USGS
Earthquake Hazards Program

Summary notes from the July 6-7, 2006 meeting of the
Scientific Earthquake Studies Advisory Committee (SESAC)
Golden, Colorado

Meeting Participants

SESAC Members

Lloyd Cluff, *Chair*, Pacific Gas & Electric
Tom Jordan, University of Southern California/ Southern California Earthquake Center
Art Lerner-Lam, Center for Hazards and Risk Research, The Earth Institute, Columbia University
Vicki McConnell, Oregon Department of Geology & Mineral Industries
Jonathan Price, Nevada Bureau of Mines and Geology
Sharon Wood, University of Texas at Austin
Unable to attend: Jim Dieterich, University of California at Riverside and Chair, National Earthquake Prediction Evaluation Committee; Paul Somerville, URS Corporation

USGS Staff

David Applegate, Earthquake Hazards Program (EHP), Reston VA
Michael Blanpied, EHP, Reston
Rufus Catchings, Earthquake Hazards Team, Menlo Park CA
Art Frankel, Geologic Hazards Team, Golden CO
Elizabeth Lemersal, EHP, Reston
Nico Luco, Geologic Hazards Team, Golden
Peter Lyttle, Landslide Hazards Program, Reston
Jill McCarthy, Geologic Hazards Team, Golden
James Quick, Volcano Hazards Program, Reston
Eugene "Buddy" Schweig, Geologic Hazards Team, Memphis TN
David Wald, Geologic Hazards Team, Golden
Rob Wesson, Geologic Hazards Team, Golden

The meeting agenda is appended to this summary with annotations for file names of Powerpoint presentations in the Presentations folder and other files in the Background folder provided on a separate CD.

July 6, 2006 (Open Session)

Call to Order and Introductions

SESAC Chairman Lloyd Cluff began the meeting at 8:30 a.m., and attendees introduced themselves.

Updates from Program Office and Geologic Hazards Team

Dave Applegate and Jill McCarthy reviewed plans for the 1-1/2-day meeting, to include a tour of the new upgraded NEIC facility and a demonstration of Hydra. Applegate summarized recent EHP activities. He reported that Mark Myers' name has been sent to Congress and a hearing is anticipated on July 27. Myers headed up the oil and gas division within Alaska's Department of Natural Resources. The group discussed what Myers might focus on at USGS. Applegate noted that one of the main challenges facing the program was that all remaining supplemental tsunami funds must be spent by September 30, 2006. The National Earthquake Information Center (NEIC) upgrades have been accomplished, but upgrades to the Global Seismographic Network (GSN) have been hampered by the slow pace of obtaining diplomatic approvals in the Caribbean and logistics associated with telemetry. McCarthy stated that nine stations are to be installed in the Caribbean, but four memoranda of understanding and their associated permits are seemingly stalled. Funds have been placed into working capital accounts so that they can be used for installation beyond September 30th, as it is anticipated that roughly half the stations will be installed by then. Data for the new stations will be shared with the host universities; USGS will provide Earthworm support and upgrading of the stations over time.

Applegate described the Southern California multi-hazards demonstration project. A strategic plan is being developed based on stakeholder input; the project will include five major hazards and a number of USGS organizations and programs. The President's budget request for fiscal year (FY) 2007, released in February 2006, includes $300,000 for the earthquake-focused part of the project to initiate a concentrated study of the Southern San Andreas Fault system. That increase was approved by the House but not included in the Senate mark, which also limited redirection of existing funds pending details from USGS on where the funds are coming from. Jordan asked about the breadth of support for the initiative within USGS, which Applegate described as high. Vicki McConnell requested "USGS Budget 101," wanting to understand why USGS information of where funds would be re-directed from (to support the SoCal initiative) did not get to the Senate. Applegate explained that DOI makes extensive edits in order to focus on what is deemed to be most important to provide to Congress.

