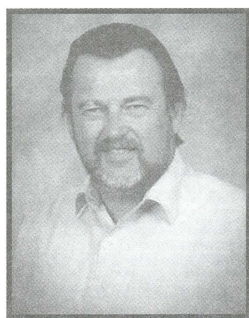


Improved Earthquake Safety for the Wasatch Front

USSC Votes In New Chair



Peter McDonough has been a natural gas distribution and pipeline engineer for 30 years. He has a BS in Civil and Environmental Engineering from Clarkson College of Technology, Potsdam, N.Y. and a MS in Civil Engineering from the Polytechnic

Institute of New York. He is a Licensed Professional Engineer. Since 1979 he has been involved with earthquake engineering design in Utah. A member of the Earthquake Engineering Research Institute, he is also vice-chair of the American Society of Civil Engineer's Technical Council on Lifeline Earthquake Engineering.

He has co-authored three books on lifeline earthquake engineering and is currently editing a fourth on the Nisqually Earthquake. His vision for the USSC is to build on the successes of the various committees and to make the USSC better known among the larger community.

Look for more contributions from Peter McDonough in upcoming issues of the Forum.

New Vice Chair's Vision for Leading the Utah Seismic Safety Commission

By: UCCS Vice Chair Barry H. Welliver

At the 70 percent mark, the USSC has had great success in becoming an advocate within the state of Utah for seismic safety. It has emerged as a clearinghouse of information regarding earthquake concerns and moved decisively forward in the areas of public and business education. Its mandate to "act as a source of information...." has been met and exceeded. As the commission moves into its final years under its original statute, the decisions and directions taken will literally either help ensure its continuation or seal its fate.

The present commission was founded in the aftermath of the 1994 Northridge, California earthquake. It was the conviction of Representatives Ken Burningham, Nancy Lyon and Afton Bradshaw that created HB 358 in 1994 establishing the present Utah Seismic Safety Commission. Representative Burningham's motivation was school safety. He was a schoolteacher and had also been affected by the

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Earthquake Activity in the Utah Region for 2000

by Susan J. Nava
with significant contributions
by Jeff Fotheringham and Lorraine Nelms

The following is the reported earthquake activity for the final 3 quarters of 2000. The reports correspond to the accompanying maps.

2000 2nd Quarter: During the three-month period April 1 through June 30, 2000, the University of Utah Seismograph Stations located 542 earthquakes within the Utah region (see accompanying epicenter map A). The total includes one earthquake in the magnitude 4 range, one earthquake in the magnitude 3 range, and 41 earthquakes in the magnitude 2 range. Earthquakes which have magnitudes of 3.0 or larger (plotted as stars and specifically labeled on the epicenter map) are described below. There were no earthquakes reported felt during the report period. (Note: All times indicated below are local time, which was Mountain Daylight Time during the report period.)

Earthquakes of Magnitude 3.0 or Larger (or Felt)

ML 3.3 May 25 09:24 p.m. 8 mi SE of Circleville, UT
ML 4.4 May 27 03:58 p.m. 10 mi SW of Uravan, CO (near Utah border)
Neither of the above earthquakes was reported felt in Utah.

Other Notable Seismicity (see map A)

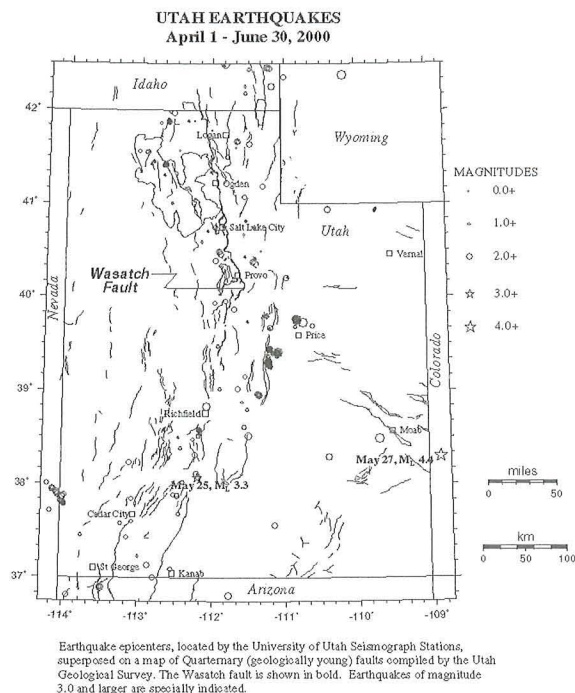
Central Utah: Distinct clusters of seismic events to the southwest and north of Price spatially coincide with sites of active underground coal mining in the eastern Wasatch Plateau and Book Cliffs, respectively, and are interpreted to be mining-related. These include a total of 377 located shocks (0.5 @ M @ 2.9).

