Vogtle PEmails

From: Gleaves, Bill
Sent: Tuesday, July 10, 2018 9:15 AM
To: Chamberlain, Amy Christine; Wes Sparkman (WASPARKM@southernco.com); Eddie Grant (x2egran@southernco.com); Vogtle PEmails
Cc: Dixon-Herrity, Jennifer; Jackson, Diane; Travis, Boyce; Nolan, Ryan; Ray, Sheila; Makar, Gregory
Subject: Draft RAI w/4 Questions - LAR 17-043, "Containment Pressure Analysis" WCAP-15846 WGOTHIC
Attachments: WCAP 15846 WGOTHIC RAIs.pdf

Amy/Wes,

Please see attached for our new draft RAI (with 4 questions) on the LAR-17-043 review.

By this email, the draft RAI is being entered into public ADAMS.

If there is SUNSI information in this draft RAI, please let me know immediately. If there is SUNSI information in the RAI response, please so state in your response and this must happen quickly so that it can be removed from public ADAMS before being released (about 5 business days for that process).

The next step is for SNC to identify if it has questions or comments or, if not, to accept the draft RAI as final by informing me of the acceptance.

Once SNC accepts this draft RAI as "final" we typically expect that the RAI response will be 1 month after the draft RAI is accepted by SNC as "final." In addition, the staff will not be able to complete the review approximately 1 month after receipt of an acceptable response or supplement. If the change is needed sooner than that date to support construction, please consider submitting a request for a PAR.

Respectfully,
Billy
William (Billy) Gleaves
Senior Project Manager
Licensing Branch 4
OWFN 8H17
US NRC

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DRAFT RAI on WCAP-15846 for LAR-17-043: "Containment Pressure Analysis"

July 10, 2018

Question 1: ITAAC cleanup

General Design Criterion 40, "Testing of Containment Heat Removal System," requires in part that the containment heat removal system be designed to permit appropriate functional testing to assure the operability of the system as a whole, and under conditions as close to the design as practical the performance of the full operational sequence that brings the system into operation, including operation of the associated cooling water system.

Section 3.1.5 of the LAR requests a revision to an ITAAC criterion allowing for analysis showing that as-tested performance of the passive containment cooling system (PCS) is greater than that assumed in the peak pressure analyses as a result of PCS water flow testing conducted on other AP1000 plants. However, it was not clear from the additional criteria proposed what the nature of the analysis would be in the event the flow criteria were not satisfied. While the proposed analysis would generally satisfy the design commitment, the analysis itself is not described in sufficient detail in the LAR for staff to conclude that the report referenced in the ITAAC could meet the intent of the proposed change.

Therefore, staff requests that the licensee clarify the submittal to define the acceptance criteria (i.e. "…a report exists and concludes that the as-measured flow rates provide the PCS with sufficient heat removal capability such that the limiting safety analysis values (for the chosen figures of merit – flow rate, etc.) assumed in the peak containment pressure and temperature analyses remain bounding"), and provide a summary in the response describing the role of the calculation in more detail than the LAR. Further, the staff review requires the submittal contain a detailed description of how the expected calculation (i.e., a comparison of a calculation performed in WGOTHIC demonstrating the heat transfer for the test exceeds the obtained results) shows that the, "as-tested delivered flow rates were compared to the minimum safety analysis delivered flow rates showing that although the flow at 72 hours did not meet the minimum 72 hour flow rate, the system (including uncertainties) performed better than expected." This information is requested so that the staff can make a finding on the suitability of the revised ITAAC and to ensure the new, proposed ITAAC has clearly inspectable acceptance criteria in the event that the flow criteria are not satisfied.

Question 2: Code update language

General Design Criterion 38, “Containment Heat Removal,” requires in part that a system to remove heat from the reactor containment be provided. The system safety function shall be to reduce rapidly, consistent with the functioning of other associated systems, the containment pressure and temperature following any loss-of-coolant accident and maintain them at acceptably low levels.

As stated in the LAR, WGOTHIC is the code used to demonstrate the capability of the AP1000 containment to satisfy the aforementioned requirements. Enclosure 2 of the LAR, the revised WCAP-15846, describes the methodology as implemented in WGOTHIC used to calculate the containment performance parameters.

In Section 3.2 of WCAP-15846, the revisions to WGOTHIC proposed as part of the LAR are described. Additionally, the document states that, “subsequent code version updates will be made to address changes in computing platforms, correction of errors, and updates to enhance the user experience without it being a change in methodology. Therefore, updates will not be made to this document unless a methodology-changing code change is made.”

Staff understands the basis for the statement, which generally aligns with the provisions of 10 CFR 50.59, 52.98, or other like change processes. However, as written, it is not clear to the staff that, “correction of errors” would always fall within the constraints of those change processes. Therefore, the staff requests that the text in Section 3.2 of WCAP-15846 be clarified to identify the types of errors that would rise to the level of a, “methodology-changing code change.”

Question 3: Heat sinks

General Design Criterion 50, “Containment Design Basis,” requires in part that the reactor containment structure, including access openings, penetrations, and the containment heat removal system be designed so that the containment structure and its internal compartments can accommodate, without exceeding the design leakage rate and with sufficient margin, the calculated pressure and temperature conditions resulting from any loss-of-coolant accident.

This margin shall reflect consideration the conservatism of the calculational model and input parameters.

In order to demonstrate adequate containment performance, the analytical model credits a number of thermal conductors as heat sinks. These heat sinks are documented at a high level in the FSAR and LAR, and described in further detail in WCAP-15846 and the supporting documentation. As part of the LAR, additional heat sinks are being credited in addition to refinements to the heat sink parameters resulting from more information becoming available during detailed design.

In order to support the staff's review of the revised heat sink inventory, the staff requests additional information documenting or quantifying the relative impacts of the conservatism in the heat sink parameters. Specifically, given that the model as proposed credits a stated conservative inventory of heat sinks, staff requests a sensitivity case for the calculated containment pressure with a nominal heat sink area credited, as well as any sensitivity cases for the calculated pressure for other relevant parameters that have a quantifiable impact on the conservatism in the analysis.

Question 4: Baffle support flow losses

General Design Criterion 38, "Containment Heat Removal," requires in part that a system to remove heat from the reactor containment be provided. The system safety function shall be to reduce rapidly, consistent with the functioning of other associated systems, the containment pressure and temperature following any loss-of-coolant accident and maintain them at acceptably low levels.

As described in WCAP-15846, film losses from the containment shell from welds and baffle support attachments are modeled based on a combination of testing and a set of bounding assumptions. Specifically, Section 7.2.6 of the WCAP references, "phase 2 condensation tests" and states that, "…while the tests were designed to simulate conditions inside the containment, some of the conclusions are applicable to the issue of film stripping by the baffle supports on the outside the containment." The majority of the testing described in the WCAP has been reviewed by the NRC either as part of the design certification application or other licensing actions. Although staff has audited the material related to this application, the level of detail of

docketed information related to this testing is insufficient to reference in the staff safety evaluation.

In order to make a reasonable assurance finding regarding the suitability of the assumptions made for condensation losses over the containment shell, staff requests the licensee provide a high level summary of the test program and relevant outputs from the testing related to this LAR and to describe and justify the applicability of the testing performed to the current amendment, including identifying any discrepancies between the actual test conditions and expected facility conditions and their relevance to the results.