Cluff discussed his participation in the April 18, 2006, field hearing of the U.S. Senate's Disaster Prevention and Prediction Subcommittee during the1906 Centennial Conference in San Francisco. He spoke on science and engineering issues, focusing on the 2005 SESAC report recommendations; the need to increase work on multiple hazards; the So Cal demonstration project; and the instability of the San Francisco Bay delta levees. Sen. Barbara Boxer seemed especially concerned and pledged to press for the support needed to address the problem.

Update on national seismic hazard map/Cobb letter

Art Frankel provided background on the June 14, 2006 letter to SESAC Chair Cluff from Kentucky State Geologist Jim Cobb (attachment). The letter followed up on concerns Cobb had expressed during a presentation at SESAC's meeting in Memphis regarding the application of the national seismic hazard maps to Kentucky. He feels that the Department of Energy's decision to locate a major nuclear processing facility in Portsmouth, Ohio rather than in Paducah, Kentucky was due to the overly high hazard that the 2% chance of exceedance in 50-year maps depict for

the northern arm of the New Madrid Seismic Zone. Cobb also raised these concerns in a presentation at the recent Boston workshop held by the National Seismic Hazard Mapping Project. Frankel noted that while Cobb is correct that 3 of the 5 attenuation relations are based on point source models, adding other sources will likely reduce ground motions only slightly while other factors may raise ground motions. Cobb's letter also cites his papers published by the Kentucky Geological Survey's Zhenming Wang stating that there are mathematical errors in the probabilistic seismic hazard assessment (PSHA) methodology used for the maps and arguing that alleatory uncertainties should be removed from PSHA.

Action Item (SESAC/USGS): USGS to provide SESAC with response to earlier Cobb letter to USGS raising these concerns and draft reply to Cobb commenting on that response.

The group discussed Cobb's concerns. Sharon Wood noted that the old USGS National Seismic Hazard Mapping Project web site was very confusing, a concern that Cobb had expressed during the Memphis meeting, which may have contributed to misunderstandings about per year probabilities for 100-year recurrence. In contrast, the updated web site is very good and works well for her classes. She complemented USGS on its responsiveness to the earlier concerns. Jon Price asked how the hazard estimates for this region could be lessened. Frankel responded that more knowledge is needed about the northern arm of NMSZ—it should be that the northern arm has reduced activity, i.e., a longer recurrence interval. Perhaps the logic tree should be modified to reflect this possibility, which would require more knowledge about the liquefaction potential. If we had this knowledge, then the east-west extent of the zone could possibly be modified. Price suggested that exploring these possible changes to the logic tree would show KGS that USGS wants to work with them in good faith.

Action Item (USGS): Pursue studies that could result in logic-tree modifications for seismic hazard maps based on improved knowledge of liquefaction potential in the New Madrid Seismic Zone.

Also in response to Price's query, Frankel noted that the possibility that the 1811/1812 earthquakes were a clustering of three dependent events rather than a sequence, which is how they are currently treated, would reduce the chance of exceedance, an issue currently being dealt with for Cascadia. Using the 10% in 50-year map would also reduce estimated ground motion. The Building Seismic Safety Commission (BSSC) may consider using the 5% in 50-year map as part of its Project 07 to update the NEHRP provisions, which in turn feed into the next-generation model building codes. The existing BSSC commentary is a bit weak on why the 2% in 50 year was chosen in 1997. A better explanation can be found in EERI's *Earthquake Spectra*. At the Boston meeting held by NSHMP, engineers from the eastern US were quite vocal about the 2% in 50 year being used rather than the 5% in 50 year, which would have resulted in lower ground motions. For Project 07, BSSC will hold workshops in both the eastern and western US to provide for input, including re-looking at the 1997 decision. They are doing so with USGS urging, and USGS will provide funds for the workshops. ATC is holding a workshop in December to provide input to BSSC’s project 07.

