

MINUTES OF THE  
MEETING OF THE SENATE COMMITTEE  
ON GOVERNMENT AFFAIRS

SIXTY-FIRST SESSION  
NEVADA STATE LEGISLATURE  
February 13, 1981

The Senate Committee on Government Affairs was called to order by Chairman James I. Gibson, at 10:45 a.m., Friday, February 13, 1981, in Room 243 of the Legislative Building, Carson City, Nevada. Exhibit A is the Meeting Agenda. Exhibit B is the Attendance Roster.

COMMITTEE MEMBERS PRESENT:

Senator James I. Gibson, Chairman  
Senator Keith Ashworth  
Senator Gene Echols  
Senator Virgil Getto  
Senator James N. Kosinski  
Senator Sue Wagner

COMMITTEE MEMBERS ABSENT:

Senator Jean Ford (Excused)

STAFF MEMBERS PRESENT:

Lee Hanson, Legislative Counsel Bureau Audit Division  
Anne L. Lage, Committee Secretary

BILL DRAFT REQUEST 17-569 (S.B. 236)

Alters the procedure for filling vacancies in the Legislature.

The committee agreed to introduce this bill.

SENATE BILL NO. 123

Creates council for seismic safety and makes various additions to law relating to seismic safety.

Senator Thomas R. C. Wilson introduced Senate Bill No. 123 to the committee and asked Mr. Gilbert F. Cochran, Reno Chapter, Nevada Society of Professional Engineers, to speak regarding this bill.

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Mr. Cochran testified that California became concerned about seismic safety following the 1936 Long Beach earthquake and the 1972 San Fernando earthquake. As a result of the 1972 earthquake, the California Legislature took action by establishing a seismic safety council. Utah subsequently followed California's lead by also establishing a seismic safety council. In 1978, Governor O'Callahan established a Nevada Ad Hoc Panel to look at what state and local entities were doing with respect to the risks represented by earthquakes in this area and to develop a report with recommendations. An interim report was completed in December of 1978 requesting consideration of creating a Nevada Seismic Safety Council and modification to the statutes regarding land use planning.

No action was taken during the 1979 Legislative session or by the Governor. Because the Nevada Society of Professional Engineers believed this issue to be of great import, especially in the western part of Nevada where both the seismic risk and seismic hazard are high, they have presented this bill.

Mr. Cochran testified that the appropriation request of \$90,000 for the first year and \$98,000 for the second year was an ideal situation. It would allow the council to employ a senior executive director, a professional staff associate, a half-time secretary and a travel budget. Mr. Cochran testified that as a bare minimum there should be travel funds appropriated for members of the council to meet on a quarterly basis, an operating budget to allow it to function, and a half-time secretary.

By elimination of state support for the executive director, the budget needs would drop to \$50,000. If the professional staff associate was also eliminated the funds required would drop to \$26,000.

Mr. Cochran then presented the committee with the following handouts:

A reproduction from the Ad Hoc Panel Report on the uniform building codes map of seismic risk in the United States. See Exhibit C.

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The conclusions and recommendations section of the Ad Hoc Panel Report. See Exhibit D.

Excerpts from the panel report which address the reasons why these programs are needed. See Exhibit E.

Analysis and justification for funding the seismological laboratory. See Exhibit F.

Chairman Gibson questioned whether any thought had been given toward incorporating this council within an existing agency. Mr. Cochran replied that he did not feel this to be a possibility.

Senator Wagner expressed concern over the size of the council. She believed 18 members to be too large and asked Mr. Cochran to reevaluate the staff to determine which members would be essential.

Dr. Alan Ryall, Director of the Seismological Laboratory University of Nevada, Reno, presented his statement in support of Senate Bill No. 123. See Exhibit G. He also presented a statement from John Schilling, Director and Geologist Nevada Bureau of Mines and Geology. See Exhibit H.

Mr. Tom Stephens, President Reno Chapter National Society of Professional Engineers, testified that a seismic council was needed. He felt the council should not be implemented for less than four years.

Dr. David B. Slemmons, Consulting Geologist, presented his statement to the committee regarding his experiences of conducting research on earthquake hazards for the past twenty-five years. See Exhibit I.

Mr. John A. Bonnell, Chairman of the Nevada Ad Hoc Panel, testified that at the present time there was no focus for the total problem in Nevada. There also was no information center.

Mr. Vern Rowley, Director Research and Development Carson City School District, testified that he was in support of Senate Bill No. 123. See Exhibit J.

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Mr. Lee Hanson, Legislative Counsel Bureau Audit Division, testified that section 17 of this bill had no reversion clause. He stated that this provision should be incorporated into the bill. See Exhibit K.

Mr. Robert B. Simpson, Nevada Society of Architects, testified that he was very uneasy with the existing data base. He was in support of this program.

Mr. William Hancock, Secretary-Manager Public Works Board, testified that the State Public Works Board supported the intent of this bill. He felt that the council should be separate from any other agency.

Chairman Gibson stated that the need for a seismic council had been substantiated, but the practicality of being able to provide substantial funding at this time was doubtful. Chairman Gibson suggested that there may be a way to initiate the coordination, collection and development of data without including all that Senate Bill No. 123 requests.

