

Minutes of ANSS Pacific Northwest Regional Advisory Committee
27 May 2008
minutes prepared by Tom Yelin
DRAFT

The meeting was held at the University of Washington Seattle campus, in the University of Washington Club facility (formerly the Faculty Club). It began at approximately 10:10 AM and ended at about 2:10 PM (with a brief break for lunch).

Please see last page for the list of attendees.

Paul Bodin began with a report on the status of the PNSN, including progress made in replacement of aging network infrastructure and an increase in the number of permanent stations, both broad band and strong motion (see for example the slides labeled "New Stations" and "Advances" in the PDF version of the Power Point presentation).

After this status report, specific topics were introduced and discussed in varying length and detail. Because Craig Weaver had to leave by 12:30, John Vidale rearranged the agenda to begin with the topics about which Craig had information.

Use of ANSS products

The discussion focused on what was learned from the Sound Shake 2008 earthquake exercise. The ground rules (namely restricting use of the Internet for the first part of the exercise) compromised use of ShakeMap.

Once it was available it seemed like many persons involved made little or no use of ShakeMap. The sense of this group is that this lack of use arises at least in part from lack of familiarity with ShakeMap. One person commented that handing an EOC staff member a ShakeMap manual and telling them to read it is not a useful tactic. To be useful to EOC personnel and responders in the field, ShakeMap has to be easy to use, and these people need adequate training in its use (but not too much training, because if it requires too much training, we have failed in the first requirement).

Several people agreed with the statement that a clearly highlighted link to the "did you feel it" map from the ShakeMap page for any earthquake would be helpful for initial evaluation of geographic extent of an earthquake's effects.

C.B. Crouse speculated that emergency response personnel in Washington and Oregon might be able to learn more about ShakeMap by being directed toward California earthquake ShakeMaps and "playing" with them. Eric Holdeman

thought that such people might be better motivated to learn about ShakeMap by studying ShakeMaps for PNW earthquakes. To increase the “stock” of such earthquakes, he suggested that we might lower the ShakeMap threshold to magnitude 3.0.

Multiple ShakeMap updates were a source of confusion during the Sound Shake exercise. In a real earthquake, such updates will happen. This confusion indicates the need for better communication between seismologists and EOC personnel and responders about ShakeMap and its use and limitations (see comments above about “keeping things simple”).

Someone commented that being able to make ground motion information available to EOC’s for rapid import into their own GIS systems would be a good thing.

Instrumentation of dams along the central Columbia River in Eastern Washington

Craig Weaver reported that the Federal Energy Regulatory Commission has required or is likely to require that a half-dozen dams along the Columbia have some level of seismic instrumentation installed on and/or near them. Two instruments have just been installed on the Wells Dam by the USGS and PNSN.

Presumably the dam operators will purchase the instruments themselves. The question is how involved should the PNSN be in installing and maintaining these instruments, and what should the PNSN’s role be in collection and analysis of the data.

This group did not arrive at definite answers to these questions.

Concerns that were raised include:

CB – a detailed characterization of a dam’s response to strong ground motion will require more than two or three sets of tri-axial accelerometers.

Engineering expertise is needed to decide what instrumentation is appropriate for each dam.

NetQuakes

Craig Weaver gave a brief description of the “NetQuake” strong motion seismograph. It is a relatively cheap (approximately ~\$3K per unit) instrument that could be installed at any location that had DSL or cable broadband Internet service. Paul Bodin said that a NetQuakes seismograph would automatically send triggered event data to a central data collection center (in this case the PNSN), ready for inclusion in an earthworm data processing stream.

C.B. noted that \$3K per unit still seemed pretty expensive. Someone commented that if funding was available to place a large enough order, the per unit cost might decrease.

Craig said that the Department of Homeland Security has expressed some interest in funding a large deployment of these units in the region between Seattle and the Canada border, as a prelude to the 2010 Winter Olympic Games.

Craig reported that some Southern California seismologists have hailed NetQuakes as the “next great revolution” in seismology and that such instruments are the best hope of achieving the necessary urban seismograph densities to fulfill the goals of the ANSS.

[Click here to read a more detail description of “NetQuakes.”](#)

Earthquake Early Warning (EEW)

John Vidale led this discussion. Some countries (notably Japan) have made significant progress toward the goal of EEW. Steve Malone agreed that most of the technical and scientific problems have been resolved. What is lacking is adequate funding to construct a truly adequate warning system including hardened telemetry and warning broadcast systems. Also, the benefits of EEW implementation are not proven, but with some experience in other regions will become more clear.

