



NEVADA EARTHQUAKE SAFETY COUNCIL

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*Jon Price, Secretary
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TO: Mr. Ron Lynn, Chairman, Nevada Earthquake Safety Council
Board of Directors, Nevada Earthquake Safety Council

FROM: Jim Reagan, Chairman, Strategic Planning Committee

RE: Annual Report of activities for Plan Year 2000

I am pleased to provide a summary of activities and efforts achieved by the Standing Committees and members of the Nevada Earthquake Safety Council for the calendar year 2000. In an organization such as this, where membership is derived from dedicated educators, scientists and professionals with a common interest, it is often difficult to measure the progress and successes that have been realized. As you review the attached committee reports, I'm sure you will agree that we are making substantial progress toward the Mission and Goals of the Council.

Executive Summary:

The attached pages provide detailed information of projects and accomplishments either complete or in progress. Highlights of these activities include another successful "Earthquake Awareness and Preparedness Week" and the production of 17,250 Earthquake Safety Calendars that were distributed to every teacher, public and private, in the state of Nevada. The Response and Recovery Committee implemented training of Community Emergency Response Teams trainers and have successfully completed training of individuals in the Las Vegas community.

The Geoscience committee has demonstrated significant progress on numerous projects. Four new geologic maps in the Las Vegas/Pahrump, Reno/Carson, and rural regions were developed for use as geological hazard, land use planning, and mitigation efforts. Scientific data in the Lake Tahoe region was improved by studies of faults and historic earthquakes, investigation of tsunami potential for the lake, and improved analog seismic monitoring in the Truckee area. The Nevada Seismological Laboratory began participation in the USGS Advanced National Seismic System (ANSS) initiative, which will provide integrated strong motion data into the NSL analysis and archiving system. Also the Antelope Real-Time recording and analysis software is operational and provides real-time networking with the National Seismic Network, U. C. Berkeley and U. C. San Diego, and the strong motion network in southern Nevada is also improved.

The Risk Mitigation Committee is well under way with the adoption of the "Nevada Earthquake Risk Mitigation Plan", the publication of "Living with Earthquakes in Nevada" and the funding of eleven seismographs for rural school districts science curriculum. There were three "Awards in Excellence for Earthquake Risk Mitigation" awarded last year.

Individually, the committees have provided incremental progress toward their goals, but collectively, they have moved this council to a new level in earthquake awareness and safety in our state. Although many projects came to fruition this year, many more are ongoing or require several years to accomplish. The year 2001 Goal Summary for each Committee are also attached for your review. I would like to add my congratulations for the hard work of all council members.

NEVADA EARTHQUAKE SAFETY COUNCIL

STANDING COMMITTEE ANNUAL REPORT

ACTIVITIES IN PLAN YEAR 2000

GOAL A:

Increase earthquake awareness and education.

RESPONSIBILITY:

Awareness and Education Standing Committee

ACTIVITIES AND ACCOMPLISHMENTS FOR 2000 OBJECTIVES:

A-1. Inform general public about earthquakes hazards, safety, and risks.

- ◆ Earthquake Awareness and Preparedness Week
- ◆ Governor's Proclamation
- ◆ Newspaper articles and interviews
- ◆ Milk Carton message (Earthquake Awareness and Preparedness Theme -"Secure Your Future - Shake Don't Break expanded)
- ◆ Seismo-Watch weekly updates
- ◆ Presentations / Talks / Tours / Interviews
- ◆ Nevada Seismological Laboratories web site
- ◆ Resource / Contact List (sponsors for calendar, poster contest and other activities)

A-2. Incorporate earthquake education in school curricula.

- ◆ Earthquake Awareness and Preparedness Week
- ◆ Governor's Proclamation
- ◆ Statewide Earthquake Drill
- ◆ Preparedness and Mitigation materials send to schools statewide
 - Copying donated by Nevada Bell
 - Mailing donated by Sierra Pacific Power/Nevada Power
- ◆ Poster Contest
 - Certificates for county winners signed by governor
 - Prizes donated by the Nevada Broadcasters Association, Charlie Watson, and the Nevada Earthquake Safety Council
 - Copying donated by Nevada Bell
- ◆ Earthquake Safety Calendar 2001
 - Over 17,250 calendars produced and delivered to teachers statewide
 - Mailing donated by Sierra Pacific Power/Nevada Power
- ◆ School Demonstrations / Presentations / Talks / Tours
- ◆ Contact List
- ◆ Statewide list of public and private school addresses and phone numbers

A-3. Facilitate development of continuing seismic hazard education programs for government and industry.