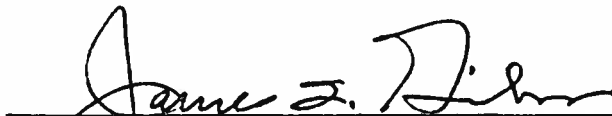
Senate Bill No. 123 was to be taken under further advisement.

There being no further business, meeting was adjourned at 12:06 p.m.

Respectfully submitted by:

  
Anne L. Lage, Secretary

APPROVED BY:

  
Senator James I. Gibson, Chairman

DATE: 2/17/81

EXHIBIT A

SENATE AGENDA

Preliminary

COMMITTEE MEETINGS

Committee on Government Affairs , Room 243 .

Day Friday , Date February 13 , Time upon adjournment .

S. B. No. 123--Creates council for seismic safety and makes various additions to law relating to seismic safety.

Senator Wilson, Prime Sponsor  
Gilbert F. Cochran, Director, Water Resources

ATTENDANCE ROSTER FORM

COMMITTEE MEETINGS

SENATE COMMITTEE ON Gov't Affairs

DATE: 2/13/81

EXHIBIT B

PLEASE PRINT NAME	PLEASE PRINT ORGANIZATION & ADDRESS	PLEASE PRINT TELEPHONE
Gilbert F. Cochran	Reno Chapt., Nev. Soc. Prof Engineers	673-7367
John Virginia Mat	Interested citizen	882-0449
John A. Borrell	Nev Soc Prof Engrs	747-1418
Swainia Cochran	Interested Citizen	825-9558
Allan Ryall	Univ of Nevada Reno	784-4975
D Burton Stemmans	" " " "	784-6067
Flori Ryall	" " " "	784-4975
JAMES NICHOLS	HARDING HANSON ASSOC RENO	529-6123
LEE HANSON	L.C.B. AUDIT	885-5822
TOM STEPHENS	President Reno Chapter Nev Soc of Prof Engrs	825-4165
Stan Hansen	NSPE State President	882-5172
JC Rowley	Canon City School District	885-6316
Tom J. Dan	GUEST SON LETTO	423 4100
Frank Daniels	Daniels Engrs LTD + Panels <sup>Ad Hoc</sup> Members	882-3779
Robert B. Simpson	NEVADA SOCIETY OF ARCHITECTS	786-4210

