Sequoyah Units 1 and 2 LAR Pre-Application Meeting
TS 3.9.8 (Decay Time) and FHA Dose Analysis
Meteorological Monitoring and Dispersion Modeling Topics

1. The following items regarding atmospheric dispersion modeling drawings submitted or referenced help ensure a comprehensive LAR:

    a. be presented to scale;
    b. show the plant, the location of all potential accident release points, the exclusion area boundary and low population zone boundary for all directions;
    c. identify any offset (in degrees) between Plant North and True North on the site plan, plot plan, etc.;
    d. identify the locations of all main and emergency air intakes, locations of unfiltered in-leakage that supply air to the control room(s), and ingress / egress pathways to the control room(s) and, if located onsite, the onsite Technical Support Center (TSC); and
    e. confirm, for an onsite TSC, whether it shares the same control room envelope as the control room and, if so, describe it in detail.

2. A comprehensive LAR would document the following characteristics of all contaminated releases to the atmosphere that are relevant to atmospheric dispersion modeling, including but not limited to:

    a. the specific types of releases (i.e., point or area source) and whether they are considered to be ground level, vent, or stack releases consistent with applicable regulatory guidance;
    b. the elevation of all release locations;
    c. the elevation and dimensions of all buildings on which the releases being considered occur and the elevation and dimensions of buildings adjacent to such locations;
    d. the release characteristics that identify the orientation (if not vertical), and document, as applicable, the presence of a rain cap or other obstruction to exhaust airflow, the exit velocity (or exit flow rate and stack radius), and exit temperature; and
    e. the elevation of all main and emergency air intakes, any unfiltered in-leakage pathways that supply air to control room and, if applicable, the TSC, and assumed receptor heights on ingress / egress pathways.0

3. A comprehensive LAR that documents the meteorological (MET) data input to the dispersion modeling would:

    a. state whether the basis for the MET monitoring program is consistent with Safety Guide 23, “Onsite Meteorological Programs," dated February 1972 (ADAMS Accession No. ML020360030) or Regulatory Guide (RG) 1.23, Revision 1, "Meteorological Monitoring Programs for Nuclear Power Plants" (ADAMS Accession No. ML070350028);
    b. provide data recovery statistics for wind speed, wind direction, and atmospheric stability (based on delta-T) at all applicable measurement levels for each parameter individually and for the joint recovery of all three parameters, by year, as well as for the composite period of record (POR);
    c. confirm whether any data substitution is reflected in the POR used as input for the dispersion modeling and summarize, for those affected parameters, the substitutions made;
    d. justify, as to its applicability, the 2004 to 2013 POR for the Met data to be used for this LAR in that the NRC staff notes, from TVA’s pre-application meeting slides, is outside (older than) the range given in the last paragraph of RG 1.23, Section B;

e. provide sequential hourly (ASCII-character) Met data as MS Excel files for each year in accordance with the format in Appendix A of RG 1.23, Revision 1, including identifying the respective units of measure and whether the reported delta-T values listed in the files are as measured over the indicated height interval or have been adjusted to degrees C per 100 meters consistent with Table 1 of RG 1.23 (if the Met data is reported using different units of measure and/or the data is in a different format, please explain those differences);
f. provide sequential hourly (ASCII-character) data files in the format required for input to ARCON96 and identify the respective units of measure;
g. document the joint frequency distributions (JFDs) of wind speed and wind direction by atmospheric stability class by year and for the composite POR in a form consistent with Table 3 of RG 1.23, Revision 1, including the units of measure for wind speed and delta-temperature;
h. document the type(s) of wind instruments (e.g., mechanical cup and vane, and/or sonic anemometer) that were used over the proposed 10-year POR for dispersion modeling, including the calm threshold for the cup and vane type instrumentation, and/or the assumed value for a sonic anemometer; and
i. identify if a sonic anemometer was used to acquire the wind data at any time during the indicated POR and, if so, whether the reported wind directions and/or wind speeds represent scalar- or vector-averaged values noting that the data averaging method could result in different X/Qs and/or impact locations (the explanation should consider that current American National Standards Institute standards on MET monitoring specifies the use of scalar averaging for wind direction and wind speed measurements for applications of straight-line dispersion models like PAVAN).

4. Concerning the PAVAN dispersion modeling for offsite receptors, a comprehensive LAR would demonstrate consistency with RG 1.145, "Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants," Revision 1, dated November 1982 (ADAMS Accession No. ML003740205). Topics suggested to be addressed would include, but would not limited to:

   a. submitting text files of input and output for all PAVAN model runs;
   b. confirming whether the code is integrated as part of a larger dose modeling platform and, if so, equivalency to the base PAVAN code should be provided;
   c. providing technical justification for any departures from the regulatory positions in RG 1.145 or the model users guidance;
   d. confirming whether PAVAN was run using Met input in the form of JFDs or hourly data;
   e. identifying any assumptions and discussing input developed for the model based on NUREG/CR-2858, "PAVAN: An Atmospheric-Dispersion Program for Evaluation of Design-Basis Accidental Releases of Radioactive Materials from Nuclear Power Stations," (ADAMS Accession No. ML12045A149), and RG 1.145; and
   f. confirming that the dispersion modeling for offsite receptors (i.e., at the EAB and/or LPZ) is <u>not</u> performed using the ARCON dispersion model in accordance with RG 1.249, Revision 0, “Use of ARCON Methodology for Calculation of Accident-Related Offsite Atmospheric Dispersion Factors,” dated August 2023 (ADAMS Accession No. ML22024A241) (if so, data and information similar to Items (a), (b), (c), and (d) and the guidance in RG 1.249, would be suggested).

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5. Concerning the ARCON96 dispersion modeling for onsite receptors, a comprehensive LAR would demonstrate consistency with RG 1.194, "Atmospheric Relative Concentrations for Control Room Radiological Habitability Assessments at Nuclear Power Plants," Revision 1, dated June 2003 (ADAMS Accession No. ML031530505). Topics suggested to be addressed would include, but would not be limited to:

    a. submitting text files of input and output for all ARCON96 model runs;
    b. confirming whether the code is integrated as part of a larger dose modeling platform and, if so, equivalency to the base ARCON96 code should be provided;
    c. providing technical justification for any departures from the regulatory positions in RG 1.194; and
    d. identifying any assumptions and discussing input developed for the model based on RG 1.194 and the model users guidance in NUREG/CR-6331, “Atmospheric Relative Concentrations in Building Wakes,” Revision 1, dated May 1997 (ADAMS Accession No. ML17213A190).