ClinchRiverESPHFNPEm Resource

From: Schiele, Raymond Joseph <rjschiele@tva.gov>
Sent: Thursday, March 30, 2017 6:51 AM
To: Sutton, Mallecia
Cc: Stout, Daniel Paul; Hastings, Peter S
Subject: [External_Sender] Audit Plan HydroHealthPhysics1 (003) (5)
Attachments: Audit Plan HydroHealthPhysics1 (003) (5).docx

Mallecia,

Please find the draft audit plan with suggested corrections. I will be available today to discuss at your convenience.

Thanks,

Ray

Hearing Identifier: ClinchRiver_ESP_HF_NonPublic
Email Number: 86

Mail Envelope Properties (0FA7144D673855418F1030CB8FBF3E612BEFC37C)

Subject: [External_Sender] Audit Plan HydroHealthPhysics1 (003) (5)
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From: Schiele, Raymond Joseph

Created By: rjschiele@tva.gov

Recipients:
"Stout, Daniel Paul" <dpstout@tva.gov>
Tracking Status: None
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Tracking Status: None
"Sutton, Mallecia" <Mallecia.Sutton@nrc.gov>
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CLINCH RIVER NUCLEAR SITE EARLY PERMIT APPLICATION SITE HYDROLOGIC ENGINEERING AND HEALTH PHYSICS AUDIT PLAN

A. Background

Tennessee Valley Authority submitted ground water, surface water, and source term characterization and release documentation and modeling files to the U.S. Nuclear Regulatory Commission (NRC) as part of their Clinch River Nuclear Site (CRNS) Early Site Permit (ESP) application. In preparation for the audit, the staff reviewed the data and information within the corresponding context of Sections 2.4, 11.2.3 and 11.3.3 of the Site Safety Analysis Report (SSAR) and identified information needs that would promote a better understanding of the detailed analyses and bases underlying the formal application.

In conjunction with the audit, several members of the staff will visit the proposed site location and surrounding area (Attachment 1) in an effort to become familiar with the site layout and the surrounding features and physiography. This will also provide the staff an opportunity to discuss the information needs identified during the staff's initial review of the application and associated SSAR Sections (Attachment 2) with the applicant's subject matter experts (SMEs), staff and contractors. During the audit, the staff will review and discuss ground and surface water models, supporting modeling documentation and calculation packages, and source term characterization and releases. The audit will allow the staff to better understand the site and modeling results in order to make appropriate safety conclusions concerning site characteristics and assess the radiological consequences of the normal liquid and gaseous effluent and accidental liquid effluent releases to air, ground and surface water. It will also assist the staff in identifying subsequent requests for additional information needed to allow the staff to conduct a complete review of the CRNS ESP application.

B. Regulatory Audit Bases

This regulatory audit is based on the following:

- NUREG 0800, "Standard Review Plan"
- Regulatory Guide (RG) 1.206, "Combined License Applications for Nuclear Power Plants"
- 10 CFR Part 20, "Standards for Protection Against Radiation"
- 10 CFR 100.20, "Factors to be Considered When Evaluating Sites"
- 10 CFR100.21, "Non-seismic Siting Criteria"
- 10 CFR 100.23, "Geologic and Seismic Siting Criteria"
- 10 CFR 52.17 Contents of Applications; Technical Information, subparts (a)(1)(ii) and (a)(1)(vi)
- 10 CFR Part 50, Appendix A, General Design Criterion 2
- 10 CFR Part 50, Appendix I, "Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion "As Low as is Reasonably Achievable" for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents"
- 40 CFR Part 190, "Environmental Radiation Protection"

C. Regulatory Audit Scope or Methodology

- The area of focus for the audit is the CRNS ESP application hydrologic engineering and health physics evaluation with ~~and~~ supporting documentation.

