Geological Society of Nevada

SOUTHERN NEVADA CHAPTER

GSN Newsletter **October, 2001**

Earthquake Hazard in Las Vegas Area, Nevada

DATE: **Thursday, October 25, 2001**

SPEAKER: **Dr. Burt Slemmons**

LOCATION: **Room 102 Lilly Fong Geoscience Building**

TIME: **5:30 p.m. Social hour**
6:30 p.m. Presentation

Announcements:

The Southern Chapter of GSN now has a website!
http://www.unlv.edu/Colleges/Sciences/Geoscience/GSN/gsnsc.htm
Bookmark the page to stay on top of the Southern Chapter events.

Sunrise-Frenchman Mountains Fault Zone

Coutesty of Jim O'Donnell

Earthquake Hazard in Las Vegas Area, Nevada

Dr. Burt Slemmons – Consulting Geologist.

Abstract (GSN- Las Vegas meeting on October 25, 2001)

The study is based on one completed in the spring of 2001 with nine co-authors. It concludes that faults in the Las Vegas area are primarily caused by tectonic activity related to the major regional faults with subordinate compaction on some of the faults within the valley. At least eight major faults capable of generating earthquakes of M 6.5-7.0 are in the immediate area. The surface rupture length of these faults can be used to define the potential earthquake size, but there is little and inadequate paleoseismologic data for fault histories, earthquake recurrence intervals, and time of the last earthquake event for each fault. Several unmapped faults were observed during the aerial reconnaissance, which exhibit Late Pleistocene to Holocene offsets.

Conclusions

1. Faults in Las Vegas Valley area are mainly tectonic with a subordinate differential compaction component.
2. The four main N-S faults appear to be linked to the Lake Mead FS and Las Vegas SZ.
3. Earthquake magnitudes for the valley faults are at least M 6.7-6.9 ± 0.4 and surface rupture lengths (SRL) are ~20-38 km.
4. Earthquake magnitudes for the regional faults (Arrow Canyon Range F., Dry Lake Range F., California Wash F., Lake Mead FZ, and possibly the Las Vegas SZ) are: ~M 6.5-7.0 ± 0.4. A SRL of ~50 km for the Lake Mead FZ is based on the regression of Wells and Coppersmith (1994).
5. Although the faults have low to moderate slip rates, the timing, frequency and recurrence intervals for Las Vegas faulting events is very poorly known.
6. The earthquake hazard is partly determined by fault slip rate and recurrence interval, but we do not discuss this question due to inadequate data.
7. This report found several unmapped, or poorly recognized active faults in and near the valley, which demonstrates that there is a higher hazard than has been previously documented.
8. Current building codes and construction practices do not adequately take into account these higher magnitude seismogenic earthquake sources.

FAULT	SRL (km)	M_w MAGNITUDE	MAX. SCARP HT. (m)
1 Decatur-Eglington FZ	34	6.9 for SRL of 34 km	23
2 Valley View-Scarp II FZ	31	6.8 for SRL of 31 km	25
3 Cashman-Whitney Mesa FZ	30	6.8 for SRL of 30 km	61
4 Sunrise-Frenchman-River Mountains. FZ	38	6.9 for SRL of 38 km of preferred model	>11
5 Lake Mead FS	48?	7.0 for SRL calc. from displacement on Black Hills F.	+3 m in Holocene alluvium

Not Listed in Table: Las Vegas SZ, and Arrow Canyon Range FZ, Dry Lake FZ and the Las Vegas SZ shown by Langenheim and others (2001) within the valley basin.

Reference: Slemmons, D.B., Bell, J.W., dePolo, C.M., Ramelli, A.R., Rasmussen, G.S., Langenheim, V.E., Jachens, R.C., Smith K., and O'Donnell, J., March 28-30, 2001, Earthquake Hazard in Las Vegas, Nevada: *in* Luke, B., Jacobson, E., and Werle, J., (editors). Proceedings, 36th Annual Symposium on Engineering Geology and Geotechnical Engineering, University of Nevada, Las Vegas, P. 447-459.

D. BURTON SLEMMONS, Ph. D

Consulting Geologist and Prof. of Geology and Geophysics Emeritus at University of Nevada, Reno.

Dr. Slemmons taught geology, environmental geology, and earthquake engineering courses for 38 years at the University of Nevada – Reno. He supervised over two dozen theses dealing with active tectonics, mainly in the Basin and Range region. His International and regional work has resulted in the publication of more than 80 papers and abstracts dealing with geology, active earthquake faults, and the impact on man of earthquake hazards. Dr. Slemmons retired from teaching in 1989 and moved to Las Vegas.

