PMSummerColpEM Resource

From: Wentzel, Michael
Sent: Friday, July 16, 2010 8:04 AM
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Subject: Staff Slides for ACRS Meeting on Summer Chapter 2
Attachments: VCS 2.0-2.2.pptx; VCS 2.3.pptx; VCS 2.5.pptx

Amy,

Attached are the staff's slides for the 7/22 ACRS meeting. Please note that the slides may change between now and the actual meeting. If you have any questions, please let me know.

Thanks,
Mike

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Presentation to the ACRS Subcommittee

V.C. Summer Units 2 and 3 COL Application Review

AFSER Sections 2.0-2.2

July 21-22, 2010

Staff Review Team

- **Technical staff**
  - David Sisk, Physical Scientist
- Project Management
  - Michael Wentzel
  - Joseph Sebrosky

Overview

- Sections 2.0(site characteristics), 2.1(Geography and Demography) and 2.2(Near by Industrial, Transportation, and Military Facilities) of the FSAR is a combination of information from two sources:
  - Standard content from the AP 1000 COL
  - Additional application specific information

Technical Topics of Interest

- Exemption request for the maximum safety wet-bulb (noncoincident) air temperature
- The evaluation of aircraft and airway hazards
- The evaluation of the potential hazard to new Units 2 and 3 due to an accidental release from storage tanks located at VCSNS Unit 1.
- The evaluation of potential hazards to new Units 2 and 3 due to other chemicals from Norfolk Southern's rail line.

Maximum Safety Wet-bulb (noncoincident) Air Temperature Exemption

- DCD Revision 17 Tier 1 value for maximum wet bulb (noncoincident) is 86.1°F.
  - VC Summer site parameter value is 87.3°F
- Exemption request will be discussed in several sections of the VC Summer SER:
  - Section 2.0 discusses the exemption and if appropriate will make the finding that the special circumstances of 10 CFR 50.12 are met (finding temporarily relocated to Section 9.2)
  - Section 2.3 discusses whether the regional meteorological data supports the 87.3°F value
  - Sections 5.4, 6.2, 6.4, 9.1, and 9.2 of the SER will evaluate impacts of higher temperature on the design

Maximum Safety Wet-bulb (noncoincident) Air Temperature Exemption, cont'd

- Sections 5.4, 6.2, 6.4, 9.1, and 9.2 of the SER will include evaluations of the following:
  - Incontainment refueling water storage tank (IRWST) temperature control with the normal residual heat removal system (Section 5.4 of the SER)
  - Containment pressure control (Section 6.2 of the SER)
  - Control room habitability (Section 6.4 of the SER)
  - Other systems that are affected (Sections 9.1 and 9.2)
    - Service water system
    - Spent fuel pool cooling system
    - Component cooling water system
    - Central chilled water system

Aircraft and Airway Hazards

- Based on an independent review of airways passing near VCSNS, the NRC confirmed that Airway V53 passes approximately 2.25 miles from VCSNS Units 2 and 3. As a consequence, the third criterion of Section 3.5.1.6 of NUREG-0800 is not met. The staff will evaluates this consequence in SER Section 3.5.1.6.

Potential Hazard Due To An Accidental Release From Unit 1 Storage Tanks

- Based on an independent confirmatory analyses, the NRC staff finds that an accidental release of Ammonium Hydroxide (28%) from storage tanks located at VCSNS Unit 1 would exceed the IDLH concentration outside the MCR. This chemical is further evaluated for control room habitability in SER Section 6.4.

Potential Hazards Due To Other Chemicals Transported By Rail

- Based on an independent confirmatory analyses, the NRC staff finds that two chemicals transported via rail, cyclohexylamine and chlorodifluoromethane would exceed their respective IDLH concentrations outside the MCR. These chemicals are further evaluated for control room habitability in SER Section 6.4.

Confirmatory Items

- The applicant's proposed changes to VCSNS COL FSAR Section 2.2.3.1.3 and Tables 2.2-209 and 6.4-201 will remain as applicant's confirmatory items 2.2-1, 2.2-2, and 2.2-3, respectively.