On a related topic, Price asked about the status of Seth Stein’s argument that there is virtually no deformation in New Madrid. Frankel stated that others have found quite a bit of deformation

across the Reelfoot fault. For intra-plate seismic activity, a great deal of deformation is not necessarily expected.

Finally, Frankel noted that Shelby County (Memphis) has modified their building code for non-critical buildings, so that the 10% in 50 year from the 1997 maps are used, which results in lower standards for design by about a third of what was required for seismic safety two years ago.

Improving USGS input into HAZUS and other loss estimation tools

Applegate provided background on NEHRP legislation and reauthorizing language related to loss estimation and risk assessment. The USGS focus is on assuring that science is made useful to at-risk communities with several examples cited in the presentation. As part of the White House Office of Management and Budget (OMB) Program Assessment Rating Tool (PART) process for the USGS Geologic Hazard programs, USGS was instructed to work to improve the use of seismic monitoring in FEMA's HAZUS loss estimation software. Similar guidance appeared in the OMB budget passback for FY 2006, both for USGS and for FEMA. As a result, the agencies developed a joint plan and identified initial milestones.

Nico Luco provided background explanations on the factors that feed into risk. Luco has been assessing what role and products are most appropriate for USGS in order to meet user needs and to best use USGS science and research. The input received is summarized in his presentation (attachment), describing what the community would like to see from USGS and what activities were discouraged. The group discussed the issue of open-source risk modeling, which the private sector will not use, but others wish to use so that risk calculations are transparent. Tom Jordan pointed out that the focus of using such models should be on regional results. Art Lerner-Lam asked who USGS envisions as our client. Luco stated that HAZUS focuses on post-earthquake loss estimates and on scenario modeling and that results give expected losses, not a range of losses. USGS could focus on homes and schools, as these buildings are not typically dealt with by risk modeling companies. Lerner-Lam stated that it would be good to try to influence how risk is judged by both public and private sectors. In collecting good fragility data, transparency and good communication about the process is vital. Price asked if FEMA will continue to support HAZUS. Luco stated that FEMA views the HAZUS earthquake portion as mature, so FEMA's focus is on the hurricane and flood modules of HAZUS-MH. Price recommended that USGS focus should be on making the earthquake model better with improved site condition data (because FEMA has spent millions on HAZUS), rather than developing a new risk model. Luco said that USGS may be able to use data from instrumented buildings to provide an improved methodology, not simply better input data. Rob Wesson suggested that the mean loss data that HAZUS provides is not always sufficient; for example HAZUS cannot produce loss estimation curves, so that the scope of possible losses can be seen. Seeing the full range of losses may help communities to make better decisions, such as the Memphis code issue discussed earlier. It was noted that BSSC's Project 07 is investigating a risk-targeted approach to mapping of ground motions for seismic design.

Luco indicated that the long-term goal is to create an interactive web tool for quantitative seismic risk assessment of wood-frame residential buildings and to involve Keith Porter (CalTech), who was part of CUREE's wood-frame project, and having a module within OpenSHA that Ned Field

(USGS Pasadena) is developing. Luco described the phases for the development of this tool. Cluff encouraged Luco to look at Mary Comario's (UC Berkeley) work with risk.

McConnell wondered if there are any possible liability issues and stated that USGS should not provide information that is contrary to what local jurisdictions require in their codes. Wood suggested that a project in Istanbul may be useful (she will provide link); there is a NEES project at the University of Buffalo that is testing a full-scale house—it is just beginning and may provide interesting data; and wondered if soils will be an issue within the planned tool for residences—homeowners will not know about their soils and even the good California Geological Survey maps are not specific enough for lot-specific determinations. McConnell recommended that USGS have a clear goal in mind, i.e., identify what action is wanted from homeowners, then develop and test tool with the goal in mind.

