

Summary Minutes

Nevada Earthquake Safety Council

4 August 2004

The Nevada Earthquake Safety Council (NESC) met from 9:00 a.m. to 3:10 p.m. at the Clark County Department of Building's Russell/Cameron Office in Las Vegas. These and previous minutes are posted on the NESC Web site (www.nbmj.unr.edu/nesc).

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

Mike Blakely*, Blakely, Johnson, and Ghush, who also held the proxy for
 Ian Buckle*, UNR Center for Civil Engineering Earthquake Research
 Wayne Carlson*, Nevada Public Agency Insurance Pool
 Press Clewe, who held the proxy for
 Bernie Anderson*, Nevada State Assemblyman
 Ted Droessler, Clark County Building Department
 Craig dePolo, Nevada Bureau of Mines and Geology, who held the proxy for
 Phil Herrington*, Carson City Building Department
 Diane dePolo, Nevada Seismological Laboratory, who held the proxy for
 John Anderson*, Nevada Seismological Laboratory
 Greg Flanigan*, Farmers Insurance
 Terri Garside, Nevada Bureau of Mines and Geology, who held the proxy for
 Greg Moss*, The Moss Group, and for
 Marge Gunn Nutman*, Nevada Association of Counties & Lincoln County Office of Emergency
 Management
 Mark Harris*, Nevada Public Utilities Commission
 Werner Hellmer, Clark County Department of Development Services, Building Department
 Deborah Hinman, SBC, who held the proxy for
 Jim Reagan*, Sierra Pacific Power Company
 Jenelle Hopkins*, Clark County School District, Las Vegas
 Bruce Hurley, National Nuclear Security Administration/Nevada State Office
 Gloria Leggio, Las Vegas Academy (Clark County School District)
 Ron Lynn*, Clark County Building Department
 Glade Myler, Office of the Attorney General
 Dan O'Brien, State Public Works Board
 Jim O'Donnell*, UNLV
 Russ Pederson, Washoe County Sheriff's Office
 Jon Price*, Nevada Bureau of Mines and Geology
 Ed Ruttan*, American Red Cross
 Burt Slemmons*, University of Nevada, Reno (retired, Las Vegas consultant)
 Catherine Snelson*, UNLV Geoscience Department
 Wanda Taylor, UNLV Geoscience Department
 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:

Michael Lynch*, Builders Association of Northern Nevada

Ray Shaffer*, Nevada State Senator

The minutes from the meeting on 5 May 2004 were approved.

COMMITTEE REPORTS

Awareness and Education Committee

Diane dePolo discussed progress on collecting oral history accounts from the 1954 earthquakes near Fallon. Because this is the 50th anniversary of these events, the newspapers have nicely covered the project, and volunteers are coming forward. The Churchill County Museum has been very helpful.

Ron Lynn noted that the Mandalay Bay has donated funds for an earthquake calendar in either 2005 or 2006, and he is working with other hotels to contribute.

Jenelle Hopkins reported that she was unsuccessful in getting items about the winners of the 2004 poster contest in the local newspapers in Las Vegas.

Research Committee

Craig dePolo reported on the Basin and Range Province Seismic Hazard Summit II. Four potential policy recommendations for adoption by the Western States Seismic Policy Council came out of the meeting.

The California Seismic Safety Commission is working on a map showing shaking potential in northeastern CA and western NV. We expect that the California Geological Survey will complete their work on this map by October. The Committee will review the map before publication.

UNR is planning to hold an earthquake-scenario tabletop exercise on February 1, 2005. Staff from the Nevada Bureau of Mines and Geology and the Nevada Seismological Laboratory are helping to formulate the exercise.

The first box trench in Nevada is currently open along the Warm Springs Valley fault north of Reno. A box trench is one with four connecting trenches; this configuration is helpful in evaluating strike-slip faults.

Eric Fossett, UNLV graduate student, will be defending his M.S. thesis on Friday, August 6 (Room 102 in the Lilly Fong Geoscience Building). His work on the Black Mountain fault south of Las Vegas was partially supported with FEMA/NDEM funds channeled through the NESC.

Mike Blakely stated that the design work on a fact sheet about anchoring water heaters to walls is finished. A copy will be distributed with these minutes. The key is attaching the strap to the wall.

Ron Lynn reminded NESC members that recommendations for mitigation awards are due at the November meeting. There is a form for nominations on the NESC Web site.

Ron noted that the entire structure of the Clark County Building Department's offices at Russell and Cameron was mitigated for nonstructural earthquake hazards. A base isolation system for two mainframe computers cost \$8,000. Total costs, including straps for computers, were under \$30,000. A video of the work will be made available to the NESC.