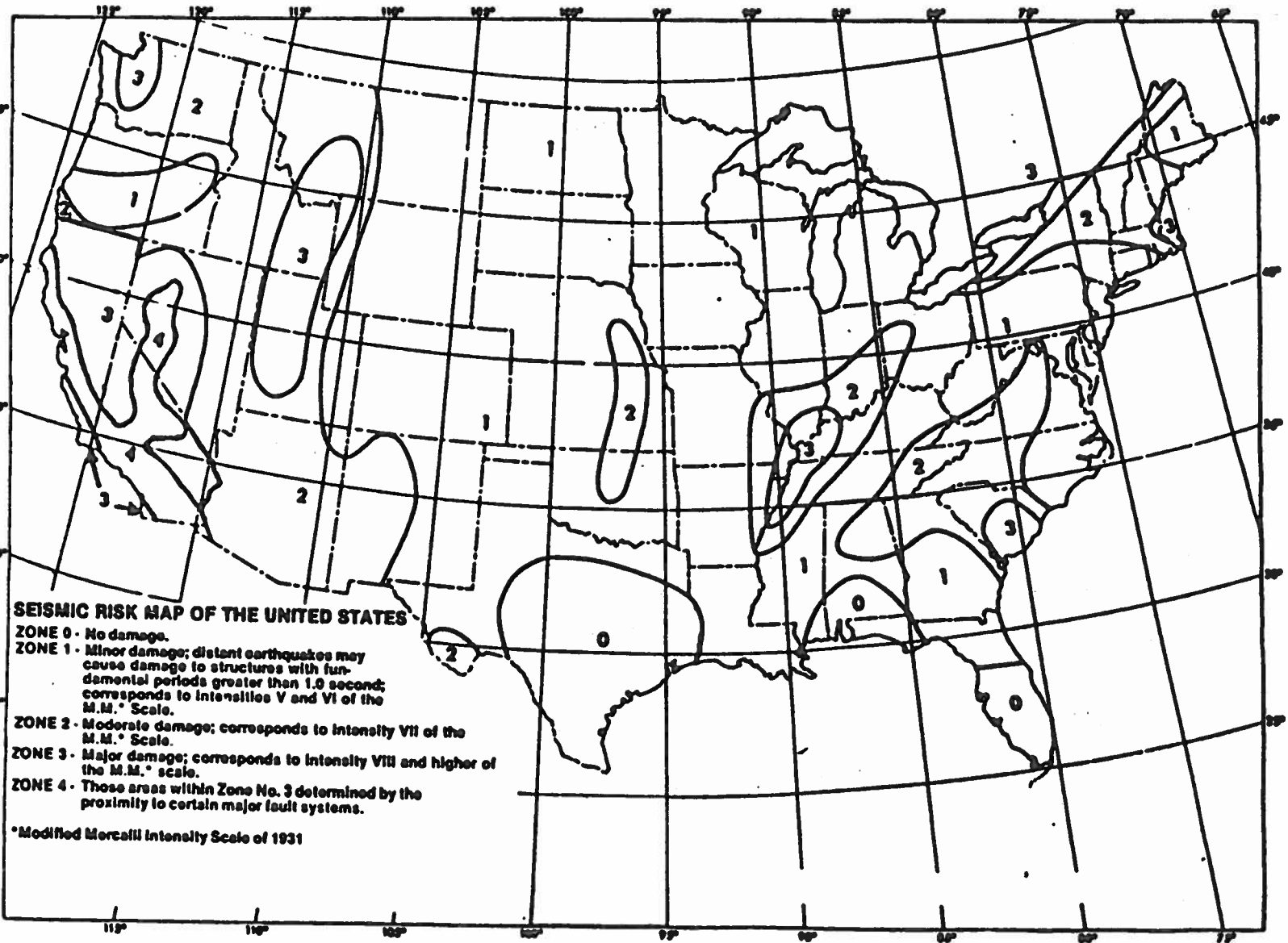


Figure 2

EXHIBIT C

—SEISMIC ZONE MAP OF THE UNITED STATES

For areas outside of the United States see Appendix Chapter 23

from the

UNIFORM BUILDING CODE

V.  
CONCLUSIONS AND RECOMMENDATIONS

EXHIBIT D

The Nevada Ad Hoc Panel on Seismic Hazard Mitigation, through the work of its own members and the members of the Panel's several Work Groups, has come to several broad conclusions with regard to seismic hazards in Nevada as enunciated below.

Conclusion No. 1: The citizens of Nevada face a very real and growing earthquake hazard. Nevada is in a region of seismic activity which, even during the course of the Panel's activities, experienced several minor earthquakes; August 3, 1978, in Pleasant Valley - Richter magnitude 2.8; September 4, 1978 in Diamond Valley (2 shocks) - Richter magnitudes 4.3 & 4.6; February 13, 1979 in Carlin - Richter magnitude 3.6; February 22, 1979 in Doyle, California - Richter magnitude 5.0. The extent of the hazard posed is growing, not because of increased seismicity, but because of our rapidly expanding population which is being housed and working in structures that may not be adequately designed for the earthquake hazard.

Conclusion No. 2: With limited exception, earthquake hazard related planning in Nevada is inadequate. The relatively high potential for a major damaging earthquake in, or near, one of Nevada's urban centers, particularly in western Nevada, demands effective plans for disaster preparedness, disaster response, effects mitigation and land use. Clark County has the best disaster plan but it is weak in its seismic coverage. Washoe County seems to have progressed further with seismic land use considerations, but the program seems to have little impact. No community seems to have an earthquake mitigation program or plan. Of the major utilities, the telephone companies appear to have the most sophisticated disaster contingency plans but in general such "lifeline" plans are "ad hoc" with little apparent coordination. The overall planning situation should be rectified to insure minimization of public official liability.

Conclusion No. 3: There is no overall program or plan that focuses seismic research and data collection to areas of high state or local priority. Significant seismic research is being conducted within the University System, but most of it is financed by the federal government and as such is responsive to the federal perspectives on research needs. There is little state or local agency input to the process. Data collection through installation of strong motion recorders in high-rise structures is "run" by local building departments under provisions of the Uniform Building Code.



This is a hap-hazard and ineffective program that lacks direction or maintenance and in its current state is a waste of developer and taxpayer money. These data are valuable and the program should be properly recognized and cared for.

Conclusion No. 4: There is no focal point in Nevada for communication or coordination of programs related to earthquake hazards either among public and private entities within Nevada, or between Nevada and other states, and the federal government. The Ad Hoc Panel provided a temporary focal point, and its activities served to highlight just how serious the communication and coordination problem is. Earthquakes affect and involve a broad spectrum of disciplines and agencies with divergent objectives and programs. Because of this diversity, a mechanism for communication and coordination is required.

Conclusion No. 5: The manner and extent to which the State of Nevada, its political subdivisions, and private enterprise, address and deal with the earthquake hazard problem, is inadequate. The State Legislature and the Executive Branch should give serious consideration to this matter and take appropriate actions. Failure to do so may, in the event of a major damaging earthquake, subject the State, its agencies, local entities, and public officials to significant questions or threat of liability.

The preceding five conclusions represent a synthesis of the many findings made by the Panel during the course of its ten-month investigation and study. These findings, which are extensively discussed in the main body of this report, have also formed the basis for several Panel Recommendations. It is believed that immediate action on these recommendations is warranted and that such action by the Legislative and Executive Branches would go a long way toward developing what the Panel believes to be an adequate "earthquake hazard mitigation program". These recommendations are as follows:

- Recommendation No. 1: The State of Nevada should establish an independent and interdisciplinary Seismic Safety Council to continue the efforts initiated by the Ad Hoc Panel on Seismic Hazards Mitigation.