PAGER project

Dave Wald described PAGER (Prompt Assessment of Global Earthquakes for Response), which will provide concise estimates of the impacts of global earthquakes, especially in the developing world where aid agencies are particularly eager to have rapid information. The focus of the current prototype is on fatalities since there is more data on fatalities than on injuries. The next version will also focus on uninsured and non-engineered build damage. Wald described the new USGS Earthquake Notification Service (ENS), which can be tuned by the user based on the importance of the earthquake based on shaking reports and PAGER estimates. Did You Feel It? is now global. In discussion, Wood noted that the contours on PAGER are difficult to understand. Price asked about connections with the UN International Year of Planet Earth (2007-2009). McCarthy responded that the US has not signed on yet, but USGS is hoping that the International Year will provide opportunities for presentations on PAGER and its uses. Rufus Catchings asked if tsunami probabilities will be included, and Wald stated that this may be dealt with in the future if resources are available.

Global Risk Identification Program

Lerner-Lam described the Global Risk Identification Program (GRIP), a World Bank project that seeks to mainstream hazard and risk as factors that are dealt with for economic development. The World Bank is using Hotspots and Reducing Disaster Risks reports to screen country assistance strategies. The UN's Independent Evaluation Group report stated that there is too much spending on recovery. The project is using exposure as a proxy for risk. The project will develop a Global Risk report in 2007-2008, then every 3-5 years thereafter, which is to be used by the UN Development Program in its country development strategies. The project seeks to develop partnerships between countries with greater and lesser capabilities for capacity development and product delivery and to draw out studies by in-country institutions. The project wants to focus on standards development—a less ad hoc system that what is currently used. Development specialists are the focus, not earth scientists. International organizations do not have much technical expertise, so this is a limiting factor. Funding of $3-5 M per year is the hope during the development phase, to include demonstration projects. Future projects would be funded by individual countries related to development projects. Ross Stein was asked to submit a proposal for funding under this project (his proposal was sent to SESAC on 6/30/06 and is in

the Background folder). After lunch the committee discussed GRIP and other multi-hazard projects. The concern is that the focus on hazard and risk science is often greatly reduced when more than one hazard or risk is focused on.

SESAC roundtable discussion of NEHRP strategic plan

Applegate briefed the committee on NEHRP activities in recent months. The Interagency Coordinating Committee (ICC), which was formally established in the 2004 reauthorization of NEHRP, met in May with all members and will meet again in July. A draft report outline for required annual reports is being developed. John Filson spends about a quarter of his time supporting the new NEHRP office at NIST, which was designated as the lead agency in the same reauthorization. The NEHRP agencies held a town hall meeting during the Quake 06 conference to get feedback from the earthquake community in advance of revising the NEHRP strategic plan, hearing that a 21st-century plan is needed. Agencies are using a gap analysis to document what has been completed and is successful and what has yet to be done.

USGS asked for SESAC's feedback on the existing NEHRP strategic plan and recommendations for the next one. McConnell emphasized that metrics are needed to assess how far along agencies are and needs to deal with how related endeavors (such as Earthscope, which NSF does not consider part of its NEHRP contribution) will be used in the future. Jordan stated that the current plan does not reflect the rapid progress of earthquake science. In particular, model-based results should be dealt with in the plan along with earthquake system science and high-performance computing. Cluff asked that Pat Leahy convey the perspective at the NEHRP ICC meeting that the plan should have simple and clear over-arching strategic statements and be clearly forward-looking. Price stated that the link between the USGS Science Strategy and the plan should be clear. Each agency should establish overall goals and these should be reflected in all plans, documents, etc. The opportunities that geodesy provides should be stated in plan. Jordon pointed out that peta-scale computing is a current buzzword—NASA and NSF are focusing research on it, but USGS is missing from such large-scale computing efforts to process considerable data that exists and will be developed. Lerner-Lam noted that the push on community resilience is good, but it is an outcome, not a strategy, and it can serve to diffuse the science. McConnell stated that the plan should be sensitive to the changes that have taken place in FEMA's mission, including the loss of the preparedness function to elsewhere in the Department of Homeland Security. Price recommended that the plan identify how NEHRP has and will be affected by 9/11, Katrina, and peta-scale computing. The committee would like to be able to review a draft of the NEHRP strategic plan within a coupled of weeks of the late October SESAC meeting.