The Las Vegas Academy has done some nonstructural mitigation with assistance from the Junior League.

Wayne Carlson noted that volunteers generally should be registered with employers as non-paid employees, so that they are protected with liability and disability insurance.

Policy Recommendations

Wayne Carlson led a discussion on a policy statement regarding emergency earthquake research funds. The recommendation is for NDEM to ask for such funds either from the Legislature or through grant opportunities with FEMA or otherwise. Craig dePolo estimated that the cost for digging and documenting prior earthquake activity for one trench is approximately \$25,000. Discussion about how many trenches are needed per biennium ensued. Press Clewe suggested getting as much of the funds from grants as possible, rather than necessarily all from the legislature.

Glade Myler called the NDEM Deputy Director, Kamala Carmazzi, to inquire whether existing funds are available for such needs. She reported that emergency relief and disaster-resistance funds could probably not be used for this purpose, but that perhaps other funds could.

MOTION PASSED: The Council unanimously passed a motion to endorse a recommendation to NDEM for a policy statement on emergency earthquake research funds (See Appendix A), with the expectation that \$100,000 be made available for the first two years, enough to cover opening and documenting four trenches at \$25,000 each.

Wayne Carlson then led a discussion of a policy statement on unreinforced masonry (URM) buildings. Dan O'Brien noted that local jurisdictions and the Nevada State Public Works Board do not have authority over school districts. Mike Blakely stated that in most cases, knowledge of the age of the building and a walk-through can determine whether the building is an URM. Generally, a brick or stone building built in the 1930s or older is an URM.

MOTION PASSED: The Council unanimously passed a motion to endorse a recommendation to DEM for a policy statement on unreinforced masonry buildings: It is the policy of the State of Nevada that unreinforced masonry buildings should be identified and prioritized for earthquake hazard mitigation. A statewide survey that identifies URM structures and categorizes the degree of earthquake damage vulnerability should be completed by state, local, and school officials.

ACTION ITEM: Jon Price will convey these two motions to NDEM.

ACTION ITEM: Glade Myler will look into specific language regarding actions recommended for implementation of this policy.

Strategic Planning Committee

Debbie Hinman reported for Jim Reagan. Adoption of the revised annual report for 2003 will be postponed until the November in order for it to be distributed to NESC members for their review.

ACTION ITEM: Jim Reagan will distribute the annual report for 2003, with the expectation that it will be adopted at the November 2004 NESC meeting. Terri Garside will place this item on the agenda.

Nevada Hazard Mitigation Planning Committee

Ron Lynn reported on activities of the committee. Procedures for recommending priorities to NDEM are being developed. The State Hazard Mitigation Plan is being revised in response to comments from FEMA. It appears that it will be difficult for local jurisdictions to compete for the available funds.

The Impact of Rockery Walls, Are They Safe?

Werner Hellmer, Senior Engineer with the Clark County Department of Development Services, Building Department, discussed standards for design and construction of rockery walls. Typically a trench is dug; gravel is placed at the bottom of the trench; then the wall is built up with the largest rocks at the base. A liner is used to keep fine material from infiltrating between rocks in the wall. As the wall is built, blocks as large as one ton are at the bottom, and they generally like to have rocks about 250 pounds or more at the top. In best practice, one rock sits on two rocks, rather than on just one rock below. However, smaller rocks are sometimes used, particularly near the tops of the wall, and these could fall off during an earthquake.

Much of this type of construction has been in the Pacific Northwest. Some jurisdictions prohibit this type of construction, and there are no national standards, including considerations of failure during earthquakes. California appears to have no standards for construction or performance of such walls.

Some walls in the U.S. have failed. One wall has failed in Las Vegas Valley, primarily because of water behind the wall; fortunately no structures were damaged.

Mike Blakely noted that the (old) building code prohibits URMs in seismic zones 3 and 4. In his opinion, rockery walls are URMs. There has not been a dynamic analysis of how these walls will perform during earthquakes. Ron Lynn noted that short fences are not covered in the building codes, and some of these walls are therefore exempt.

Werner concluded his presentation with pros and cons of rockery walls. Pros include cost and aesthetic qualities; cons include problems with source of quality materials, time required to properly construct, and costs of specialized equipment and skilled operators. Design is based on a gravity-wall concept. Key design factors are unit weight, friction, and batter. There are unique load conditions, and there can be problems with drainage, hydrostatic pressure, and seepage. The walls have no rigidity; they are flexible.

