gardner called the meeting to order at 10:00 a.m. Legislative Director Salina Valencia called the roll and noted that quorum was not yet present.

II. CHAIRMAN'S REMARKS

Commissioner Gardner observed that one more Commissioner was needed to make a quorum, and he said another Commissioner would be arriving soon. He advised that some agenda items would be taken out of order so voting could occur when a quorum was present.

IV. DRAFT REPORT ON THE Mw6 SOUTH NAPA EARTHQUAKE OF AUGUST 24, 2014 (Out of Order)

Commissioner Gardner proposed beginning with the report on the South Napa earthquake. Executive Director Richard McCarthy invited Dr. Laurie Johnson, Pacific Earthquake Engineering Research (PEER) Center, to discuss the results of her research and present her draft

findings. He said Dr. Johnson would be compiling a list of recommendations. He suggested appointing an ad hoc committee to hold a workshop session to review the completed report and cull down the recommendations.

Dr. Johnson said she was still meeting with local officials and stakeholders to refine the recommendations and finish the last section of the report. She noted that the first sections on geoscience, infrastructure, and structures were fairly complete.

Dr. Johnson indicated that a number of important studies had been done since the Commission's October meeting regarding geosciences, structural performance, utilities, and post-earthquake response, and the results of those investigations have been incorporated in the report. She said the report emphasizes success stories to illustrate the effectiveness of certain existing policies, identifies areas where existing policies and mitigation practices are not successful, and discusses where new policies should be developed. She noted that the report looks at recent earthquakes that occurred elsewhere, including the earthquakes in Baja California, San Simeon, Chile, Japan, and New Zealand. Dr. Johnson added that the report also looks at how certain scientific, engineering, and technological advances have affected emergency response and recovery, including earthquake detection and notification, disaster damage assessment, performance standards for structures and infrastructures, and coordination and management of emergency response and recovery efforts.

Dr. Johnson said next steps include completing meetings with stakeholders, refining the recommendations, working with the Commission to review and prioritize the recommendations, and then finalizing the report.

Commissioner Gardner thanked Dr. Johnson for her presentation and her comprehensive report.

Commissioner David Rabbitt commented that he enjoyed reading the report and found the recommendations very helpful. He observed that local jurisdictions face challenges in conducting accurate initial damage assessments, estimating the extent of damage, and identifying hidden damage that appears later. He noted that owners of some private buildings were reluctant to have their facilities inspected because they lacked the ability to relocate or conduct repairs. Dr. Johnson said this issue is a particular concern for undocumented workers who fear that government intervention could lead to deportation of themselves and their family members.

Commissioner Rabbitt said California's mutual aid system worked well in response to the South Napa earthquake, and he noted that his county was able to send people to Napa immediately. He applauded local water districts and PG&E for their assistance as well.

Commissioner Rabbitt reported that Sonoma County recently waived demolition fees for a structure damaged in the South Napa earthquake. He noted that having procedures in place for streamlining bureaucratic requirements, issuing disaster declarations, and coordinating damage assessments would be very beneficial for local governments. He said Sonoma County recently sent a letter to all URM building owners to remind them of the placarding requirements and to draw attention to their seismic risks. Commissioner Rabbitt also expressed support for expanding CEA's earthquake brace-and-bolt program.

Commissioner Rabbitt thanked Dr. Johnson for highlighting all of these important issues in her report.

Commissioner Ian Parkinson commented that emergency responders were unable to shut off water supplies in some damaged areas, and he recommended highlighting this issue in the report.

Commissioner Ken Cooley noted there have been a number of studies by ATC and other organizations pertaining to rapid damage reconnaissance, and the National Association of Home Builders sponsored a detailed investigation after the Northridge earthquake. He suggested disseminating these tools to local governments to help them address structural issues. He offered his assistance in calling the directors of particular state agencies to urge them to consult with experts in emergency recovery and response.

Commissioner Goodwin said he just left an OES safety assessment class in West Sacramento where he learned that many participants were not familiar with post-disaster training resources for inspectors. He recommended publicizing and promoting these programs so more potential inspectors can take advantage of them.

Commissioner Miyamoto observed that only 6 percent of California homeowners currently have earthquake insurance, and the high deductible is a major obstacle for many homeowners. Dr. Johnson agreed, and noted that improving insurance coverage is one of the major recommendations in the report. She advocated creating a federal disaster insurance program, looking at alternatives to insurance such as crowd-source funding, and encouraging the banking industry to offer low-interest loans to small businesses and attaching repair loans to existing mortgages. Dr. Johnson added that it typically takes states about two years to distribute federal disaster funding, which hinders rapid recovery. Commissioner Miyamoto expressed concern about the seismic risk of high-rise condominiums in Los Angeles and San Francisco.

Commissioner Gardner suggested deferring further discussion of these issues to the workshop, and he recommended inviting insurance industry representatives and other stakeholder groups to participate.