Southwestern Utah: A cluster of earthquakes along the Utah-Nevada border 20 miles ENE of Panaca, Nevada (~60 mi WNW of Cedar City, Utah), includes 19 shocks (1.1 @ M @ 2.3) that occurred intermittently throughout the report period. A cluster of 11 small earthquakes (0.8 @ M @ 1.5) about 5 mi ESE of Sevier (~10 mi SSW of Richfield) also includes shocks that occurred intermittently throughout the report period; these shocks were a continuation of seismic activity that began during the previous calendar quarter in this area.

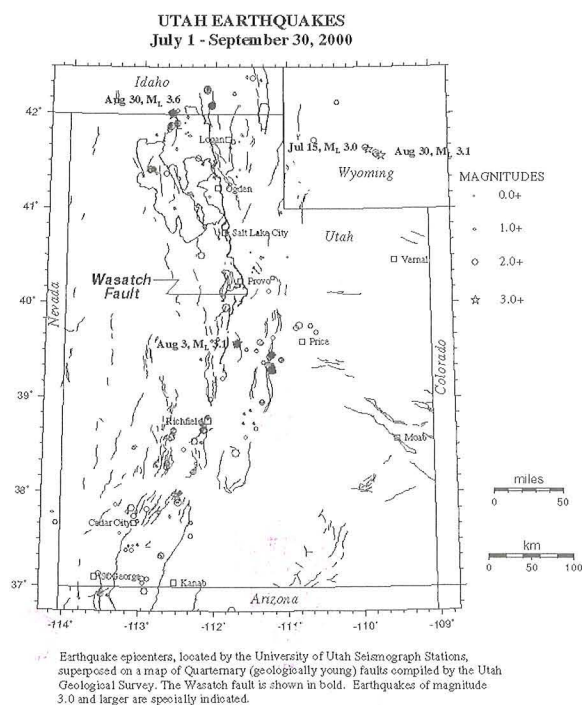
Northwestern Utah: Two concentrated clusters of small earthquakes are formed by: (1) eleven earthquakes (0.3 @ M @ 1.7) that occurred between April 4 and May 6 about 25 mi W of Garland (~40 mi WNW of Logan) and (2) eleven earthquakes (0.7 @ M @ 1.5) that occurred between April 22 and May 7 about 17 mi NNE of Lakeside (~50 miles SW of

continued on page 3

MAP A



MAP B



Earthquake Activity cont.

2000 3rd Quarter: During the three-month period July 1 through September 30, 2000, the University of Utah Seismograph Stations located 424 earthquakes within the Utah region (see accompanying epicenter map B). The total includes four earthquakes in the magnitude 3 range, and 34 earthquakes in the magnitude 2 range. Earthquakes which have magnitudes of 3.0 or larger (plotted as stars and specifically labeled on the epicenter map) are described below. There was one earthquake reported felt during the report period. (Note: All times indicated below are local time, which was Mountain Daylight Time during the report period.) Additional information on earthquakes within the Utah region is available from the University of Utah Seismograph Stations.

Earthquakes of Magnitude 3.0 or Larger (or Felt)

ML 3.0	July 15	08:05 p.m.	22 mi W of Green River, WY
ML 3.1	Aug. 3	07:34 a.m.	5 mi SSW of Fountain Green, UT
ML 3.1	Aug. 17	05:02 p.m.	11 mi W of Green River, WY
ML 3.6	Aug. 30	02:21 a.m.	22 mi SW of Malad City, ID

The shocks near Green River, Wyoming, on July 15 and August 17 occurred in an area of active underground trona mining. Seismic recordings from the August 17 shock suggest that it was mining-related, whereas the July 15 shock may not have been (W. J. Arabasz and J. C. Pechmann, 2001, *Seismic Characterization of Coal-Mining Seismicity in Utah for CTBT Monitoring*, technical report to Lawrence Livermore National Laboratory, Rept. No. UCRL-ID-122800).

Other Notable Seismicity (see map B)

Central Utah: The magnitude 3.1 main shock on August 3 near Fountain Green, Utah (~50 mi W of Price), is part of a cluster of 13 earthquakes (0.4 @ M @ 3.1) that occurred from August 1 through August 4. Seismic events that are densely clustered to the southwest of Price and scattered immediately to its north spatially coincide with sites of active underground coal mining in the eastern Wasatch Plateau and Book Cliffs, respectively, and are interpreted to be mining-related. These include a total of 206 located shocks (magnitude 0.4 to 2.4).

