

## Summary Minutes

### Nevada Earthquake Safety Council

15 August 2003

The Nevada Earthquake Safety Council (NESC) met from 9:00 a.m. to 3:27 p.m. at the Clark County Building Department's Russell/Cameron Office in Las Vegas. These and previous minutes are posted on the NESC Web site ([www.nbmng.unr.edu/nesc](http://www.nbmng.unr.edu/nesc)).

Ron Lynn chaired the meeting. Individuals attending the meeting are members of the Council:

Rasool Anooshehepoor, Nevada Seismological Laboratory, who held the proxy for John Anderson\*  
 Mike Blakely\*, Blakely, Johnson, and Ghushn, who also held the proxy for Ian Buckle\*, UNR Center for  
 Civil Engineering Earthquake Research  
 Wayne Carlson\*, Nevada Public Agency Insurance Pool  
 Craig dePolo, Nevada Bureau of Mines and Geology (NBMG), who held the proxy for Michael Lynch\*,  
 Builders Association of Northern Nevada  
 Diane dePolo, Nevada Seismological Laboratory  
 Eric Fossett, UNLV Graduate Student  
 Terri Garside, Nevada Bureau of Mines and Geology  
 Marge Gunn Nutman\*, Nevada Assoc. of Counties & Lincoln Co. Office of Emergency Management  
 Mark Harris\*, Nevada Public Utilities Commission  
 Rose Henderson, State Public Works Board  
 Deborah Hinman, SBC, who held the proxy for Phil Herrington\*, Carson City Building Department  
 Jenelle Hopkins\*, Clark County School District, Las Vegas  
 Jeffrey Lusk, Federal Emergency Management Agency (FEMA), Region IX  
 Ron Lynn\*, Clark County Building Department  
 Greg Moss\*, The Moss Group  
 Glade A. Myler, Deputy Attorney General  
 Elton Nutman, Lincoln County  
 Jim O'Donnell\*, UNLV  
 Bert Prescott, Nevada Division of Emergency Management (NDEM), representing Rick Martin  
 Jon Price\*, Nevada Bureau of Mines and Geology, who also held a proxy for Greg Flanigan\*, Farmers  
 Insurance  
 Gary Rasmussen, geological consultant  
 Jim Reagan\*, Sierra Pacific Power Company  
 Burt Slemmons\*, University of Nevada, Reno (retired, Las Vegas consultant)  
 Catherine Snelson\*, UNLV Geoscience Department  
 Wanda Taylor, UNLV  
 Jim Werle\*, Converse Consultants

\* indicates member of the Board of Directors.

A quorum of directors (the necessary 11) was present.

Board Members unable to attend or send a proxy included:

Bernie Anderson\*, Nevada State Assemblyman  
 Tim Crowley\*, Nevada Resort Association  
 Ed Ruttan\*, American Red Cross  
 Ray Schaffer\*, Nevada State Senator

The minutes from the meeting on 16 May 2003 were approved.

## **COMMITTEE REPORTS**

### **Education Committee**

Jenelle Hopkins and Cathy Snelson reported good progress on the seismographs in schools program. Three three-component instruments in Clark County schools are connected to the Nevada Seismological Laboratory, and another five are operational as educational units connected only to computers in the schools. The school district has been helpful. The committee is seeking grants to help pay for training of the teachers. The committee is working on earthquake curricula for schools. An initiative (as part of the federal No Child Left Behind Act of 2001) is underway to have Nevada teachers be properly trained in the disciplines that they teach.

**ACTION ITEMS:** Cathy Snelson and Jenelle Hopkins will make recommendations to the Council for action regarding the initiative to have Nevada teachers be properly trained in the disciplines that they teach.

**ACTION ITEM:** Ron Lynn will approach the Nevada Resort Association to fund an earthquake calendar. Diane dePolo will provide Ron with necessary information regarding costs.

Wayne noted that the seismic network in rural schools is operational with five schools fully participating so far.

### **Research Committee**

Craig dePolo reported on the workshop on risk management in the multi-hazard world that he and Bert Prescott attended earlier in the summer at FEMA's training center in Emmitsburg, Maryland. Craig reported on some items that may be of interest to the Council.

The State of California is automatically running FEMA's loss estimation computer program, HAZUS, and a shakemap program immediately after an earthquake. They can complete the HAZUS run in 10 minutes. Cal OES, Cal GS, USGS, and FEMA agreed to use this as the primary HAZUS report after an earthquake in California.