Presentation to the ACRS Subcommittee

V.C. Summer Units 2 and 3 COL Application Review

AFSER Section 2.3
Meteorology

July 21-22, 2010

Staff Review Team

- Technical Staff
  - Kevin Quinlan, Physical Scientist (Meteorologist)
- Project Management
  - Mike Wentzel

Content of Section 2.3

- FSAR Chapter 2.3 incorporates by reference Revision 17 of the AP1000 DCD.

- COL items, Supplemental Information, and a Departure
  - VCS COL 2.3-1 – Regional Climatology
  - VCS COL 2.3-2 – Local Climatology
  - VCS COL 2.3-3 – Onsite Meteorological Measurements Program
  - VCS COL 2.3-4 – Short-Term Diffusion Estimates
  - VSS COL 2.3-5 – Long-Term Diffusion Estimates
  - VCS SUP 2.0-2 – Comparison Table of Site Parameters and Site Characteristics
  - VCS SUP 2.3-1 – Regional and Local Climatology
  - VCS DEP 2.0-2 – Noncoincident Wet-Bulb

Technical Topics of Interest

- 2.3.3 Onsite Meteorological Measurement Program
  - COL applicant described the onsite meteorological measurements program and provided a copy of the resulting meteorological data.
  - Applicant met RG 1.23, Revision 1 criteria for siting of the tower in relation to Units 2 & 3
    - New meteorological tower began recording data in December 2006.
    - Staff verified that the location of the new tower is representative of the site area.
    - Unit 1 meteorological tower will serve as a backup data source for Units 2 and 3 during routine service, maintenance, and accidental atmospheric radiological releases.

Technical Topics of Interest

- 2.3.4 Short-Term (Accident) Diffusion Estimates
  - Comparison of atmospheric dispersion site parameters and site characteristics
  - COL FSAR presented EAB & LPZ χ/Q values
  - COL FSAR presented Control Room χ/Q values
- 2.3.5 Long-Term (Routine) Diffusion Estimates
  - Comparison of atmospheric dispersion site parameters and site characteristics
  - COL FSAR 2.3-5 verified release points and receptor locations

Presentation to the ACRS Subcommittee

V.C. Summer Nuclear Station Units 2 and 3
COL Application Review

AFSER Section 2.5
Geology, Seismology, and Geotechnical Engineering

July 22, 2010

Staff Review Team

- Sections 2.5.1 and 2.5.3
  - Dr. Gerry L. Stirewalt, Senior Geologist (presenter)
  - Meralis Perez-Toledo, Geologist
  - Drs. Anthony J. Crone and Richard W. Briggs, U.S. Geological Survey Geologists
- Section 2.5.2
  - Sarah Tabatabai, Geophysicist (presenter)
  - Drs. David M. Boore, Stephen H. Hartzell, and Yuehua Zeng, U.S. Geological Survey Geologists
- Sections 2.5.4 and 2.5.5
  - Dr. Weijun Wang, Senior Geotechnical Engineer (presenter)
  - Frankie Vega, Geotechnical Engineer
  - Dr. Carl J. Constantino and Thomas W. Houston, Information Systems Laboratories Geotechnical Engineering Consultants
- Project Management
  - Mike Wentzel

