A Probabilistic Seismic Hazard Analysis Updates Review for Two DOE Sites

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Project Description

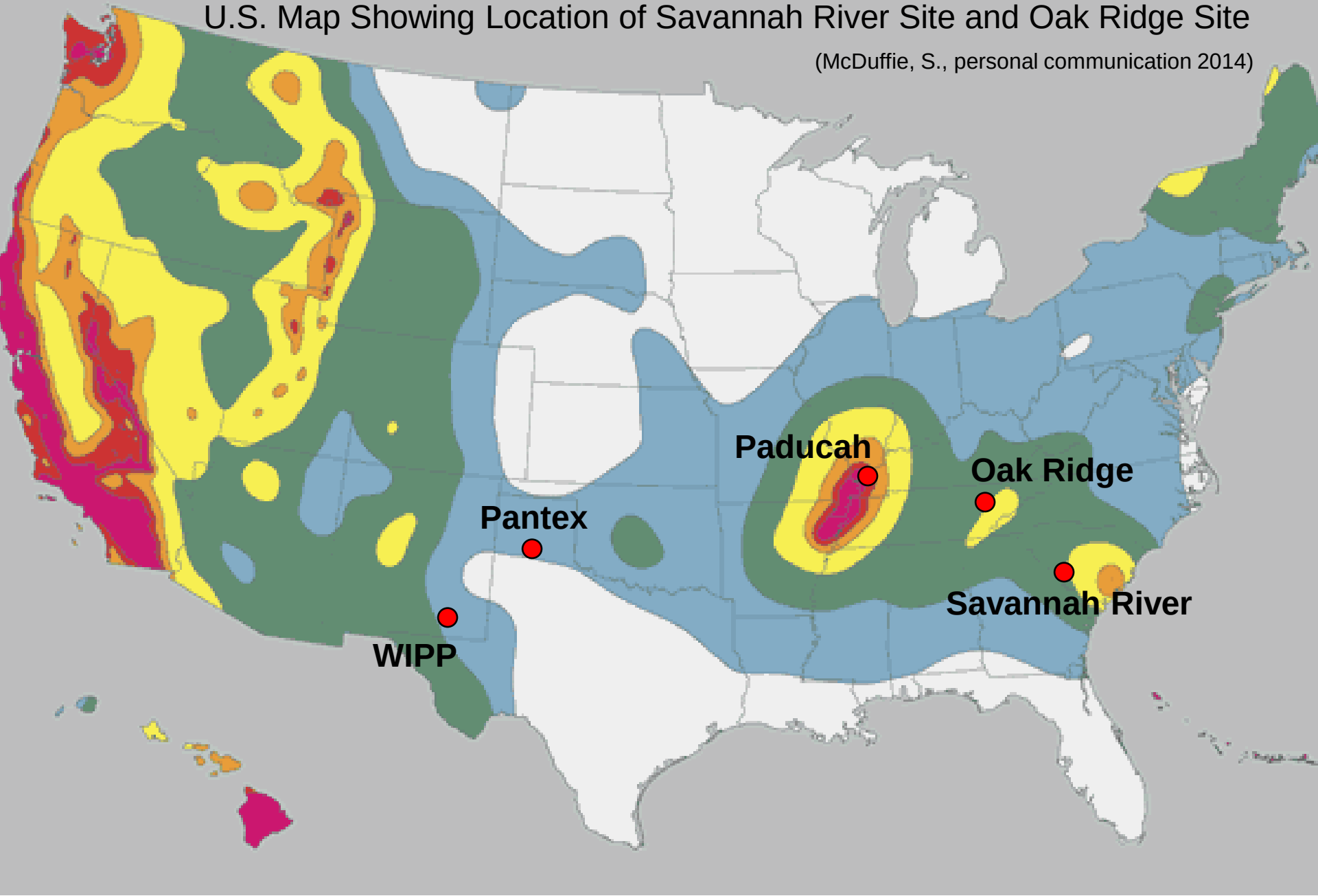
- **Project Goals:**
  - Review licensee reports submitted to the NRC for existing CEUS plant sites in response to the NRC Request for Information dated March 12, 2014
  - Evaluate the latest PSHAs performed at the Savannah River Site (SRS) and Oak Ridge (OR)
  - Make recommendations requiring further actions that are needed

  - **Approach**
  - Consider DOE O 420.1C and SSHAC assessment guidance to conduct reviews
  - Assess PSHA updates by reviewing the process used and the technical aspects of the PSHA Updates for the SRS and OR
  - Provide Summary Tables for ease of reference of findings
  - Provide recommendation for future actions

- **Schedule**
  - Review based on information available as of April 7, 2014
  - Report completed June 2014.