Action Item (USGS): Provide SESAC with draft NEHRP strategic plan ahead of next meeting.

Earthquake early warning test

Mike Blanpied described the MOU with UC Berkeley, CalTech, and USC for a three-year pre-prototype evaluation of several earthquake early warning (EEW) algorithms on California Integrated Seismic Network (CISN) data streams, using real earthquakes to test the accuracy of the parameters of early warning predictions and to identify what network system upgrades (CISN

in particular) would be needed to deploy an EEW system. The USGS Earthquake Hazards Program is funding the evaluation through ANSS for infrastructure development and through its External Research Support component. Jordan stated that this project's need to get data from one point to another very quickly is an IT challenge and that the management and operational guidance aspects are quite important to have more information about for EEWs to be successful. Catchings asked when we might get intermediate algorithm results. There will be annual reports from the management group (Oppenheimer, Allen, Hauksson) and the ANSS steering committee will provide reviews. Wood stated that the ANSS steering committee has not made a big commitment to EEW as instrumented buildings are seen as a greater priority. Applegate indicated that EHP needed to carry out this pre-prototype as Congress expects that earthquake early warning will be achieved in future. McCarthy stated that the big costs will be moving from research prototype to operational. Applegate indicated that the EEW test is planned to become part of the broader Southern California multi-hazard demonstration project should it get expanded funding.

ANSS Steering Committee report

Wood reported that 7 buildings and 4 bridges were funded in FY 2006 for instrumentation bringing the total ANSS station number to 650. The next round will focus on Southern California, but there will be no new instruments funded in 2007. The committee has requested a document describing how things have changed in the last 10 years (focus on LA, Seattle, and New York City) and what is anticipated in the next 10 years. NEIC has made tremendous accomplishments. The regional networks operate independently and have not bought into the system approach—they are being asked to address uniform performance standards in their 3-year proposals (for 2007-09). Bill Leith attended the recent NEES meeting and has ideas on how NEES and ANSS can work together. The National Strong Motion Program is being folded into ANSS. ANSS is working with the California Strong Motion Instrument Program (CSMIP) to gather data from instrumented structures. Lerner-Lam wondered about nuclear reactor monitoring—the plants are required by NRC to install monitors but with the exception of PG&E the data is not tracked or used.

NEPEC report

Blanpied presented a summary of the recent NEPEC meeting. The committee met in May and has recommended a workshop in the Pacific Northwest on episodic creep and tremor. NEPEC has also recommended that USGS provide probabilities that underlie the National Seismic Hazard Maps on the web in a manner that may discourage some researchers from presenting a compilation of existing probabilities as "news." NEPEC has a subcommittee to develop "rules of engagement" that researchers would need to meet in order to have NEPEC evaluate their predictions. Jordan stated that at SCEC's Collaboratory for the Study of Earthquake Predictability (CSEP) meeting in June, the establishment of three testing centers was discussed—to be natural labs with ETH Zurich and New Zealand, in California through RELM and ETH Zurich focused on the Great Basin. SCEC's Regional Likelihood Models (RELM) is sunsetting, with activities in future to be carried out by WGCEP and CSEP; a new earthquake forecasting and predictability working group will be established within SCEC.

NEIC reception and tour

The group attended the tour by Stuart Sipkin and Ray Buland, including a HYDRA demonstration.