Several good Web sites were reviewed during the workshop. These include [www.hazardmaps.gov](http://www.hazardmaps.gov), a site for multi-hazard mapping initiatives; [www.disasterhelp.gov](http://www.disasterhelp.gov), a site outside FEMA's firewall that will be used more to share information among states and local governments; and [www.earthviewer.com](http://www.earthviewer.com), a site for viewing satellite imagery.

A point made at the workshop was that a message needs to be repeated six or seven times to get through to the public. NESC should consider an advertising campaign for the "Beat the Quake" message to be used in next year's Earthquake Awareness Week.

Craig is designing a drop-cover-and-hold refrigerator magnet.

Los Angeles no longer allows chimneys to be braced. They must be built to resist earthquakes in that community.

Montana is using Census blocks rather than the larger Census tracts in their running of HAZUS.

FEMA uses an average value of a cost of a life of \$1.7 million in its cost-benefit analyses.

"Every situation properly perceived is an opportunity."

Craig distributed a sheet with information to be the main message during the next year's efforts to educate the public during Earthquake Awareness Week and at other times. Please send comments on the information below (between \*\*\*\*\*) to Craig (cdepolo@unr.edu).

ACTION ITEM: All interested parties should send Craig dePolo (cdepolo@unr.edu) comments on the draft messages to the public for the "Beat the Quake" campaign outlined by the Research Committee.

\*\*\*\*\*FOR A ONE-PAGE LIST OF KEY ACTIONS\*\*\*\*\*

**Beat the Quake  
Steps to Earthquake Safety**

**DUCK, COVER, and HOLD during an earthquake.**

- Identify safety spots at home and work.
- Don't panic and run.

**Identify and fix your dangerous and/or costly shaking hazards.**

- Bookcases, heavy objects on shelves, large mirrors, computers
- Secure, relocate, or remove dangerous and/or valuable object.

**Prepare an emergency safety kit.**

- Flashlight, water, non-perishable food, first aid

**Make an earthquake plan.**

- Family meeting plans, out-of-town telephone contact

**Work on long-term earthquake fixes.**

- Bolt house to foundation.
- Brace weak walls.

**Be earthquake-aware when making changes to your home.**

**Get earthquake information.**

- Visit an earthquake safety web site, [www.seismo.unr.edu](http://www.seismo.unr.edu), and "Living with Earthquakes in Nevada," [www.nbmgs.unr.edu](http://www.nbmgs.unr.edu).

\*\*\*\*\*FOR THE MESSAGE ON A REFRIGERATOR MAGNET\*\*\*\*\*

**Beat the Quake**

**If you feel an earthquake, DUCK, COVER, and HOLD.**

**Identify and secure or relocate dangerous shaking hazards.**

**Prepare an emergency-safety kit.**

**Make an earthquake plan.**

\*\*\*\*\*

Ian Buckle has offered to brace the computers in the State's EOC at NDEM in Carson City.

The UNR Earthquake Laboratory had a demonstration of its third, new shake table, with good media coverage, Craig has made some videos of experiments using the table; these will be shown at a future Council meeting.

Cathy Snelson reported that her seismic experiment to evaluate the three-dimensional structure of Las Vegas Valley went very well.

Cathy mentioned that Lawrence Livermore National Laboratory (Dave McCallen) is willing to financially support a southern Nevada meeting on earthquake hazards.

Jim Werle noted that the last such meeting on seismic hazards in the area was in 1996. That conference raised many questions. A spring 2004 follow-up conference will be quite timely, given all the new research that has been done.

2002 Denali earthquake was on a Sunday – likely would have had children injured in schools, had the earthquake not been on a weekend. Nevada should focus on non-structural hazard mitigation in schools. This would be a good project for FEMA's mitigation grants.

**ACTION ITEM:** Jim Werle, Cathy Snelson, and Craig dePolo should work on timing, presumably in the spring of 2004, and organization of a southern Nevada earthquake hazard meeting.

**ACTION ITEM:** Ron Lynn tasked an ad hoc subcommittee on non-structural hazards in school (Craig dePolo, Jenelle Hopkins, and Tim Crowley) to suggest recommendations on what schools should do.

**ACTION ITEM:** Ron Lynn also asked Craig to evaluate the Clark County Building Department for non-structural hazards during an earthquake.