Commissioner Cooley observed that California has been a leader in the use of insurance pools to help building owners. He noted that California established an earthquake recovery fund in 1990, after the Loma Prieta earthquake, which was repealed in 1992 because of actuarial concerns. He said the current CEA program was then established using funds from insurers, but the challenge of capitalizing the program and growing the fund remains. He advised that the state spends about \$250,000 each year to purchase reinsurance to back up the CEA program. Commissioner Cooley added that the disclosure requirements were modified in 2014, and he said he had a resolution pending to revamp the system to include federal support. Dr. Johnson commented that a great deal of research has been done about these issues, but political will to implement them has been lacking.

Commissioner Gardner thanked Dr. Johnson for her presentation.

III. APPROVAL OF OCTOBER 8 AND 9, 2015 MEETING MINUTES

ACTION: Commissioner Peggy Hellweg made a motion, seconded by Commissioner **, that:

The Commission approve the minutes of the October 8 and 9 meeting as presented.

* Motion carried, ** – 0 (Commissioners ** and ** absent during voting).

VI. THE HAYWIRED EARTHQUAKE SCENARIO: PLANNING FOR DISASTER IN A WIRED (AND WIRELESS) WORLD (Out of Order)

Dr. Dale Cox, Project Manager, Science Application for Risk Reduction (SAFRR), U.S. Geological Survey (USGS), explained that the mission of SAFRR is to innovate the application of hazard science for safety, security, and the economic wellbeing of the nation, and SAFRR is best known for its work in developing the ShakeOut earthquake scenario. He noted that earthquake scenarios are developed to represent single large and plausible seismic events, and they are based on deterministic analysis rather than probability. He said these consensus-based scenarios integrate many scientific disciplines and expertise, using the best hazard science available. He added that USGS works with many scientists and community partners, and the results are intended to fit users rather than scientists.

Dr. Cox reported that the HayWired scenario features a 7.0-magnitude earthquake on the Hayward fault. He said the scenario can be used to help prepare and develop effective policies to enhance earthquake resilience in an interconnected world, and interconnectedness is the theme that runs through the whole scenario. Dr. Cox advised that potential damage resulting from the HayWired scenario is estimated at \$30 billion or more.

Dr. Cox presented slides depicting potential ground motions and expected structural damage from the HayWired scenario. He indicated that USGS has completed liquefaction studies, and those results are now being reviewed. He said CGS will contribute landslide projections, and then after-slip and cumulative aftershock impacts will be incorporated.

Dr. Cox pointed out that earthquake impacts are interconnected. He said USGS researchers are looking closely at water supply and distribution issues, problems that were highlighted in the Southern California ShakeOut scenarios. He advised that some people in the East Bay could experience water outages ranging from one to three months. Dr. Cox noted that telecommunications systems will also be affected by a large earthquake on the Hayward fault, so USGS is conducting economic and resilience analyses of the digital economy.

Dr. Cox observed that many buildings will be yellow-tagged and red-tagged after a large earthquake, and members of the public need to understand the limitations of the building code. He said current building codes are designed for life safety, but this does not mean that damaged buildings will remain usable after a major event. For this reason, he noted, USGS is conducting an investigation to determine how much risk the public will accept and pay for, and what alternatives exist to the current code.

Dr. Cox commented that fire following earthquake will be a huge problem after a large earthquake on the Hayward fault, so USGS has been working with fire experts and local firefighting jurisdictions to make them aware of the risk. He said many people will be trapped in stalled elevators and collapsed buildings, creating additional disaster response challenges.

Dr. Cox advised that USGS will also be estimating how many people might be saved by implementation of an earthquake early warning system, and it appears that such a system could result in a substantial reduction in earthquake-related injuries.

Dr. Cox said Dr. Laurie Johnson is working to analyze HayWired scenario impacts on at-risk communities to develop a framework for identifying and identifying populations that are likely to face long-term displacement and recovery challenges.

Dr. Cox noted that the final step in developing the HayWired scenario will be to identify community, environmental, economic, and policy implications. He said USGS hopes the scenario will help local communities prepare for lifeline restoration, improve building codes to provide for post-earthquake functionality, reduce the risk for fire following earthquake, anticipate and manage environmental health issues, develop effective plans for recovery of communities at risk, improve the resilience of the digital economy, use scientific information to assist with response and recovery, and enhance communication of earthquake early warning and after-slip and aftershock forecasts.

Dr. Anne Wein, Disaster Scientists and HayWired Science Leader, USGS, stated that USGS is working with scientists, community leaders, building professionals, and government representatives, and she welcomed the Commission's assistance in expanding outreach to appropriate organizations and agencies. She displayed a slide identifying the many contributors and partners in the development the HayWired scenario.

Commissioner Gardner thanked Dr. Cox and Dr. Wein for their presentation, and he offered the Commission's ongoing support and help.

V. DEVELOPING AN INTERACTIVE WEB-BASED EARTHQUAKE AND TSUNAMI EDUCATION PROGRAM

Dr. Lori Dengler, Humboldt State University, provided Commissioners with copies of a book recently released by the Redwood Coast Tsunami Work Group. She discussed a proposal to develop a Web-based interactive earthquake and tsunami education program using the book. She said the purpose of the program is to focus interest and engage families, children, and classrooms in positive activities to promote discussion of earthquake and tsunami risks. She noted that selling preparedness and motivating people to take action depends in large part on getting people to talk about the issues, and one key component of the education program is encouraging discussion.

