

# U.S. NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

*Protecting People and the Environment*

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USNRC

May 16, 2007 (4:05pm)

OFFICE OF SECRETARY  
RULEMAKINGS AND  
ADJUDICATIONS STAFF

## North Anna ESP Hearing Topic 7 – Seismic Safety

### NRC Staff Presentation

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NRC Office of New Reactors

SEARCHED \_\_\_\_\_  
 SERIALIZED \_\_\_\_\_  
 INDEXED \_\_\_\_\_  
 FILED \_\_\_\_\_

MAY 16 2007  
 FEDERAL BUREAU OF INVESTIGATION  
 U.S. DEPARTMENT OF JUSTICE

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U.S. NUCLEAR REGULATORY COMMISSION

In the Matter of Dominion Nuclear North Anna, LLC

Docket No. 52-008-ESP Official Exhibit No. 23

OFFERED by: Applicant/Licensee Intervenor \_\_\_\_\_

NRC Staff  Other \_\_\_\_\_

IDENTIFIED on 4/24/07 Witness/Panel Minson

Action Taken:  ADMITTED  REJECTED  WITHDRAWN

Reporter/Clerk MC



# North Anna Early Site Permit Hearing

- Requirements and Guidance
- Regional and Site Geology
- Vibratory Ground Motion
- Site Subsurface Materials
- Staff Conclusions



# Regulations and Guidance

- Investigate geologic and seismic characteristics [10 CFR 100.23(c)]
- Determine site Safe Shutdown Earthquake (SSE) ground motion [10 CFR 100.23(d)]
- Determine potential for surface deformation [10 CFR 100.23 (d)]
- Regulatory Guide 1.165



## Regulations and Guidance

- RG 1.165 “Identification and Characterization of Seismic Sources and Determination of Safe Shutdown Earthquake Ground Motion”
  - Describes site investigations
  - Provides probabilistic approach for seismic hazard
  - Steps for determining site SSE
- RGs 1.132, 1.138, 1.198



## Regional and Site Geology

- Applicant used areal seismic source zones to characterize hazard
- Staff probed characterization of several regional and local faults
  - Mountain Run, Stafford, Seven Fall Lines
- Staff reviewed characterization of areal source zones
  - Central Virginia Seismic Zone (CVSZ)
  - East Coast Fault System
  - Charleston, SC



## Regional and Site Geology

- Staff reviewed previous and current characterization of unnamed fault “a”
  - Traverses site
  - Length of 3000 ft
  - Investigated in detail during 1970s
  - Fault is not capable
    - Overlying sediment not disturbed
    - Radiometric dating
    - Lack of topographic expression, seismicity



# Vibratory Ground Motion

- Staff reviewed probabilistic approach to characterize seismic hazard
  - Follows RG 1.165
  - Seismic sources updated
  - Ground motion models updated
- Staff verified adequacy of controlling earthquakes
  - Local (M5.4 at 12 mi)
  - Distant (M7.2 at 191 mi)



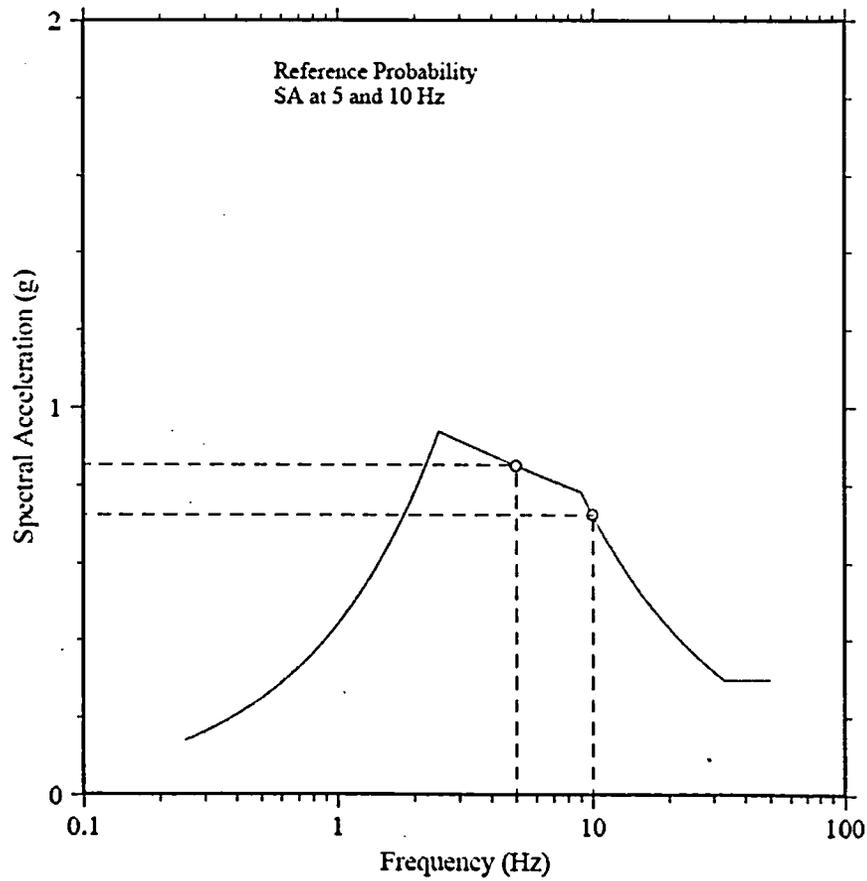
# Vibratory Ground Motion

- Staff reviewed revised reference probability (RP)
  - RG 1.165: median  $1 \times 10^{-5}/\text{yr}$
  - Applicant: mean  $5 \times 10^{-5}/\text{yr}$
- Staff performed confirmatory analysis of revised RP
  - Revised RP reflects current understanding of CEUS hazard