July 7, 2006 (Open Session)

USGS Science Strategy Team progress report

Buddy Schweig gave an overview of the development of the USGS Science Strategy. He is part of a team of working scientists assembled to draft the document. Tasked by the Director, the team was asked to be realistic but not be concerned about implementation. The strategy presents exciting directions that USGS should be pursuing. During the development of the strategy, the team learned a great deal about all of the USGS people and resources. Hazards was viewed as a key science direction with EHP frequently mentioned as a success story. The existing hazards initiative was included. There is a strong emphasis on moving into societal risk and community vulnerability and resilience, and the considerable research that can and should be done on risk. The focus is on interdisciplinary science— on using all (or most) of USGS capabilities to solve problems. The team started with a list of 7 societal needs that USGS could assist with, a number of which have been combined. The team was concerned that all components and people within USGS that are doing important work can see themselves in the strategy. McConnell recommended that part of the strategy be to cut across the silos and help USGS people know what is being done in other areas of the USGS. Input was sought from many external constituencies, although a listening session held in Washington, D.C., did not get as much participation as the team hoped.

Action Item (USGS): Provide SESAC with a draft of the science strategy for review prior to the next SESAC meeting.

Overview of geohazard coordination efforts

Applegate explained that the morning's session would focus on an OMB request for SESAC to provide guidance on coordination among the USGS geohazard programs (Earthquake Hazards Program, Landslide Hazards Program, Volcano Hazards Program, Global Seismographic Network, Geomagnetism Program). These five programs went through the OMB Program Assessment Rating Tool (PART) process together and, having been judged "Moderately Effective" with an 82 score, the programs received follow-up recommendations from OMB on how to do better. The resulting Improvement Plan from OMB sets milestones for how to meet the recommendations. Last year, the programs were given a recommendation to "Identify opportunities to coordinate hazards investments across landslide, earthquake and volcano activities." The program coordinators subsequently carried out a number of activities for which OMB deemed the recommendation to be met and issued a new recommendation for this year's Improvement Plan: "Evaluate initial efforts to coordinate hazards investments across landslide, earthquake and volcano activities."

The programs have four milestones to meet this recommendation, the last of which is to have SESAC review "geohazard program coordination and potential efficiencies" and deliver a letter report by the end of August. The morning's presentations focus on coordination efforts so far, the actions being carried out for PART, and perspectives from both the Landslide Hazards Program (Peter Lyttle) and Volcano Hazards Program (Jim Quick) as well as that of the Geologic Hazards Team (Jill McCarthy), which incorporates all but volcano.

Action Item (SESAC): Prepare a short letter report to address how USGS is doing so far, some possible opportunities for the future, obstacles and even perhaps limits to coordination (i.e. at some point these programs have separate roles).

As background, the committee was provided with a draft document prepared for OMB identifying a number of case studies of interprogram coordination. By the end of July, the programs will have a report evaluating the 24/7 operations at NEIC and the opportunities that poses for the other geologic hazard programs.

Landslide Hazards Program perspective

Peter Lyttle provided his perspective as Landslide Hazards Program coordinator. See attached slides for his presentation. The program is funded at roughly $3 million. Recent increases have enabled the program to enhance partnerships through contracts, cooperative work, and a new charter with the National Weather Service. The program has a number of key external constituents.

The program is guided by its planning document "National Landslide Hazards Mitigation Strategy: A Framework for Loss Reduction". The strategy was reviewed by the National Research Council in the report "Partnerships for Reducing Landslide Risk", which emphasized the need for a greatly expanded landslide hazard reduction effort. The Landslide Hazards Program is just one component of USGS landslide efforts, which also include activities supported by the Coastal and Marine Geology, Volcano and Earthquake Hazards, National Cooperative Geologic Mapping programs as well as the Water Resources Discipline.

A key focus of the program has been developing rainfall thresholds for burned areas, leading to a prototype post-fire flood and debris flow warning system in southern California with the National Weather Service to deliver warnings with much greater specificity than previously possible. The project combines NWS operational capabilities for precipitation forecasting and measurements and warning dissemination with USGS expertise in post fire debris flow hazard assessments and defining triggering rainfall threshold conditions.