The Nevada Organization of Building Officials is discussing this issue and would appreciate the guidance from the NESC on the proposed draft standards. Mike Blakely suggested that someone needs to do the dynamic analysis of loading of the backfill behind the walls and of the walls themselves. Alternatively, shake-table experiments could be done. There should also be analysis of freeze-thaw effects (which contributed to the failure of gabions at Incline Village).

A handout was distributed from the department of Civil and Environmental Engineering (CEE) at the University of Nevada, Reno. The handout summarized the need for further laboratory and/or field tests. A study was proposed by the CEE group and others, focusing on fundamental understanding of the seismic behavior of rockery walls. The investigation involves field (using blast loading) and laboratory shake-table testing and analytical model development.

ACTION ITEM: Ron Lynn charged Werner Hellmer to chair an Ad Hoc Committee on Rockery Walls. The committee should report to NESC with any recommendations for the adoption of guidelines for their construction and performance during earthquakes.

Seismic Velocities Measured in the Las Vegas Area

Wanda Taylor summarized work by Barbara Luke, John Louie, Jeff Wagner, Cathy Snelson, Dave McClelland, and others. The area on the north side of the valley has a higher potential for ground shaking than the area that has already been built up. The deepest part of the basin is west of Frenchman Mountain. The fault along the west side of Frenchman Mountain (the Frenchman fault) is probably the controlling fault for the alluvial basin of Las Vegas Valley. There appear to be three stages of development of the basin: the Miocene Muddy Creek Formation/Horse Spring Formation – 13 to 3 million years old, Early Quaternary (1.6 million years old and younger) alluvial fans and lacustrine deposits, often clay rich, and < 20 thousand-year-old alluvial deposits. The research group used over 1,100 well records (with average depth of 175 meters) to evaluate the stratigraphy of the basin. The clay-rich zones tend to have higher shaking potential than gravel-rich zones. They have mapped the La Madre fault (oblique, east-west striking strike-slip fault related to Mesozoic thrusting), which is exposed in the Red Rock Canyon area, to extend under alluvium in the western part of the valley. They have developed a 3D lithology (rock type) model. A lot more work could be done, including more investigation of the Quaternary faults and integration of more well data. Earlier studies showed that amplifications correlate with basin depth. This new work shows that basin depth and amplifications correlate with lithology. Shear-wave velocities measured in the upper 350 meters show variations related to lithology and depth, which affects compaction. Overall, the basin shape is mostly controlled by faults, which are up to 13 to 10 million years old. Clay-rich (fine-grained) deposits have relatively low shear-wave velocities and thus are more susceptible to shaking. These deposits occupy a central and southern zone within the basin-fill deposits. A technical report will be submitted to Lawrence Livermore National Laboratory, which helped to fund the study.

Wanda stated that John Louie has changed his mind about poor correlations between lithology and measured shear-wave velocity. He now believes that there is a good correlation between the geology and measured shear-wave velocities. Indeed, the correlation between velocities and the surficial geology is poor, because the surficial geologic maps only show what is exposed at the surface, immediately below the soil, but when looking at the volume of rock being measured (the upper 350 meters), there is a good correlation.

Ron Lynn encouraged Wanda to make the report available to NESC members.

San Simeon Earthquake, San Luis Obispo County, California

Ron Alsop, Emergency Manager for San Luis Obispo County, discussed his county's effects from and response to the Magnitude 6.5, 22 December 2003 San Simeon earthquake. The county has 44,000 people in San Luis Obispo, 27,000 in Paso Robles, and 108,000 in unincorporated areas. He showed slides of liquefaction, lateral spreading, landslides, rockfalls, and damage from ground shaking. A big concern was the loss of private water systems. Another concern was having to relocate functions of the Atascadero City Hall. At Paso Robles, there is a continued problem of hot spring water below a parking lot at their city hall (at one point, the water was flowing at about 1,000 gallons per minute). There was much nonstructural failure. The Diablo Canyon nuclear power plant had no damage. Liquefaction affected farms and cities. Landslides were widespread.

Their EOC, which is staffed by various agencies, activated 29 minutes after the event. They knew immediately when the power went out that the earthquake was nearby. There were two fatalities in an URM in Paso Robles. They did not activate an emergency alert system, because they figured the public already knew that something was up, and the local media was covering the event. He feels that they should have spent more time responding to the local media.

The Preliminary Damage Assessment teams from FEMA, California Office of Emergency Services, and the Small Business Administration arrived on December 26 and stayed for two or three days. Their initial assessment was that there was not enough damage to get federal assistance for individuals. A political push to get a second Preliminary Damage Assessment on January 2 helped to have that decision reconsidered.