U.S. Map Showing Location of Savannah River Site and Oak Ridge Site

(McDuffie, S., personal communication 2014)



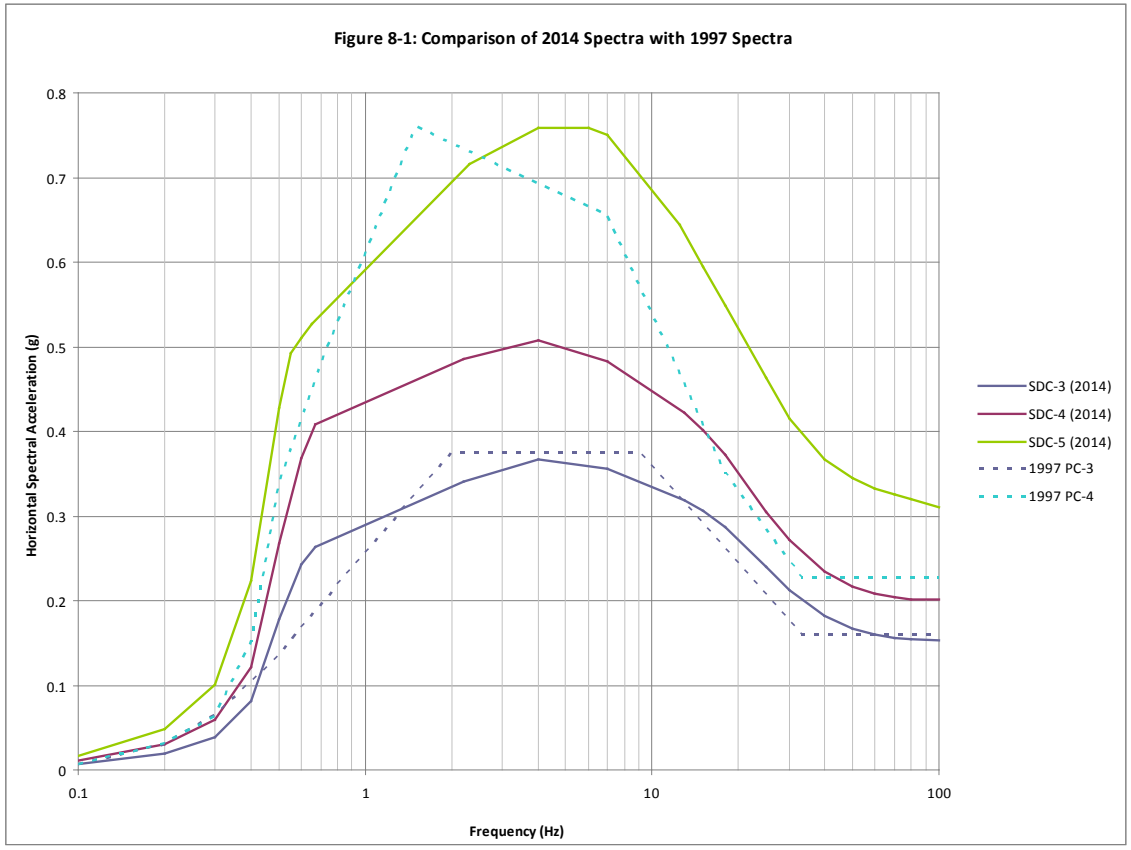
SRS Supporting Documents

- Fugro Consultants, Inc., *Probabilistic Seismic Hazard Analyses (PSHA) for the Savannah River Site (SRS),* prepared for Savannah River Nuclear Solutions, Draft, December 27, 2013.
- Peer Review Panel, *SRS PSHA Update Review of Probabilistic Seismic Hazard Assessment (PSHA) for the Savannah River Site (SRS),* PR No. 2131-PR-03, Rev.0, dated 9/30/13 by Fugro Consultants.
- Peer Review Panel Memorandum from Kevin Coppersmith to Rucker Williams, dated February 8, 2014.
- Peer Review Panel Letter Report, *SRS PSHA Update Project, Meeting #1, Key Issues and Available Data, August 11, 2010,* August 20, 2010.
- Salomone, Lawrence, *SRS PSHA Update Project Presentation, Meeting #1, August 11, 2010.*