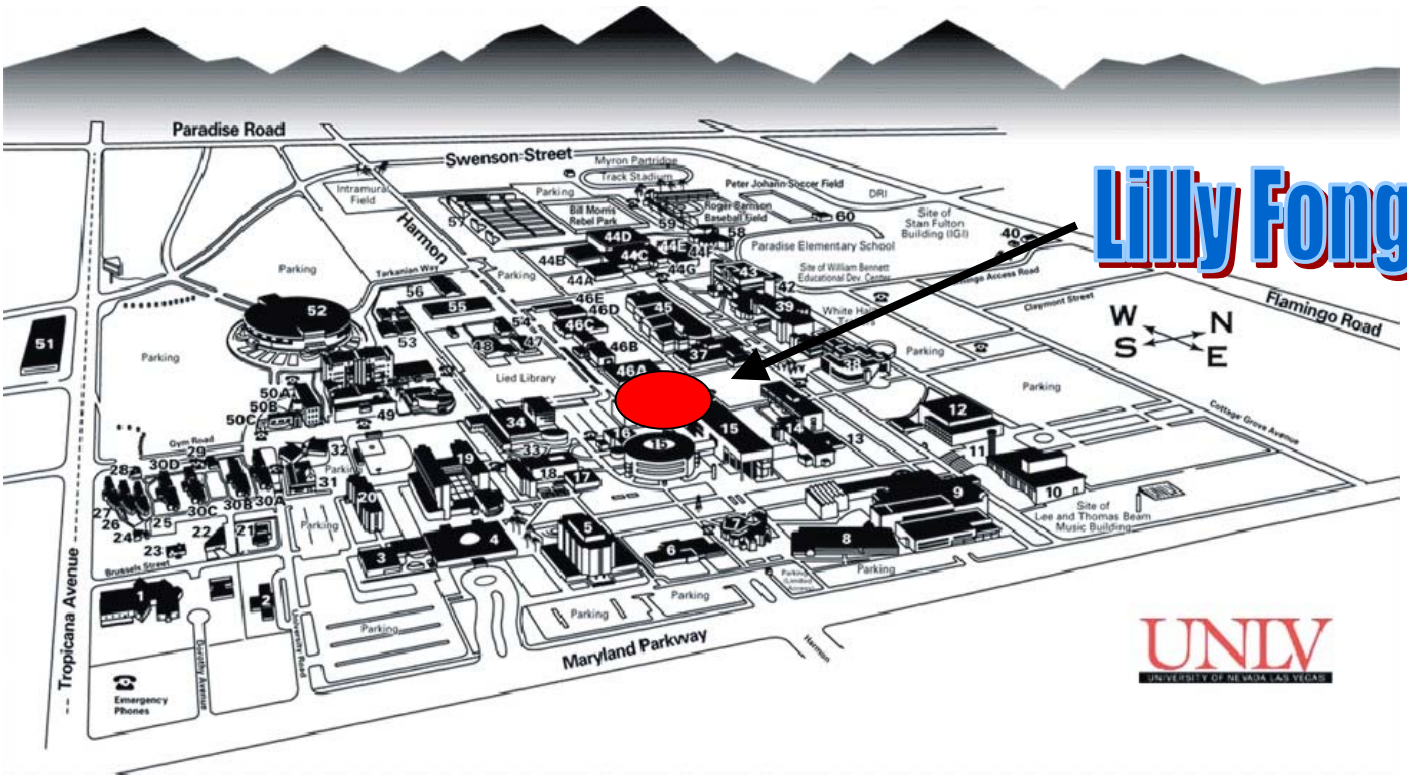
He has worked as a consultant for Lawrence Livermore National Laboratory, U. S. Nuclear Regulatory Commission, International Atomic Energy Commission, and industry on earthquake hazards and risk for nuclear power plants, waste disposal, mining facilities, gas and oil pipelines, dams and other vital facilities.

Dr. Slemmons had also served as a director on the Nevada Earthquake Safety Council since it was organized in 1992, and been active with the Las Vegas (Southwestern Section) of the Association of Engineering Geology since it started. His main research in the 1990's was studying and evaluating the earthquake hazard in the Las Vegas and Yucca Mountain areas.

Announcements

Look! Its a *NEW* GSN web site!
http://www.gsnv.org
http://www.unlv.edu/Colleges/Sciences/Geoscience/GSN/gsnsc.htm

If you know of anyone that would like to become a member of if you need to renew your membership in the Geological Society of Nevada, a membership application is attached or can be accessed online.



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