The annual meeting of the Association of Engineering Geologists will be in Las Vegas in the fall of 2005.

Jim Werle noted that over the last year there has been much more awareness of the need for fault investigations. Essentially all the geotechnical consulting firms are evaluating faults and liquefaction hazards in their work. Henderson recently required a third opinion to referee conflicting geotechnical reports regarding the presence of faults on a particular project. Jim stated that interesting aspects that might be addressed in the future are registration of geologists and positions for "County Geologists" to review the work of geotechnical consultants.

Jim also noted that there is much new work being done on seismic classifications of soils to comply with the International Building Code. It will be worthwhile to collect and compile the new data from trench studies and soil classifications. Ron Lynn remarked that the soils reports are available for the public to view (although not necessarily to copy) at the Clark County Building Department.

Bert Slemmons noted that the question still exists whether the faults in Las Vegas Valley are considered tectonic versus related to subsidence. Ron Lynn noted that in terms of setbacks from faults (not building right over the faults), whether the fault is caused by earthquakes or subsidence doesn't matter. Jon Price noted that the question does become important in the probabilistic seismic hazard analysis that feeds into building codes.

**ACTION ITEM:** Jim Werle and Greg Moss were tasked to work with Ron Lynn on recommendations from the Council for preservation of data, including locations of faults and trenches where information was collected.

**ACTION ITEM:** Mike Blakely and Jeff Lusk were tasked to look into methods for securing water heaters. Specifically, the International Building Code requires a three-strap method for bracing water heaters, but there may be suitable alternatives that the Nevada Organizations of Building Officials (NOBO) may want to consider.

### **Policy Recommendation Committee**

Wayne Carlson distributed a copy of the bill (Assembly Bill 57) that was passed by the Nevada Legislature and was signed by the Governor on June 9, 2003. Ron Lynn reported that he relayed the passage of the bill and its contents to NOBO.

Wayne asked whether there are model laws on post-earthquake.

### **Strategic Planning Committee**

Jim Reagan distributed a copy of the revised strategic plan (from November 2001) with revised goals, which were developed by committee chairs. These will be posted on the NESC Web site. Please review these for discussion and approval during the November 2003 Council meeting. Please send comments to Terri Garside (tgarside@unr.edu), who will forward them to Jim Reagan.

**ACTION ITEM:** Terri Garside will see that a motion to approve the revised strategic plan and a motion to approve the revised annual report will be placed on the agenda for the November Council meeting. She will also see that the revised strategic plan and the revised annual report are posted on the NESC Web site for review before that meeting.

### **Western States Seismic Policy Council**

Jon Price noted that WSSPC is holding its annual meeting, which is open to anyone interested in earthquake policy issues in the western states or at the national level, September 20-24, 2003, in Portland, Oregon. Please visit the WSSPC Web site for details about the program and information on registration ([www.wsspc.org](http://www.wsspc.org)). Ron Lynn amplified on the importance of WSSPC in developing policies.

#### **Earthquake Preparedness Suggestions: Nevada Tourism Industry and Warehouse Merchandise Industry**

Ron Lynn indicated that two documents on suggestions for earthquake preparedness (one for the Nevada tourism industry and another for the warehouse merchandise industry) will be posted on the NESC Web site. Ron reviewed these documents for use in working with the industries and felt that, although good for letters, they need to be consolidated for use as laminated placards. NESC could offer to train industry individuals and offer laminated cards for hotel staff.

Jim Reagan suggested that such information be made into all-hazards information. Ron Lynn noted that nearly every hotel has a placard in every room for what to do in the event of a fire. However, generally less than one percent of people actually read these. Pictorial and multi-language printing may be essential.

**ACTION ITEM:** Terri Garside will see that these documents are posted on the NESC Web site.

**ACTION ITEM:** Ron Lynn will discuss this initiative with the Nevada Resort Association.

**ACTION ITEM:** Jon Price will put discussion of hazard information for hotel staff and visitors on the agenda for the next meeting of the Nevada Hazard Mitigation Planning Committee.

### **Nevada Hazard Mitigation Planning Committee**

Jon Price reported on the creation of a new Nevada Hazard Mitigation Planning Committee. The bylaws for the committee were recently approved by legal counsel and signed by Frank Siracusa, NDEM Chief.