- ◆ Earthquake Awareness and Preparedness Week
- ◆ City of Sparks and Carson City Project Impact
- ◆ Earthquake preparedness and training for child care providers

NEVADA EARTHQUAKE SAFETY COUNCIL

STANDING COMMITTEE ANNUAL REPORT

ACTIVITIES IN PLAN YEAR 2000

GOAL B:

Improve emergency management, response and recovery systems.

RESPONSIBILITY:

Response and Recovery Standing Committee

ACTIVITIES AND ACCOMPLISHMENTS FOR 2000 OBJECTIVES:

B-1 Improve the Integrated Emergency Management System statewide.

- ◆ Council members participated in “Substantial Damage Estimator Workshop” offered by FEMA Disaster Field Office in Las Vegas.

B-3 Encourage the development of Community (or Neighborhood) Emergency Response Teams (CERT or NERT) to enhance citizen preparedness and survival in earthquake prone communities.

- ◆ The Nevada Division of Emergency Management hosted a 3-day workshop on Train the Trainer for Community Emergency Response Teams in January 2000.
- ◆ The Las Vegas area will be training 50 volunteers for Community Emergency Response Teams.

NEVADA EARTHQUAKE SAFETY COUNCIL

STANDING COMMITTEE ANNUAL REPORT

ACTIVITIES IN PLAN YEAR 2000

GOAL D:

Improve essential geoscience information.

RESPONSIBILITY:

Geoscience Standing Committee

ACTIVITIES AND ACCOMPLISHMENTS FOR 2000 OBJECTIVES:

D-2 Reduce earthquake losses by mapping and identifying geologic hazards.

- ◆ The Nevada Bureau of Mines and Geology and the Nevada Seismological Laboratory continued to conduct research and monitoring programs designed to reduce earthquake losses in Nevada. These programs were funded from various sources, including the national Earthquake Hazard Reduction Program, the U. S. Department of Energy, Yucca Mountain Program, and the U. S. Geological Survey STATEMAP Program.
- ◆ The Nevada Seismological Laboratory (NSL) continued studies of earthquake epicenters, focal mechanisms, aftershocks of specific faults in Nevada (including Scotty's Junction, Double Springs, Skull Mountain, and Las Vegas-Boulder City area). The strong motion response in Las Vegas Valley is the subject of ongoing research.
- ◆ Staff members from NSL and the Department of Geological Sciences continued studies of Quaternary and Holocene paleoseismic faults, large landslides, and historic earthquakes in the Lake Tahoe region.
- ◆ The potential for tsunami from a large earthquake bounding Lake Tahoe was investigated. Potential wave heights around the lake margins range up to 10 meters, so simple recommendation to anyone living in the vicinity of the lake is to immediately seek high ground at least 10 meters above the lake) if they feel a severe earthquake.

D-3 Develop and support the implementation of a criteria for performance of geologic-hazards investigations.

- ◆ The highlight contribution of 2000 to help the public recognize, understand, and cope with the Nevada earthquake hazards are in the NBMG Special Publication 27, "Living with Earthquakes in Nevada" by Craig dePolo, Lucy Jones, Diane dePolo, and Susan Tingley. The publication is a cooperative effort of authors from three organizations including the Nevada Bureau of Mines and Geology (NBMG) and the Nevada Seismological Laboratory.
- ◆ In 2000 NBMG also published 4 new geologic maps, mostly at 1:24,000 scale that form the basis for hazard studies, land use planning, and risk mitigation. They include the Las Vegas/Pahrump region, the Reno/Carson City area, and other maps distributed through the state in rural areas.
- ◆ During 2000 the Nevada Seismological Laboratory continued to study the implications of precariously balanced rocks for seismic hazards. The existence of precariously balanced rocks seems in some instances to contradict seismic hazard analysis results. This study has national implications for predicting ground motions and for improving how seismic hazards will be estimated in the future.

(Geoscience Continued)

D-5. Develop, incrementally, a strong-motion program throughout the state.

