

Welcome to the second SQUG/SEQUAL Newsletter of 2005. We hope you find this brief update on SQUG/SEQUAL related activities informative and useful.

On a personal note, several very large and catastrophic earthquakes have occurred around the world over the last year. The December 2004 Northern Sumatra earthquake and tsunami accounted for 280,000 deaths and the October 2005 Pakistan earthquake toll is currently over 80,000. I must admit that I'm thankful to be writing about earthquakes rather than living through them and I am reminded that the seismic business we work in can have hazardous consequences. I'd like to encourage you to support those burdened by these events as well as those affected by the extensive hurricane and flood damage in the Gulf States in the US.

John Richards
SQUG/SEQUAL Chairman

In This Edition

Recent Earthquakes 1
 NARE/NERP Evaluations 2
 Relay GERS Errata..... 2
 Member Survey 2
 eSQUG Updates 2
 2005 Winter Meeting..... 2
 On the Regulatory Front..... 3
 New Plant Seismic Issues 3
 Future Strategies..... 4

Approximately 4 million people are homeless and rescue efforts have been hampered by numerous landslides in the remote region.

Recent Earthquakes

Here are some highlights from recent earthquakes. We'll provide a more detailed update on 2005 earthquakes at the December 7-9 SQUG / SEQUAL Winter meeting.

Pakistan

On October 8, 2005, a 7.6M earthquake struck 60 miles north-northeast of Islamabad, Pakistan. Approximately 80,000 people were killed and there was extensive damage in northern Pakistan. The entire town of Muzaffarabad Kashmir was destroyed as well as most of the town of Uri. A number of other towns in Kashmir and northern Pakistan had severe damage. Some damage also occurred in neighboring India where over 1,300 people were killed. The vast majority of deaths were caused by collapsed buildings.



Peru

A 7.5M earthquake occurred on September 26, 2005 in a mountainous and sparsely populated region of northern Peru. The earthquake caused very few deaths or injuries. Most of the houses and many other buildings were destroyed in the local region.

Greater Los Angeles

A minor earthquake (4.9M) occurred in the Los Angeles area on June 16, 2005. The epicenter was 3 miles northeast of Yucaipa CA, or 71 miles east of LA. The earthquake caused no death, very few injuries, and little damage.

Eastern US

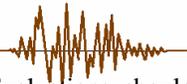
Several small earthquakes occurred in the eastern US including the following:

- Ridgely, TN, 3.0M, June 2, 2005

- Tipton MO, 3.3M, July 31, 2005
- Cokedale, CO, August 10, 2005
- Hot Springs, NC, 3.7M, August 24, 2005
- Norfolk, NY, 3.6M, September 6, 2005
- Niota, TN, 3.6M, October 12, 2005,
- Harbor Beach, MI, 4.2M, October 20, 2005

This list shows that eastern US earthquakes are fairly common, although not usually damaging. None of these earthquakes caused significant numbers of injuries or damage.

NARE / NERP Evaluations



Two new NERP Evaluations should be posted on the SQUG web site (<http://squgweb.mpr.com>) before the end of the year. These evaluations are the first NERP examples for performing a NARE evaluation for replacement parts. The examples cover a replacement transformer in a cabinet and a motor in a horizontal pump assembly.

The Steering Group discussed several options to continue assisting members

in the use of NARE. Two of the possible alternatives are (1) drafting purchase specifications that incorporate the appropriate equipments caveats necessary to ensure the purchased equipment would be qualified via NARE and (2) performing plant-specific NARE evaluations for members as part of their membership dues. We will discuss these at the upcoming SQUG/SEQUAL Winter meeting on December 7-9.

Relay GERS Errata



In 2004, we issued two Advisories to current and former SQUG Member Representative and Alternates describing errors in the relay GERS reports. We recently completed the final step in correcting those errors by issuing errata sheets for the EPRI GERS reports.

You should have received the errata pages in an e-mail from Bob Kassawara through the SQUG List Server. First, let me mention that **these are not new errors**. They are the same errors we previously communicated to you through the 2004 Advisories. These errata are the official process to correct the EPRI reports.