The purpose of the Committee is to advise the Nevada Division of Emergency Management concerning hazard-mitigation planning, activities, and policies. All hazards, including natural and man-made, may be considered, and the Committee should adhere to the State Hazard Mitigation Plan prepared in accordance with the federal Disaster Mitigation Act of 2000 (DMA 2000). Specific charges to the Committee are to:

- (1) Implement the State Hazard Mitigation Plan, through the following actions:
  - (a) Encourage local and regional, multi-jurisdictional governmental agencies and the private sector to prepare their own hazard mitigation plans;
  - (b) Initiate the preparation of appropriate proposals from state agencies and encourage local and regional, multi-jurisdictional governmental agencies to submit proposals for pre-disaster mitigation projects in Nevada;
  - (c) Review proposals submitted for pre-disaster mitigation projects and make recommendations to NDEM for priorities for funding;
  - (d) Assist NDEM in the preparation of formal proposals to FEMA for pre-disaster mitigation projects;
  - (e) Promote activities that contribute toward building disaster-resistant communities throughout Nevada; and
  - (f) Assess risks from natural hazards in Nevada, and use risk assessments in the development of Hazard Mitigation Plans and in the evaluation of proposals for mitigation projects.
- (2) Review and revise the State Hazard Mitigation Plan, as required by federal law or as needed.

A Board of Directors will serve as the governing body for the Committee. Directors will be appointed by and serve at the pleasure of the Chief of NDEM.

Directors will consist of one representative of the following state, local, and regional, multi-jurisdictional governmental agencies and the private sector:

1. Clark County Emergency Management (Jim O'Brien)
2. Washoe County Emergency Management (Press Clewe)
3. Rural County Emergency Management (Margie Gunn Nutman)
4. Local or Multi-Jurisdictional Emergency Management (Rick Diebold)
5. Local or Multi-Jurisdictional Floodplain Management – Northern Nevada (Jeanne Ruefer)
6. Local or Multi-Jurisdictional Floodplain Management – Southern Nevada (Gale Fraser)
7. Nevada Bureau of Mines and Geology (Jon Price)
8. Nevada Department of Conservation and Natural Resources/Division of Forestry (Bob Ashworth)
9. Nevada Department of Conservation and Natural Resources/Division of Water Resources (Kim Groenewold)
10. Nevada Department of Transportation (Frank Taylor)
11. Nevada Earthquake Safety Council (Ron Lynn)
12. Private Sector (Jim Reagan)
13. At-large (private sector or governmental agency – individual to be determined)

Names in parentheses are individuals who have been appointed to serve. Jon Price and Rick Diebold have been asked to be the chair and vice chair of the committee, respectively.

The Nevada Fire Safe Council is doing county-by-county planning for wildland fires. Bert Prescott stated that the wildland fire mitigation plan will be an annex to the State Hazard Mitigation Plan. Jim Reagan noted that other funds, outside FEMA's pre-disaster mitigation funding program, are available for fire mitigation. Marge Gunn mentioned that rural counties often have difficulties in providing matching dollars.

### **Update on Recent Earthquakes and Research**

Rasool Anooshehpour reported that there were only 15 earthquakes with magnitude of 2.8 or greater in Nevada in the last few months. The largest was a magnitude 4.2 near Elko.

The Advanced National Seismic System (ANSS) now has 16 stations in the Reno/Sparks area, 6 in Carson City, and 11 stations in Las Vegas. They trigger on big earthquakes but also pick up small ones. There will be 8 new stations this coming year (three in Reno/Sparks, one in Minden/Gardnerville area, four in Las Vegas) and one new instrument to be used as a spare.

John Louie, Professor with the Nevada Seismological Laboratory, has invented a new method for measuring shear-wave velocity in shallow materials. He uses background noise (from automobiles and other motion) instead of an active source (hammer or explosion). He conducted an experiment with 120 sensors in mid-July along a line that parallels I-15 through the center of Las Vegas Valley. Individual sensors were placed about 20 meters apart. This information allows calculation of shear-wave velocity in shallow sediments, which is used to determine the National Earthquake Hazard Reduction Program (NEHRP) soil classification, which, in turn, is needed in building design.

Cathy Snelson described preliminary results from her seismic experiment in Las Vegas Valley, which is designed to image the basin depth and three-dimensional structure of sediments in the "Seismic Investigations in Las Vegas Valley - Evaluating Risks (SILVVER)." Students from UNLV, UNR, UTEP, UK-South Hampton, and other universities and some local resident volunteers helped with the experiment. They used 6,000 pounds of explosive in 9 separate explosions (up to 1,000 pounds). Based on gravity data, the deepest part of the basin appears to be below Nellis Air Force Base. The new data, which appear to be excellent, will be used to refine this. Within a few months, Cathy hopes to analyze the data.