- ◆ In Fall 2000 the Nevada Seismological Laboratory obtained commitments from the USGS for ten new strong-motion instruments through the Advanced National Seismic System (ANSS) initiative. Siting and communications issues will be resolved by October 2001. Data from these instruments will feed directly into an integrated real-time analysis and archiving system at the Nevada Seismological Laboratory.
- ◆ The Seismo lab also expanded its analog seismic network in the western Nevada region to give better coverage of the area north of Truckee, California where there have been large numbers of small earthquakes lately. Earthquakes in this area just west of the California border affect Western Nevada, and any other seismic networks did not cover the area.
- ◆ Another effort in 2000 expanded the seismic network in southern Nevada. NSL is now operating two stations outside Las Vegas with a third station awaiting BLM permitting. The 3 three component digital stations will give optimal coverage for minimal cost in the Las Vegas region. Las Vegas is outside any area for which NSL has funding for operating seismic networks. Equipment funds are relatively easily obtained, and the operations will be continued so long as funds are available.

D-6. Develop a statewide, real-time, earthquake monitoring system.

- ◆ In 2000 the Nevada Seismological Laboratory combined the statewide digital and analog seismic networks into a single integrated network with the Antelope Real-Time recording and analysis software package. Automatic location and magnitude programs interface directly with notification systems including paging of key personnel and NSL web page updates. Real-time data exchanges are now operational with the National Seismic Network, U.C. Berkeley, and U.C. San Diego to improve locations especially of regional events.

D-8. Determine expected magnitude and frequency of return on various size earthquakes on known fault systems.

- ◆ The Nevada Seismological Laboratory continued studies of modeling of strong earthquake ground motion, including specific studies of strong motions from normal faulting earthquakes. NSL completed a study of several strong earthquakes that produced strong motions with an objective of better developing methods to predict the strong motions. One significant study was the Dinar, Turkey earthquake, as Dinar has the same geometry, relative to the fault that ruptured, as Reno and Carson City to the major normal faults on the west side of those cities. The modeling of strong motions also included thrust and strike-slip earthquakes.

OTHER ACTIVITIES NOT IN 2000 OBJECTIVES.

- ◆ Members and participants of the NESC council activities, faculty at UNR and UNLV, staffs of the Nevada Bureau of Mines and Geology and the Nevada Seismological Laboratory continue to interact with the media, public and organizations, particularly after earthquakes were felt in various parts of the state.
- ◆ Several interviews have been made on TV stations, help was provided to journalists, and talks presented to service organizations.
- ◆ FEMA made grants to help up-grade the seismographic station at UNLV.

NEVADA EARTHQUAKE SAFETY COUNCIL

STANDING COMMITTEE ANNUAL REPORT

ACTIVITIES IN PLAN YEAR 2000

GOAL E:

Promote the mitigation of earthquake risks resulting in increased safety for the citizens of and visitors to Nevada.

RESPONSIBILITY:

Risk Mitigation Committee

ACTIVITIES AND ACCOMPLISHMENTS FOR 2000 OBJECTIVES:

E-1 Participate in producing "Living with Earthquakes"

- ◆ "Living with Earthquakes in Nevada" booklet extensively was revised and updated by Craig dePolo and published on the NBMG Web site and in printed form.
- ◆ "Project Engage," an effort to get the public prepared for earthquakes was discussed. Further distribution of "Living with Earthquakes in Nevada" as a newspaper supplement and distributed to new homeowners was considered.

F-2 Award in Excellence for Earthquake Risk Mitigation

- ◆ Tom Stephens and Rod McInnis of the Nevada Department of Transportation for their seismic retrofit of the I-80/U.S. 395 interchange in Reno
- ◆ Corey Farley, reporter with the Reno Gazette-Journal for his continuing coverage of earthquake issues, including his 2/4/2000 article
- ◆ Keith Rogers, reporter with the Las Vegas Review Journal, for his April 11, 1999 article "If the big one hits here, will we be ready?"

F-3 Writing of the *Nevada Earthquake Risk Mitigation Plan*

- ◆ Presented draft of Nevada Earthquake Risk Mitigation Plan 2000 to NESC for review and comment. Incorporated input from DEM and FEMA representatives into revisions. Added transportation and utility sections for consideration in the 2001 plan document.