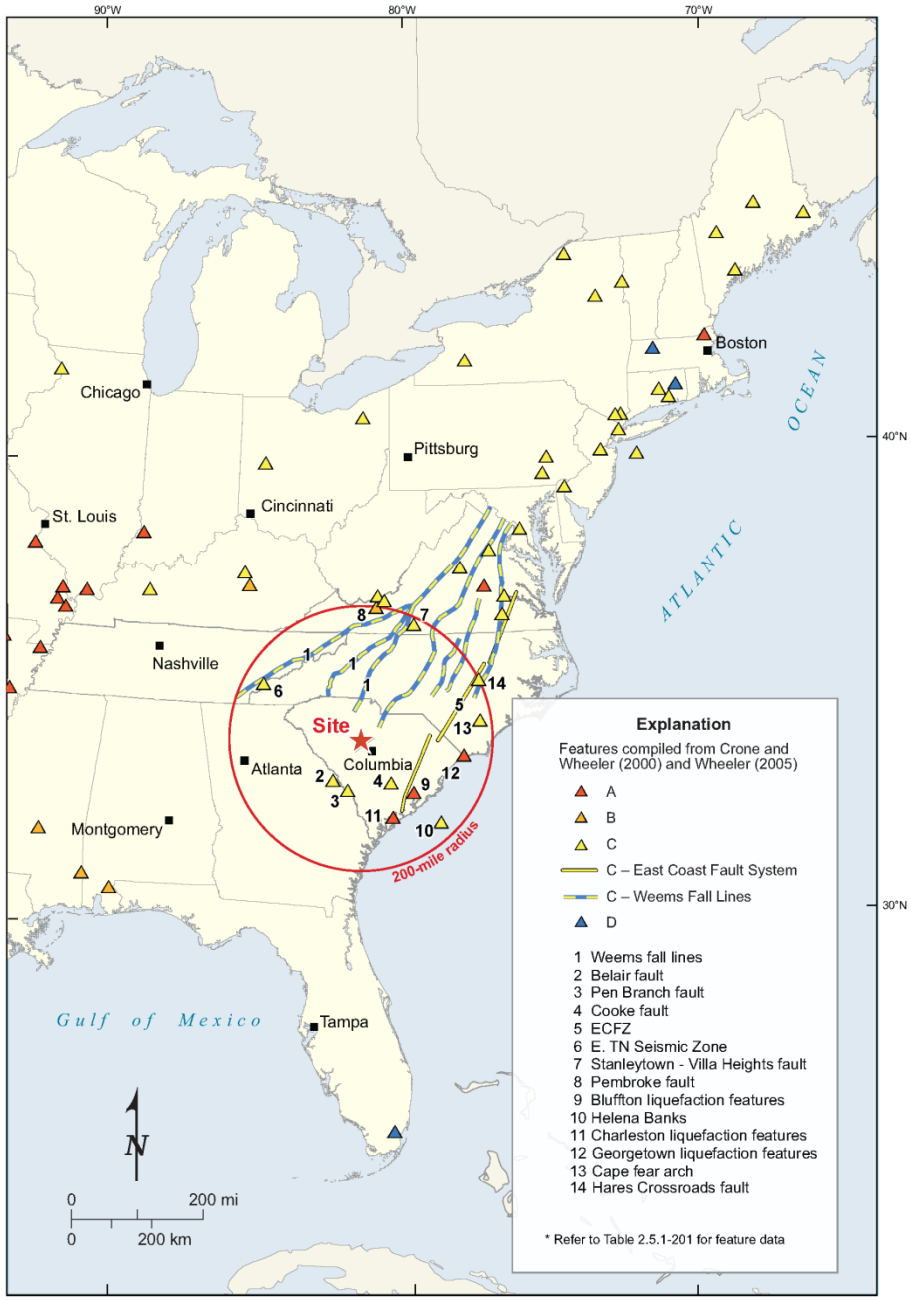
Overview

- Section 2.5 of the VCSNS AFSER issued with two Confirmatory Items and one License Condition
  - All COL Information Items (11 for AFSER Section 2.5.4 and two for AFSER Section 2.5.5) resolved based on FSAR Revision 2.
  - All Confirmatory Items resolved based on FSAR Revision 2, except 2.5.2-1 related to fractile hazard curves and 2.5.4-1 related to concrete fill design, thermal cracking, and monitoring.
  - License condition 2.5.1-1 for AFSER Section 2.5.1 related to geologic mapping of excavations for safety-related structures.

Section 2.5.1–Basic Geologic and Seismic Information

- **Capability of tectonic structures mapped in the site region, site vicinity, and site area**
  - Issue: Ensure that no potentially-capable tectonic faults (i.e., faults of Quaternary age, 2.6 million years ago [Ma] to present) have been mapped in the site region, site vicinity, or site area.
    - Applicant identified 14 potential Quaternary tectonic features in the site region (i.e., potentially capable tectonic structures with possible associated seismic hazard).
    - No mapped tectonic structure to which the 1886 Charleston area earthquake can be associated has been identified. Charleston area is characterized as a seismic source zone for assessment of seismic hazard, rather than as a specific tectonic fault or fault zone (AFSER Section 2.5.2).