Dr. Dengler said the arrival of tsunami debris from Japan on California's coast has spiked recent interest in earthquakes and tsunamis. She showed a picture of the boat "Kamome" that washed

ashore in Crescent City and noted that this boat is the largest piece of tsunami debris found so far. She reported that a group of California students cleaned the boat, raised money, and the boat was returned to Japan in October of 2013, and this effort led to a very positive exchange program. Dr. Dengler stated that she co-authored a bilingual book called “The Extraordinary Voyage of the Kamome” for elementary school students about the boat project.

Dr. Dengler thanked the California Office of Emergency Services (OES) for contributing funds to develop a Website providing information about the earthquake, the tsunami, and debris. She asked for the Commission’s support for a two-year project to develop resources and activities based on the book. She noted that the book provides a vehicle for discussing ocean currents and cultural issues that are not typically addressed in traditional earthquake education efforts, and existing activities and programs can easily be linked to the book.

Dr. Dengler said a multi-language online version of the book is being created, and metrics will be developed to track Web usage. She advised that at least three book-related activities are being planned for this year’s Tsunami Awareness Week at the end of March, and similar activities are being developed for the 2016 ShakeOut. She stated that the second year of the project will entail new activities, more extensive curriculum development, expanded publicity and outreach, and additional assessment. Dr. Dengler described some of the activities and projects associated with the book, and she invited commissioners to join the new advisory group.

Commissioner Gardner drew attention the project description and budget details in the meeting packet. He proposed that the Commission approve a two-year contract for \$48,779, and he pointed out that almost \$60,000 in matching funds will be contributed.

ACTION: Commissioner Knudson made a motion, seconded by Commissioner **, that:

The Commission approve the project as proposed.

* Motion carried, ** – 0 (Commissioners ** and ** absent during voting).

Dr. Dengler thanked the Commission for its support.

XIII. POST-EARTHQUAKE FIRE PERFORMANCE OF A LIGHT-GAUGE COLD-FORMED STEEL FRAME BUILDING (Out of Order)

Mr. McCarthy introduced a proposal for a project with the University of California, San Diego (UCSD), to fund tests to measure the post-earthquake fire performance of a light-gauge cold-formed steel-frame building on UCSD’s shake table. He noted that the Commission previously sponsored shake table tests on a building designed to emulate a hospital setting.

Commissioner Gardner observed that the hospital building shake table tests yielded important information on post-earthquake fire performance. He invited Dr. Tara Hutchinson, UCSD, to discuss the proposed project in more detail.

Dr. Hutchinson thanked the Commission for its past support. She said the full-scale hospital building project involved three phases of earthquake shaking and one phase of live fire testing, and Commission funds were used to study base isolation, fire following earthquake, and dissemination of a video summarizing the results. She noted that the research identified potential problems with elevators, stairways, access doors, and lightweight façades, and a number of code changes were proposed as a result.

Dr. Hutchinson stated that the proposed project will focus on the fire performance of a full-scale, mid-rise, cold-formed, steel-frame building. She said current knowledge about the seismic performance of cold-formed steel (CFS) frame systems is limited so this project will help fill that gap. Dr. Hutchinson identified industry groups, private organizations, and government agencies partnering with UCSD to support the project.

Dr. Hutchinson observed that there have been some major fires in wood-frame structures, so the insurance industry is particularly interested in noncombustible materials like steel to avoid these problems. She said insurers are offering builders lower premiums as incentives to use more cold-formed steel.

Dr. Hutchinson explained that the project will include live fire testing to assess the building's performance after seismic shaking. She said past earthquakes have shown damage to fire protection systems, weakened structural and nonstructural components, degraded compartmentalization. She pointed out that electrical shorting, ruptured gas lines and fuel lines, and damaged seismic shut-off valves all contribute to post-earthquake fire hazards. Dr. Hutchinson added that post-earthquake fires can have high consequences, including the spread of fire, smoke, high temperatures, structural weakening, and damage to fire protection systems, and this research will provide knowledge about their severity.

Dr. Hutchinson said that after the earthquake testing, UCSD researchers plan to perform live fire experiments in controlled compartments to assess the spread of fire and smoke, track the performance of fire safety systems, and identify key damage locations throughout the building.

Dr. Hutchinson requested Commission support to expand the seismic test program and extend the testing time. She recommended finishing live fire testing in June to minimize the risk of spreading fires during San Diego's hot and dry summer season.

Commissioner Gardner expressed support for the proposed project as a way of gaining more knowledge about seismic and fire performance of cold-formed, steel-frame buildings. He noted that the total request is for \$49,350, and he recommended approval.

Commissioner Goodwin thanked Dr. Hutchinson for her presentation. He noted the current code cycle is nearing completion, with new provisions taking effect in January of 2017. He said the next cycle will deal with updates to the 2019 code, and he expressed his opinion that the proposed research will be a tremendous benefit when developing those code upgrades. Commissioner Goodwin observed that many jurisdictions, including his own, are seeing a spike in mid-rise construction, especially multi-family and assisted-living occupancies.

