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North Anna Nuclear Power Plant Seismic Event

Presentation to the Commissioners
August 30 and September 1, 2011

North Anna Design Basis

- North Anna Nuclear Power Plant (NANPP) has two Design Basis Earthquake (DBE) ground motion, one for structures, systems, and components (SSCs) founded on top of rock, which is anchored at 0.12 g, and the other is for SSCs founded on top of soil, which is anchored at 0.18 g.
- NANPP has two corresponding Operating Basis Earthquake (OBE) ground motion, anchored at 0.06 g for rock and 0.09 g for soil.

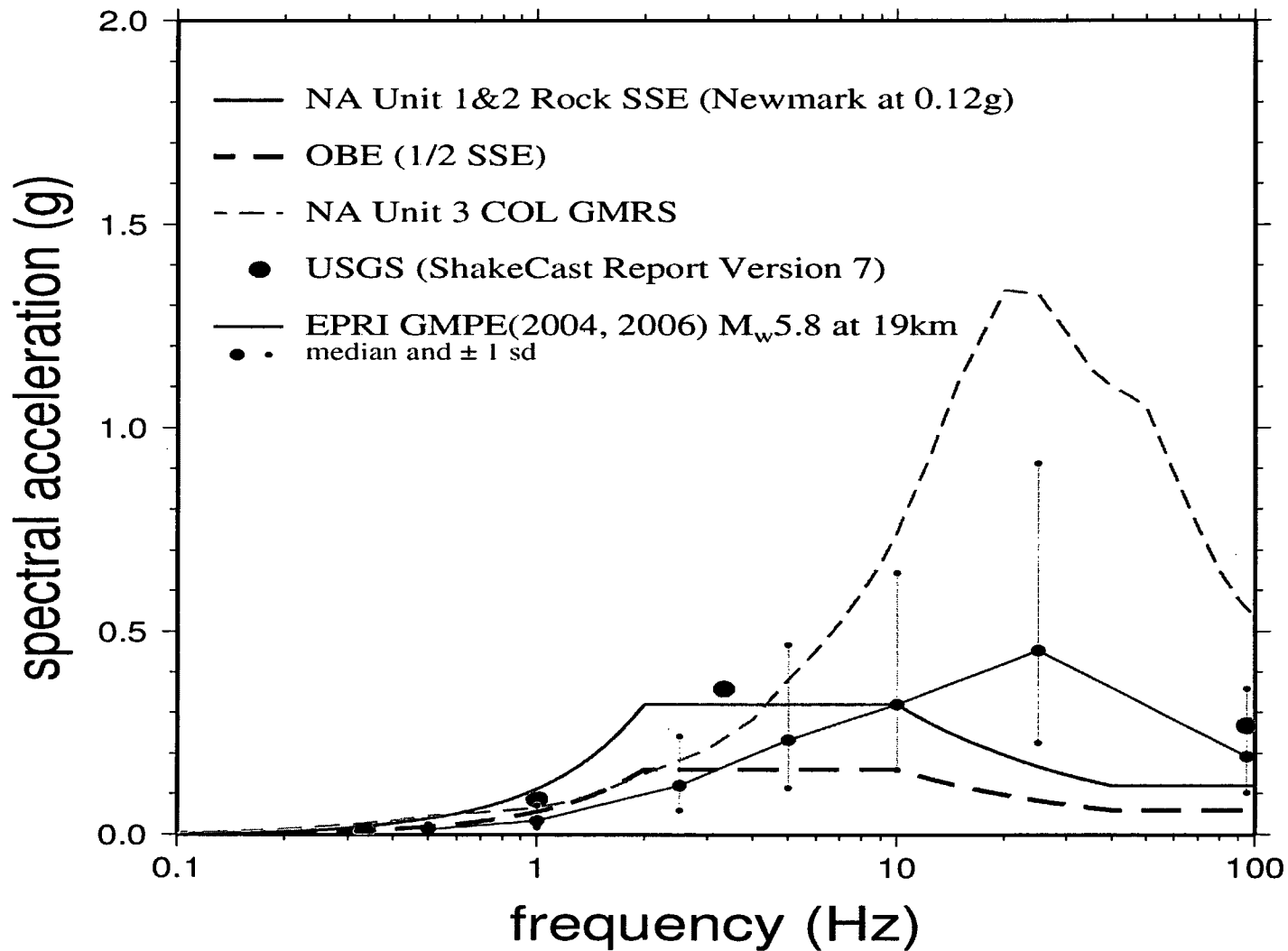
Sequence of Events

- On August 23, 2011, North Anna Power Station declared an Alert due to significant seismic activity onsite from an earthquake which had a measured magnitude of 5.8.
- The licensee conducted the 1st general walkdown of the plant as required by the North Anna Power Station abnormal procedure for seismic event.
- The licensee conducted the 2nd walkdown after the magnitude 4.5 aftershock.
- Seismic Response Spectrum Recorder (scratch plate) readings identified that the Design Basis Earthquake had been exceeded.
- On August 26, the licensee declared all safety-related SSCs of Units 1 and 2 inoperable

Initial Staff Assessment

- This is a first of a kind event
- NRC staff performed independent analysis
(See Figure 1)

Figure 1



Regulatory Framework

- Appendix A to Part 100—Paragraph V(a)(2), “Determination of Operating Basis Earthquake” (this regulation does not address beyond design basis events.)
- RG 1.166, “Pre-earthquake Planning and Immediate Nuclear Power Plant Operator Post-earthquake Actions”
- RG 1.167, “Restart Of A Nuclear Power Plant Shut Down By A Seismic Event”

NRC Ongoing Evaluations

- The staff will confirm that the licensee is performing plant walk downs in accordance with RG 1.166, "Pre-earthquake Planning and Immediate Nuclear Power Plant Operator Post-earthquake Actions"
- Information from NANPP's seismic recordings will provide the basis for the staff's assessment of the licensee's operability determination of the affected structures and components.