This Council should have interdisciplinary and expert representation and because of the fundamental importance of seismic hazards to society, the Council should be independent from any agency currently dealing with aspects of the problem. The need for such an entity is not now being met by any state organization other than the Ad Hoc Panel. The Panel has developed a draft of legislation for consideration by the Governor and Legislature for implementing this recommendation. (See Appendix A )

In as much as the 1979 Nevada Legislature adjourned without addressing the question of seismic hazards or holding any sort of hearing on the above recommendation, the Panel strongly urges as an interim measure, that Governor List officially continue the Ad Hoc Panel. Formal continuation should provide the Panel with authority to seek Federal or other funds to support its activities.

- Recommendation No. 2: The 1981 Session of the Nevada Legislature should revise NRS 278.160 to require preparation of a "Seismic Safety Plan" as an element of city, county or regional master plans.

The Panel believes that the seismic hazards of Nevada are of sufficient concern to warrant the mandatory preparation of seismic safety plans. The Panel recognizes such a requirement will place burdens on some jurisdictions that may necessitate State assistance of both a technical and financial nature. Ability to prepare such plans, however, will be dependent upon availability of basic geological and seismological information and data that define the nature and extent of seismic hazards in any given locale. These data are not now available for the vast majority of the State's urban areas. This problem is the subject of the next recommendation.

- Recommendation No. 3: The State of Nevada should substantially increase the next biennial appropriation to the Nevada Bureau of Mines and Geology and authorize increased staff for the express purpose of accelerating the Bureau's Seismic Hazard Mapping Program.

The Nevada Bureau of Mines and Geology Seismic Hazard Mapping Program appears to be of excellent quality but it is seriously under-funded and understaffed. As of June, 1979, only three such maps have been published, two are in open file status and four others are in various stages of preparation. If the State is to initiate a serious program to reduce earthquake hazards, these data must be made available. In the long run, one of the most effective means of reducing seismic risks lies in adoption of adequate land use plans, and for these, this type of data is requisite. Given the rapid rate of population growth and urbanization in Nevada, the time for development of such plans is now, if in fact not overdue. An estimate of costs that will be required to bring this mapping program up to an acceptable and realistically accomplishable level has been prepared at the Panel's request by the Director of The Nevada Bureau of Mines and Geology. (See Appendix B)

- Recommendation No. 4: The State of Nevada should adopt as State Law the "seismic" provisions of the 1979 edition of the Uniform Building Code as promulgated by the International Conference of Building Officials and require its application without exception in all political subdivisions of the State.

The Uniform Building Code is currently used by most, but not all, local jurisdictions. However, most have adopted it with exceptions to its provisions. The Panel believes that with respect to earthquake hazards there should be no exceptions and that all structures in the State must be designed and built to these minimum seismic safety standards.

- Recommendation No. 5: The State of Nevada should establish within the Nevada Bureau of Mines and Geology a "Center for Seismic Hazard Assessment Data" in order to archive and make available all such data developed by all public and private entities within Nevada.

A large amount of valuable seismic hazard data is being developed by consultants on a day-to-day basis in support of all types of public and private construction and development activities. The preponderance of these data are contained in consultant reports but never enter the public domain even though they are developed to support activities for which government permits are required. A mechanism is needed to make these data publicly available to enhance our mitigation of seismic hazards. A precedent exists in the State Water Law related to "well logs" for requiring submittal of such types of data for use by the general public. The proposed Center should be established and the Nevada Bureau of Mines and Geology charged during the coming biennium with developing an efficient mechanism for getting the data and developing "rules and regulations" pertaining to the types and format for data submission. This mechanism and related rules and regulations should be subject to public hearing before their adoption. Funding during the first two years should cover only the cost of the above items. Implementation funding should be delayed until such time as an operable program is defined. Old data should be subject to inclusion and furthermore, contributors of data should not be held liable for any subsequent use of that data.

- Recommendation No. 6: The Nevada Seismic Safety Council should give high priority to "Alquist-Priolo" type of legislation to identify hazardous areas and require that proper detailed studies be prepared to characterize and delineate the problem areas, and to use proper planning and development procedures for the safe utilization of these areas.

The presence of active faults and of zones of potential ground failure in or near the urbanized centers of the State create places of high seismic risk. The mitigation of seismic hazards is most effectively accomplished by establishing an organized and legal procedure for locating and defining these areas, and for developing guidelines that will permit the seismically safe development and utilization of these hazardous areas. The primary goal of such legislation is to protect the public and to minimize the natural and legal hazards to the individuals and organizations responsible for the use of these areas. The effective conduct of this type of program will, in part, depend on the conduct of geologic, seismologic and engineering research of these regions.

- Recommendation No. 7: The State of Nevada should substantially increase the seismographic station distribution, and the accuracy of earthquake epicenter locations within all parts of Nevada, in order to make it possible to provide a rapid epicenter location of future earthquakes in any part of the State, and to improve seismic zoning in all parts of Nevada, including the southern and eastern parts of the State.

The present mission and region of study of the University of Nevada Seismological Laboratory is limited to coverage of the northwestern and northcentral parts of the State. The lack of any agency having a long-term commitment to provide a similar program of instrumentation and location for earthquake activity in the southern and eastern parts of the State makes it impossible to properly assess earthquake hazards and risks in Nevada. The mission of the Seismological Laboratory of the University of Nevada, Reno, should be broadened and the appropriation of funds increased to include a statewide basis for location and evaluation of earthquake epicenters, and to provide a seismologic basis for identifying seismically active faults of the region.