ACTION: Commissioner Goodwin made a motion, seconded by Commissioner Hellweg, that:

The Commission approve the project as proposed.

* Motion carried, ** – 0 (Commissioners ** and ** absent during voting).

Commissioner Gardner encouraged Commissioners and audience members to visit the shake table at UCSD to watch testing in action. He said the shake table is a truly amazing facility, and in-person observation is well worth the trip.

Commissioner Gardner thanked Dr. Hutchinson for her presentation.

VII. STRATEGIES FOR INCAPACITATING THE EFFECT OF BUILDING SEISMIC PERFORMANCE AND STAKEHOLDER DECISION-MAKING IN POST-EARTHQUAKE RECOVERY MODELING

Mr. McCarthy introduced Dr. Ross Stein, Global Earthquake Model (GEM), and Dr. Henry Burton, University of California at Los Angeles (UCLA). He invited Dr. Stein to begin with an overview of GEM's structure and activities, followed by a discussion of the recovery modeling project by Dr. Burton.

Dr. Stein noted that GEM shares many commonalities with the Seismic Safety Commission. He said GEM's mission is to help the world prepare for a rising tide of earthquake, and the Commission's mission is to provide vigilance and oversight to California's earthquake problem, so working together helps both entities achieve their missions. He explained that many parts of the world have dense populations on or near active faults, and he cited the examples of Tehran, Iran; Quito, Ecuador; and Bogota, Colombia. He noted that India has been slowly moving into Asia over the past 40 million years, creating the Himalayas and the foothill thrust faults lining the collision zone. Dr. Stein observed that there are now 600 million people living in the Ganges plain, which will amplify the shaking of seismic waves, and most of them are unaware of their earthquake risk. He said these areas are characterized by poor-quality construction, dense populations, and low awareness of seismic safety issues. He stated that GEM's mission is to disseminate knowledge to keep people from denying their seismic risk.

Dr. Stein said GEM was formed in 2009 as a public-private partnership focused on improving understanding of seismic hazards around the world and demonstrating the effectiveness of seismic hazard assessment. He stated that GEM was built on principles of fostering independence, openness, and being a credible and trusted source of information. Dr. Stein noted that the Seismic Safety Commission is an associate participant on GEM's governing board and an important funding partner for GEM's research.

Dr. Stein identified the members of GEM's public-private partnership, including 11 sponsor nations, 12 private companies, a number of international project sponsors, and associate organizations. He said GEM works to gather data sets to improve seismic hazard assessment and then builds models and tools to forecast seismic risks and social and economic vulnerabilities.

He noted that the Commission is provided funding for projects like Dr. Burton's that enhance understanding of the post-earthquake recovery process.

Dr. Stein commended the Commission for being a leader in terms of inclusiveness, bipartisanship, transparency, and collaboration. He noted the Commission was also instrumental in launching the CEA and PEER, supporting shake table testing at UCSD, promoting modeling of liquefaction and landslides, looking at the earthquake vulnerability of agricultural industries, drawing attention to the problem of URM buildings, working for disclosures of seismic hazards to homeowners, and focusing on earthquake preparedness and post-earthquake recovery.

Dr. Burton provided an update on the Commission-sponsored post-earthquake recovery modeling project. He explained that simulation models of post-earthquake recovery are important for assessing the effectiveness of various policy actions in enhancing the recovery process. He noted that a simulation tools allows policy makers, emergency managers, and planners to explore various scenarios to identify which policies can improve recovery trajectories and make informed decisions.

Dr. Burton talked about the effects of stakeholder decision-making in post-earthquake recovery modeling. He said the actions of homeowners, business owners, and local governments all have important effects on recovery times, and the impacts of these decision-making processes are being incorporated in GEM's recovery models. Dr. Burton noted that decisions such as whether to relocate temporarily or leave the neighborhood are driven by a number of factors, including the level of damage in the surrounding community, actions of neighbors, and local government policies. He added that data this issue will be gathered through interviews with affected community members, information from the South Napa earthquake, and a survey to determine likely actions by stakeholders if an earthquake occurs.

Commissioner Cooley pointed out that Proposition 13 limits the amount of property taxes paid by California homeowners, and people are reluctant to lose this advantage. In response, he noted, the California Legislature has allowed homeowners to transfer their exemptions from reassessment to other areas after certain disasters. He recommended looking at historical data from the Loma Prieta earthquake and Oakland fires to find out how many people have taken advantage of these provisions.

Dr. Burton summarized the results of his research so far. He said important factors in recovery are the ability to repair or keep buildings functional after an earthquake, time to receive insurance funds, access to federal assistance, home ownership versus renting, and whether a neighborhood population is predominantly low-income or minorities. He noted that UCLA researchers have completed a case study of soft-story, wood-frame buildings in the Koreatown neighborhood in Los Angeles, and they plan to look at the entire inventory throughout the City of Los Angeles. He displayed a chart showing recovery trajectories for scenarios based on different earthquake magnitudes. He pointed out the difference in recovery times between retrofitted and unretrofitted soft-story buildings.

Dr. Burton said next steps will entail further data collection from the South Napa earthquake, incorporating stakeholder decision-making models, evaluating the model through earthquake simulation, and completing an inventory for the entire City of Los Angeles.