2.5.1 – Basic Geologic and Seismic Information



Potential Quaternary Features in the VCSNS Site Region (AFSER Figure 2.5.1-2 after FSAR Figure 2.5.1-215)

Section 2.5.1–Basic Geologic and Seismic Information

- **Capability of tectonic structures mapped in the site region, site vicinity, and site area**
  - Resolution: Staff's review of detailed responses to RAIs resolved concerns related to occurrence of potentially capable tectonic structures mapped in the site region, site vicinity, and site area.
    - Staff found that information (i.e., constraining field relationships and radiometric age dates) provided by the applicant documented that no Quaternary tectonic faults have been mapped in the site region, site vicinity, and site area.

Section 2.5.1–Basic Geologic and Seismic Information

- **Potential for tectonic structures in excavations for safety-related structures**
  - Issue: Ensure that no capable tectonic faults exist in the excavations for safety-related structures.
    - Staff must examine geologic features observed and mapped in excavations for safety-related structures to ensure that no capable tectonic faults exist.
    - Minor shear zones proven by the applicant to be at least 45 Ma in age were mapped in the Unit 1 excavation, and similar structures may occur in the excavations for Units 2 and 3.
  - Resolution: License Condition 2.5.1-1 requires applicant to perform geologic mapping of excavations for safety-related structures; evaluate geologic features discovered; and notify NRC when excavations are open for examination.

