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**From:** [Khanna, Meena](#)  
**To:** [Auluck, Rajender](#)  
**Subject:** FW: North Anna Earthquake Issue Commissioner Briefing final with talking points  
**Date:** Tuesday, August 30, 2011 4:29:00 PM  
**Attachments:** [North Anna Earthquake Issue Commissioner Briefing final.pptx](#)

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**From:** Khanna, Meena  
**Sent:** Tuesday, August 30, 2011 9:56 AM  
**To:** Wilson, George  
**Subject:** North Anna Earthquake Issue Commissioner Briefing final with talking points

D/56



# **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)\* values
- Structures, systems, and components (SSCs) founded on top of rock, anchored at 0.12 g
  - SSCs founded on top of soil, anchored at 0.18 g
- NANPP has two corresponding Operating Basis Earthquake (OBE) values, anchored at 0.06 g for rock and 0.09 g for soil (OBE is 1/2 of the DBE)

\* Design Basis Earthquake means the same as Safe Shutdown Earthquake

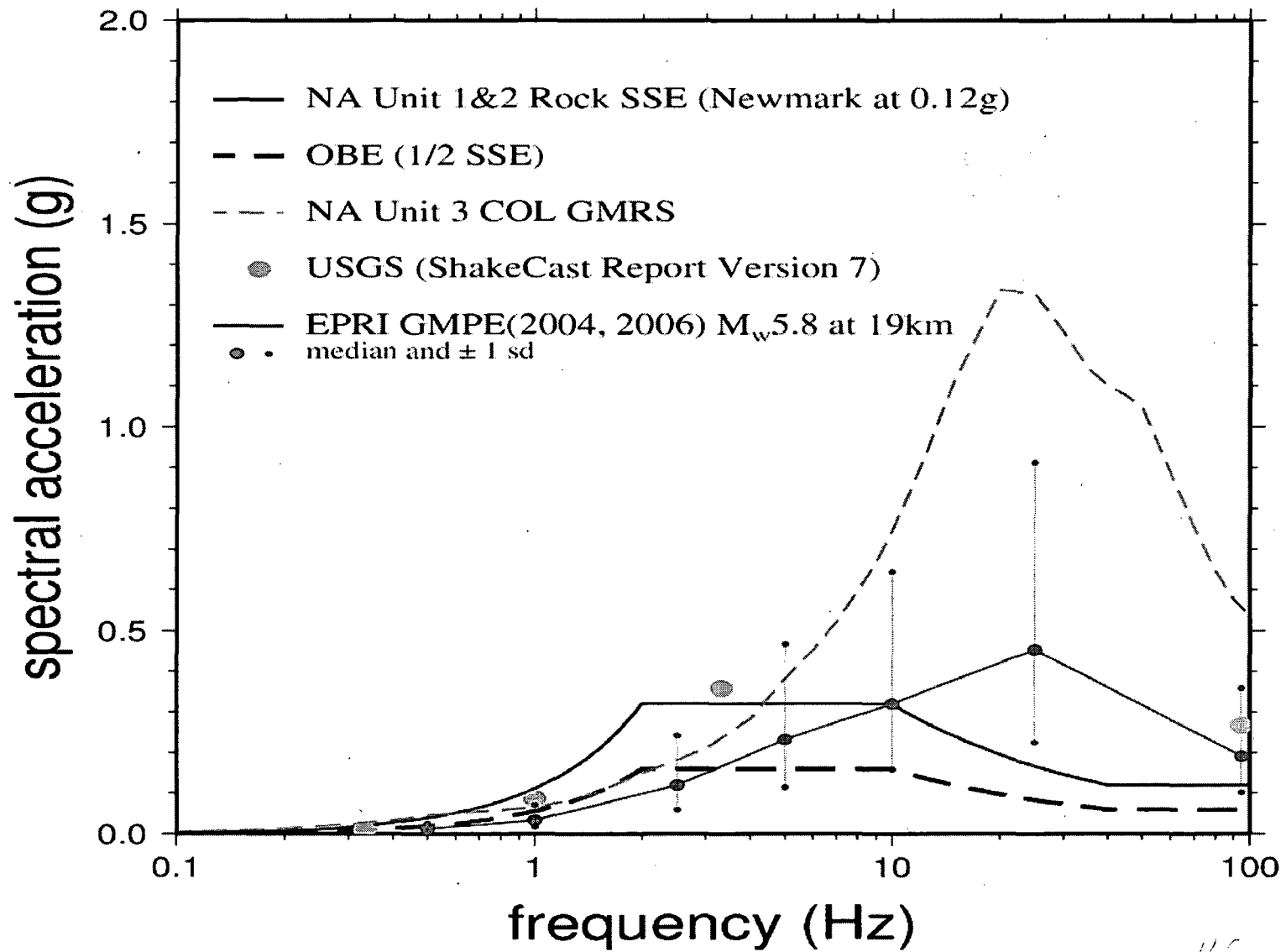
# Sequence of Events

- 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 1<sup>st</sup> general walkdown of the plant as required by the North Anna Power Station abnormal procedure for seismic event.
- The licensee conducted the 2<sup>nd</sup> walkdown after the magnitude 4.5 aftershock.
- Seismic Response Spectrum Recorder (scratch plate) readings identified that the Design Basis Earthquake had been exceeded at certain frequencies.
- On August 26, the licensee declared all safety-related SSCs of Units 1 and 2 inoperable and issued a 10 CFR 72 Notification

# Initial Staff Assessment

- Exceedance of the DBE is an unprecedented event at an operating unit
- However, while Perry Unit was under construction, an earthquake occurred that exceeded SSE at high frequency (15hz)
  - A special safety inspection was conducted by the NRC's Region III Staff on February 5–7, 1986. See Inspection Reports 50–440/86005 and 50–440/86006. This included a post-earthquake walkdown and visual inspection of an extensive list of safety-related systems and components.
- 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 specifically address beyond design basis events.)
- RG 1.166, “Pre-earthquake Planning and Immediate Nuclear Power Plant Operator Post-earthquake Actions” references EPRI NP-6695, “Guidelines for Nuclear Plant Response to an Earthquake”
- RG 1.167, “Restart Of A Nuclear Power Plant Shut Down By A Seismic Event”



# NRC Ongoing Evaluations

- The staff will use RG 1.166, "Pre-earthquake Planning and Immediate Nuclear Power Plant Operator Post-earthquake Actions" as guidance in evaluating the licensee's response to the seismic event.
- Information from NANPP's seismic recordings will be utilized by the staff to assist in the assessment of the licensee's operability determination



# Augmented Inspection Team

- AIT was dispatched today, which will be conducted in accordance with MD 8.3, "NRC Incident Investigation Program."
- Objectives of the AIT include:
  - Collect, analyze and document factual information and evidence
  - 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 that the regulatory requirements in Appendix A of Part 100 are met.
  - 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.