D. Information and Other Background Material for the Regulatory Audit

- ESP Application, Revision. 0, Section 2.4, 11.2.3 and 11.3.3
- Letter from TVA to NRC, CNL-16-~~191~~199, "Clinch river - Submittal of Supplemental Information Regarding Hydrology in Support of Early Site Permit Application" December 8, 2016, (ADAMs Accession No.ML16344A085)
- Letter from TVA to NRC, CNL-16-191, "Submittal of Supplemental Information Regarding Radiation Protection and Accident Consequences in Support of Early Site Permit Application for Clinch River Nuclear Site," December 2, 2016 (ADAMs Accession No. ML16340A258)
- Letter from TVA to NRC, CNL-16-~~191~~157, "Clinch River Nuclear Site - Submittal of Groundwater Calculation Input and Output Files in Support of Early Site Permit Application", September ~~29~~30, 2016, (ADAMs Accession No. ML16280A066)
- Letter from TVA to NRC, CNL-16-~~191~~156, "Submittal of Hydrology Calculation Input Files in Support of Early Site Permit Application for Clinch River Nuclear Site", September ~~29~~30, 2016, (ADAMs Accession No. ML16280A065)
- Letter from TVA to NRC, CNL-16-191, "Submittal of Hydrology Calculation Input and Output Files in Support of Early Site Permit Application for Clinch River Nuclear Site", July 28, 2016 (ADAMs Accession No. ML16216A115)
- Information Needs (*See* Attachment 2)

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E. Audit Team

The following are the audit team members:

Mallecia Sutton, NRC Project Manager
Stephen Breithaupt, NRC Technical Reviewer
Yuan Cheng, NRC Technical Reviewer
Richard Clement, NRC Technical Reviewer
Joseph Giacinto, NRC Technical Reviewer

F. Logistics

The audit will consist of two parts1) face-to-face at Bechtel in Reston, Virginia office on April 17, 2017 through April 19, 2017 and 2) additional face-to-face at Tennessee Valley Authority Knoxville Office Complex, Knoxville, Tennessee on April 24, 2017 through April 27, 2017.

The proposed schedule for the audits are as follows:

Location: Bechtel Corporation
12011 Sunset Hills Rd
Reston Va. 20190

Date: Monday April 17, 2017

12:00 p.m. - Audit Opens
12:15 p.m. - Site Orientation and Safety Briefing
3:30 p.m. - Teams Debrief
4:00 p.m. - Audit Adjourns for the Day

Date: Tuesday April 18, 2017

9:00 a.m. - Audit Resumes
12:00 p.m.-1:00 p.m. – Lunch
1:00 p.m. - 43:030 p.m. – Team Continues Audit
3:30 p.m. - Teams Debrief
4:00 p.m. - Audit Adjourns for the Day

Date: Wednesday April 19, 2017

9:00 a.m. - Audit Resumes
12:00 p.m.-1:00p.m. – Lunch
1:00 p.m. - 4:00 p.m. – Team Continues Audit
4:00 p.m. - Audit Concludes
4:30 p.m. - Audit Exit

Location: Tennessee Valley Authority Knoxville Office Complex
400 West Summit Hill Drive
Knoxville, TN 37902

Date: April 24, 2017

3:00 p.m. - Audit Opens
3:15 p.m. - Site Orientation and Safety Briefing
4:30 p.m. - Audit Adjourns for the Day

Date: **April 25, 2017**

8:00 a.m.-12:30 p.m. –Teams Assemble/Travel to Cherokee and Douglas Dams for Site Tours
11:30 a.m.-12:00p.m. – Lunch provided at Cherokee Dam
12:30 p.m. - 3:30 p.m. – Team ~~Returns~~ travels to Norris Dam for Site Tours~~to TVA Office and Discuss Information Needs~~
3:30 p.m. - Teams Debrief
4:30 p.m. - Audit Adjourns for the Day

Date: **April 26, 2017**

8:00 a.m.-11:30 a.m. – Audit Resumes, Teams Assemble/Travel to Melton Hill Dam and CRN for Site Tours
11:30 a.m. - 12:00 p.m. – Lunch at CRN Site
12:00 p.m. - 3:30 p.m. – Team Continues CRN Tour (if necessary) and Discuss Information Needs (at CRN Site Office)
3:30 p.m. - Team Debrief (at CRN Site)
4:30 p.m. - Audit Adjourns for the Day

Date: **April 27, 2017**

8:30 a.m. - Audit Resumes at TVA Office to Discuss Information Needs
10:30 a.m. - Audit Concludes
11:30 a.m. - Audit Exit

G. Deliverables

The audit team plans to issue a regulatory audit summary within 90 days after completing the audit.

