Southern Nuclear

Proposed Farley Nuclear Plant
Units 1 & 2 Containment Temperature License Amendment Request Non-Acceptance Discussion

Revise Technical Specification 3.6.5
Containment Air Temperature
Actions Upon Exceeding Limit

Discussion Meeting: July 11, 2024

Southern Nuclear

Agenda

- Description
- Reason for Change
- Non-Acceptance Letter
- Points for More Detailed Justification
- Points for Additional Clarification
- Discussion

Revise Technical Specification 3.6.5, Containment Air Temperature

DESCRIPTION

- Proposed Specification
  - LCO – Containment average air temperature shall be ≤ 120 F (no change)
  - LCO Note from last summer emergency amendment
    - Remove obsolete Note
  - Action upon exceeding the limit (expand)
    - A.1 – Verify containment average air temperature ≤ 122 F [within 8 hours AND once per 8 hours thereafter]
    - A.2 – Verify by administrative means that containment average air temperature has not exceeded 120 F for > 720 cumulative hours in the current calendar year [within 8 hours AND once per 8 hours thereafter]
    - A.3 – Verify refueling water storage tank temperature ≤ 100 F [within 8 hours AND once per 8 hours thereafter]
    - A.4 - Restore containment air temperature to within limit within 30 days

Revise Technical Specification 3.6.5, Containment Air Temperature

Reason For Change

- Elevated site ambient temperatures experienced during 2023 summer months drove the containment average air temperature very close to the existing limit of 120F
- The high ambient temperature conditions were projected to continue during the summer months (and possibly worsen) and are also expected in 2024
- High temperature extremes often extend over an extended period
- Hoping to avoid repeated NOEDs and/or Emergency LARs

NON-ACCEPTANCE LETTER

- Received July 1, 2024
- Identified 2 points that the NRC requests SNC to provide a more detailed justification
- Identified 2 points that the NRC requests SNC to provide additional clarification

Revise Technical Specification 3.6.5, Containment Air Temperature

POINT ONE FOR MORE DETAILED JUSTIFICATION

- Provide information to appropriately characterize the basis for and safety margin during the proposed 30-day completion time. The application should describe the plant-specific methodology used to analyze the impact on the peak cladding temperature (PCT) for the large break loss-of-coolant accident (LOCA), including why the methodology used is appropriate for the evaluation being performed along with the key results, pertinent inputs, the uncertainties associated with the inputs, and any assumptions or limitations relevant to the analysis. A qualitative discussion stating that the PCT change was estimated from sensitivity studies performed on similar pressurized water reactor plant designs is not sufficient for the NRC to make a finding for Farley that the fuel integrity requirements of 10 CFR 50.46 are maintained. In addition, this qualitative discussion is not sufficient to justify the specification is derived from an analysis included in the final safety analysis report, as required by 10 CFR 50.36.

Revise Technical Specification 3.6.5, Containment Air Temperature

PCT IMPACT ASSESSMENT

- PCT estimated effect was performed pursuant to 10 CFR 50.46(a)
  - Consistent with past precedent for other LCO changes that lead to small changes to the LOCA licensing basis
  - Full LOCA analysis requires multi year effort that is not commensurate with small changes to LOCA analysis inputs
- Westinghouse methodology for 10 CFR 50.46 reporting is based on WCAP-13451 (circa 1992)
  - Examples of evaluations are:
    - *Use of a sensitivity based on analysis of plant A, to estimate the effect on plant B, when it can be shown that the application is appropriate or conservative for plant B*
    - *…*

Evaluation Methodology Overview

- The ASTRUM method relies on a statistical sampling technique to demonstrate that there is a high level of probability that the 10 CFR 50.46 acceptance criteria would not be exceeded under postulated LBLOCA conditions.
- The statistical sampling of the uncertainty contributors occurs simultaneously in the uncertainty analysis, leading to scatter in the analysis results when plotted as a function of a single uncertainty contributor. As such, the use of the ASTRUM uncertainty analysis results is not considered to be the best option to estimate the effect of the maximum accumulator temperature increase
- Instead, accumulator temperature sensitivities performed with the NRC-approved Code Qualification Document (CQD) methodology (WCAP-12945-P-A) from similar pressurized water reactor (PWR) plant designs with similar fuel assembly design, power level, and predicted cladding temperature response are utilized to determine an estimated effect to support the license amendment request.
  - CQD methodology required parametric accumulator temperature sensitivity studies
  - Conservative trend based on existing sensitivities was used for FNP

10 CFR 50.36 REQUIREMENTS

- SNC would like further clarification concerning what the NRC is asking related to 10 CFR 50.36. Please identify the 10 CFR 50.36 requirement for remedial actions to be derived from an analysis included in the final safety analysis report.