Many people initially received the relay GERS reports when they attended the Seismic Capability Engineer Walkdown Training Course. This makes it a little difficult to ensure that everyone who has a GERS report receives the errata sheets. Therefore, you might want to take some steps within your company to notify people who might have copies of the relay GERS reports about the errata. This would be especially important for anyone still involved in SQUG activities and/or seismic qualification work. We will discuss other communication options at the Winter meeting.

Member Survey



This fall we sent out a NARE and Seismic Qualification Methods survey to our members. We have received a fair number of responses and we are getting an interesting view of seismic qualification practices among our members as well as your thoughts for continued SQUG/SEQUAL support.

We'll present the survey results at the upcoming SQUG/SEQUAL Winter meeting.

eSQUG Updates



An update to the eSQUG web-based database is working its way out the door. This latest update includes new data supporting the Crane Evaluation Guideline, adds data for equipment that has been through multiple earthquakes, and enables you to download digitized versions of the site-specific spectra.

One proposal for 2006 eSQUG development is to calculate site-specific spectra from the Northridge earthquake and incorporate over 200 new equipment records associated with those spectra. Decisions on

2005 Winter Meeting

The 2005 SQUG/SEQUAL Winter meeting will be on December 7 through 9, 2005 at the Hyatt Regency hotel in Coral Gables. You should have received an official announcement from Bob Kassawara several weeks ago. The meeting will start at 1:00pm on the 7th and end at noon on the 9th. You can check out the hotel at www.coralgables.hyatt.com.

We hope you'll be able to join us to receive updates on our activities, network with your peers, and help us steer the organization to best meet your needs. Please remember to return your meeting registration form. It is very important for planning the various meals.



2006 support will be made at the SQUG/SEQUAL Winter meeting.

On The Regulatory Front

Here are a few highlights from recent NRC/utility interactions. We'll discuss these, and more at the Winter meeting.

- A temporary change performed in the field at Susquehanna caused a loss of seismic qualification of one train of the emergency service water ventilation subsystem. Inspectors determined that failure to implement the temporary change procedure caused the loss of seismic qualification of the ESW ventilation subsystem, which provides cooling for the ESW pumps. Susquehanna performed an engineering evaluation and approved the use of a special tool to secure and maintain the seismic qualification of the damper. They installed this tool and declared the damper operable.
- NRC inspectors at Oconee determined that failure to follow procedures in replacing seismic monitoring system batteries as required, inadequate procedures for centering the masses, and use of an unapproved procedure to perform calibrations represented a performance deficiency. The inspectors concluded that failure to follow procedure requirements could render the seismic monitors inoperable, if the batteries failed after their expiration dates.
- Inspectors at Three Mile Island identified a non-cited violation for deficient maintenance procedures that did not contain sufficient work instruction

or acceptance criteria to ensure the safety related 125/250 volt battery was properly reassembled after replacement of a battery cell. Operators did not follow procedure steps in the order specified and procedure quality was deficient because it did not provide instruction to perform intercell battery resistance checks or torque the battery rack connection bolts to verify seismic qualification prior to declaring the battery operable.

- At Kewaunee, inspectors identified a finding because the licensee failed to provide adequate design control to ensure that Class I equipment was protected against damage from rupture of a pipe or tank resulting in serious flooding or excessive steam release to the extent that the Class I equipment's function is impaired. The plant's design did not ensure that the aux. feedwater pumps, 480-volt safeguards buses, safe shutdown panel, emergency diesel generators and 4160-V safeguards buses would be protected from random or seismically induced failures of non-Class I systems in the turbine building. A preliminary SDP Phase 3 risk analysis determined that this finding was of substantial to high safety significance. Kewaunee has taken significant

corrective actions, including extensive system and structural modifications to address this issue.