ATTACHMENT 1

CRNS - Site Visit and Reconnaissance

During the site visit, staff would like to view and reconnoiter:

- The CRNS for viewing the bend in the Clinch River and the surrounding topography that controls routing of flood flows;
- The bridges bounding the CRNS (Highway 58 Bridge downstream and Highway 95 Bridge upstream);
- The Norris Dam, Melton Hill Dam, the Douglas (and its saddle dams) Dam, and the Cherokee Dam sites with an SME to provide an overview of the hydraulic characteristics and identification of analyzed hypothetical dam failure locations;
- Proposed cut/fill areas for the CRNS project and, existing backfill and backfilled areas of the former CRBR site activities;
- Cut bank patterns along the curved portions of the Clinch River adjacent to the site;
- Formation and/or unit outcrops on and/or adjacent to the CRNS and general locations of monitoring wells and well clusters;
- Areas of seeps and springs related to groundwater flow patterns and, topographic depressions or ponds at the CRNS; and,
- Area of the planned discharge structure (CR River Mile 15.5) outfall and locations of postulated cooling water intakes and, the postulated receptor locations.

Serial No.	SSAR Section	Information Need

ATTACHMENT 2

CRNS – Hydrologic Engineering (Chapter 2.4) Review Site Audit Information Needs

1	2.4.1.2	The "former Oak Ridge Water Treatment Plant" is described as having an "active surface water withdrawal permit". Please provide an SME to discuss the disposition of the active permit with respect to the former plant. Additionally, staff requests confirmation that the "Oak Ridge Water Treatment Plant" in Section 2.4.1 is the same as the "City of Oak Ridge's West End Water Treatment plant" described in Section 2.4.13 and if so, requests that the applicant use consistent water treatment plant naming conventions throughout the SSAR. Please provided an SME to discuss the allowed uses of an industrial water permit and if such a permit could include potable water uses within the permitted facility. The SSAR discussion provides information on surface water aspects of the hydrosphere but no information on groundwater. Please provide a discussion of the groundwater portion of the hydrosphere in the SSAR. The SSAR discusses the Reservoir Operations Study (ROS) that included changes in minimum flow requirements and flood control operations on releases. Please provide a copy of the ROS and identify pertinent sections of the ROS relevant to the CRNS ESPA.
2	2.4.2.1	The SSAR provides a brief discussion of the flood history at the CRNS including a table of historic floods on the Clinch River Arm of Watts Bar Reservoir (Table 2.4.2-1 of SSAR.) Staff note that two of the flood elevations are derived from model calibration, while others are derived from historic flood profiles and a Clinch River flood report. For the historical flood profiles, please provide the source of the information. For the flood report, please provide discussion about how these elevations were developed.
3	2.4.2.2	The SSAR provides a discussion of potential flooding events that could affect the CRNS. Clarify why the discussion of Flooding from Dams Breaches and Failures only includes sunny day dam failures when hydrologic and seismic dam failures are also important.

ATTACHMENT 2

CRNS – Hydrologic Engineering (Chapter 2.4) Review Site Audit Information Needs

4	2.4.2.3	The SSAR states that site drainage "can reasonably take full advantage of the current topography and provide more than adequate runoff capability... with flow directed to Clinch River arm of Watts Bar Reservoir." Since the CRN site drainage plan has not been provided, please clarify how it can reasonably be assumed from the current topography that adequate drainage during local intense precipitation (LIP) can be achieved. The SSAR provides a brief discussion of precipitation distribution. Provide a detailed discussion in the SSAR on the development of the precipitation distribution at the CRN site. Provide an SME who can discuss the methods supporting estimation of LIP.
5	2.4.3.2	The SSAR discusses several PMP storms that were analyzed for the PMF analysis, including their temporal distribution; however, discussion of the methods in sufficient details is not included in the SSAR for staff evaluation. Please provide a discussion of the methods and calculations of the PMP development for the four types of events in the SSAR. The discussion in the SSAR should be in sufficient detail for staff to evaluate the PMP development. The SSAR states that the PMP storm has a depth of 17.5 inches in the watershed upstream Watts Bar Dam. Please provide a discussion of sufficient detail in the SSAR on how this depth was determined, since the reference provided (HMR-41) only provides the depth for a 7980 mi^2 basin, which can be moved along the primary axis of the Tennessee River.
6	2.4.3.3	Please clarify why nonlinear adjustment of unit hydrographs (UHs) is included in the SSAR as a component of precipitation losses.
7	2.4.3.4.1	The SSAR states the UHs are used in the runoff model; however, no discussion or reference is provided as to how the UHs were developed. Please provide a discussion or a reference to a document in the SSRA of how the UH's were developed including the validation of the UHs. The SSAR states that storage volumes from projects identified in the National Inventory of Dams (NID) were included in runoff and inflow hydrograph development. Please clarify in the SSAR how the storage volume from NID dams was used to develop inflow hydrographs. Provide an SME who can discuss the methods supporting dam breach outflow estimations for national inventory of dams (NID) dams.