Short-term future plans for the program include developing more rainfall thresholds for more areas with tighter definition. Longer-term advances could include web-based maps generated in near-real time using actual or predicted precipitation measurements and that show debris flow probability, magnitude, and area of inundation.

With respect to inter-program coordination, Lyttle emphasized the example of Seattle where Craig Weaver, head of the Seattle office of the Earthquake Hazards Team, served as a key local

contact and champion for both earthquake and landslide work in the area. His efforts to develop a consortium for LiDAR acquisition is a good example of obtaining data that is broadly beneficial across hazards and programs within USGS and its partners. He also cited the key role of Jill McCarthy as supervisor of landslide and other hazard efforts in the Geologic Hazards Team. Finally, he noted the opportunity presented by increased USGS engagement with FEMA and other partners in improved loss estimation with implications for many hazards.

In discussion, Jon Price asked whether there have been any presidential disaster declarations for landslides with Lyttle indicating that while there have been no standalone ones, landslides can be mentioned in the declaration as a secondary hazard, but it takes awareness on the part of emergency managers.

Volcano Hazards Program perspective

Jim Quick provided his perspective as Volcano Hazards Program coordinator. See attached slides for presentation. Quick discussed the National Volcano Early Warning System (NVEWS) planning effort, which drew on the ANSS experience. The initial framework document will be followed in September by an implementation plan. A major driver for the program and NVEWS is user needs. FAA recently did a user needs study that called for alerts of ash clouds in under five minutes of the event to allow for diversion. There are 250 flights a day between Asia and Europe that pass over 42 active U.S. volcanoes plus additional active volcanoes on Kamchatka and Japan.

Quick emphasized that real-time seismic monitoring is critical to detect small quakes early in the eruption cycle. Other needs include telemetered GPS supplemented by InSAR; emission and detection of ash (including Doppler radar); and underpinning knowledge of volcano behavior.

During discussion, Cluff asked about the potential threat of a partial flank collapse of Mauna Loa. Price asked about access to Department of Defense assets. There was considerable discussion of the USGS role in the magmatic component of EarthScope's Plate Boundary Observatory project. USGS has provided guidance of which volcanoes can generate the most information given the time limitations and obtained permitting and permissions on federal lands. Quick noted the Survey's long-term interest in taking over and maintaining certain PBO sites at the end of the NSF project.

Geologic Hazards Team perspective

Jill McCarthy provided her perspective as chief scientist of the Geologic Hazards Team, which includes scientists supported by the Earthquake Hazards Program, Global Seismographic Network, Geomagnetism Program, and Landslide Hazards Program. Everything but volcanoes. In her view, the main place for integration and cooperation across programs is on the operational side. NEIC pulls in real-time data from both ANSS and GSN streams. The ANSS process itself has integrated regional and national networks in order to provide one common answer and seamless presentation to the public, which is a non-trivial accomplishment. Core strengths in network operations and software development can be leveraged in the future. The Geomagnetism program's activities are very similar to the operational aspects of the Earthquake Hazards

Program, and efforts are underway to piggyback on the expertise developed at NEIC. A major challenge today is skyrocketing IT security requirements. The Geologic Hazards Team has been through it more than any others and was able to take advantage of the tsunami supplemental to address some of the needs. This investment needs to be leveraged across the geologic hazard programs. Like Peter Lyttle, she cited loss methodology as an area for sharing expertise. The NEIC's shift to a 24/7 operation also creates opportunities along with the upgraded web, IT security, and system administration capabilities. If the boundaries of what NEIC analysts can provide are made clear, there is the potential to offload some of the nuisance-level communications, serving a filtering role. McCarthy also cited the web as an opportunity for greater collaboration. Half of the total USGS web page views are earthquake-related, and another big chunk are from the other hazards programs. A great deal has been learned from large earthquakes. She also suggested the Akamai service for web bursting as a useful tool for other programs.