Commissioner Miyamoto commented that data from the Napa earthquake is useful for looking at smaller residential and commercial buildings. He recommended looking at data from Christchurch, New Zealand, with respect to modern concrete structures and high-rise buildings. Dr. Burton responded that the researchers will incorporate published data from the New Zealand earthquake in their study. He noted that the insurance structure in New Zealand is quite different from insurance in the U.S., and this factor also needs to be considered.

Commissioner Miyamoto acknowledged that the availability of insurance is a critical factor in recovery. He said other important factors are government policies, the availability of private funding from the commercial sector, and uncertainty as to the repairability of earthquake damage. Dr. Burton agreed that uncertainty is an important variable that needs to be incorporated in the model.

Commissioner Gardner thanked Dr. Burton for his presentation. He commented that he was struck by how closely GEM's recovery model tracks California's model.

VIII. JPL TECHNOLOGY FOR EARTHQUAKE RESILIENCY: LESSONS FROM THE NAPA AND NEPAL EARTHQUAKES, AND A PROPOSED PATH FORWARD

Mr. McCarthy noted that the Commission has been working with the National Aeronautics and Space Agency (NASA) Jet Propulsion Laboratory (JPL) to identify lessons learned from the Napa and Nepal earthquakes. He introduced Dr. Susan Owen, JPL, and invited her to present a progress report. He recommended that the Commission consider supporting a second phase of this project.

Dr. Owen provided an update on work being done with airborne remote sensing. She said the Commission funded a pilot project to look at how JPL capabilities can be better linked to state resources and agencies to improve earthquake resiliency. She reported that JPL researchers analyzed some of the impacts of JPL's response to the recent Napa earthquake and the Nepal earthquake, and they also explored potential projects for a second phase. Dr. Owen advised that JPL technology can be used to improve search and rescue efforts using the FINDER technology, and to assess damage and characterize earthquakes with airborne and satellite-based radar.

Dr. Owen explained that the FINDER technology was developed at JPL with funding from the Department of Homeland Security, and it consists of portable radar unit that can detect people trapped alive in buildings. She said this technology can help search and rescue teams identify which buildings have people trapped underneath rubble. She noted that FINDER technology has been tested by FEMA and proven effective in the Nepal earthquake. Dr. Owen stated that the FINDER technology has been licensed to an independent private company that has developed several prototype units.

Dr. Owen noted that by field-testing the units in Katmandu, JPL researchers found that people standing around damaged buildings created noise interference. She said that when FINDER units were employed in remote villages to minimize background noise, the units were much more successful there. She added that JPL hopes to refine the technology to mitigate this problem.

Dr. Owen advised that the proposed second phase of work will explore how use of FINDER can be expanded to assist search and rescue teams in California. She said Cal OES and the Commission connected JPL with Larry Collins, the Los Angeles County Fire Department battalion chief, who runs an active urban search and rescue team with a history of working with new technology and responding to international events. She noted that Chief Collins had already heard about FINDER and expressed interest in working with JPL engineers to identify useful test cases and next steps. Dr. Owen presented slides showing some examples of how JPL engineers envision using second-generation FINDER technology in the future.

Dr. Owen stated that JPL also plans to expand the use UAVSAR technology, a system that allows airplanes to take high-resolution images of faults to study surface expressions of faults after earthquakes. She said UAVSAR can identify places where surface offsets intersect with key infrastructure components like pipelines, roads, and bridges. She added that Dr. Andrea Donnellan, the next speaker, would discuss use of UAVSAR for damage assessment after the Napa earthquake in more detail as part of her presentation.

Dr. Owen said Dr. Catherine Jones from JPL is working with the Department of Water Resources to identify ways UAVSAR capabilities can help the state with emergency response as well as ongoing monitoring of Sacramento Delta levees and the California aqueduct. She noted that UAVSAR was used after the Napa earthquake to confirm that the levees were undamaged.

Dr. Owen recommended developing a companion proposal for using UAVSAR for earthquake emergency response. She noted that on-board processing capability to generate images and analyze data on the plane would facilitate more rapid damage assessment. She said JPL is interested in working with state government agencies to make sure the type and resolution of the information provided is useful to response agencies.

Dr. Owen talked about JPL's outreach to the Los Angeles Office of Emergency Management and the California Earthquake Clearinghouse, and FEMA Region IX to participate in exercises, provide demonstration products, and make sure JPL products meet their needs. She said JPL's plans for Phase 2 include a workshop with stakeholders to refine data format, delivery, and documentation.

Dr. Owen indicated that JPL expects to have a draft report to the Commission by the end of January that will articulate in more detail the importance of the technology in JPL's response to Napa and Nepal, lessons learned, and suggestions for a second phase of projects.

Commissioner Gardner thanked Dr. Owen for her presentation.

Dr. Donnellan said manned Gulfstream 3 aircraft with modified autopilot settings are used for UAVSAR system in order to ensure accurate and stable repeat flight paths. She indicated that JPL has been talking with the Air National Guard about using another type of aircraft for UAVSAR. Dr. Owen added that Dr. Jones is also exploring this option. She said JPL will inquire about other possibilities for using the National Guard's unmanned aircraft.