ATTACHMENT 2

CRNS – Hydrologic Engineering (Chapter 2.4) Review Site Audit Information Needs

8	2.4.3.4.2	Staff's examination of the HEC-RAS model found only one cross section located at the CRN site. Please explain the adequacy of the HEC-RAS model cross sections interval in relation to the geometry of the CRN site. Staff's examination of the HEC-RAS model found that the cross sections are placed in the vicinity of the CRN site at approximately 2 mile intervals. Explain the how the model geometry accurately sufficiently describes the Clinch River geometry in the vicinity of the CRN site. Staff's examination of the HEC-RAS model found that the Highway 58 Bridge and its abutments were not included, though they could produce a backwater effect on the PMF elevation at the CRN site. Please explain why the bridge was not included in the model. The SSAR provides a brief description of the HEC-RAS model used for PMF and dam failure analyses. Please provide a discussion in the SSAR with sufficient detail on the development of the HEC-RAS model. The discussion should include (but not be limited to) development of cross sections and their layout, dam rating curves, elevation-storage curves, and dam operations rules. Please provide an SME who can discuss the methods and calculations supporting runoff and stream course model development, as well as the methods and calculations for dam operations.

ATTACHMENT 2

CRNS – Hydrologic Engineering (Chapter 2.4) Review Site Audit Information Needs

9	2.4.3.4.3	The SSAR states that storage volume curves were verified against the known reservoir volume. Please provide a discussion in sufficient detail in the SSAR that describes the methods and results of the reservoir volume verification. Also provide figures in the SSAR that show the methods and results. Staff noted that figures in SSAR Section 2.4.4 provided the elevation-storage curves for most (if not all) the reservoirs included in the CRN site analysis. Please provide a reference and discussion in the SSAR of those figures as it pertains to calibration of the HEC-RAS model. The SSAR states that flood elevations were calibrated in three different model sections. For the first two sections, from the confluence of the Clinch River with the Tennessee River to Melton Hill Dam and from Melton Hill Dam to Norris Dam, the calibration was at three locations for the 1973 and 2003 floods. Please: (1) Clarify that these flood events were previously presented in SSAR Section 2.4.2.1 Flood History; (2) Provide a figure in the SSAR showing the calibration point locations; and, (3) Provide figures in the SSAR showing the calibration results for both of the flood events. For the upstream sections from Norris Dam to the tributaries of the Clinch River, the floods from 2002 and 2003 were used for calibration. Please: (1) Clarify why the 2002 flood was not included in Section 2.4.2.1; (2) Provide a figure in the SSAR showing the calibration point locations; and, (3) Provide figures in the SSAR showing the calibration results for both of the flood events.
10	2.4.3.4.4	The SSAR provides a general discussion of the inclusion of operational rules and rating curves for the three dams that directly affect the water surface elevation at the CRN sites. SSAR Figures 2.4.3-4 through 2.4.3-6 provide the illustration of the operational rules. Staff notes that these are relatively complex figures illustrating the anticipated operations during a flood event. SSAR Figures 2.4.3-7 through 2.4.3-9 provide the rating curves for various cases. However, these case are not discussed in this section. In the SSAR, please provide a discussion as an example that follows the operational curve of the Norris Dam. Also provide a discussion in the SSAR of the various cases presented in the rating curve figures and state which of those were applied to the flood mechanisms evaluated.
11	2.4.3.5	Please provide an SME familiar with the methods and calculations supporting runoff and stream course model development who can assist in showing how the PMF analyses applies to the CRNS.
12	2.4.3.5 and 2.4.2.2	Please provide an SME to explain how bridges bounding the CRNS, (Highway 58 Bridge downstream and Highway 95 Bridge upstream), are considered in the PMF analyses.