The above program can be implemented by an increase in the Building Permit fee. This funding would also support the maintenance of the Nevada strong motion network (see Recommendation No. 8), but not the purchase of strong motion instruments.

- Recommendation No. 8: The State of Nevada should establish a statewide program of instrumentation, data storage and interpretation of strong motion seismographic records of Nevada earthquakes to provide a basis for assessing future earthquake design and structural response of engineered structures in Nevada.

The present programs of acquiring strong motion data for earthquakes and the response of engineering structures to Nevada earthquakes is scattered in many governmental and cooperating organizations. The stations are biased toward nuclear test events and not to natural earthquakes that are likely to occur within the region. Many instruments are not continuously operational, due to problems of maintenance or their primary objective to support only nuclear detonation programs. The general lack of recordings for normal faulting earthquakes, the most prevalent type of earthquake phenomenon in Nevada, show a special Nevada need to acquire records that would be representative of the type of earthquakes that characterize this region for all world-wide data. Present indirect data suggests many Nevada structures may be overdesigned for the reverse-slip and strike-slip type of earthquakes that are representative of other parts of the world.

The State should designate UNR Seismological Laboratory to conduct a unified program of siting, instrumentation, maintenance and collection of data from existing and new strong motion stations within the state, that can provide the basis for proper seismic design of important engineering structures within the State. The building permit for large engineering structures shall include a fee for purchase by an appropriate agency of three sets of strong motion instruments to be installed at sites to be selected by the Seismic Safety Council or regional advisory groups. If the sites are within the structure, space and utilities are to be provided by the owner.

The basis for assessment and evaluation of earthquake hazards, and eventually prediction, lies in the development and maintenance of a reliable data base on geological and seismological conditions, events, and phenomena. In this regard, there are three elements of primary concern stated below:

EXHIBIT E

- The State of Nevada needs a permanent, state supported basic seismic network to provide uniform coverage of earthquakes in the State, with capability for rapid epicenter and magnitude determination.

Earthquake epicenter locations, magnitudes, and ground acceleration are basic data in the study of seismic hazards, and the rapid determination of those factors are important to alert Civil Defense and other disaster agencies of changes in activity that could warn of an impending large earthquake. The University of Nevada, Reno, Seismological Laboratory now maintains a limited seismograph network focused on northern Nevada. However, over 85% of the support for that effort is dependent upon Federal grants and contracts, and the program is therefore subject to the uncertainties and vagaries of shifting Federal Programs. The Panel believes that this program should be strengthened through greater State participation and support. The Director of the Seismological Laboratory has prepared a statement of what could be accomplished with greater State support. (Appendix F)

- There is a need for the State of Nevada to promote the development of an adequate statewide strong motion instrumentation and analysis program for major or structures for various types of ground and bedrock conditions.

Strong motion instruments provide a record of the response of structures to earth motion induced by earthquakes. This record integrates factors of the structural design, local soil and bedrock conditions, and the magnitude and duration of ground motion. These data are important to the design of seismically safe structures, analysis of structural damage following an earthquake, and the study of geological and geophysical factors important to seismic hazards. The Uniform Building Code requires installation of strong motion instruments in buildings of certain size and in consequence many have been installed in the Reno and Las Vegas areas. However, the indiscriminant requirement for these is ineffective in terms of assuring appropriate geographic distribution. A related problem is associated with the qualifications of individuals responsible for selection of the type and quality of instruments, since the UBC is silent on this important factor. Furthermore, there is no program for maintenance of instruments or analysis of the data. A program is necessary to make this

a fruitful endeavor. It has been suggested that such a program could be financed through a surcharge on building permit fees to assure equitable distribution of costs.

- Significant benefits would be realized if the State of Nevada established a public repository for archiving basic geological, geotechnical, and geophysical data developed to assess seismic hazards or design criteria in relation to construction and building activities.

The siting or design of buildings or other structures generally involves study and investigation of the site to detect presence of earthquake faults, or to determine soil conditions. This generally involves shallow borings to determine soil properties and, in the case of major structures, can include trenching to locate and log faults, and seismic velocity studies. All of these data are critical to increasing our general knowledge of seismic activity and assessing earthquake hazards. A large amount of valuable seismic hazard data is being developed by consultants on a day-to-day basis in support of all activities. The preponderance of these data, contained in consultant reports, never enter public domain even though they are developed to support activities for which government permits are required. On the other hand, a precedent exists in the State Water Law related to "well logs" for requiring submittal of such types of data for use by the general public.

There is no single agency responsible, or active in collecting, evaluating, and compiling statewide or regional data in a systematic, long-term program. Federal agencies regard this as a state responsibility.

The proposed center should be established, and a mechanism is needed to make data publicly available to enhance our mitigation of seismic hazards. The Nevada Bureau of Mines and Geology should be charged during the coming biennium with developing and efficient mechanism for getting the data and developing "rules and regulations" pertaining to the types and format for data submission.