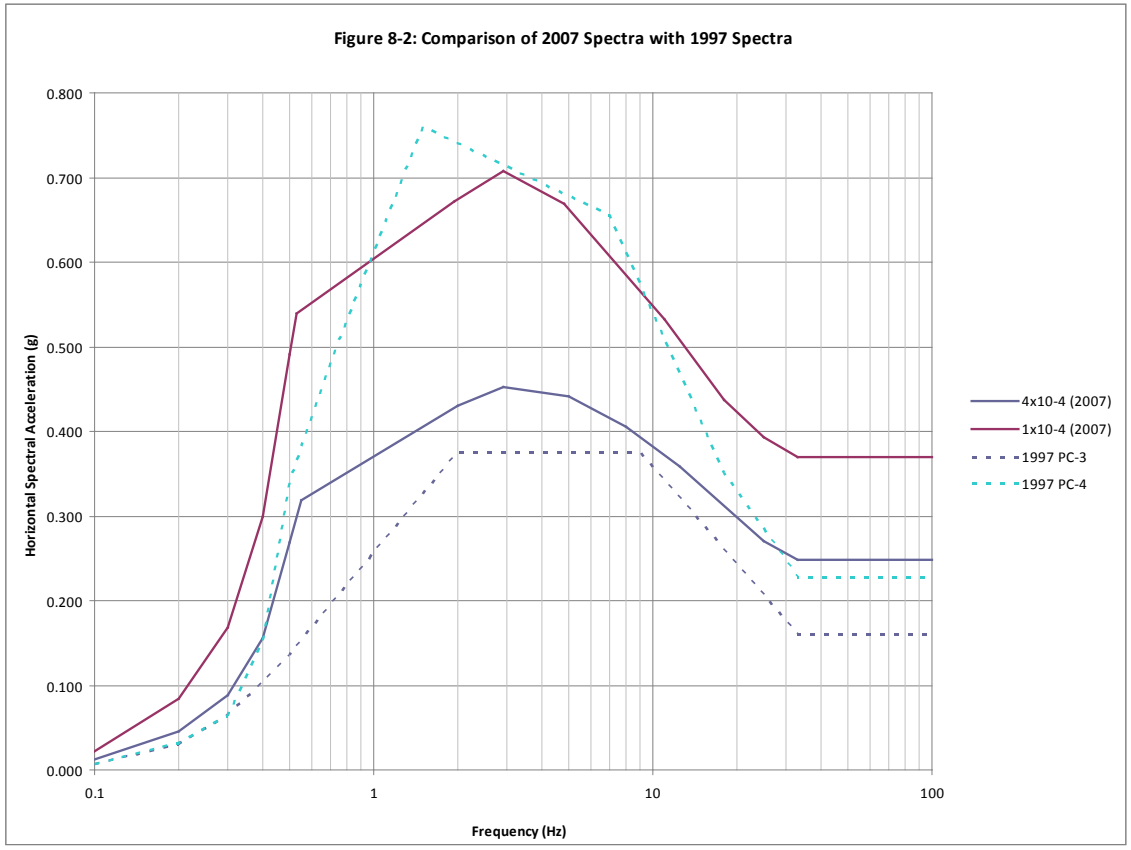
Oak Ridge Supporting Documents

- Facility Design Engineering, *Update of the Seismic Hazard at the Department of Energy National Nuclear Security Administration Y-12 National Security Complex,* September 2003.
- Design Engineering, Engineering Division, *Update of the Seismic Hazard at the Department of Energy National Nuclear Security Administration Y-12 National Security,* August 2012*.*
- Litehiser, Joe, *Y-12 Seismic Hazards Overview Presentation,* February 25-26, 2014.
- Memorandum from Joe Hunt to Basant Dilodare, *Seismic Mitigation Working Group-Action Status Meeting, Clinch River Site Investigations,* December 3, 2013.