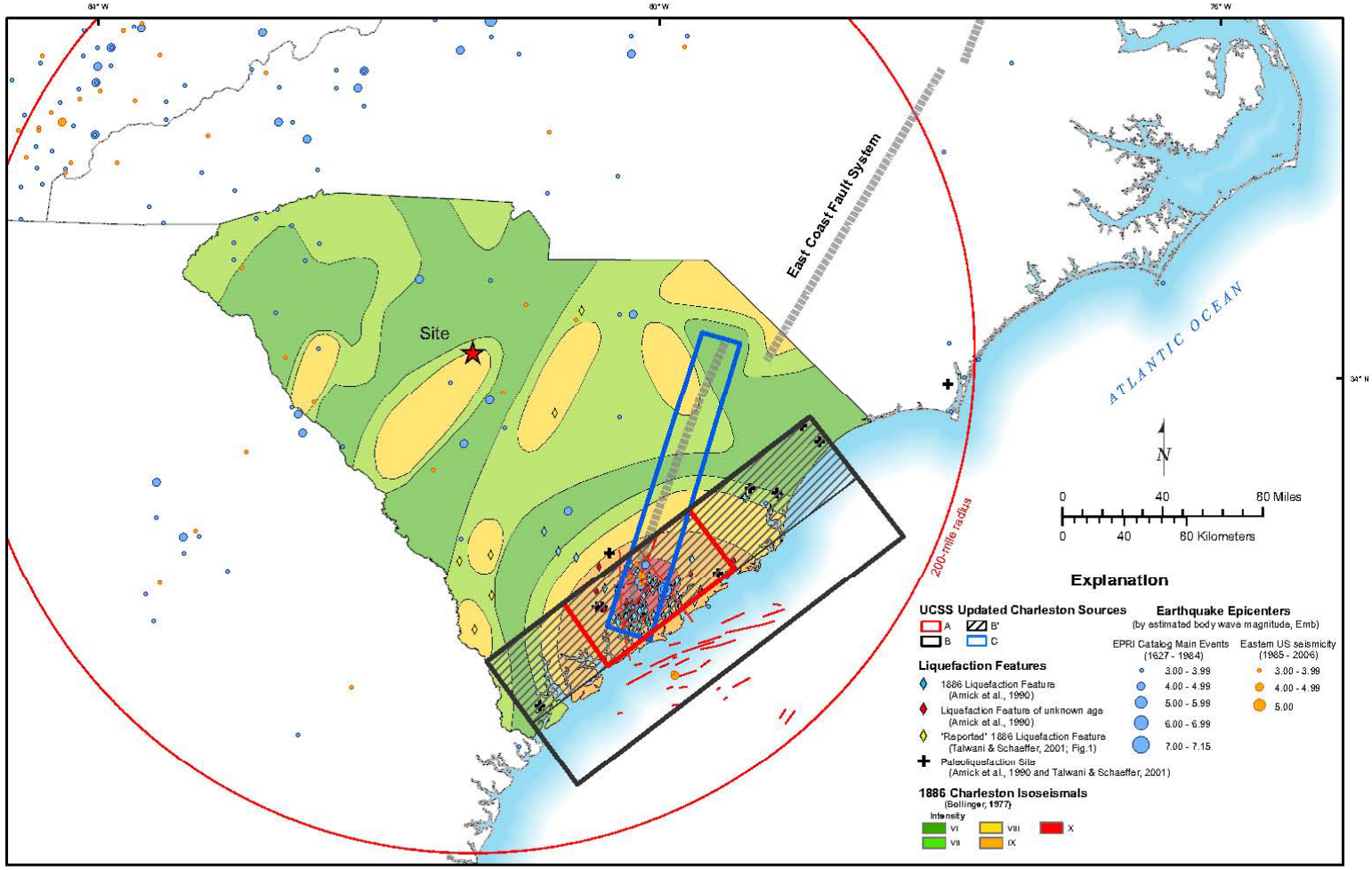
Section 2.5.2–Vibratory Ground Motion

- **Reservoir-Induced Seismicity (RIS)**
  - Issue: Staff was concerned about the largest potential seismic event associated with the Monticello reservoir due to RIS, and whether water level changes in the reservoir have been correlated with seismicity.
  - Resolution: Applicant documented that the two largest reservoir-induced earthquakes were of magnitude 2.8 (1978 and 1979); that the AP1000 CSDRS bounds the postulated magnitude 4.5 event for Unit 1; and that no correlation has been shown between seismicity and water level changes since initial filling of the reservoir.

Section 2.5.2–Vibratory Ground Motion

- **Charleston Seismic Zone**
  - Issue: Applicant updated the original 1986 EPRI Charleston seismic source models with the UCSS model originally presented in the SSAR for the Vogtle ESP site (SNC, 2008).
    - Staff asked applicant to address a newly-reported Charleston area paleoliquefaction feature (Talwani and others, 2008) in regard to the UCSS model.
  - Resolution: Talwani and others (2008) estimated a magnitude of about 6.9 for the causative earthquake, which falls within the M_{max} range captured in the UCSS model, and the newly-reported paleoliquefaction feature lies within one of the source area geometries defined for the UCSS model.

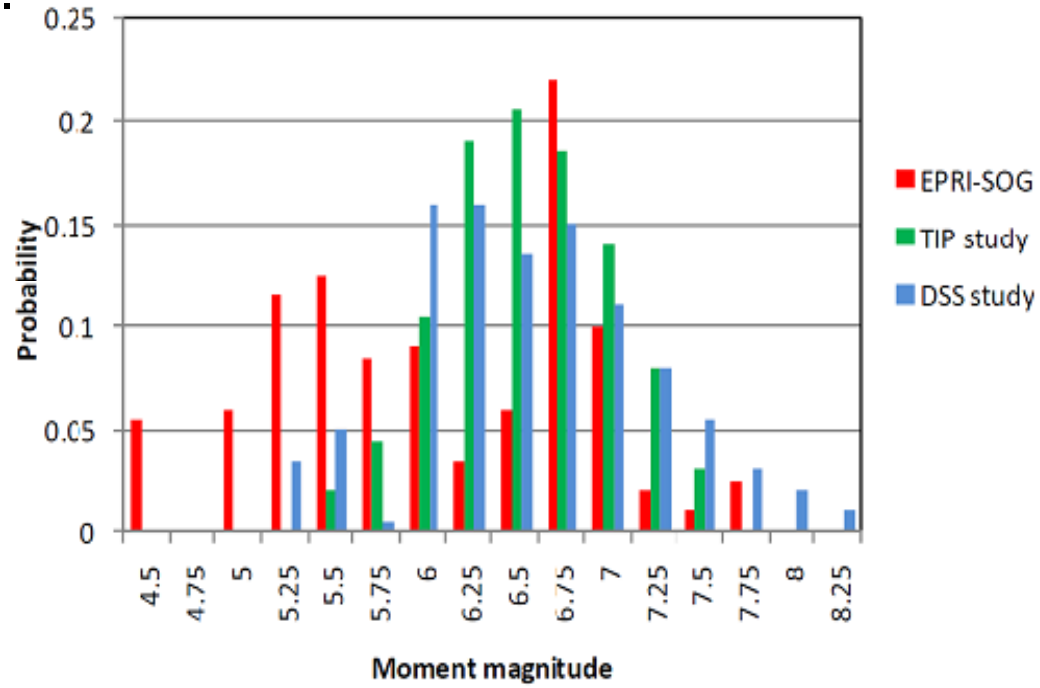
Section 2.5.2–Vibratory Ground Motion



Updated Charleston Seismic Source (UCSS) Model
(FSAR Figure 2.5.2-213)

