

2009 ULAG MEETING SUMMARY

Utah Liquefaction Advisory Group

Wednesday, February 11, 2009

Utah Department of Natural Resources Building, Room 2000

Steve Bartlett, Facilitator

Mike Hylland, UGS liason

Members present:

Steve Bartlett, U of U

Travis Gerber, BYU

Grant Gummow, UDOT

Mike Hylland, UGS

Mark Petersen, USGS

David Simon, SBI

Les Youd, BYU

Guests:

Doug Bausch, FEMA

Steve Bowman, UGS

Bob Carey, UDHS

Craig dePolo, NBMG

David Dobbins, Draper City

Chris DuRoss, UGS

Kevin Franke, Kleinfelder/BYU

Dan Gillins, U of U

Steve Harmsen, USGS

Dan Hinkley, U of U

Tyler Knudsen, UGS

Bret Lingwall, U of U

Bill Lund, UGS

Greg McDonald, UGS

Michael Olsen, UCSD

Ivan Wong, URS

INTRODUCTION, REVIEW OF ULAG STRATEGIC PLAN, AND SUMMARY OF FY2009 PROJECTS

The meeting commenced at 8:00 a.m. Steve Bartlett (University of Utah, Department of Civil & Environmental Engineering) began the meeting by summarizing the ULAG strategic plan which consists of:

- Development of probabilistic liquefaction hazard maps (including liquefaction triggering, lateral spread, and seismically induced ground displacement) for the urban Wasatch Front counties
- Development of GIS programs for implementing the probabilistic hazard maps
- Establishment of a subsurface geotechnical database for public use (presently contains data from 930 boreholes)
- Education and public outreach

Steve then summarized work undertaken on projects over the past year, including:

- Development of mapping techniques for under-sampled units, and uncertainty analysis (U of U graduate research)
- Development of performance-based local-government geohazards ordinances (Draper City)

- Seismic assessment of Salt Lake Valley transportation network (UDOT)
- Ground-failure investigations along 400 South in Salt Lake City (U of U graduate research)

Steve noted that several Salt Lake Valley maps that were initially funded through past National Earthquake Hazards Reduction Program (NEHRP) awards currently exist in draft form, but have not been finalized and formally published because they are being updated with the 2006 USGS strong motion estimates. These maps include (1) probabilistic liquefaction potential, (2) probabilistic lateral-spread displacement, and (3) deterministic lateral-spread displacement (M 7.0 earthquake). Steve also pointed out that no liquefaction projects in Utah have been funded by NEHRP the past two years.

TECHNICAL PRESENTATIONS

Under-sampled Units and Uncertainty Analysis Dan Gillins, University of Utah

Dan presented his work to date on under-sampled geologic units and uncertainty analysis in liquefaction-potential maps. In particular, Dan emphasized the importance of mean grain size and fines content in ground-displacement equations (i.e., greater uncertainty and loss of predictive power if those terms are removed). Dan is developing a statistical approach to characterizing surficial geologic units for which little geotechnical data exist based on the characteristics of geologic units having known geotechnical parameters. The goal is to develop reliable post-event (i.e., ShakeMap-based) predictive maps.

Ground-settlement Mapping for Salt Lake Valley for M 7.0 Event Dan Hinckley, University of Utah

Dan presented his work to date on ground-settlement mapping for a scenario M 7.0 earthquake in Salt Lake Valley. Dan posed the question of whether a 15% threshold criterion is appropriate, and a suggestion was made to apply a 33% threshold and compare the resulting maps. In the discussion of implementation of the mapping, it was pointed out that the trigger for site-specific studies would be a probabilistic liquefaction-potential map, and not displacement/settlement maps. Mark Petersen (USGS) suggested that development of the settlement map include input from the structural engineering community.

DISCUSSION OF PERFORMANCE-BASED GEOHAZARDS ORDINANCE FOR DRAPER CITY

David Simon (Simon-Bymaster, Inc.) has been working with Steve Bartlett and Draper City to develop performance-based criteria for the city's geohazards ordinance. He introduced David Dobbins (Draper City assistant city manager), who summarized the city's process of working with developers and the evolution of the city's geohazards

ordinance. Draper City is in the process of developing conservative design recommendations for certain types of structures in particular hazard categories. Les Youd pointed out the relatively low cost of many liquefaction-hazard mitigative measures when they are incorporated into a project's design. A discussion followed (led by Mark Petersen and Les Youd) pertaining to a possible shift in building codes from collapse/life safety criteria to minimizing damage. Several attendees strongly cautioned against replacing site-specific engineering design with recommendations based on non-site-specific regional maps. From the mixed views voiced at the meeting, it is apparent that details of the performance-based approach warrant further discussion prior to implementation of new geohazards ordinance guidelines and requirements.

PRIORITIES FOR FY2010 RESEARCH

At the time of the ULAG meeting, federal funding levels for NEHRP were uncertain due to the change in administration and contraction of the national economy; many FY2009 proposals recommended for funding by NEHRP review panels still had not received funding approval. Steve Bartlett suggested, and the working group members agreed on, three projects as priority focus areas for the coming year, only one of which would potentially involve a NEHRP proposal:

- Completion of the graduate research work (under-sampled geologic units and uncertainty analysis) of Dan Gillins; Steve estimates ~\$15k is needed to complete the work, and is going to pursue funding possibilities through the State of Utah (possibly FEMA money via the Division of Homeland Security).
- Investigation of the structural relationship between the Warm Springs and East Bench faults (sub-sections of the Salt Lake City segment of the Wasatch fault zone); this could involve collaboration with members of the Utah Quaternary Fault Parameters Working Group, and NEHRP funding would be pursued.
- Compilation of existing geotechnical data along the I-15 corridor in Utah County (possible support from UDOT).

The meeting was adjourned at noon.