Idaho-Utah border area: A concentrated cluster of earthquakes just north of the Utah border and about 3 mi WSW of Dayton, Idaho (~30 mi NW of Logan), includes 19 shocks (0.5 @ M @ 2.3) that occurred from September 11 through September 30. To its west, a cluster of 15 shocks (0.7 @ M @ 3.6) coincides with the location of the August 30 main shock of magnitude 3.6 and chiefly represents aftershock activity that continued through September 8.

2000 4th Quarter: During the three-month period October 1 through December 31, 2000, the University of Utah Seismograph Stations located 1561 earthquakes within the Utah region (see accompanying epicenter map C). The total includes two earthquakes in the magnitude 3 range, and 41 earthquakes in the magnitude 2 range. Earthquakes which have magnitudes of 3.0 or larger (plotted as stars and specifically labeled on the epicenter map) are described below. There were five earthquakes reported felt during the report period.

Earthquakes of Magnitude 3.0 or Larger (or Felt)

ML 3.6	Oct. 27	07:17 a.m.	5 mi WNW of Montpelier, ID
MC 2.6	Nov. 8	01:41 p.m.	3 mi NE of Richfield, UT
MC 2.5	Nov. 8	02:15 p.m.	3 mi NE of Richfield, UT
ML 3.6	Nov. 11	02:17 p.m.	23 mi SE of Vernal, UT
MC 2.6	Nov. 27	09:32 a.m.	8 mi WSW of Price, UT (felt in Price)
MC 2.9	Nov. 27	12:34 a.m.	2 mi NE of Richfield, UT

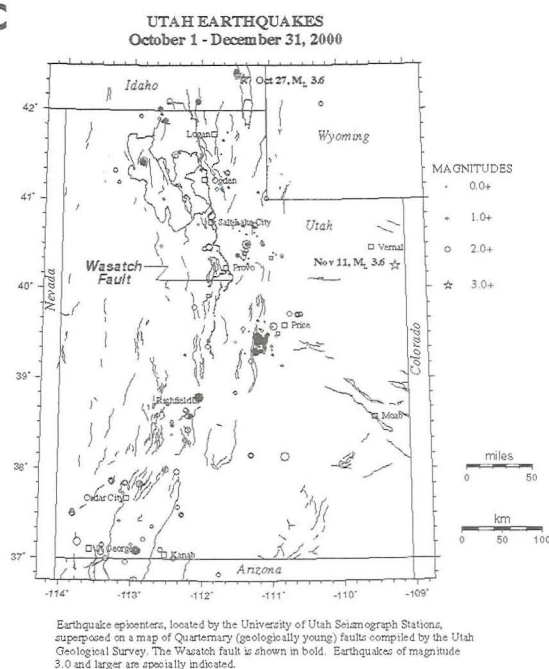
Other Notable Seismicity (see map C)

Central Utah: The felt earthquakes near Richfield, Utah, on November 8 and 27 (see table above) were part of a cluster of 23 recorded shocks (0.5 @ M @ 2.9) that occurred between November 8 and December 1 a few miles to the northeast of Richfield. Similar clusters of small earthquakes (including felt shocks) have episodically occurred in the Sevier Valley area near and to the south-southwest of Richfield since April 1999.

Seismic events that are densely clustered to the southwest of Price and scattered immediately to its north spatially coincide with sites of active underground coal mining in the eastern Wasatch Plateau and Book Cliffs,

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MAP C



Utah Seismic Safety Commission Quarterly Meeting

By: Amisha Lester

The Utah Seismic Safety Commission held its July meeting in Salt Lake City, Utah. Walter Arabasz made a motion for the Commission to nominate and appoint a Vice-Chair for the two-fold purpose: first, to assist the Chair in handling the responsibilities of the Commission chairmanship and, second, to enlarge the active leadership of the Commission. Anne vonWeller seconded the motion and it was unanimously approved. Representative Don Bush agreed to direct the nomination and election of a new Chair and Vice-Chair for the Commission. Peter McDonough was elected Chair for the Commission.

Bob Carey spoke on the USSC website, and the Commission allocated up to \$2000 to Barry Welliver to maintain the site. Bob Carey also reported on the Commission's partnership with HAZUS Data User's Group. FEMA has given \$10,000 to work on further developing the HAZUS capabilities. A website will be created with Automated Geographic Reference Center (AGRC) for information on the data user's group. The user's group also want to perform and develop training with the HAZUS software. Bob emphasized the need for HAZUS results to reflect specific input data for Salt Lake and Davis Counties rather than national default data. A partnership between the Commission and the HAZUS Data User's group would facilitate access to the most up-to-date and accurate HAZUS data. Currently, only three people are working on collecting and compiling the data.

Earthquake Activity *cont.*

These include a total of 1308 located shocks. During the report period, the University of Utah Seismograph Stations conducted a special project, sponsored by the Utah School and Institutional Trust Lands Administration, to study mining seismicity in the vicinity of Trail Mountain (~30 mi SW of Price). A 10-station portable seismograph array was locally deployed for continuous monitoring. As a result, the number of small mining-related seismic events detected and located in this region increased significantly compared to earlier report periods.

