GROUND-SHAKING WORKING GROUP
MEETING SUMMARY - APRIL 9, 2003

April 11, 2003

Working Group Members Attending	Observers
Ivan Wong	Barry Welliver
Gary Christenson	Greg McDonald
Walter Arabasz	
Jim Pechmann	
Bob Smith	
Jim Bay	
Marv Halling	
Kyle Rollins	
Gerard Schuster	
Francis Ashland	
Steve Bartlett	

POSSIBLE 2004 NEHRP PROPOSALS

A "strawman" list of possible projects related to ground-shaking hazard mapping was compiled from the March 18 meeting and subsequent discussions and was presented for discussion. We estimate that roughly three projects at $50K or two at $80K each are likely to be funded. Results of the discussion are listed below in italics after the project topic:

1) Characterize V_S structure down to R1 using SASW in Utah Valley and Weber/Davis Counties. *Jim Bay, Francis Ashland, and Kris Pankow are planning to submit a proposal to perform SASW to characterize Vs30 at about 45 sites in Utah Valley. Jim hopes to retrieve data down to about 40 m.*

2) Deep SASW and/or seismic reflection surveys to characterize basin structure down to R1 and R2. *Ken Stokoe and Jim Bay are considering resubmitting last year's proposal to use a new source to perform deep SASW at about 8 sites. Jerry Schuster and USGS may be interested in coordinating seismic-reflection surveys using Stokoe's source if project is funded.*

3) 3D seismic imaging of Wasatch Front valleys and the Wasatch fault zone. *Bob Smith is considering a cooperative NEHRP project with NSF to perform a LARSE -type study in the Wasatch Front, primarily to model the Wasatch fault (shallow listric vs. deep planar), but also to gather basin shape (mostly R2) data. The study would use P-waves to image the central Wasatch Front using airgun shots in Great Salt Lake and Utah Lake, and shotpoints in drillholes on land. The study would be performed over a 4-6 week period. Bob will be meeting with co-workers to determine how to proceed.*

4) Development of community velocity model for both site response analyses and basin modeling of ground motions. Begin in the Salt Lake Valley and propose for Utah Valley and Weber/Davis Counties in subsequent years*? This project will use results of the projects listed above to develop a 3D model of the velocity structure of Salt Lake Valley. Project work is temporarily postponed pending results of present and future studies.*

5) Studies of site amplification and resonant frequencies using ANSS data. *Jim Pechmann and Kris Pankow will use recordings of small earthquakes from ANSS instruments to study site amplification and resonant frequencies in Salt Lake Valley.*

6) Analyses of small to moderate magnitude earthquakes (weak motion), as recorded by the ANSS, to calculate stress drops, kappa, Q, and amplification factors for Utah earthquakes. *Ivan Wong and others will use weak-motion ANSS recordings to evaluate these seismological parameters for Utah earthquakes as part of his dissertation research.*

7) Dynamic laboratory testing of selected soil types including sensitive clays to evaluate use of generic shear modulus reduction/damping curves. *Jim Bay and Kyle Rollins are considering a relatively low-cost proposal to test existing samples available from UDOT and other sources.*

8) 2D and 3D modeling of strong ground motions for M 7 scenario earthquakes along the Wasatch fault. *This project and other 2D and 3D modeling will be postponed until a better 3D basin model (see 4 above) is developed.*

EARTHSCOPE

Bob Smith is Chair of the Science and Education Committee of EarthScope, and described the program and the instruments planned for Utah. The potential exists for proposing EarthScope-related research (including using a supplemental high density network of portable stations) to acquire data and information that would aid in the ground shaking hazard mapping efforts. For more information, visit the website at www.earthscope.org.

USGS INVOLVEMENT

Jim Pechmann, Jerry Schuster, Francis Ashland, and Gary Christenson met with Bill Stephenson and Jack Odem of the USGS on Monday, April 7, to discuss seismic reflection profiles by the USGS in SLV this summer. Bill and Jack will be returning a mini-vibroseis vertical p-wave source truck from California to Texas this summer, and can stop for 3-4 days in Utah to perform a survey. They will be in Utah the first week of September, and will need help in permitting a line and 3-4 people to move geophones and survey geophone locations. They would like to run a 2-3-km-long line, and believe they can reach depths of 1 km or more and at least retrieve depth to R1 and R2 data. A characterization of S-wave velocity structure down to R1 and possibly R2 may also be possible by analyzing P- to S-converted waves. Logistics are a severe constraint, because they need a 2-3-km-long non-paved surface

and can't cross busy streets. They've had luck in California running surveys along canal roads, and had scouted a possible stretch of the Utah Lake Distributing Canal in southwestern SLV from about 134th S to 118th S. Upon looking at various depth-to-R2 models, the group decided a line to the northeast closer to the center of the southern part of SLV would better characterize basin structure. UGS will look for possible sites near the Midvale tailings along the Jordan River between 78th S. and 90th S, and coordinate with Utah universities to identify field assistants.

Gary Christenson talked to Tom Holzer who operates the USGS cone-penetrometer truck. Tom said that for NEHRP projects, the truck is charged out at $40/hour and $0.50/mile for mobilization, plus operator (Tom Noce, USGS) travel expenses. No USGS salaries are charged. Average penetration depth is about 17 m, and they do about 3 holes/day if located close to one another. Maximum depth is about 51 m under ideal conditions. For liquefaction studies, they typically calculate liquefaction potential index (LPI), and for Vs30 holes they use a 2 m sample interval. The truck has a built-in seismic source. The truck may be performing some work in the central U.S. eventually, so we may want to consider coordinating to reduce mobilization costs.

FINAL WORKING GROUP PLAN

The final Ground-Shaking Working Group plan was presented and discussed. A final copy including suggested corrections/revisions is attached. (*The Utah Seismic Safety Commission endorsed and adopted the plan at their meeting on April 11, 2003*)

FUTURE ACTIVITIES

The UGS would like the Ground-Shaking Working Group to become a permanent advisory body to the state earthquake program. Future activities will include at least an annual meeting coordinated with the NEHRP External Program RFP to discuss progress and new projects, and to revise the long-term plan. Also, we will have periodic workshops and technical presentations/discussions regarding on-going project work. Depending on opportunities for internal USGS work, we may also call on the Working Group to review sites for additional seismic-reflection lines or other proposed activities by internal USGS personnel.