Social engineering issues include a robust way to get the early warning out and training the populace how to best respond to such warnings. There are also questions about the cost-benefit ratio of such warnings. These problems and questions still have not been answered.

Joan Gomberg noted that at the recent Nation Earthquake Conference, 1/3 of attendees indicated that they thought EEW was a “good idea”. Someone noted that this may have been the equivalent of voting for Mom and Apple Pie.

It was noted that the SESAC report took a cautious view regarding EEW and although it supported further research on this topic, it should not be at the expense of other ANSS goals (i.e., it should not have top priority).

Structural Monitoring (led by John Vidale)

See the accompanying PDF/Power Point presentation for the bullets for this topic. John reported that two tri-axial strong motion units will soon be temporarily installed on the Alaska Way viaduct.

Overall the structural engineering community has not provided much guidance to the PNSN regarding ways to contribute to the advance of knowledge of seismic response of buildings, despite several offers to explore ways to monitor vulnerable structures such as the Tacoma Narrows Bridge and the Viaduct. Until this happens, the PNSN cannot do much more than it already has done, which so far is only some remedial Nisqually analysis and simple monitoring experiments in the UW Tower and on the viaduct.

GPS data in monitoring

See the PDF/Power Point presentation for bullets on this topic. They were read with a few comments and we then moved on to the next topic.

Aftershock probabilities

Joan Gomberg reported that the major road block to completing an aftershock probability study for the Pacific Northwest was time and personnel.

This problem is also probably more complicated than in California, because of the three distinct classes of earthquakes in the PNW: subduction, shallow crustal and Benioff zone earthquakes.

C.B. suggested studying other subduction zones as possible analogs to the Cascadia for the aftershock problem.

The committee recommends that the completion of an aftershock probability study be placed at a higher priority.

ETS (Episodic Tremor and Slip) studies

John Vidale showed seismograms of Cascadia tremor induced by the passage of waves from the China earthquake. Joan Gomberg expressed optimism that instrumentation deployed in the last few years and the concentration of research activity on ETS will lead to a much greater understanding of subduction zone processes.

State of Oregon support for earthquake hazard studies

Oregon DOGAMI (Department of Geology and Mineral Industries) obtained ~\$100K from the state to purchase 3 TA stations, which the PNSN will operate and maintain. In the past ~2 years, DOGAMI has purchased three strong motion instruments to be added to the PNSN. Two of those three strong motion sensors have been installed in Newport and Monmouth, Oregon. The third is slated for installation somewhere in eastern Oregon, hopefully by the fall of 2008.

We noted ongoing operational fiscal support from the State of Oregon for the PNSN would be beneficial, and bring monitoring in that state more in line with the arrangements for monitoring in other states.

Closing thoughts and summary of priority actions

The coming year may see significant fiscal constraints on network operations and new initiatives. The retirements of George Crawford and Ron Teissere and the current uncertain status of the Washington State Seismic Safety Commission presents challenges for continued progress on earthquake issues in state government.

We briefly discussed membership of the Advisory Committee and no major changes were viewed as necessary.

Action items:

C.B. Crouse, Susan Chang, and Bill Perkins urge that high priority be given to the replacement of the failed deepest borehole seismometer at the Seattle School District headquarters in the Duwamish Valley.

The committee also encourages increased priority be given to completion of a PNW aftershock probability study.

List of Attendees:

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| C.B. Crouse, Chair | URS Corporation |
| T.J. McDonald | City of Seattle Emergency Management |
| Dave Nelson | Washington State Emergency Management Division |
| Susan Chang | City of Seattle |
| Craig Weaver | USGS Seattle |
| Bob Zimmerman | Boeing and CREW |
| Gary Gordon | Boeing |
| Bill Perkins | Shannon and Wilson |
| Eric Holdeman | ICF International |
| Tim Walsh | Washington DNR |
| Recep (Ray) Cakir | Washington DNR |
| Luke Meyers | Pierce County Emergency Management |
| John Vidale | PNSN, ANSS Regional Co-ordinator |
| Paul Bodin | PNSN |
| Steve Malone | PNSN (emeritus) |
| Bill Steele | PNSN |
| Joan Gomberg | USGS Seattle |
| Tom Yelin | USGS Seattle |