Section 2.5.2–Vibratory Ground Motion

- **Eastern Tennessee Seismic Zone (ETSZ)**
  - Issue: Applicant did not include newer ETSZ source models that post-date the 1986 EPRI study in the VCSNS PSHA.



Comparison of ETSZ M_{max} distributions from EPRI-SOG, TIP, and TVA Dam Safety Studies (AFSER Figure 2.5.2-13)

Section 2.5.2–Vibratory Ground Motion

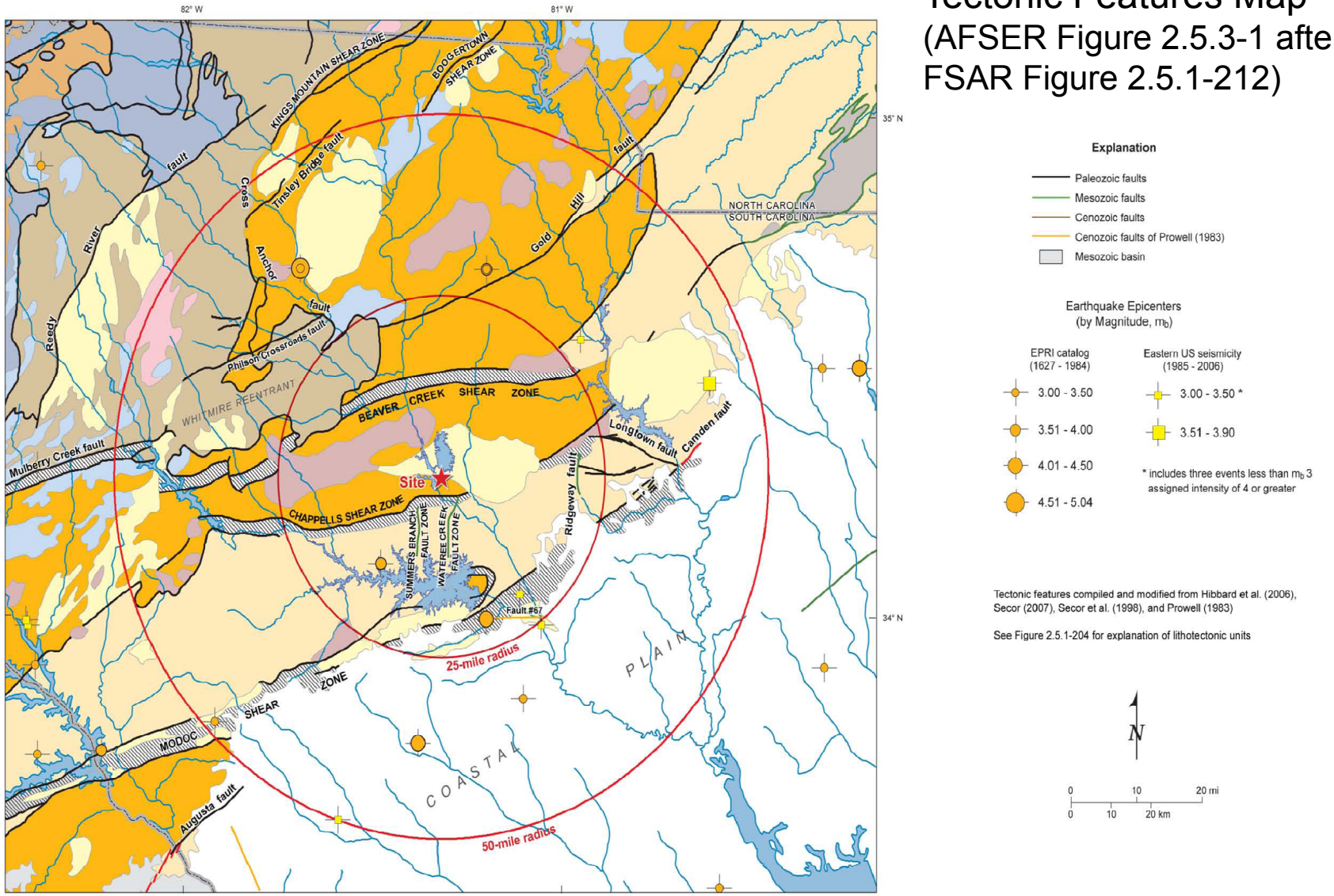
- **Eastern Tennessee Seismic Zone**
  - Resolution: Applicant referred to a sensitivity study conducted by NEI for the ETSZ (2008) and concluded, based on results of that generic study for a hypothetical site in the middle of the ETSZ, that changes resulting from updating the 1986 EPRI study were not significant.
    - Staff performed an independent sensitivity analysis to assess whether the updated M_{max} distribution used in the NEI sensitivity study significantly changed the final GMRS for the VCSNS site.
    - Results of staff's sensitivity calculation showed that increasing original EPRI-SOG M_{max} distributions for the ETSZ did not significantly impact seismic hazard for the VCSNS site. GMRS values increased only slightly at 1 Hz (0.094 g to 0.104 g) and 10 Hz (0.428 g to 0.468 g).