Geotechnical studies made to discover information relative to earthquake and seismic risk or hazard, or earthquake engineering design data from which interpretations and conclusions are formulated, should be provided to the Center. Such data should include, but not be limited to, fault maps, exploratory trench profiles and cross-sections, test borings, and geophysical base data such as seismic refraction or reflection records. Data related to mineral, oil and gas, and geothermal resources or exploration can be deposited in the Nevada Bureau of Mines and Geology general data files at the discretion of the originator. Old data should be subject to inclusion and furthermore, contributors of data should not be held liable for any subsequent use of that data. The mechanism and related rules and

regulations should be subject to public hearing before their adoption. Funding during the first two years should cover only the cost of the above items. Implementation funding should be delayed until such time as an operable program is defined.

### Research Priorities

To date, the State has had minimal participation in a number of research areas that are critical to an adequate program of earthquake hazard reduction in Nevada.

Foremost among these is the statewide seismic network which has, over the last 15 years, received support primarily from federal research contracts and has therefore been subject to continual shifting of priorities within the federal program.

A second program of vital importance is the strong motion instrumentation program which, at the present time, lacks central direction or State funding. Other areas of the overall research program in order of their priority are: acquisition of high resolution aerial photography and archiving of basic research data.

- The State of Nevada should support a permanent, basic seismographic network operated by the Seismological Laboratory to provide statewide coverage of earthquake epicenters and Richter magnitudes to be telemetered to the Laboratory for rapid and effective analysis for disaster evaluation and response, and archiving for detailed or specialized studies.
- The State should support a program of strong motion instrumentation of major or vital engineering structures, and of various types of ground and bed-rock conditions on a statewide basis to develop an adequate strong motion program.
- The State should initiate, perhaps with the federal government and adjoining states, a program of remote sensing data including high resolution photography with low-sun angle U-2 photography that will assist in mapping and evaluating the distribution and characteristics of active faults, and stable tectonic blocks of Nevada.
- Basic geological data should be archived to prepare an integrated State of Nevada program of research and data collection that will provide essential earthquake information and analysis that will satisfy local and statewide needs.



## PROPOSED PROGRAM

In the following paragraphs, a program of instrumental research on Nevada earthquakes is described at three levels of State support (in terms of 1979 dollars): (1) current level, \$51,000, (2) enhanced level, \$100,000, (3) optimum level, \$300,000.

EXHIBIT F

- (1) Current level, \$51,000. The current level of support provides for 2.0 full-time employee positions and some operating money. This State support will be supplemented with \$84,000 of research funds from the U.S. Geological Survey's Earthquake Hazard Reduction Program, earmarked for studies of seismic risk in the Nevada region. Other research grants and contracts are for projects not directly related to earthquake hazards. The Geological Survey funds are awarded annually, on the basis of research proposals; there is no guarantee of continued funding in the future. (In large part because of the Laboratory's dependence on "soft" money, it has had considerable difficulty in attracting and keeping highly qualified professional personnel.)

With the current level of Geological Survey support, the Laboratory can continue to operate the 30-station seismic network, analyze the data, issue the Laboratory Bulletin and carry out a modest program of research on earthquake hazard in the Nevada region. This level of support does not, however, provide for replacement of old pieces of equipment, improvement of the system or expansion of the network into areas that are not adequately covered now. Reconfiguration of the network to provide more even coverage would reduce the capability to study earthquake activity around centers of population (Reno, Tahoe and Carson City), and as a result could lessen the Laboratory's chances of obtaining Geological Survey support. If the U.S.G.S. contract support were to terminate, the Laboratory could not continue to operate a seismic network in Nevada.

- (2) Enhanced level, \$100,000. If the seismology program were supported by the State at the level of \$100,000 per year, there would be some flexibility that does not exist now. Initially, most of the additional funds would be used to replace items of equipment that are almost worn out (tape recorders, chart recorders), and to provide some additional coverage in areas like northwest Nevada, Elko and Ely. Later on, part of the increased funds would be used to support increased analysis and professional positions. The research program would still, however, be dependent on federal support, our investigation of seismic risk would remain at a modest level and instrumental coverage of the State would not include southern Nevada.
- (3) "Optimum" level, \$300,000. A modest program of seismological research that would be independent of federal funding would require \$300,000 or more per year in State support. At this level, the network could be expanded to provide even coverage of the State, old equipment could be replaced, the system could be gradually upgraded to include advanced digital equipment and additional staff could be hired to expand the research effort. More effort would be directed at detailed field

investigations of areas that have been tentatively pinpointed as having relatively high potential for large earthquakes in the future. Equipment in these areas would be supplemented to provide for measurements of geophysical parameters that have been associated with successful earthquake predictions in China and the Soviet Union. All analysis would be kept current, as opposed to the Laboratory's present backlog of about a year in routine analysis. Permanent support for two or more professionals would enable us to hire and retain highly qualified researchers.

#### JUSTIFICATION

The University Seismological Laboratory is the only State agency charged with responsibility for instrumental studies of earthquakes and seismic risk. The level of State support for this program is far less than in any other state with a comparable seismological research program (Alaska, California, Utah, for example). The instrumental data base is an absolutely essential ingredient of risk assessment -- without it there would be no way to assign higher or lower probabilities of rupture to the thousands of potentially active faults that are distributed rather evenly over most of the Nevada region. Near-real-time analysis of data from a telemetering network of instruments around the State is essential to alert Civil Defense and other disaster agencies of changes in activity that could presage a large earthquake.