F-4 Promote nonstructural mitigation

- ◆ Supported NESC priority funding for Non-Structural Hazards Demonstration Project by Barbara Luke at UNLV and for Non-Structural Mitigation of Red Cross Building in Reno.
- ◆ Participated in the Safety Expo 2000 at Park Lane Mall in Reno.

OTHER ACTIVITIES NOT INCLUDED IN 2000 OBJECTIVES:

- ◆ The NESC Scenario for a Major Earthquake in Western Nevada (NBMG Special Publication 20) was used in an earthquake recovery and mitigation workshop, supported by the City of Sparks and Washoe County.
- ◆ The Nevada Public Agency Insurance Pool and Public Agency Compensation Trust agreed to fund seismographs for eleven rural school districts to be used in their science curriculum and to provide data to the Nevada Seismological Laboratory.

**STRATEGIC PLAN
FOR
EARTHQUAKE SAFETY IN NEVADA**

GOAL SUMMARY

GOALS FOR PLAN YEAR 2001

GOAL A:

Increase earthquake awareness and education.

STRATEGY:

Identify distinct target populations and develop strategies, communication methods and programs that will optimize the education and awareness efforts for each target. Identify grant sources and regenerating revenue methods to support annual projects such as Earthquake Awareness Week, drills, calendar, and poster contest. Develop a resource and contact list that can be easily updated, for use by the council, standing committees, and educators in the state. Expand membership and participation in education and awareness projects and efforts.

RESPONSIBILITY:

Awareness and Education Standing Committee

OBJECTIVES: (Annual Events - A Ongoing Activity - O)

- A-1 Inform general public about earthquake hazards, safety and risks
 - Resource / Contact List (O)
 - Emergency Management / Preparedness Courses (O)
 - SEISMO-WATCH (O)
 - Web Site (O)
 - Talks / Tours / Presentations (O)
 - Earthquake Awareness & Preparedness Week (A)
 - Calendar (A)

- A-2 Incorporate earthquake education in school curricula
 - Resource / Contact List (O)
 - School Demonstrations / Presentations / Talks / Tours (O)
 - Earthquake Awareness Week (A)
 - Statewide Earthquake Drill (A)
 - Statewide Poster Contest (A)
 - Calendar (A)
 - Preparedness Guide for School (Caughlin Ranch Model) (1998/99)

- A-3 Facilitate development of continuing seismic hazard education programs for government and industry
 - Project Impact; Carson City, Douglas County, Las Vegas, Sparks 2001/2002
 - Earthquake Awareness & Preparedness Week (A)
 - Commercial / Industrial Safety (O)

**STRATEGIC PLAN
FOR
EARTHQUAKE SAFETY IN NEVADA**

GOAL SUMMARY

GOALS FOR PLAN YEAR 2001

GOAL B:

Improve emergency management, response and recovery systems.

STRATEGY:

Integrate the existing emergency management system at all levels of the government and the private sector, and conduct training and exercises to accomplish an effective level of readiness for the protection of life, health, property and the environment during and after an earthquake.

RESPONSIBILITY:

Response and Recovery Standing Committee

OBJECTIVES: (Annual Events - A Ongoing Activity - O)

- B-1 Improve the Integrated Emergency Management System statewide (O)

- B-2 Encourage development of coordinated communication systems for integrated response and recovery systems statewide (O)

- B-3 Encourage the development of Community (or Neighborhood) Emergency Response Teams (CERT or NERT) to enhance citizen preparedness and survival in earthquake prone communities. (O)

- B-4 Develop exercises or workshops based upon Western Nevada Earthquake Planning Scenario, for government agencies and inform business/industry and private citizens (A)

- B-5 Encourage Mutual Aid and Inter-Local agreements to facilitate resource availability and deployment to support response and recovery during a seismic event. (O)

- B-6 Encourage use of Incident Command System for local governments, public safety agencies, business and industry, hospital facilities and non-profit agencies (O)

**STRATEGIC PLAN
FOR
EARTHQUAKE SAFETY IN NEVADA**

GOAL SUMMARY

GOALS FOR PLAN YEAR 2001

GOAL C:

Improve seismic safety of buildings and infrastructure.

STRATEGY:

Utilize the most recent geoscience information to develop geotechnical criteria for enhancing the safety of existing and future buildings and infrastructure including retrofit to meet seismic requirements, and to make land use compatible with known seismic hazards. Secure funding mechanism for implementation.