### **Division of Emergency Management Update**

Bert Prescott reported that Kamala Carmazzi is not sure whether the entire \$200,000 that NDEM had hoped would be available for earthquake-related projects now will be available, but she hopes that at least half of that amount will be. She will know in about two or three weeks.

**ACTION ITEM:** Jon Price should follow up on the Council's recommendations for funding of projects from the May 2003 meeting with Kamala Carmazzi.

NDEM will be moving into a new building, along with the Nevada Division of Forestry, in 2005, next to the National Guard in Carson City.

A major, 14-day exercise, labeled "Determined Promise 03" is beginning Monday afternoon, August 18. The Department of Defense (DOD) has the lead. FEMA, NDEM, and many other agencies are involved. The center for the exercise is Logandale in northeastern Clark County. FEMA and other federal agencies will activate their operations center with about 80 people, and the DOD Joint Task Force for Civil Support will send about 600 people. The exercise will help prepare for a possible bioterrorism event.

There will be a weapons of mass destruction (WMD) exercise on October 4 in Storey County, involving Washoe County.

Clark County is hosting HAZMAT Explo 7, November 17-21 ([www.hazmatexplo](http://www.hazmatexplo)), an opportunity for training on hazardous materials. Marge Gunn noted that the National Association of Title Three Program Officers (NASTTPO) participates in this event.

FEMA is revising its federal response plan to incorporate the Incident Command System (ICS). This will require some revision of state and local emergency response plans. The Department of Homeland Security will be the lead agency. The major thrust is to revise the federal approach to match the standard approach that is being used by local governments.

Bert Prescott stated that the Nevada Office of Homeland Security has received and distributed \$675,800 in Department of Justice (DOJ) grants. In addition, \$550,000 in Phase I FY'03 grants have been awarded. A little over \$3 million in FY'03 Phase II grants for equipment will be awarded soon.

Bert noted that one grant cycle is open right now; this is for FY'03 State agency funding from DOJ. Notifications went out Friday, August 8. Draft applications are due to DEM September 5. Final applications are due September 26. Universities are eligible as well. The grant subcommittee will meet October 8, and the main Committee on Homeland Security will meet the following week. This is primarily for personal protection equipment and detection equipment. Training, planning, and exercises (and GIS systems) can be included in this.

Bert pointed out that FEMA's Pre-Disaster Mitigation Program has two parts. The application process for planning grants (largely for local hazard grant writing) is now closed. The second part, for competitive projects, is open for proposals. These are largely for bricks and mortar projects. The notice of intent went out July 24. Bert's deadline for grant proposals is September 15. It has a FEMA cap of \$3M and a 3:1 federal: non-federal matching requirement. So far, the City of Reno is proposing two projects on the Truckee River, and the City of Sparks has another proposal pending.

The State Hazard Mitigation Plan will be delivered to NDEM (by the consultant hired to help write the plan) in late August.

Please see [www.dem.state.nv.us](http://www.dem.state.nv.us) for further information about NDEM programs.

Glade A. Myler, Deputy Attorney General, stated that Assembly Bill 441 is now law. It deals with sensitive issues that can be addressed in closed session of meetings such as the Council meetings, if the Governor's office determines that the information is classified or sensitive. Examples may be discussions of plans for buildings in the state or vulnerabilities to terrorist attacks.

### **What Happens When Small Businesses Encounter Earthquakes**

Terri Garside discussed the business continuity class that she attended last spring. The workshop was conducted by a private company ([www.dspnetwork.com](http://www.dspnetwork.com)). Some interesting statistics were reported at the workshop. Ninety-three percent of companies without a recovery plan go out of business within five years of a loss from a disaster. Fifty percent of businesses that do not recover their data within 10 days never fully recover. Critical business functions cannot continue for more than 4.8 days without a data recovery process. A key to a successful recover plan is testing the plan before a disaster occurs.

Craig dePolo showed a video produced by the Cascadia Region Earthquake Workgroup (CREW) on business survival and recovery after an earthquake or other disaster. Planning is the key. The video can be purchased for \$99 (DVD or VHS) from CREW ([www.crew.org](http://www.crew.org)) and comes with a CD with related information and documents for a business recovery kit.