POINT TWO FOR MORE DETAILED JUSTIFICATION

- Provide information to enable the staff to make a finding that the performance-monitoring element of risk-informed decision making has been met. The application should discuss how the licensee will document the margin remaining in the PCT calculation and how this margin will be tracked/maintained in case of any future revisions to the analysis of record. Even if ample margin exists today to justify the safety of the proposal, the NRC staff needs to assure that future amendment reviews appropriately consider the impacts of the request.

PCT MARGIN TRACKING

- *50.46(a)(3)(iii) For each change to or error discovered in an acceptable evaluation model or in the application of such a model that affects the temperature calculation, the applicant or holder of a standard design approval or the applicant for a standard design certification (including an applicant after the Commission has adopted a final design certification rule) shall report the nature of the change or error and its estimated effect on the limiting ECCS analysis to the Commission and to any applicant or licensee referencing the design approval or design certification at least annually as specified in § 52.3 of this chapter. If the change or error is significant, the applicant or holder of the design approval or the applicant for the design certification shall provide this report within 30 days and include with the report a proposed schedule for providing a reanalysis or taking other action as may be needed to show compliance with § 50.46 requirements. The affected applicant or holder shall propose immediate steps to demonstrate compliance or bring plant design into compliance with § 50.46 requirements.*

50.46(a)(3)(iii) requires tracking/maintaining margin to the 10 CFR 50.46 acceptance criteria in case of any future revisions to the analysis of record

POINT ONE FOR ADDITIONAL CLARIFICATION

- Expand on the response to supplemental information request 2 related to Net Positive Suction Head (NPSH). Specifically, the NRC requests that the licensee provide a discussion on the uncertainties for the containment average air temperature and the accumulator water temperature that are inputs to the GOTHIC code used to evaluate how the proposed change in the Containment Average Air Temperature impacts LOCA sump temperature response. In addition, include the NPSH margin for the containment spray pumps during the LOCA recirculation phase, along with the margin information already provided for the residual heat removal pumps in the June 14, 2024, supplement. Lastly, provide a discussion on the version of the GOTHIC code used for the NPSH analysis. If the version is different from a previously NRC-accepted version, discuss the verification performed to justify that the change in the code version does not result in a numerically significant departure from the previously accepted version.

ADDITIONAL CLARIFICATION POINT ONE DISCUSSION

- The GOTHIC code used to evaluate how the proposed change in the Containment Average Air Temperature impacts LOCA sump temperature response does not apply additional uncertainties to the containment average air temperature and the accumulator water temperature. The chosen inputs provide additional margin (2 degrees for accumulator temperature and 5 degrees for containment temperature).
- The calculation of record for Farley for containment average air temperature determined the channel statistical analysis (uncertainty) of the instruments is +/- 2.5 °F. There are no installed temperature indicators on the accumulators.
- Considering both the RHR pumps and the CTMT spray pumps, NPSH margin is unaffected for increases in sump temperatures above 206.6 °F – the point at which CTMT has reached saturation conditions.
- The GOTHIC code version used for the NPSH analysis is Version 8.1, which was approved by the NRC (ML22263A225).

POINT TWO FOR ADDITIONAL CLARIFICATION

- Provide information sufficient to justify that the Required Actions in the technical specification can be considered remedial actions as defined in 10 CFR 50.36, rather than a new LCO. The NRC notes that: (1) the proposed Actions simply allow continued operation for up to 30 cumulative days a year, (2) that there are no explicit restorative actions proposed by the licensee; the licensee can wait for temperatures to drop, and (3) the licensee appears to expect that current peak containment temperature will be challenged every year during the hot weather months.

10 CFR 50.36 ADDITIONAL CLARIFICATION

- Request is based on supplemental evaluations;
  - not a change to Analysis of Record (AOR), the basis for 120 F LCO
- Remedial actions are proposed for when the LCO is not met
- Proposed Required Actions (RAs) A.1, A.2 & A.3 are remedial actions supported by supplemental evaluation
- Proposed RA A.4 limits the continued operation as does existing RA
  - Completion Time is based on very low safety significance and expected need
- Additional information was provided in the supplemental response. SNC requests further clarification regarding why this was insufficient.
- SNC requests NRC clarify what they are looking for with regard to items 1, 2 and 3.

Discussion / Feedback