There has been confusion related to damage assessment dollar figures, and there were problems with the victims' expectations versus actual federal assistance. Local residents are still complaining. The FEMA estimate was \$69 million in damage. The current estimate of the county is \$239 million, and the damage to public structures was at least \$78 million. Shake maps underestimated shaking.

An established emergency management system was in place; however many people were not aware of the system and its concepts related to earthquake response. The training issue is generally recognized as a resource limitation, not a fault or blame situation. However, overall response efforts generally went well.

Cooperative efforts between agencies worked well. GIS and GPS were useful for mapping. In general, response and recover went as well as could be expected. The big challenges included damage assessment, particularly the initial issue of demonstrating a need for federal damage assessment. One big improvement will be to increase information to local media.

The HAZUS run, based on the 1990 census, was close to the county's damage assessment. A remark was made that the initial damage estimate from the 1994 Northridge earthquake underestimated the actual damage by a factor of seven.

Since the earthquake, the Paso Robles city council and the City of San Luis Obispo have sped up dealing with their URMs. There were lots of aftershocks, and the recovery efforts captured front-page headlines. But now, there is little attention given to earthquake mitigation in the media. Today, about 27% of the public has emergency kits in their homes (compared to 10% nationally).

Recent Earthquakes

Diane dePolo reported that a scientific paper about deep earthquakes at Lake Tahoe, for which Ken Smith is the senior author, is scheduled to be released in Science magazine later this month and that a pre-publication copy will be released at 11:00 a.m. on Thursday, August 5, in the magazine's on-line version, Science Express, which can be accessed at www.scienceexpress.org. The deep events near Lake Tahoe stopped in February. Shallower events, including a magnitude 4.2 near Lake Tahoe in early June, have been recorded.

The largest earthquake recently in Nevada was a 4.5 on May 16 near Caliente. The station coverage in that part of Nevada is poor. Several earthquakes have occurred in the 2-3 range in the Last Chance Mountain area.

Mitigation Strategies

Jon Price reported that the earthquake mitigation strategies approved by the NESC at its 15 November 2002 meeting and detailed with cost estimates at the 21 February 2003 meeting are being integrated into the State Hazard Mitigation Plan. The four main categories of projects include:

- (1) mitigation of nonstructural hazards,
- (2) defining the earthquake hazard in Nevada cities and communities,
- (3) public awareness and education, and
- (4) assessing and minimizing earthquake risks.

Significant progress has been made in these areas during the last two years.

Old Business

Ron Lynn reviewed action items from the last meeting.

Terri Garside has received several reports from individuals and groups who led projects funded through NESC.

ACTION ITEM: Terri Garside will continue to solicit reports from individuals and groups who have led projects funded through NESC.

ACTION ITEM: Gloria Leggio will make a presentation on the Las Vegas Academy retrofit project at the February 2005 NESC meeting in Las Vegas.

ACTION ITEM: NESC members should consider nominating recipients for the NESC mitigation awards by October 17, one month before the next NESC meeting.

New Business

ACTION ITEM: Ron Lynn and Wayne Carlson will write a letter to NDEM regarding the four policy recommendations adopted by NESC at this and the previous meetings, asking for a response by the November NESC meeting.

Gloria Leggio recognized Jim O'Donnell for his help at the Las Vegas Academy – in helping the school recognize its earthquake hazards, setting up a seismograph for the school, helping with the retrofit project, educating students and parents about nonstructural mitigation. She presented Jim with a plaque, and the Council joined in congratulating him as an exceptional volunteer.

ACTION ITEM: Ron Lynn reactivated the nominating committee (to refill the position with the Nevada Resort Association and possibly Phil Herrington; there may be an interested individual from the city of Reno). Committee members include Jon Price, chair, John Anderson, and Rick Martin.

Public Comments

No comments were made.

ANNOUNCEMENTS

The **next meeting** of the Nevada Earthquake Safety Council will be Wednesday, November 17, 2004 in the Jot Travis Student Union on the UNR campus in Reno.

(After the meeting, the following dates were set for future NESC meetings:

Wednesday, February 16, 2005 (Las Vegas)

Wednesday, May 4, 2005 (Reno)

Wednesday, August 3, 2005 (Las Vegas)

Wednesday, November 9, 2005 (Reno)

REVIEW OF ACTION ITEMS

Jon Price will convey the motion regarding policy statements to NDEM.

Glade Myler will look into specific language regarding actions recommended for implementation of the policy regarding unreinforced masonry buildings.

Jim Reagan will distribute the annual report for 2003, with the expectation that it will be adopted at the November 2004 NESC meeting. Terri Garside will place this item on the agenda.