Craig reviewed highlights from a report by the University of Wisconsin-Green Bay Center for Organizational Studies on the 1994 Northridge earthquake ([www.riskinstitute.org](http://www.riskinstitute.org)). Traditional precautions do not necessarily help businesses survive. Most businesses do not fail immediately after the event. Most losses do not occur during or right after the event. Most owners had few ideas about how they ought to recover.

Craig suggests that eventually NESC should hold a workshop on business recovery. To lead the effort, there should be a state recovery plan.

Greg Moss suggested showing the video on Public Access TV.

Greg also suggested this business interruption concerns should perhaps be handled by the new Nevada Hazard Mitigation Planning Committee.

**ACTION ITEM:** Jon Price will see that discussion of business recovery after a disaster be placed on the agenda for the Planning Committee.

## FEMA Update

Jeff Lusk reported that FEMA will be maintained as an agency within the Department of Homeland Security. Natural hazards will still be addressed within the Department and FEMA. NEHRP has been recommended for reauthorization. The National Institute of Standards and Technology (NIST) is likely to be the lead agency for NEHRP. NEHRP reauthorization allows for more funds for ANSS and other NEHRP programs.

An update of FEMA's loss estimation model, HAZUS, called "HAZUS MH" is supposed to be released soon, perhaps in September. "MH" stands for "Multi-Hazard," reflecting the addition of flooding to the model, and there is some uncertainty in when the release "might happen."

Jeff has been working with Craig dePolo to help organize a non-structural mitigation workshop and encourage other non-structural mitigation efforts. He is working with the TV show "Trading Spaces" to develop non-structural mitigation components into their programming.

Jeff stated that he has secured four more FEMA-surplus computers for the Nevada seismometers in schools program.

Jeff remarked that it is unsure whether the emergency management grants that come from FEMA to States, and which in Nevada are used to help fund the Nevada Earthquake Safety Council, will be transferred from FEMA to DOJ.

## Update on the Recent Integrated Emergency Management Course

Jim O'Donnell and Jon Price reported on the August 11-15 Integrated Emergency Management Course for the City of Las Vegas at FEMA's training center in Emmitsburg, Maryland. The course, which was attended by approximately 75 officials, including Mayor Oscar Goodman, from the City and other cooperating agencies and organizations, was a great success in building confidence in the City's ability to respond to a major disaster, in recognizing areas needing better communication and planning, and in recognizing earthquake hazards. Three members of the Council (Jim, Jon, and Ed Ruttan) participated in the exercise, for which the main event was a magnitude 5.9 earthquake on the Frenchman fault, with a depth of 12 kilometers and an epicenter 4 kilometers east of downtown Las Vegas. As part of the exercise, Ron Hess, GIS Supervisor with the Nevada Bureau of Mines and Geology, had run FEMA's earthquake loss estimation computer model, HAZUS, to estimate the possible loss.

For a **magnitude 5.9 daytime event**, HAZUS estimated, for all of Clark County:

**\$2.2 to 8.9 billion in economic loss,**

of which \$1.2 to 4.7 billion was in building damage,

\$0.3 to 1.3 billion was in damage to building contents, and

\$0.7 to 2.9 billion was in business interruption losses related to the building stock;

*\$14 million loss in highway damage*

*\$500,000 loss in railroad damage*

*\$12 million in loss at airports*

*\$23 million in loss to waste-water systems*

*\$570,000 in loss to oil facilities*

*\$44 million in loss to electrical utilities*

*\$18 million in loss to communication systems;*

**major damage to 4,000 to 17,000 buildings (655 completely destroyed);**

**3,000 to 12,000 people needing public shelter;**

**300 to 1,200 people needing hospital care (but only 768 of 2,341 beds available in the county during the first day, up to 910 at Day 3 and 1,730 at Day 30); and**

**80 to 300 fatalities.**

*(Casualty numbers are expected to be less for either a night-time or commute-time earthquake.)*  
 52% functionality at the 2 emergency operation centers, 17 fire stations, and 15 police stations;  
 38% functionality at the schools;  
 20+ fires started as a result of the earthquake;  
 2.3 million tons of debris (reinforced concrete, steel, brick, wood, and other debris) needing to be removed;  
 Complete damage to 1% of the county's 647 bridges (extensive damage to another 2%)

After the exercise, we relayed to the City officials the results of the other HAZUS runs that we made.