Northwestern Utah: A cluster of earthquakes with epicenters in the Great Salt Lake, 13 mi NE of Lakeside (~50 mi WNW of Ogden), includes 16 shocks (0.8 @ M @ 2.8) that occurred intermittently during the report period.

Northern Utah: From December 8 through 12, a cluster of 27 earthquakes occurred about 4 mi E of Heber City (~28 mi SE of Salt Lake City). Seismicity is common in this locality, which coincides with the epicentral area of a magnitude (ML) 4.3 earthquake in October 1972.

Southeastern Idaho: The magnitude 3.6 earthquake near Montpelier, ID, on October 27 (see table above) was part of a sequence of 13 recorded earthquakes from October 27 through December 24 that occurred in the vicinity of Montpelier and Georgetown, Idaho, in the northern Bear Lake Valley. Closer to the Utah border, a cluster of 17 small earthquakes (0.5 @ M @ 1.7) occurred about 4 mi WSW of Dayton, Idaho (~30 mi NW of Logan, Utah); most of these earthquakes occurred on November 30.

USSC Vision *cont.*

worked diligently to keep the concept of earthquake safety and preparedness alive. We owe a duty to those whom, with foresight, were able to continue the work of seismic safety in Utah by creating a unique commission for the state at a time when there was great resistance.

As we move into this year, I would ask the commission to think about its strategic plan. To wonder where we might shore up our charge, and to contemplate how we can effectively change the present landscape of apathy and shortsightedness. This is a defining moment. We need to consider our position and move decisively as a body of advisors, making our knowledge accessible to the public and providing convincing argument to our legislators.

I personally look forward to pressing public officials to take responsible charge, to be foreword thinking and to find ways to integrate earthquake safety into the fabric of the Utah society. I'd like to challenge our professional and business communities to evaluate the dangers of ignorance and perceived futility. It is with these thoughts that I see our commission making an impact on our communities. Without a vision of perseverance, we will make little difference.



Existing Buildings Initiative

By Barry Welliver

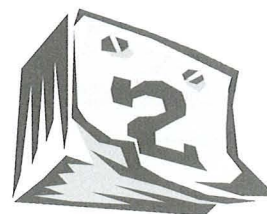
Charles Darwin, in his ponderings about evolution, came to the conclusion that a species survives based upon its "fitness" to overcome the many forces intent upon making it extinct. "Survival of the fittest" is a concept adaptable to earthquake design for buildings. The need to improve our existing building stock is self evident if we choose to preserve our heritage and protect our building environment.

The Utah Seismic Safety Commission's informal "Existing Buildings Initiative" encouraged participation by the Structural Engineers Association of Utah, and other organizations to advocate the need to improve existing building performance in earthquakes. To meet this immediate challenge, there has been a continuing effort to work within the framework of the existing building code regulation system. An amendment to chapter 16 of the 2000 International Building Code (IBC) was put forth by the SEAU Seismic Committee to address conditions where seismic strengthening would be required for buildings when the number of occupants was increased above a set amount. This was intended to supplement the provision recognizing that changes to a higher seismic "use group" would obviate the need to update the structural performance of an existing building. This proposal was accepted by the Uniform Building Code commission and will have its final public hearing in November 2001.

Other efforts in the direction of improving the seismic safety of existing buildings include a proposal to state Representative David Ure on the need for a possible special studies resolution in the legislature and a presentation to the Utah League of Cities and Towns regarding essential facilities and their critical role in post disaster.

The USSC committee on Engineering and Architecture will now partner with the SEAU Seismic committee to combine efforts on common issues. This requires broad participation by a variety of stakeholders and the input of the engineering community. It is the charge of both organizations to step forward and address the safety concerns posed by our older buildings. The issues are complex, but the need is clear.

Calendar of Events



DECEMBER

9-11
CTBUH International Conference
London, UK
Info: www.ctbuh.org

FEBRUARY

6-9
2002 EERI Annual Meeting
Long Beach, CA

MARCH

17-21
Smart Structures and Materials
San Diego, CA
Info: www.spie.org/info/ss

APRIL

7-12
World Conference on Structural Control
Como, Italy
Info: congress@icil64.cilea.it

28-1
Seismic Conference on Highways and Bridges
Portland, OR
Info: mceer@acsu.buffalo.edu

JUNE

10-12
3rd Intl Conf. on Composites in Infrastructure
San Francisco, CA
Info: www.azicci.org

JULY

21-25
Seventh U.S. National Conference
on
Earthquake Engineering
Boston, MA



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