RESPONSIBILITY:

Engineering and Architecture Standing Committee

- C-1 Encourage state and local agencies to adopt building codes and design standards that incorporate the most recent seismic requirements. (O)
 - Provide the desired regulatory process for the adopted codes and standards.
- C-2 Reduce earthquake-induced liquefaction risk to highway structures, airports, and other community infrastructure systems. (O)
- C-3 Improve plan review procedures on new construction to ensure that buildings are designed in accordance with current seismic code requirements. (O)
- C-4 Improve the post-earthquake operational status of essential service buildings. (O)
- C-5 Reduce seismic structural and nonstructural hazards in government-owned and leased buildings. (O)
- C-6 Improve seismic safety for; (O)
 - older public school buildings and historic buildings
 - operational ability of older hospital buildings
 - older high-occupancy buildings (250 persons or more)
 - older residential structures
 - mobile homes
- C-7 Evaluate survivability, in the event of an earthquake, for; (O)
 - lifeline utility-essential services
 - water and waste-water systems
- C-8 Improve the seismic safety and design of hazardous materials usage, storage, and transportation facilities. (O)

**STRATEGIC PLAN
FOR
EARTHQUAKE SAFETY IN NEVADA**

GOAL SUMMARY

GOALS FOR PLAN YEAR 2001

GOAL D:

Improve essential geoscience information.

STRATEGY:

Develop geoscience information and research required to enhance the safety of buildings and infrastructure including retrofit to meet seismic requirements, and to make land use compatible with known seismic hazards. Ensure that the best contemporary information is available to facilitate making informed decisions about seismic risk reduction. Secure funding mechanism for implementation.

RESPONSIBILITY:

Geoscience Standing Committee

OBJECTIVES: (Annual Events - A Ongoing Activity - O)

- D-1 Develop and implement a research and monitoring plan for seismic activities in the state. (O)
- D-2 Reduce earthquake losses by mapping and identifying geologic hazards. (O)
- D-3 Develop and support the implementation of a criteria for performance of geologic-hazards investigations. (O)
- D-4 Incorporate seismic hazards in development and/or modification of land use planning policies through local government ordinances. (O)
- D-5 Develop,, incrementally, a strong-motion program throughout the state. (O)
- D-6 Develop a statewide, real-time earthquake monitoring system. (O)
- D-7 Monitor faults using Global Positioning System (GPS) measurements. (O)
- D-8 Determine expected magnitude and frequency of return of various size earthquakes on known fault systems. (O)

**STRATEGIC PLAN
FOR
EARTHQUAKE SAFETY IN NEVADA**

GOAL SUMMARY

GOALS FOR PLAN YEAR 2001

GOAL E:

Promote the mitigation of earthquake risks resulting in increased safety for the citizens of and visitors to Nevada.

STRATEGY:

Empower Nevadans with common-sense ideas about earthquake risk mitigation, emphasizing non-structural mitigation, utilizing various information mediums (pamphlet, newspaper, Internet, television and radio). Seek funding for showcase projects. Incorporate risk mitigation into planning and design processes.

RESPONSIBILITY:

Earthquake Risk Mitigation Committee

OBJECTIVES:

- E-1 Promote the Awards in Excellence for Earthquake Risk Mitigation in Nevada for Earthquake Awareness and Preparedness Week. (A)
- E-2 Maintain and expand the scope of the Nevada Earthquake Risk Mitigation Plan. (O)
- E-3 Promote nonstructural mitigation by enlisting organizations for special projects focusing on high risk, critical task response and recovery facilities. (O)
- E-4 Support funding for and participate in the earthquake risk mitigation project for the Red Cross building in Reno, documenting retrofit with photographs and videos and expand to Red Cross chapters in Elko and Las Vegas. (A)
- E-5 Enlist vendors to develop and deliver mitigation training programs and preparedness kits. (A)
- E-6 Publish nonstructural mitigation instructional materials. (O)
- E-7 Promote wide distribution of "Living with Earthquakes in Nevada." (O)
- E-8 Encourage planning communities to include earthquake hazards by providing hazard information in user friendly formats. (O)
- E-9 Encourage earthquake resistant infrastructures and lifelines by providing information and participating in utility working groups. (O)