For a **magnitude 6.9 daytime event** with the same location, HAZUS estimated, for all of Clark County:  
 \$6.2 to 25 billion in economic loss,

of which \$3.5 to 14 billion was in building damage

*(about ¼ structural and ¾ non-structural),*

\$0.6 to 2.5 billion was in damage to building contents, and

\$2.1 to 8.5 billion was in business interruption losses related to the building stock

*(relocation loss, capital loss, wages, rental income);*

*\$110 million loss in highway damage*

*\$1 million loss in railroad damage*

*\$27 million in loss at airports*

*\$76 million in loss to waste-water systems*

*\$1 million in loss to oil facilities*

*\$98 million in loss to electrical utilities*

*\$41 million in loss to communication systems;*

major damage to 19,000 to 80,000 buildings (*11,000 completely destroyed*);

27% functionality at the 2 emergency operation centers, 17 fire stations, and 15 police stations;

13% functionality at the schools;

41 fires started as a result of the earthquake;

7.8 million tons of debris (reinforced concrete, steel, brick, wood, and other debris) needing to be removed;

Complete damage to 9% of the county's 647 bridges (extensive damage to another 11%)

12,000 to 46,000 people needing public shelter;

2,000 to 8,000 people needing hospital care (*but only 166 of 2,341 beds available in the county during the first day, up to 232 at Day 3 and 878 at Day 30*); and

600 to 3,000 fatalities.

*(Casualty numbers are expected to be less for either a night-time or commute-time earthquake.)*

Somewhat surprisingly for some of us, even for a **magnitude 5.0 daytime event** (the lowest magnitude accepted by HAZUS), HAZUS estimated

\$400 million to \$1.5 billion in economic loss,

of which \$200 to 800 million was in building damage,

\$100 to 400 million was in damage to building contents, and

\$100 to 300 million was in business interruption losses related to the building stock;

major damage to approximately 200 buildings (none completely damaged);

no damage to bridges;

140 to 500 people needing public shelter;

8 people needing hospital care; and

zero to 1 fatality.

During the exercise, Jon Price stressed that the results of this computer simulation should only be used to ascertain the likely severity of the event and assist the State in making decisions regarding deployment of resources to assist local governments in responding to the event. These results have helped other states to decide whether to request a Presidential Declaration of Disaster, which can trigger aid from the federal government.

### **Earthquake Related Projects for FEMA's Competitive Pre-Disaster Mitigation Grant Program**

Craig dePolo described an earthquake-related project for the pre-disaster mitigation grant program. He will be proposing a project to create earthquake special planning consideration zones for the northern part of the Reno urban corridor. Craig noted that Nevada has approximately 700 active faults, making it second in the country in terms of surface faulting risk (behind only California). Many of the faults have distributed patterns; that is, they are characterized by a wide zone of faults rather than a single fault. A good example is the Mount Rose fan, south of downtown Reno, which has dozens of small faults that appear to have moved most recently about 900 years ago. The proposed work will involve the formation of an advisory group, develop a late Quaternary fault base map, develop planning special consideration zone maps, conduct reviews of the maps, and finalize the zone maps and distribute them to local governments. The project is likely to cost on the order of \$1,000,000, with 75% from FEMA and 25% from the State. It fits well with the recently enacted Assembly Bill 57.

### **Non-structural Mitigation Workshop**

Craig dePolo is planning a non-structural mitigation workshop in the spring of 2004. The objective is to hold an informational conference for Nevada emergency managers, facilities and maintenance operators and managers, engineers, and others, and to solicit their input in the best way to eliminate nonstructural earthquake damage and hazards in Nevada. Products will include a workshop volume, a nonstructural mitigation CD, and a strategic plan for reducing nonstructural hazards in Nevada. Jeff Lusk indicated that FEMA will be providing funding to bring experts on the topic to Nevada through its technical assistance program. The Washoe County Utility Lifeline Group, FEMA, and NESC will be co-sponsors.

Craig is looking for volunteers to help to make sure that rural counties are invited and participate.

ACTION ITEM: Ron Lynn and Marge Gunn will assist Craig in getting the word to the counties.

Ron noted that the new International Building Code does require some non-structural mitigation.

Jeff Lusk mentioned that there is an unfounded perception that schools generally are safe, but in many cases private schools are not as safe as public schools. Ron Lynn said that the private schools fall under the codes of local jurisdictions (and therefore are safe), but the Nevada public school districts and UCCSN do not. In that sense, there may be more concern about public schools in Nevada than about private schools.