IX. UNINHABITED AERIAL VEHICLE SYNTHETIC APERTURE RADAR (UAVSAR) OBSERVATIONS OF RECENT EARTHQUAKES IN CALIFORNIA

Dr. Andrea Donnellan, NASA/JPL, said UAVSAR flights are based out of the Armstrong Flight Research Center near Palmdale. She explained that the radar system is bolted to the bottom of the aircraft and can be flown all over the world. She noted that in recent earthquakes, the plane has been able to re-fly previous flight paths within a week after earthquakes in Napa, La Habra, and Baja California, so pre-disaster and post-disaster images could be compared to identify changes.

Dr. Donnellan stated that the entire San Andreas fault system has been imaged with UAVSAR, and JPL has been focusing on the areas with heightened risk. She reported that each earthquake studied has shown a broad pattern of deformation, including after-slip and aftershock changes. She said NASA/JPL uses UAVSAR to identify fault slips on the main rupture, triggered slips, and damage to buildings and infrastructure. She noted that NASA/JPL has observed minor structural damage to buildings and streets, gas and water line breaks, and subsidence.

Dr. Donnellan showed examples of the UAVSAR images obtained in recent earthquakes. She pointed out areas of active faults, triggered slips, aftershocks, and post-earthquake deformation. She said the UAVSAR data was used to produce damage and loss estimates for critical infrastructure components and to create deformation models, tilt maps, magnitude estimates, and aftershock forecasts. She observed that UAVSAR images identified damage that would not be visible through other methods, which is helpful for mapping structures and damages, and for understanding how strain propagates over time.

Commissioner Gardner thanked Dr. Donnellan for her presentation.

At 1:30 p.m.**, the meeting was recessed for lunch. Commissioner Gardner reconvened the meeting at 2:30** p.m.

X. GUIDE AND APPENDIX TO IDENTIFY AND MANAGE THE SEISMIC RISKS OF BUILDINGS FOR LOCAL GOVERNMENTS

Commissioner Randall Goodwin drew attention to the draft appendices to the Guide to Identify and Manage the Seismic Risks of Buildings for Local Governments. He said the appendices are resources for local government officials who want more details and information about particular topics mentioned in the guidebook. He explained that the guidebook is intended as a nontechnical, gateway document for local governments. Commissioner Goodwin welcomed input and feedback from commissioners.

Commissioner Goodwin expressed his appreciation to Senior Structural Engineer Fred Turner for his assistance, and he proposed disseminating the guidebook as quickly as possible.

Commissioner Knudson asked about the format of the revised guidebook. Mr. Turner said that although the last version was published as a booklet, this new document will be published electronically and posted online with an index containing hyperlinks to each section. He added that the guidebook will also be available in hard-copy form.

Mr. McCarthy asked whether the Commission needed to allocate more funds for editing the appendices and adding graphics. Mr. Turner stated that there are still funds left in the editor's current contract, and additional costs will depend on the extent of the remaining editing and creation of graphics. He suggested including images and figures to illustrate some of the topics covered in the guidebook and appendices.

Mr. McCarthy proposed sending the revised version of the executive summary to the Business, Consumer Services, and Housing Agency Secretary for a final review. Mr. Turner offered to send a Word version to commissioners and Agency to facilitate editing.

Commissioners thanked Commissioner Goodwin and Mr. Turner for their work.

XV. LEGISLATION (Out of Order)

Commissioner Cooley provided copies of a legislative resolution pertaining to the California Earthquake Authority's post-earthquake financing resources. He noted that California has enacted a number of ground-breaking policies since the time of the Coalinga earthquake, including efforts to develop an insurance pool after the Loma Prieta earthquake to help deal with the state's earthquake peril, and establishment of the California Earthquake Authority (CEA) in 1995. Commissioner Cooley said the resolution recites highlights of this history, identifies federal programs that could help strengthen California's system, and urges Congress to adopt a financing program.

Commissioner Cooley presented copies of another bill that explains the CEA law updates the language of the mandatory offer provisions.

XI. DEPARTMENT OF STATE HOSPITALS' REPORT ON SEISMIC SAFETY

Mr. Turner drew attention to the memo under Tab XI of the meeting packet. He said state hospitals now include both mental health facilities and containment facilities for the criminally insane, and patient characteristics have changed over the years. He noted that a predecessor organization to the Commission was involved in creation of the Hospital Building Safety Board in 1973 after the San Fernando earthquake, and one of the conditions of that law was an exemption for state hospitals, many of which were known to be housed in old buildings that required a considerable amount of deferred maintenance. Mr. Turner explained that the state was unwilling to allocate funds to improve state hospitals at that time, but the Legislature added funds to the Department of State Hospitals' budget last year to help address these problems. He

said the Department of State Hospitals was required to summarize current knowledge about the seismic safety of their facilities, and that report was due on January 10, 2016.

Mr. Turner advised that the Commission has not yet seen the final report. He drew attention to his summary of the vulnerability estimates contained in the draft report. Mr. Turner added that the staff will forward a copy of the final report to commissioners as soon as it is available.