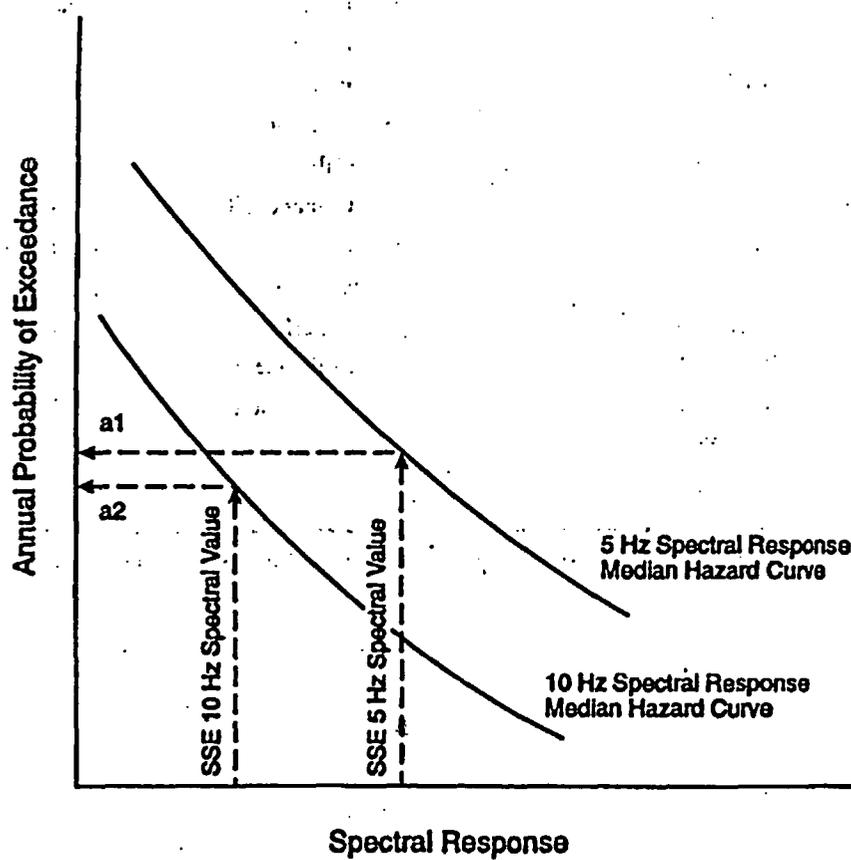
# Reference Probability from SSE

(source: RG 1.60)



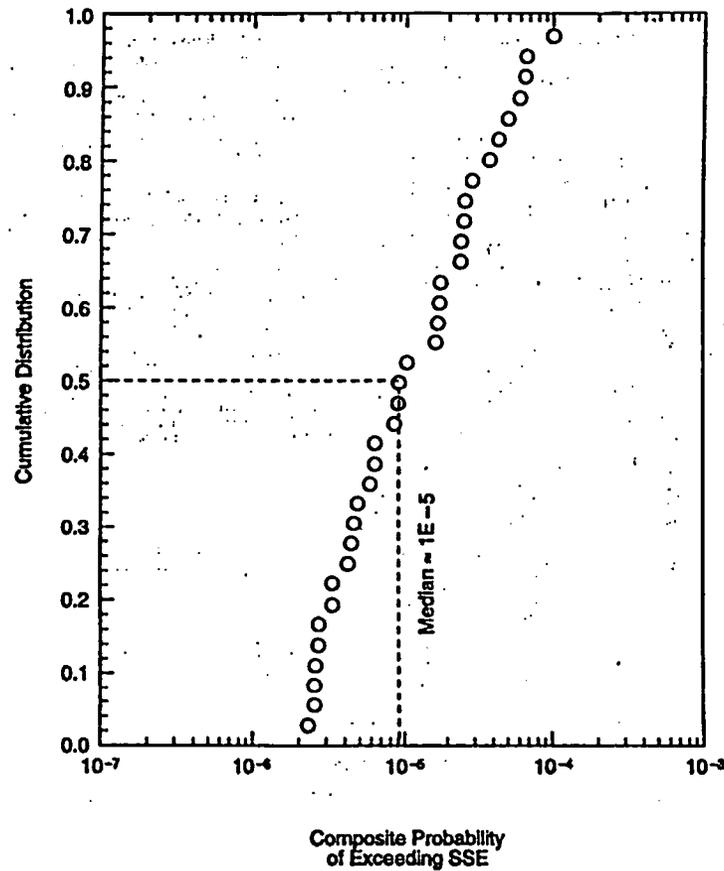
# Reference Probability (cont.)

(source: RG 1.165)



# Reference Probability (cont.)

(source: RG 1.165)





## Site Subsurface Materials

- Staff visited site to observe field explorations
- Staff reviewed properties of subsurface soil and rock
- Staff verified similarity between NAPS and ESP site soil and rock
- Staff verified adequacy of field explorations and laboratory testing



## Staff Conclusions

- Applicant provided thorough characterization of geology, seismology, soil/rock properties
- Applicant appropriately characterized seismic sources for SSE
- Revised RP reflects current understanding of hazard and provides acceptable SSE
- ESP site is acceptable from geological and seismological standpoint
- Applicable regulations met