

ClinchRiverESPHFNPEm Resource

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Subject: Clinch River May 8-9 Site Audit Plan Draft_20170330.docx
Attachments: Clinch River May 8-9 Site Audit Plan Draft_20170330.docx

Draft RGS audit plan for planning and scheduling purposes. If any clarification or changes are needed, we can discuss next week.

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**Draft Audit Plan for Areas Covered in Section 2.5 of the Site Safety
Analysis Report, Clinch River Nuclear Site Early Site Permit Application**

APPLICANT: Tennessee Valley Authority (TVA)

DATES: May 8-10, 2017

LOCATIONS: TVA Knoxville Office Complex
400 West Summit Hill Drive
Knoxville, Tennessee 37902

Clinch River Nuclear Site
Oak Ridge, Tennessee

AUDIT TEAM: David Heeszal, Team Leader (NRO/DSEA/RGS)
Alice Stieve (NRO/DSEA/RGS)
Weijun Wang (NRO/DSEA/RGS)
Ricardo Rodriguez (NRO/DSEA/RGS)
Michael Dudek (NRO/DSEA/RGS)

PROJECT MANAGER: Allen Fetter (NRO/DNRL/LB3)

AUDIT OBJECTIVE

The objective of the planned audit is to initially discuss issues identified by the staff during the review of the application at the TVA Knoxville Office Complex in downtown Knoxville, TN. The audit will also consist of a tour of the ESP site and surroundings, review of geologic core samples collected during site investigations, and discussions of probabilistic seismic hazard analysis evaluations methodology, and karst formation evaluation proposed in the Site Safety Analysis Report. In addition, staff will visit locations at the site and in the surrounding area to study geologic structure and texture, and audit calculation packages as needed.

AUDIT ACTIVITIES AND SCHEDULE

NRC staff will conduct the review over a period of two business days, May 8 & 9, 2017. If necessary, the audit can be extended until noon May 10, 2017. The need for an extension will be determined by the NRC staff responsible for the audit before the planned adjournment of the meeting on May 9.

An agenda for the audit is presented in Attachment A. Attachment B contains specific information needs for each review section. If necessary, any circumstances related to the conductance of the audit will be communicated to the safety PM, Allen Fetter (NRC), at 301 415-8556 or at allen.fetter@nrc.gov.

Agenda

**TVA Clinch River Nuclear (CRN) ESP Site Audit
Pertaining to the Review of the CRN SSAR, Section 2.5
TVA Knoxville Office, Knoxville, Tennessee, May 8, 2017
TVA CRN Proposed Site, Oak Ridge, Tennessee, May 9, 2017
TVA Knoxville Office, Knoxville, Tennessee, May 10, 2017 (if needed)**

Monday, May 8, 2017, MORNING SESSION: AUDIT - proprietary

- 08:30-08:45 Audit Entrance / Introduction [NRC/TVA]
- 08:45-12:00 Documentation Review and Discussion: Methodology for seismic calculations and analysis, void formation evaluation and associated calculations¹
..... [NRC/TVA]
- 12:00-13:00 **Lunch**

Monday, May 8, 2017, AFTERNOON SESSION: AUDIT - proprietary

- 13:00-16:30 Documentation Review and Discussion continued..... [NRC/TVA]
- 16:30-16:45 NRC Internal Caucus..... [NRC]
- 17:00 **Adjourn**

Tuesday, May 9, 2017, MORNING SESSION: AUDIT - proprietary

- 09:00-12:15 Site Tour (examination of cores/samples, area/vicinity geologic features²)
[NRC/TVA]
- 12:15-13:00 **Lunch**

Tuesday, May 9, 2017, AFTERNOON SESSION: AUDIT - proprietary

- 13:00-16:30 Site Tour (area/vicinity geologic features continued)..... [NRC/TVA]
- 16:30-16:45 NRC Internal Caucus..... [NRC]
- 16:45-17:00 Exit Meeting..... [NRC/TVA]
- 17:00 **Adjourn**

Wednesday, May 10, 2017, MORNING SESSION: AUDIT - proprietary

- 08:00-10:00 Discussion of additional audit items (if needed) [NRC/TVA]
- 10:00-10:30 NRC Internal Caucus..... [NRC]
- 10:30-11:00 Exit Meeting..... [NRC/TVA]
- 11:00 **Adjourn**

Information needs specific to SSAR Sections

2.5.1 Geologic Information

Field trip to visit features described in SSAR text or illustrated in SSAR figures (if possible):

1. Visit the surface projection/location of Shear Fracture Zone on site or across the river. In CNL-16-162, p E1-36, you state that the shear zone crops out to the northeast of the CRBRP along the right bank of the Clinch River arm of the Watts Bar Reservoir and strikes parallel to the strike of the bedding planes.
2. Visit location of Chestnut Ridge and Copper Creek faults in site location.
3. Visit Quaternary deposits and landforms (terraces) in site area.
4. Visit 2 Sinkhole clusters on site (northern boundary and to the SE (as indicated on fig 2.5.1-46)
5. Visit 3 small Caves aligned with the Knox/Conasauga contact within a strike tributary valley just north of CR on ORR (fig 2.5.1-47).
6. Visit pinnacle and cutter exposure near Copper Ridge Cave (fig 2.5.1-40), an abandoned phreatic cave within site area. Visit both the hillside exposure and the cave.

Examine specific core for:

1. Examples of Shear fracture zone in borehole: MP 423; MP 201, MP 101
2. Examples of open voids in boreholes (from ESP Table 2.5.1-11): borehole #50 (void at ~741 ft elev); MP 418 (void at ~ 756 and ~735 ft elev)
3. Examples of clay or soil filled voids as described in CNL-16-162:

CNL-16-162, pE2-17: A number of the cavities encountered in the boreholes were partially to completely filled with clay or soil.

CNL-16-162, pE2-9, you describe a Doll et al 1999 study of a large mud filled void (~39 ft.) discovered in the subsurface near Y12. What stratigraphic formation is this feature formed in.

4. Examples of Knox unconformity (Blackford/Knox contact) from borehole MP 201 and MP 423

Discussion topics:

Discuss your evaluation of landslide hazard at the site location in consideration of SSAR section 2.5.3.8.2.2 and regional scale Figures 2.5.1-22 & 2.4.9-5.

Discuss apparent inconsistency between Tables 2.5.1-16 and 2.5.1-17.

2.5.2 Vibratory Ground Motion

Discussion topics:

Discuss consideration of rates and b-values for the ETSZ in CEUS-SSC SSHAC update and

Discuss 1-D site response analysis

2.5.4 Geotechnical Engineering

Examine specific core/sample for:

Borings MP101, MP201, MP202, and MP102 with emphasis on shear fracture features

Discussion Topics:

Plaxis model calculation package

Bearing capacity and settlement packages

Discuss the inconsistency between the geologic basis in Section 2.5.1.2.3.4 *Estimation of hypothetical large void* and the input parameters and sensitivity analysis for the Plaxis model.

DRAFT