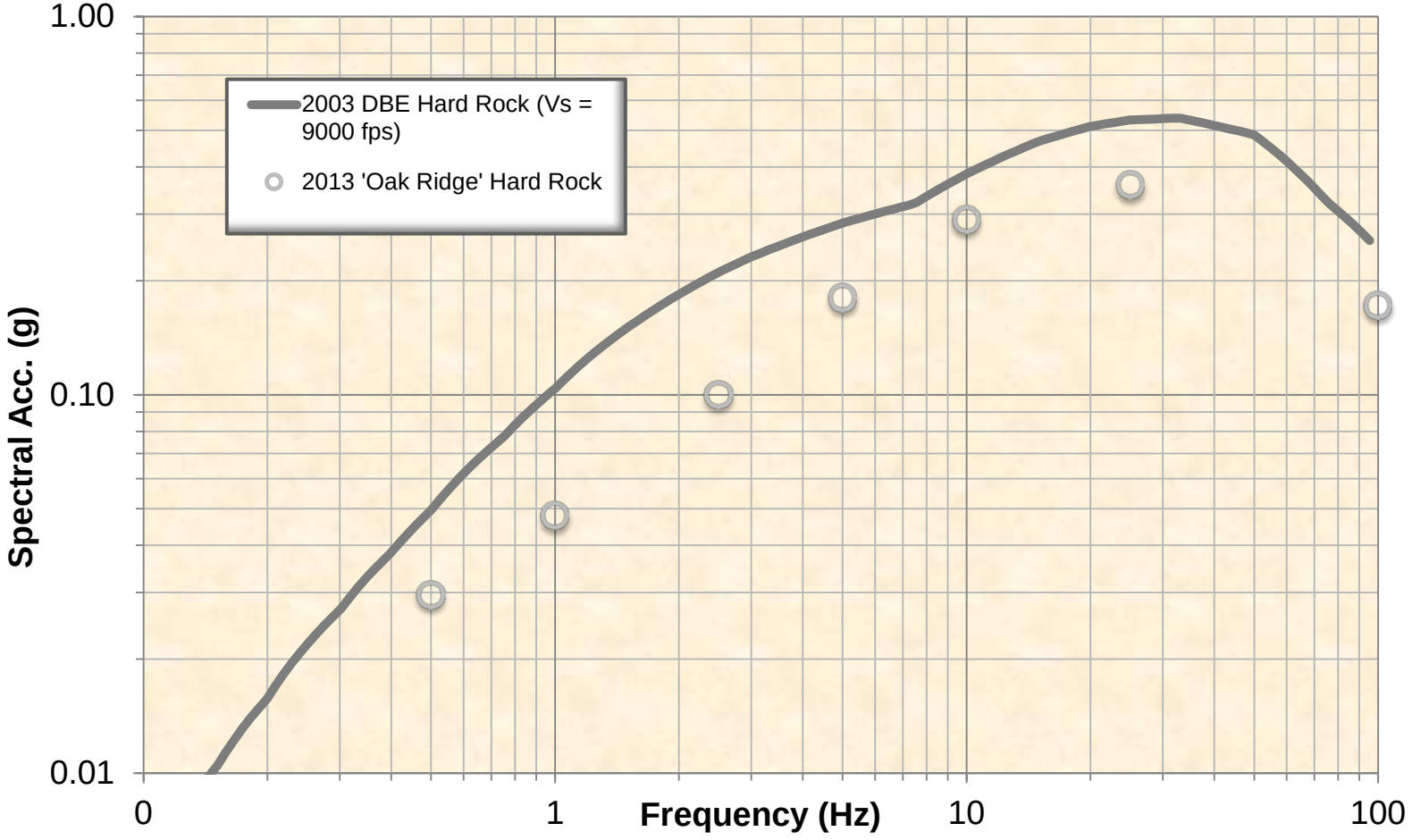
Comparison of SRS PSHA Update Spectra and 1997 Existing SRS PSHA Spectra



Comparison of 1997 Existing SRS PSHA Spectra and 2007 SRS Spectra Using 2002 USGS Hazard at Rock



Comparison of 2,500-year UHRS from Frankel et al. (2003) and PSHA using CEUS SSC Source Model and EPRI (2013) GMM



Conclusions

- **Savannah River Site**
- As of April 7, 2014, SRS needed to incorporate PPRP comments into the PSHA Update Report, and the PPRP closure report assessing whether the SSHAC goals were met needed to be completed and also incorporated.
- Following a SSHAC Level 2 outline for the final report would improve project documentation and transparency.
- SRS should replace the EPRI (2004, 2006) GMM but wait for the NRC's review and approval of the NGA-East GMMs.
- SRS should update the earthquake catalog using the changes made by the V.C. Summer Nuclear Station, Unit 1 in 2014 and adding any earthquakes from January 1, 2009 to the time when the PSHA update is performed.
- Incorporate SRS PSHA Update using NGA-East GMMs into SRS Site Standard 01060 and develop a plan for reassessment of SRS facilities for the SRS Qualification Plan.
- **Oak Ridge**
- The feedback from the advisory panel was not documented in the 2003 seismic hazard assessment. The 2003 assessment was based on a PSHA performed by USGS for the Y-12 site-specific rock conditions and the USGS (2002 hazard model.
- OR Design Engineering reviewed in a 2012 report changes in site-specific information and hazard methodologies and concluded that the 2003 PSHA results for the OR site are "sufficiently conservative and acceptable for use".

Concluding Remarks (continued)

- **<u>Oak Ridge (continued)</u>**
- Assessed impact of EPRI (2013) GMM and examined changes in catalog for periods 2009 to mid-December 2011 and mid-December 2011 to mid-June 2013.
- Update the OR PSHA after the NGA-East GMMs have been reviewed and approved by the NRC.
- Begin discussions with the Clinch River Project to explore how the planned PSHA for the Clinch River Project would benefit the need to update the PSHA for the three OR sites (ETTP, ORNL and Y-12).

Concluding Remarks: Post-Model Development Process

- Categorize Changes
  - Book-keeping or Corrections Involving Process Implementation
    - Exclusion of Reservoir-Induced Earthquakes
    - Selecting Mmax numbers from a spread sheet
  - Technical (Evaluating Present-Day Relevant Data and Technical Knowledge with Uncertainties)
    - Selection of Appropriate SSHAC Level Assessment Process (e.g. SSHAC Level 2)
- Implementation of Method Used for Change
- Documentation of Change
- Posting Change on CEUS SSC website for End Users