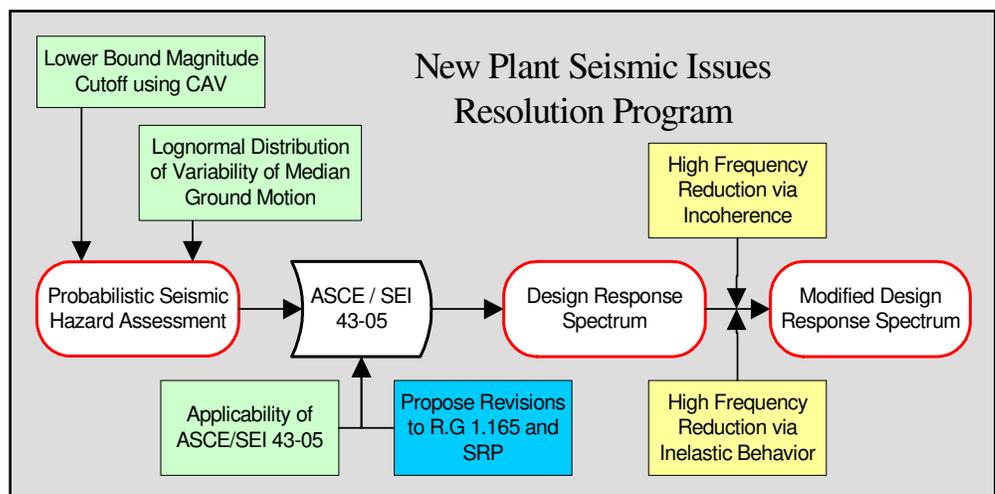
New Plant Seismic Issues

At various times, I'm sure you've heard rumblings and announcements of work going on in support of potential new nuclear plants in the US. An important part of the work revolves around the criteria for determining the site-specific seismic ground motions.

The standardized Advanced Light Water Reactor (ALWR) plants were designed to SSEs similar to a R.G. 1.60 spectrum with a PGA of 0.3g.

The current criteria for determining a site specific SSE is R.G. 1.165, which uses a site-specific probabilistic seismic hazard estimate and a relative probability of exceedance based on the most recent 28 operating US nuclear plants for determining the SSE. If you followed all of that, you should be writing this article rather than reading it!

When people tried using R.G 1.165 at potential new nuclear plant sites, they quickly discovered that the resulting SSEs exceeded the ALWR design spectra by significant amounts,



especially in the high frequency region (15Hz to 50Hz or higher). This led to a review of the R.G. 1.165 criteria, as well as reviews for unnecessary conservatism in seismic hazard estimates and criteria for evaluating the impact of high frequency ground motions.

The diagram above provides a general outline of a coordinated NEI/EPRI research program underway to resolve these issues. The fundamental SSE development process runs through the middle of the diagram with the various research areas in the colored boxes above and below. The research activities are focused in the following areas.

- Ground motion issues (highlighted in green)
- Structural issues (highlighted in yellow)
- Integration issues (highlighted in blue)

These are very technical activities and much too complicated to describe in a Newsletter, so I won't even try. We'll provide a more complete overview at the Winter meeting.

So far, the results have been promising and discussions with the NRC have been constructive. If your utility is considering a new nuclear plant, you should be aware of this work and understand the basic concepts.

Future Strategies

We had an interesting session at the November Steering Group meeting with representatives from the American Society of Civil Engineers (ASCE) and the Multidisciplinary Center for Earthquake Engineering Research (MCEER).

More recent building codes (e.g., IBC 2000, 2003) require that vital facilities such as hospitals perform seismic evaluations for non-structural systems (including equipment). Many equipment manufacturers are performing seismic testing using commercial standards to meet this criterion.

Access to the SQUG/SEQUAL earthquake experience data for equipment, and the insights and criteria drawn from the data could be very helpful in limiting the need for expensive testing and in highlighting equipment vulnerabilities.

In addition, MCEER performs post earthquake investigations that may be helpful to SQUG/SEQUAL in maintaining or even expanding the earthquake experience database.

No decisions have been made but there appear to be intriguing partnering possibilities.

We are working on plans for an MCEER representative to attend the Winter meeting and give a brief

presentation about who they are and what they do at their center.

In Closing

As always, we hope you find this Newsletter valuable and that it helps keep you up to date on our SQUG/SEQUAL activities. If you have any comments, thoughts, or contributions for the Newsletters, please let us know.

We hope everyone has an enjoyable and safe holiday season!



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