Mr. Turner noted that the budget control language required the Department of State Hospitals to consult with the Seismic Safety Commission. He said the timing of the release of draft reports has never coincided with the Commission's meeting schedule, so the Department has only been able to consult with the Commission staff so far. Mr. Turner indicated that the Commission staff identified several dozen recommended amendments to earlier drafts, and most of those revisions have been incorporated.

Mr. Turner suggested inviting a representative from the Department of State Hospitals to attend the next Commission meeting to present the results of the final report.

XII. IMPLICATIONS OF THE SAN FRANCISCO PUBLIC UTILITIES COMMISSION'S WATER SYSTEM IMPROVEMENT PROGRAM DELAYS AND REVIEW LETTER

Mr. Turner noted that state law requires the Seismic Safety Commission to report to the Joint Legislative Audit Committee on public safety implications associated with delays or deletions to the San Francisco Public Utilities Commission (SFPUC) water system improvement program. He said the Commission has completed its ninth review of the program, and a report is contained in the meeting packet. Mr. Turner advised that the SFPUC deferred approval of a number of the project delays within the past year, and although construction of those projects is nearly complete, the Commission should call this to the attention of the Joint Legislative Audit Committee.

Mr. Turner stated that the Commission has not yet received formal notice of the delays. He said the SFPUC held a hearing in early December, and further public comments are being incorporated in the notice of delays. He added that the Commission has 90 days to comment after receiving the notice of delays. Mr. Turner recommended assigning one commissioner to work with the staff to review draft comments, and he promised to update the Commission at the March meeting.

Commissioner Gardner observed that the Commission's charge is to evaluate the consequences of delays, and the delays being considered now do not seem to have significant seismic safety implications.

Mr. Turner reported that a number of primary improvement projects have already been completed, and the overall level of seismic safety is much better than it was two years ago. He observed that there will be additional major improvements for the next few years. He advised that the largest remaining project is replacement of the Calaveras Dam, which is scheduled for completion in 2019.

PRESENTATION

Commissioner Cooley presented a legislative resolution recognizing the Seismic Safety Commission's fortieth anniversary in 2015. He congratulated and commended the Commission for its many invaluable accomplishments. He commented that the Commission's interdisciplinary perspective and insight contributes to the seismic safety and wellbeing of the people of California.

Commissioner Gardner thanked Commissioner Cooley and the Legislature for honoring the Commission.

XIV. DRAFT ANNUAL REPORT FOR 2015

Ms. Daniel, Administrative Officer, presented a first draft of the 2015 annual report. She noted that the annual report provides a synopsis of all projects that were ongoing or completed during the past year. She said the staff will add additional information regarding the Commission meetings in Santa Barbara and Arcata, as well as a synopsis of Mr. Michael Kleeman's "Totally Unprepared" project, which was completed in 2015.

Ms. Daniel recommended converting the annual report to a living electronic document that can be posted on the Commission's Website and updated regularly to provide information to the public regarding ongoing projects and activities. She noted that the Commission currently has a contract with Mr. Kleeman for media and community outreach, so he might be in an ideal position to assist with this transition. Commissioners expressed support for this approach.

Commissioner Gardner asked about the estimated costs of the proposed conversion. Ms. Daniel replied that this task can be added to Mr. Kleeman's current contract, so there would be no additional cost to the Commission.

Mr. McCarthy said the staff will be meeting with Mr. Kleeman and the Business, Consumer Services, and Housing Agency's Public Information Officer to discuss ways of highlighting the Commission's good work and outreach. He welcomed input from Commissioners.

Commissioner Hellweg noted that the list of vacant positions should be updated to reflect that Commissioner Macari's position and the insurance representative seat on the Commission are currently vacant.

Ms. Daniel asked that commissioners submit additional comments and revisions to the staff by January 31 so the final version can be approved by the Commission at its March meeting. Mr. McCarthy said he would forward the draft report to Business, Consumer Services, and Housing Agency for review and comments.

XVI. EXECUTIVE DIRECTOR'S REPORT (Out of Order)

Budget

Ms. Daniel reported that the Department of General Services assigned a new budget analyst to the Commission, and a new budget forecast was prepared. She advised that the Commission is doing very well so far this fiscal year, with a projected surplus of about \$200,000. She said that figure will change because the Department of Finance is still working to implement its new accounting system, and there are still a number of outstanding invoices and receivables. Ms. Daniel estimated that the Commission may have a surplus of about \$100,000 after those adjustments.

Ms. Daniel advised that the proposed budget for fiscal year 2016-17 is \$1.36 million, \$20,000 less than 2015-16 due to a pro rata expense for administrative fees to control agencies.

Ms. Daniel stated that the Commission just completed its annual State Leadership Accountability Act report identifying major risks facing the Commission and steps to address them. She said the Commission identified three risks: retirement of key staff people and succession planning, the state's accounting system conversion, and staff resource limitations. She noted that the Commission's management team recommends creating an online manual to preserve institutional knowledge pertaining to each staff position, continuing to work with the Department of General Services' Contracted Fiscal Services to improve accounting practices and procedures, and taking steps to reduce the number of staff leave hours to minimize financial impacts on the Commission. Ms. Daniel added that the Commission will be reporting to the Department of Finance every six months regarding its progress in mitigating its risks.