 - The staff will confirm that the licensee is following the guidance in RG 1.167, "Restart of a Nuclear Power Plant Shutdown by a Seismic Event," regarding the exceptions to the EPRI NP-6695 document prior to recommending plant restart.

Augmented Inspection Team

- Region II with NRR/NRO support will be conducting an AIT at the North Anna site, in accordance with MD 8.3, "NRC Incident Investigation Program."
- Objectives of the AIT include:
 - Collect, analyze and document factual information and evidence to determine probable cause
 - Assess licensee's actions and plant equipment response during the earthquake and aftershocks
 - Identify generic issues associated with the event
 - Conduct independent extent of condition review
 - Collect information to support final determination of risk significance of event

Issues Surrounding Plant Restart

- Appendix A to Part 100—Paragraph V(a)(2) states, *"If vibratory ground motion exceeding that of the Operating Basis Earthquake occurs, shutdown of the nuclear power plant will be required. **Prior to resuming operations, the licensee will be required to demonstrate to the Commission that no functional damage occurred to those features necessary for continued operation without undue risk to the health and safety of the public.**"*
- Staff will utilize RG and EPRI guidance to assess whether Appendix A to Part 100 criteria are met.

Possible Regulatory Paths Forward

- Staff will utilize appropriate regulatory actions to ensure that the licensee takes adequate actions to ensure all systems meet the provisions of RG 1.167.
 - Confirmatory Order
 - Order/Adequate Protection

Other Potentially Affected Plants

- The list below provides the plants and the associated distance from the Epicenter:
 - North Anna is 18 km from the Epicenter
 - Surry is 139 km from the Epicenter
 - Calvert Cliffs is 141 km from the Epicenter
- NRR will confirm that the OBE was not exceeded at Surry and Calvert Cliffs.

Relation to GI-199

- The potential for the occurrence of an earthquake larger than the recent event is within the scope of GI-199 Generic Letter.