Quick noted that the principal utility of NEIC for volcanoes is to know how to direct inquiries, noting that monitoring all the life signs of a volcano is complicated and can change minute to minute. He suggested that CAP alerts were one mechanism but that NEIC would not be able to deliver the 5-minute warnings needed by NOAA, the Air Force, and DOD.

In discussion, Price asked if it would be possible for the volcano program to develop an equivalent to the NEIC tectonic summaries that are on the shelf for most likely earthquakes. Quick responded that the Smithsonian's Global Volcanism Program website contains much of that information. Lyttle noted that this would be a good goal for the landslide program, perhaps done jointly with affected states. The earthquake summary poster is another product that could be exported to other hazards. There was considerable discussion of the value of having an umbrella website for hazards and the need to standardize the volcano-focused sites. Quick noted the progress that has been made in adopting a common alerting system across the observatories.

Committee wrap-up discussion

Dates for the next meeting were identified: October 30-31 in Albuquerque. There will be a meeting in Reston to meet with the new Director: February 12, 2007 (full day) and February 13 (1/2 day)—after February 6 budget release. Future meeting topics suggested include focus on volcano hazards (HVO and seismic network).

Action Item (all): Next meeting dates: October 30-31, 2006, in Albuquerque followed by February 12-13, 2007, in Reston.

With Cluff, Jordan, Price and Wood all rotating off of SESAC following the February meeting, there is a a major need for restocking the expertise on the committee as well as identifying a new chair. Both structural and geotechnical engineering representation is needed; a state geologist and someone with geodetic expertise would also be good; seismology and planning (APA) expertise are needed too. The next SESAC chair will be an ex-officio member of NEHRP.

Agenda for
Scientific Earthquake Studies Advisory Committee (SESAC) Meeting
July 6-7, 2006
Golden, Colorado

Thursday, July 6th (Open Session all day)

Time	*Topic*	*Presenter/Participants*
8:30 am	Welcome and review of agenda	Lloyd Cluff, SESAC Chair
8:40 am	Updates from program office and teams • President's tsunami initiative implementation • Southern California Demonstration Project planning	Applegate, McCarthy, Catchings
Making the hazard to risk transition		
9:00 am	Update on national seismic hazard map/Cobb letter (PP: Frankel; Cobb letter to SESAC)	Art Frankel
9:30 am	Improving USGS input into HAZUS and other loss estimation tools (PP: Applegate slides 1-12 & Luco_Risk)	Nico Luco
10:15 am	Break	
10:30 am	PAGER project	David Wald
11:00 am	Global Risk Identification Program	Art Lerner-Lam
11:30 am	Committee discussion	
12:00 pm	*Lunch*	
1:30 pm	SESAC roundtable discussion of NEHRP strategic plan	
2:30 pm	Earthquake early warning test	Mike Blanpied
3:00 pm	Break	
3:15 pm	Allied committee reports • ANSS Steering Cmte • NEPEC	 Sharon Wood Mike Blanpied
4:15 pm	NEIC reception and tour	Stuart Sipkin & Ray Buland

Friday, July 7th (Open Session until 11:00 am)

8:30 am	USGS Science Strategy Team progress report (PP: Schweig_Science Strategy)	Buddy Schweig

Review of geohazard program coordination

8:45 am	Overview of geohazard coordination efforts (PP: Applegate, slides 13-30)	Applegate
9:00 am	Landslide Hazards Program perspective (PP: Lyttle Landslide HP)	Peter Lyttle
9:30 am	Volcano Hazards Program perspective (PP: Quick_Volcano)	Jim Quick
10:00 am	Geologic Hazards Team perspective (Word: notes from Jill McCarthy GHT perspective)	McCarthy
10:15 am	Break	
10:30 am	Committee discussion	

Executive Session

11:00 am	Committee discussion	
12:15 pm	Review action items	
12:30 pm	Adjourn	