ATTACHMENT 2

CRNS – Hydrologic Engineering (Chapter 2.4) Review Site Audit Information Needs

13	2.4.3.5 and 2.4.4.2	Please provide an SME familiar with the methods and calculations supporting runoff and stream course model development who can assist in showing how the PMF analyses applies to the Melton Hill Dam site.
14	2.4.3.5 and 2.4.4.2	Please provide an SME familiar with the methods and calculations supporting runoff and stream course model development who can relate the analyses to the site-associated dam sites.
15	2.4.3.5	Please provide citations and references for the Von Thun and Gillette method used in the hydrologic dam failure analysis.
16	2.4.3.6	The SSAR provides the PMF elevation at a location just upstream of the intake. Staff's examination of the HEC-RAS model found only one cross section located at the CRNS. Explain the adequacy of the HEC-RAS model cross sections interval in relation to the Clinch river geometry of the CRN site.
17	2.4.3.7	The SSAR provides a discussion of the calculation of wind wave elevation during the PMF. Please provide a figure in the SSAR that illustrates the PMF elevation in the Clinch River and the estimation of the fetch length used in the wind wave calculations.
18	2.4.4.1	The SSAR cites a schematic figure of the dams in the TVA system. Please provide a GIS (georeferenced) map in the SSAR that shows the location of all dams upstream of Watts Bar Dam in relation to the layout of the Tennessee River and its tributaries. The SSAR includes Figure 2.4.4-1 illustrating the elevation-storage curves for 12 reservoirs examined in the flooding analysis at the CRN site. The figure is cited but is not discussed. Staff note that this important information is relevant to the analyses discussed in SSAR Section 2.4.3. Please provide a reference to the SSAR Figure 2.4.4-1 in discussions in SSAR Section 2.4.3 on the set up of the river course model.
19	2.4.4.2	Please provide an SME who can discuss the methods and calculations for seismic and hydrologic dam failure. Provide an SME who can discuss the methods supporting dam breach outflow estimations for national inventory of dams (NID) dams.
20	2.4.4.2.1	The SSAR states that either a 25-year or 500-year coincident flood events were assumed to occur with seismic dam failure. Please provide discussion in the SSAR with sufficient detail of the methods and inflows for each of the assumed flood events.

ATTACHMENT 2

CRNS – Hydrologic Engineering (Chapter 2.4) Review Site Audit Information Needs

21	2.4.4.3	Provide an SME who can discuss the methods supporting calculations of flood wave routing with dam failures. Please provide an SME who can discuss the methods supporting calculations of 25-year and 500-year floods.
22	2.4.4.5	The SSAR provides a discussion of the calculation of wind wave elevation during the controlling flood event. Please provide a figure in the SSAR that illustrates the PMF elevation in the Clinch River and the estimation of the fetch length used in the wind wave calculations.
23	2.4.12.1.2	The SSAR discussion includes information that includes "fresh groundwater withdrawals totaled about 82 mgd in 1985." Please provide the rationale for including a discussion of 1985 groundwater withdrawals and, the relevance to current groundwater withdrawals and site conditions versus a discussion of more recent estimates of groundwater totals and usage in this SSAR section.
24	2.4.12 (throughout)	Staff requests the consistent use of unit nomenclature throughout Section 2.4 and elsewhere to avoid confusion of observed, measured, and calculated values (e.g., Section 2.4.12.1.2.1 contains text using only feet to describe stratigraphic thicknesses and in other related subsections uses feet and meters).
25	2.4.12.1.4	The SSAR states that the CRBRP wells were "likely destroyed and/or removed when the excavation and subsequent site redress for the CRBRP was performed". Were TVA well abandonment procedures or other procedures in place during the CRBRP site redress? Please provide an SME to discuss the implications to radionuclide transport analysis considering a short-circuit travel pathway through improperly abandoned shallow and/or deep boreholes potentially remaining from the CRBRP site characterization studies and redress. Please provide an SME to discuss the status of the TDEC determination regarding the disposition of OW-422L in relation to the petroleum product found in this well during well completion activities.
26	2.4.12.1.4.2	Table 2.4.12-4. Some "geologic units" specified in this table are either briefly introduced in the context of well screen intervals or not described (e.g., Rockdell) in the text of Section 2.4.12, but rather refer to Reference 2.4.12-13 from a footnote in the table, refer to a reference from Figure 2.4.12-9 or, are described in a figure (e.g., Figure 2.4.12-10). Because monitoring wells are screened over these geologic units and observations are recorded from these screened intervals and used for site characterization studies, staff requests that a hydrologic description and/or references for these unit descriptions be included in the SSAR text of 2.4.12.