XV. LEGISLATION

Ms. Valencia reported that Governor Brown released his proposed \$22.6 billion general fund budget for 2016-17. She said the budget includes significant increases in funding for education, health care, and state infrastructure while supporting the state's rainy-day fund and paying down state debts and liabilities. She noted that overall revenues are up, primarily due to temporary increases in capital gains. Ms. Valencia observed that because revenues could go down in the future, the Governor wants to insulate the state against dramatic fluctuations and downturns. For this reason, she advised, the budget includes revenue projections in the event of a downturn and a recession contingency plan, and state spending is still constrained. Ms. Valencia said a revised budget with input from the Legislature will come out in May.

Ms. Valencia said that at its emergency teleconference meeting in December, the Commission proposed revised language for SB 438 pertaining to the Commission's possible merger with the California Office of Emergency Services (Cal OES). She reported that stakeholder meetings are still underway, and it appears at this time that the Commission will remain as it is.

Ms. Valencia said stakeholders include Agency representatives, the Governor's Office, Cal OES, the Department of Transportation, Department of Conservation, and Department of Health and Human Services.

XVI. EXECUTIVE DIRECTOR'S REPORT

As a follow-up to Dr. Johnson's earlier presentation about the South Napa earthquake, Mr. McCarthy observed that scientific and engineering groups often have a tendency to make policy recommendations and wish lists that are impractical or ineffective due to a lack of understanding about the roles and relationships among state agencies. He pointed out that some recommendations are politically infeasible, such as tax credits for retrofits, and others that require state funding are unlikely to succeed. He noted that having a workshop session provides an opportunity to review ideas and winnow them down to a select group that can be prioritized and implemented. Mr. McCarthy recommended establishing a working group to consider the 45 or so recommendations in the PEER report and identify which ones the Commission can advocate and move forward.

Mr. McCarthy suggested having a workshop session in February so the Commission can take advantage of the window of opportunity that exists for making improvements. He said the staff will contact commissioners about proposed dates.

Alquist-Priolo Act Review Letter

Mr. McCarthy advised that the Mining and Geology Board is considering proposals to modify the Alquist-Priolo Act, and the Commission formed two committees to review and comment on those changes. He invited Engineering Geologist Robert Anderson to discuss the proposed comment letter.

Mr. Anderson noted that this is the first time the Commission has provided advice to the State Mines and Geology Board since he joined the Commission staff. He noted the Commission's enabling legislation mentions that the Commission should advise the Board when prudent.

Mr. Anderson stated that the technical advisory board held a hearing on September 30, 2015, to review an executive summary from the Board's executive director, and a couple issues were raised at that time. He said one involved engineering as a form of mitigation, and the other involved a change in the definition of what constitutes an active fault and the recurrence time frame. Mr. Anderson noted that the Commission addressed these issues in its December 1 letter.

2016 Meeting Locations

Mr. McCarthy welcomed suggestions from Commissioners for 2016 meeting locations. He said the March meeting will be in Sacramento, but the Commission would like to meet elsewhere in May and October.

Commissioner Gardner suggested meeting somewhere in the Imperial Valley, a seismically active area, but not during the summer months. Mr. McCarthy commented that this location might be a good venue for a joint meeting with representatives from the Mexican government. Commissioner Hellweg recommended Palm Springs. Commissioner Gardner noted that the Commission could consider meeting in Riverside again.

Commissioner Hellweg suggested San Luis Obispo. Mr. McCarthy recalled that Commissioner Ian Parkinson had mentioned San Luis Obispo as well.

Commissioner Knudson asked about the possibility of meeting in San Diego. Mr. McCarthy indicated that the Commission had not met in San Diego for many years. Commissioner Gardner noted that the shake table could be part of a visit to San Diego.

Commissioner Rabbitt recalled that the Commission had talked about meeting with Oregon officials to discuss the Cascadia subduction zone. Mr. McCarthy said he understood that Oregon had a volunteer seismic safety group under its geology department. He would investigate the status of that organization.

Commissioner Gardner asked the staff to come back with a list for the Commission to consider at the March meeting.

XVII. PUBLIC COMMENT

There were no members of the public who wished to address the Commission.

XVIII. MISCELLANEOUS & GOOD OF THE MEETING

Commissioner David Rabbitt said Golden Gate Bridge District representatives will be going to the shake table at UCSD to observe testing of the connections of the suspension bridge to fixed anchorages using dissimilar metals to dissipate the energy. He noted that the seismic retrofit program was launched after the Loma Prieta earthquake, and the cost of the next phase of seismic work is estimated at about \$500 million.

Commissioner Rabbitt reported that his county recently approved 20 separate seismic isolation valves along its aqueduct system. He said the engineers recommended 27 valves, but funding was only available for 20.

XIX. ADJOURN

There being no further business, the meeting was adjourned at 3:39 p.m.**

Salina Valencia
Legislative Director & Communications

Approved by:

Richard McCarthy
Executive Director