Werner Hellmer, chair of the Ad Hoc Committee on Rockery Walls, should report to NESC with any recommendations for the adoption of guidelines for their construction and performance during earthquakes.

Terri Garside will continue to solicit reports from individuals and groups who have led projects funded through NESC.

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Ron Lynn and Wayne Carlson will write a letter to NDEM regarding the four policy recommendations adopted by NESC at this and the previous meetings, asking for a response by the November NESC meeting.

The Nominating Committee (Jon Price, chair, John Anderson, and Rick Martin) should nominate individuals to refill the position with the Nevada Resort Association and possibly Phil Herrington's position.

respectfully submitted by Jon Price, 10 August 2004.

Nevada Earthquake Safety Council
c/o Nevada Bureau of Mines and Geology
University of Nevada/MS 178
Reno, Nevada 89557
775/784-6691 ext. 126

Appendix A
Nevada Earthquake Safety Council
Recommendation to DEM for a Policy Statement on
Emergency Earthquake Research Funds
4 August 2004

Purpose:

Increased construction activity throughout Nevada increasingly encroaches on research sites important to understanding earthquakes in Nevada. Important research that could be obtained from previous and potential earthquake event sites will be lost forever to scientific inquiry because construction activity proceeds rapidly following approval from building officials. Any opportunity for research could be lost if funds are not immediately available to permit rapid response to site evaluation opportunities. Local governments, the State of Nevada, and the University and Community College System of Nevada must work together to assure that potential research sites are identified and preserved to permit study of the site characteristics by setting aside emergency funds available for trenching and other scientific research activities.

Proposed Policy Statement:

It is the policy of the State of Nevada that local governments, the State of Nevada, and the University and Community College System of Nevada should adopt and implement plans that bolster the ability of scientists to respond rapidly to site evaluation opportunities. It is further recommended that the plans should be supported by the State financially by setting aside necessary funding to be administered by the Nevada Earthquake Safety Council.

Specific Elements of Rapid Research Response Plans:

Plans should incorporate these elements:

1. Establishment of a specific priority list that designates known earthquake sites that are deemed to be essential for research subject to effective emergency research response;
2. Develop a second priority list that focuses on potential research sites that are important to scientific understanding but that have not been designated as known earthquake sites;
3. Create an emergency approval justification document with scope of work and anticipated costs for each identified priority site to assist the NESC with determining whether and how to approve the funding when an emergency research opportunity arises.

Nevada Earthquake Safety Council Support:

The Nevada Earthquake Safety Council will adopt the priority lists and authorize emergency funding as necessary. Upon receipt of notice of the opportunity, the Chairman of NESC will initiate a response review task force to assess the opportunity and determine whether it satisfies the requirements for funding.

NEVADA EARTHQUAKE SAFETY COUNCIL
Members of the Board of Directors and Officers
(as of 4 August 2004)

Business and Industry, Southern Nevada	vacant
Business and Industry, Northern Nevada	Nevada Resort Association Michael Lynch Builders Association of Northern Nevada
Insurance Industry (statewide)	Greg Flanigan Farmers Insurance (Las Vegas)
State Government (statewide)	Mark Harris Public Utilities Commission (Carson City)
Local Government, City	Wayne Carlson Nevada Public Agency Insurance Pool (Carson City)
Local Government, County	Marge Gunn Nutman Nevada Assoc. of Counties & Lincoln Co. Office of EM
Seismology (statewide)	John Anderson Nevada Seismological Laboratory (UNR)
Geosciences, Southern Nevada	Burt Slemmons Las Vegas consultant, UNR (retired)
Geosciences, Northern Nevada	Jonathan G. Price Nevada Bureau of Mines and Geology
Engineering, Southern Nevada	Jim Werle Converse Consultants
Engineering, Northern Nevada	Mike Blakely Structural Engineers Association of NV
Education (statewide)	Jenelle Hopkins Clark County School District, Las Vegas
Community Organizations, Southern Nevada	Ed Ruttan American Red Cross
Community Organizations, Northern Nevada	Jim Reagan Sierra Pacific Power Company
University, Southern Nevada	Catherine Snelson UNLV Geoscience Department
University, Northern Nevada	Ian Buckle UNR Center for Civil Engineering Earthquake Research
Building Official, Southern Nevada	Ronald L. Lynn Clark County Building Department
Building Official, Northern Nevada	Phil Herrington Carson City Building Department
State Senate	Ray Shaffer Nevada State Senator (Las Vegas)
State Assembly	Bernie Anderson Nevada State Assemblyman (Sparks)
Member at Large, Southern Nevada	Jim O'Donnell UNLV
Member at Large, Northern Nevada	Greg Moss The Moss Group

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