ATTACHMENT 2

CRNS – Hydrologic Engineering (Chapter 2.4) Review Site Audit Information Needs

27	2.4.12.1.5.2	Reference 2.4.12-14 (aka reference 2.4.12C-5) does not seem to be publicly accessible or available to the staff. Please provide the staff with a copy of this reference or provide a means for the staff to obtain this reference.
28	2.4.12.2.2	The SSAR text indicates "locations for two SMR reactors"; however, the number of proposed reactors is not specified elsewhere in the SSAR. Is it TVA's intention to initially place two SMR reactors at the proposed CRNS? Please provide an SME to discuss: a) the spatial pattern of pumping test drawdowns across the monitoring well set, and if that pattern is consistent with orientations of observed and known fracture trends and higher permeability zones; and, b) the larger vertical gradients among the well clusters groups and if these patterns are consistent with fracture trends and/or higher permeability zones.
29	2.4.12.2.4.1	The SSAR states that "Of these tests, 5 exhibited flow by-passing around the packers." Please provide an SME to discuss the potential or probable causes of the by-pass identified (e.g., formation voids, faulty packers, packer seating etc.). Please provided an SME to comment on the potential or probable causes of why "the results from five wells (OW-409U, OW-415L, OW-421L, OW-423D, and OW-429U) had one test (falling or rising head) that could not be interpreted." Table 2.4.12-4. Please explain the basis and rationale for using a value of 155 ft (i.e., water table to bottom of "primary flow zone") to derive hydraulic conductivities for the aquifer pumping test of PT-PW given that observation well screen intervals seem to be on the order of approximately 20 feet.
30	2.4.12.4	Please identify the references used for the "Nuclear Energy Institute (NEI) groundwater initiatives" referred to in the SSAR text and include these in the SSAR.
31	2.4.12.3.1	Please provide an SME to discuss the rationale for the statement "The head relationships observed at the Melton Valley Exit Pathway monitoring wells (Reference 2.4.12-14) suggest that there is no credible pathway involving flow underneath the Clinch River arm of the Watts Bar Reservoir and exposure to water users on the opposite side of the river." As noted above, reference 2.4.12-14 does not seem to be publicly available.
32	2.4.13.2	Please provide an SME to define the word "idle" in the context of the City of Oak Ridge's West End Water Treatment plant's operational life cycle.

ATTACHMENT 2

CRNS – Hydrologic Engineering (Chapter 2.4) Review Site Audit Information Needs

33	2.4.13.3	Although discussed in the SSAR Section 2.5.4.5.3, the backfill that would be placed around the proposed power block does not seem to be represented in the conceptual model, but seems to be included in the "soil, residuum fill" category. Please comment the anticipated hydrologic properties of the granular backfill as compared to those of the "soil, residuum fill" properties and how the transport analyses might affected by inclusion of the hydrologic properties of the backfill as described in Section 2.5.4.5.3. Staff understands that "A detailed field and laboratory test program is conducted, during the COLA design stage, to evaluate backfill sources and their engineering properties." per Section 2.5.4.5.3. Please provide an SME to discuss the potential presence of chelating agents and the effects of chemicals (e.g., chelating agents, if present in soils or liquids) that could comingle with liquid radionuclides and increase the mobility of radionuclides in the environment.
34	2.4.13.5.1	Please make the corresponding calculation package for Equation 4.4.13-1 available to staff and an SME to discuss the parameters and methods used for the calculations.
35	2.4.13.5.3.3	Please provide an SME to; a) discuss the data and calculation package used to derive the average weekly discharges that were used to determine the mean value of the average weekly discharge from the Melton Hill Dam over its lifetime as approximately 4800 cfs; and, b) the probability of occurrence 0f 0.1 percent for a required minimum flow value of 400 cfs average daily flow from Melton Hill Dam continuing for 7 days.
36	2.4.13.6	Please provide an SME to discuss radionuclide dispersion and to clarify if the dispersion was included in the calculation of radionuclide concentrations in the reservoir at the receptor point.
37	2.5.4.6.2 (Construction Dewatering)	Please provide an SME to discuss dewatering plans for the excavated areas and the areal extent of the projected drawdown due to the dewatering and if, any potential existing or future users could be impacted by the dewatering and/or drawdown and the associated rationale for associated conclusions. Staff notes that construction dewatering is not discussed in SSAR Section 2.4.12 and requests that this be included in this section.
38	2.4.12C	Page 2.4.12C-11, item 9. Last sentence seems to be a text fragment. Please clarify.
39	2.4.12C.6.1.3	Please provide an SME to discuss the groundwater model setup, sensitivity runs and calibration and, the rationale for selection of the calibrated model runs for Profiles A and C.