### **Review of Old Business**

Ron Lynn stated that action items from the last meeting had been duly addressed.

Senator Ray Shaffer has agreed to serve on the Council and will try to attend the next meeting.

Rick Martin has been named as the liaison from NDEM to the Council.

### **New Business**

Bob Cox had submitted to the Council an outline of a program to address earthquake preparedness of buildings that provide essential services in Nevada.

**ACTION ITEM:** Terri Garside will ask Bob Cox to make a presentation to the Council at the next meeting regarding earthquake preparedness of buildings that provide essential services in Nevada.

No additional new business was brought before the Council.

### **ANNOUNCEMENTS**

The **next meeting** of the Nevada Earthquake Safety Council will be Friday, November 21, 2003 in Reno. This meeting will be preceded on the afternoon of the day before, Thursday, November 20, by a meeting of the Nevada Hazard Mitigation Planning Committee. In 2004, the Planning Committee will meet on Thursday mornings immediately following Wednesday meetings of the Nevada Earthquake Safety Council. These meetings are scheduled for

February 11, 2004 (Las Vegas)

May 5, 2004 (Reno)

August 4, 2004 (Las Vegas)

November 17, 2004 (Reno).

### **PUBLIC COMMENT PERIOD**

There were no additional comments from the public.

The meeting adjourned at 3:27 p.m.

Immediately afterward, Wanda Taylor took a group of meeting attendees to examine exposures in a backhoe trench cut across the Black Hills fault on the southeast side of the range south of Henderson.

### **REVIEW OF ACTION ITEMS**

Cathy Snelson and Jenelle Hopkins will make recommendations to the Council for action regarding the initiative to have Nevada teachers be properly trained in the disciplines that they teach.

Ron Lynn will approach the Nevada Resort Association to fund an earthquake calendar. Diane dePolo will provide Ron with necessary information regarding costs.

All interested parties should send Craig dePolo (cdepolo@unr.edu) comments on the draft messages to the public for the "Beat the Quake" campaign outlined by the Research Committee.

Jim Werle, Cathy Snelson, and Craig dePolo should work on timing, presumably in the spring of 2004, and organization of a southern Nevada earthquake hazard meeting.

An ad hoc subcommittee on non-structural hazards in school (Craig dePolo, Jenelle Hopkins, and Tim Crowley) should suggest recommendations for the Council to adopt on what schools should do to best mitigate non-structural hazards.

Craig dePolo should arrange with Ron Lynn to evaluate the Clark County Building Department for non-structural hazards during an earthquake.

Jim Werle and Greg Moss were tasked to work with Ron Lynn on recommendations from the Council for preservation of data, including locations of faults and trenches where information was collected.

Mike Blakely and Jeff Lusk were tasked to look into methods for securing water heaters. Specifically, the International Building Code requires a three-strap method for bracing water heaters, but there may be suitable alternatives that the Nevada Organizations of Building Officials (NOBO) may want to consider.

Terri Garside will see that a motion to approve the revised strategic plan and a motion to approve the revised annual report will be placed on the agenda for the November Council meeting. She will also see that the revised strategic plan and the revised annual report are posted on the NESC Web site for review before that meeting.

Terri Garside will see that the earthquake preparedness documents (one for the Nevada tourism industry and the other for the warehouse merchandise industry) are posted on the NESC Web site.

Ron Lynn will discuss the initiative to train industry individuals and offer laminated cards for hotel staff with the Nevada Resort Association.

Jon Price will put discussions of (1) hazard information for hotel staff and visitors and (2) business interruption and recovery after a disaster on the agenda for the next meeting of the Nevada Hazard Mitigation Planning Committee.

Jon Price should follow up on the Council's recommendations for funding of projects from the May 2003 meeting with Kamala Carmazzi.

Ron Lynn and Marge Gunn will assist Craig dePolo in getting the word to the counties about the non-structural mitigation workshop tentatively planned for the spring of 2004.

Terri Garside will ask Bob Cox to make a presentation to the Council at the next meeting regarding earthquake preparedness of buildings that provide essential services in Nevada.

respectfully submitted by Jon Price, 16 August 2003.

Nevada Earthquake Safety Council  
c/o Nevada Bureau of Mines and Geology  
University of Nevada/MS 178  
Reno, Nevada 89557  
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