Section 2.5.3–Surface Faulting

- **Surface Faulting in the Site Vicinity & Site Area**
  - Issue: Ensure that no capable surface or near-surface tectonic faulting exists in the site vicinity and site area.
    - Applicant documented that tectonic surface structures have been mapped in the site vicinity.
  - Resolution: Staff's review of detailed responses to RAIs resolved concerns related to occurrence of capable surface or near-surface faulting in the site vicinity and site area.
    - Staff found that information (i.e., constraining field relationships and radiometric age dates) provided by the applicant documented that no surface or near-surface Quaternary tectonic faults occur in the site vicinity or site area.
    - Non-tectonic surface or near-surface deformation is not expected because of the physical properties of crystalline bedrock in the site vicinity and site area and at the site.

2.5.3 Surface Faulting

V. C. Summer Site Vicinity Tectonic Features Map (AFSER Figure 2.5.3-1 after FSAR Figure 2.5.1-212)



2.5.3 Surface Faulting

Exposure of the Wateree Creek fault (206-144 Ma in age), located 3 km (2 mi) south of the VCSNS site

Section 2.5.4–Stability of Subsurface Material and Foundations

- **Excavation Plan**
  - Issue: Identification of “sound rock” in the field during excavation, and how to maintain integrity of “sound rock” underlying Category 1 foundations.
  - Resolution: Applicant stated that all overlying soils would be removed with a large ripper or trackhoe until non-rippable (i.e., “sound rock”) was reached. “Sound rock” will be confirmed in the field by a geologist using a rock hammer and visual inspection. This non-explosive method of excavation will not affect integrity of rock underlying the Category 1 foundations.

Section 2.5.4–Stability of Subsurface Material and Foundations

- **Concrete Fill Underlying Foundations**
  - Issue: How to ensure that concrete fill underlying Category 1 foundations has similar properties as “sound rock”, and how to resolve a potential thermal cracking issue for some areas with up to 17 ft of concrete fill.
  - Resolution: Applicant indicated that concrete fill will have a similar strength and shear wave velocity as “sound rock”; appropriate industry standards will be followed for concrete fill design and thermal cracking control; and a thermal control monitoring plan will be provided.
    - Confirmatory Item 2.5.4-1: Staff will ensure that a detailed concrete fill design, thermal cracking control, and monitoring plan are included in a revised FSAR.

Section 2.5.5–Stability of Slopes

- **No technical issues of interest for AFSER Section 2.5.5**
  - Applicant addressed 2 COL Information Items (VCS COL 2.5-14 and VCS COL 2.5-15) related to stability of all earth and rock slopes and the need for additional dams or embankments to be constructed at the site.
    - Staff found that slopes at the site are at an adequate distance from the power block and cooling tower area, and there is no need for additional dams or embankments to be constructed at the site.