ATTACHMENT 2

CRNS – Hydrologic Engineering (Chapter 2.4) Review Site Audit Information Needs

40	2.4.12C.7.1	Is the "site layout drawing" as referred to in the SSAR text SSAR Figure 2.4.1-4? If so, how was the groundwater model modified to account for the site grading plan and associated surface elevations shown in this figure? The SSAR indicates that "The grade elevations are approximate and may change when a specific technology is selected for the Combined License Application (COLA)." Please confirm that the finished plant grade elevation of 821 ft NAVD88 is either final or approximate. The SSAR text indicates that construction fill material was assumed to representative of a clean sand while in Section 2.5.4.5.3 the backfill is described as "Granular backfill consists of a processed graded aggregate meeting the gradation requirements of Type A aggregate of the Tennessee Department of Transportation (TDOT) Standard Specifications for Road and Bridge Construction (Reference 2.5.4-37) Section 303, Table A2-6." Please provide a comparison of the representative hydraulic properties of the backfill used for the groundwater model against those used for a Type A aggregate per the SSAR text, and provide the rationale for the Section 2.4.12C.7.2 statement that "A construction backfill of 10^{-3} cm/s (2.835 ft/day) typically represents an uncompacted backfill material." This and other SSAR sections should be made consistent when describing the material and hydraulic properties of proposed backfill material.

CRNS – Health Physics (Chapters 2.0 and 11) Review Site Audit Information Needs

Serial No.	SSAR Section	Information Need
41	2.0; Tables 2.0-1, 2.0-2, 2.0-4 through 2.0-6	Staff review of originating documents (i.e., Generation mPower, NuScale Power, Holtec, Westinghouse) containing the BWXT mPower, NuScale, SMR-160, and Westinghouse SMR source terms used in development of the CRNS PPE source terms (Note: for efficiency purposes, staff suggests uploading documents to the ERR).
42	2.0; Tables 2.0-1, 2.0-2, 2.0-4 through 2.0-6	Using information from above, staff requests a discussion with the cognizant SME (TVA's contractor) concerning the development of the CRNS PPE source terms, and the NRC staff's confirmatory analyses (Note: for efficiency purposes, staff suggests a face-to-face discussion with SME either at CRNS or at SME's office in Reston, VA).
43	2.0, 11.2.3, 11.3.3; Tables 2.0-4, 2.0-6, 11.2-1 through 11.2-9, 11.3-1 through 11.3-5	Staff requests a discussion with the cognizant SME (TVA's contractor) concerning the calculations of normal liquid and gaseous effluent releases and doses, and the NRC staff's confirmatory analyses (Note: for efficiency purposes, staff suggests a face-to-face discussion with SME either at CRNS or at SME's office in Reston, VA).
44	2.4.13; Tables 2.0-1, 2.0-2, 2.0-5, 2.4.13-1, 2.4.13-2, 2.4.13-5	Staff requests a discussion with the cognizant SME (TVA's contractor) concerning the calculation of accidental liquid effluent releases to ground and surface water and dose, and the NRC staff's confirmatory analyses (Note: for efficiency purposes, staff suggests a face-to-face discussion with SME either at CRNS or at SME's office in Reston, VA).