STATEMENT

By

Alan Ryall, Director

Seismological Laboratory  
University of Nevada, Reno

EXHIBIT G

This statement is in support of Section 12 of Senate Bill Number 123, directing the Seismological Laboratory to (a) expand its network of seismic stations to provide statewide coverage, (b) maintain existing and future strong-motion instruments in the State and collect and analyze the data from those instruments, and (c) conduct research on seismic hazards and improve seismic zoning throughout the State. Comments are the following:

1. WHY DOES NEVADA NEED AN INSTRUMENTAL SEISMOLOGY PROGRAM?

- With a history of five great (Richter magnitude 7-8) earthquakes in the western Great Basin since 1840, seismic risk is a subject that deserves the serious attention of Nevada's administrators, legislators and planning groups.
  - The potential economic benefit to be derived from an accurate picture of seismic risk is enormous.
  - The possibility of saving lives and property in future large earthquakes by working now to identify seismically hazardous areas is very real.
  - The best investment strategy for research on seismic risk involves a combination of geologic (i.e. fault mapping) and seismological (i.e., instrumental) research.

2. THE CURRENT PROGRAM OF THE LABORATORY IS AIMED AT ANSWERING THE FOLLOWING QUESTIONS:

- What areas in the Nevada region have the highest potential for large earthquakes in the near future? What areas have the lowest potential?
  - This research is important for urban planning, will greatly improve seismic zoning, may lead to decreased construction costs in some areas.
  - Current seismic zone map of the Nevada region is wrong, specifically in the assumption that future large earthquakes will occur where large shocks have occurred in historic time. Map is being revised as a result of our research.
- Can Nevada earthquakes be predicted?
  - There is some evidence that earthquake prediction may be possible in this region.

- What is the effect on earthquake activity of building reservoirs in active seismic zones?
  - Were the 1948 Verdi, 1966 Truckee and 1975 Oroville earthquakes related to the filling of reservoirs in those areas?
- By a combination of theoretical and observational studies, can we develop geophysical methods for measuring stress in rocks deep within the earth's crust?

### 3. WHY DOES THE LABORATORY NEED AN INCREASE IN STATE SUPPORT?

- The Laboratory has been supported almost exclusively from federal sources since 1962, and its success in grantsmanship has mitigated against its getting an increased State appropriation.
  - We have needed and requested State funding every biennium, but the available support always seems to go to even needier departments.
- Federal agencies are increasingly reluctant to "pick up the tab" for entire state research programs, without even a minimal long-range commitment to these programs by the states themselves.
  - In the early days of our program it was assumed by federal funding agencies that the substantial investment in Nevada seismology would eventually lead to an increase in cost-sharing by the State, but this has never materialized.
- The additional duties mandated by SB 123 cannot be undertaken without any State support.
  - Current federal research objectives are not compatible with expanding the seismic network to achieve statewide coverage, or with maintaining the strong-motion network.

### 4. HOW MUCH IS NEEDED?

- The Laboratory's current budget is about \$340,000 for FY 1981, of which only \$56,000 (i.e. 16%) is State support.
- An increase of at least \$92,000/year will be needed to accomplish the additional duties listed in SB 123, assuming that federal funding agencies will continue to carry the major portion of our program.
  - This level of support will provide half-time salaries for a seismologist, a seismographic records analyst and a programmer, full-time support for an additional technician, plus \$36,000 for operating expenses (computer costs, equipment repair and replacement, travel and general operating).

12 February 1981

EXHIBIT H

STATEMENT OF JOHN SCHILLING

Director and State Geologist  
Nevada Bureau of Mines and Geology

Re: Nevada Senate Bill 123

1. In regard to Sec. 16 of SB 123 - The Nevada Bureau of Mines and Geology is established by law to provide research and public service related to Nevada geology and mineral resources; it has no regulatory functions. In most cases research organizations should not regulate -- unbiased research is difficult at best when an organization also has policy and/or regulatory functions. For this reason I would suggest the following changes in S.B. 123: change Section 16 NRS 514.040 part 10 (lines 45-49 page 4 and lines 2-3 page 5) to read "10. Establish a depository of consultants' reports which contain seismic information used in the construction or development of any activity for which a governmental permit is required, and make this information available to the general public."
2. In regard to Sec. 17 part 2 of SB 123 - Because of staff, space, and equipment limitations, no more than \$60,000 could be spent efficiently in either fiscal year. Any funding to the Nevada Bureau of Mines and Geology should be at that or a lower level.

# DAVID B. SLEMMONS

CONSULTING GEOLOGIST  
2995 GOLDEN VALLEY ROAD · RENO, NEVADA 89506 · (702) 972-8877

February 13, 1981

STATEMENT ON SENATE BILL 123

EXHIBIT I

The following statement presents my personal opinion on the importance of Senate Bill 123. It is based on my experience developed during the past twenty five years of conducting research at the University of Nevada and in consulting for various Federal agencies and private industry on earthquake hazards and the siting or design of vital engineering structures.

1. All parts of Nevada are susceptible to damaging earthquakes of above 5.5 to 6 magnitude and the western and central parts of the state have a high seismic potential with the possibility of earthquakes of up to 7.5 magnitude. Earthquakes present a hazard that could have an even greater impact on Nevada than the disasters that have occurred during the last year.
2. I strongly endorse the need for both the Seismic Council and the support of goals and tasks proposed for the Seismological Laboratory. The authorization of the Council is urgently needed to establish policy, foster research and disaster preparedness projects, and recommend future legislation that will implement the State's policy on earthquake hazard and risk in the State. The Seismological Laboratory needs funding at a level to respond to the goals of providing statewide monitoring of earthquake activity in order to define active faults and seismic zones, earthquake mechanisms and anticipate the size and location of future earthquake activity.
3. The proposed program of undertaking field geologic studies in areas of high population density is important to defining earthquake hazards and assessing seismic risk. I endorse this important area for State support.

Respectfully submitted,



David B. Slemmons

Member, Governor's Seismic Safety Panel



*Carson City School District*

CARSON CITY, NEVADA 89701

1402 West King Street -- Post Office Box 603 -- (702) 885-6300

EXHIBIT J

BOARD OF TRUSTEES

- Mr. Del Landing, *President*
- Mr. Keith Macdonald, *Vice President*
- Mrs. Lucille Hill, *Clerk*
- Mr. Frank Matthews, *Member*
- Mr. Bob Thomas, *Member*
- Mrs. Linda Terry, *Member*
- Mr. Earl Yamashita, *Member*

Dr. Clifford J. Lawrence, *Superintendent*

Senate Government Affairs Committee  
 Nevada State Legislature  
 Capitol Complex  
 Carson City, NV 89710

Re: Senate Bill No. 123

Dear Sirs:

The problem of seismic safety in public school buildings has been discussed extensively in the Carson City School District over the past several months. Some questions in this regard were particularly difficult to answer because of a definite lack of formal guidelines, codes, or statutes in the State of Nevada.

As a result, the Board of Trustees of the Carson City School District has expressed support of legislation which would establish a council for seismic safety. The Board would hope that this council would provide leadership which would ultimately result in statutes and guidelines for future construction in the public sector.

The Board specifically encourages the enactment of Senate Bill No. 123 which creates a council for seismic safety and makes various additions to law related to seismic safety.

Sincerely,

*Vernon C. Rowley*  
 Dr. Vernon C. Rowley, Director  
 Research and Development

VCR:lh

STATE OF NEVADA  
LEGISLATIVE COUNSEL BUREAU

LEGISLATIVE BUILDING  
CAPITOL COMPLEX  
CARSON CITY, NEVADA 89710



LEGISLATIVE COMMISSION (702) 885-5627

KEITH ASHWORTH, *Senator, Chairman*  
Arthur J. Palmer, *Director, Secretary*

INTERIM FINANCE COMMITTEE (702) 885-5640

DONALD R. MELLO, *Assemblyman, Chairman*  
Ronald W. Sparks, *Senate Fiscal Analyst*  
William A. Bible, *Assembly Fiscal Analyst*

ARTHUR J. PALMER, *Director*  
(702) 885-5627

FRANK W. DAYKIN, *Legislative Counsel* (702) 885-5627  
JOHN R. CROSSLEY, *Legislative Auditor* (702) 885-5620  
ANDREW P. GROSE, *Research Director* (702) 885-5637

February 4, 1981

EXHIBIT K

Senator James I. Gibson  
Chairman, Government Affairs  
Legislative Building, Room 243  
Carson City, Nevada 89710

Dear Senator Gibson:

Senate Bill 123 is currently before your committee. Section 17 appropriates money from the General Fund to the Council for Seismic Safety. However, for fiscal years 1981-82 and 1982-83, the appropriation does not contain a reversion clause. We believe the appropriation should include a reversion provision for each fiscal year. Therefore, we would like to suggest that Section 17 of this bill be amended as follows:

Sec. 17. 1. There is hereby appropriated from the state general fund to the council for seismic safety:  
(a) The sum of \$90,000 for fiscal year 1981-82; and  
(b) The sum of \$98,000 for fiscal year 1982-83,  
for support of the council in carrying out sections 2 to 11, inclusive, of this act. Unencumbered balances of the appropriations made for the fiscal years 1981-82 and 1982-83 shall not be committed for expenditure after June 30 of each year. The unencumbered balances of these appropriations shall revert to the state general fund.

2. There is hereby appropriated from the state general fund to the bureau of mines and geology of the public service division of the University of Nevada:  
(a) The sum of \$106,400 for fiscal year 1981-82; and  
(b) The sum of \$98,400 for fiscal year 1982-83,  
for the production of topical studies, geologic maps and maps of regional fault zones. Unencumbered balances of the appropriations made for the fiscal years 1981-82 and 1982-83 shall not be committed for expenditure after June 30 of each year. The unencumbered balances of these appropriations shall revert to the state general fund.



Senator James I. Gibson  
February 4, 1981  
Page two

We are available to discuss this bill with you. Also, when this bill is before your committee, we will be present to testify regarding this amendment.

Sincerely yours,

JOHN R. CROSSLEY, C.P.A.  
LEGISLATIVE AUDITOR

By *S. Lee Hanson*  
S. Lee Hanson, C.P.A.  
Audit Manager

JRC:SLH:hjr