NRR-PMDAPEm Resource

From: Poole, Justin
Sent: Monday, September 29, 2014 8:26 AM
To: Arent, Gordon (garent@tva.gov)
Cc: Bryan, Robert H Jr (rhbryan@tva.gov); Lingam, Siva
Subject: DRAFT RAIs Regarding Review of Amendment 112 for Chapter 6
Attachments: RAIs FSAR Watts Bar 2 Amendment 112.docx

Gordon/Bob,

In reviewing TVA's Amendment 112 as part of the WBN 2 review, the staff has come up with the attached questions. Please review to ensure that the RAI questions are understandable, the regulatory basis is clear, there is no proprietary information contained in the RAI, and to determine if the information was previously docketed. If further clarification is needed, and you would like to discuss the questions in a conference call, let us know. Please also let me know how much time TVA needs to respond to the RAI questions. This email does not convey a formal NRC staff position, and it does not formally request for additional information.

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REQUEST FOR ADDITIONAL INFORMATION

BY CONTAINMENT AND VENTILATION BRANCH

FINAL SAFETY ANALYSIS REPORT AMENDMENT 112

WATTS BAR UNIT 2, DOCKET NO. 50-391

Following are Containment and Ventilation Branch (SCVB) Requests for Additional Information (RAIs) on Watts Bar Unit 2 FSAR Amendment 112:

SCVB-RAI-1

Section 6.3.2.14 states:

> "Recirculation operation gives the limiting net positive suction head requirement, and the net positive suction head available is determined from the containment pressure, vapor pressure of liquid in the sump, containment sump level relative to the pump elevation and the pressure drop in the suction piping from the sump to the pumps."

From the above statement it is not clear as to what containment pressure is used in determining the limiting Net Positive Suction Head Available (NPSHA) at the pump inlet. The possible containment pressure values that could be used are: (a) outside atmospheric pressure, or (b) TS minimum containment pressure during normal plant operation, or (c) TS maximum containment pressure during normal plant operation, or (d) the most limiting (minimum) vapor pressure at the maximum sump temperature, or (e) the most limiting (minimum) containment accident pressure, In case the containment pressure is different from (a) through (e), please describe. Specify the appropriate containment pressure used and justify that it will result in most limiting (minimum) NPSHA.

SCVB-RAI-2

Section 6.3.2.14, under heading "Residual Heat Removal Pumps" states:

> "No credit is taken for water level above the RHR sump strainer assembly, and no credit is taken for containment over pressure."

Explain what is meant by "containment over pressure". In case it implies the pressure developed inside the containment above the normal operating pressure during an accident or an abnormal event, please replace "containment over pressure" with "containment accident pressure". Refer to SECY-11-0014, second paragraph under the heading 'Background" for the rationale for terminology correction.

SCVB-RAI-3

SECY-11-0014, Enclosure 1, Section 1.0 states:

> "---------for many pressurized water reactors (PWRs), the containment pressure during an accident is assumed to be the vapor pressure at the temperature of the sump water. Some safety analyses conservatively ignore the partial pressure of the air in containment. However, if this vapor pressure is greater than the pressure in containment before the accident, it is considered containment accident pressure."

SECY-11-0014 allows using less than or equal to the most limiting (minimum) vapor pressure at the sump temperature for calculating the NPSHA at the pump inlet which is still considered as containment accident pressure (CAP). In case item (d) in SCVB-RAI-1 was used instead of items (a), (b) or (c) for calculating NPSHA at the pump inlet, please state that credit was taken for CAP equal to or less than the vapor pressure at the sump temperature. In case items (a), (b), or (c) are used for calculating NPSHA at the pump inlet please expand the above FSAR statement clarifying the specific containment pressure used for NPSHA calculation.

SCVB-RAI-4

Refer to FSAR Table 6.3-12;

(a) Please state the basis of the values of $NPSH_R$ given in this table, for example most commonly $NPSH_R$ is based on the Hydraulic Institute (HI) standard laboratory or shop test value of NPSH which gives 3-percent dynamic head drop for a given flow.

(b) Include in the table uncertainty in $NPSH_R$ that should be added to the shop value of $NPSH_R$ to determine the as-installed value of $NPSH_R$. SECY-11-0014, Enclosure 1 provides guidance regarding the uncertainty.

SCVB-RAI-5

In FSAR Section 6.2.1.3.3, under heading “Containment Pressure Calculation”, the ice temperature used in the containment pressure calculation as per assumptions (2) and (10) is 15^oF. Surveillance Requirement (SR) 3.6.11.1 states: “Verify maximum ice bed temperature is ≤ 27^oF”. The ice bed temperature is a key parameter for the ice condenser performance for pressure suppression, i.e., assuming a lower ice bed temperature for the long term pressure response is less conservative than using a higher temperature. For a conservative containment pressure calculation, please justify using a non-conservative assumption of ice temperature of 15^oF instead of 27^oF.

SCVB-RAI-6

FSAR Section 6.2.1.1.1, fourth paragraph, item (1) states:

“The design basis blowdown energy of 314.9 x 10^6 Btu and mass of 498.1x 10^3 lb put into the containment. (See Section 6.2.1.3.6)”

The blowdown energy reported in Amendment 111 in same section of FSAR was 317.3 x 10^6 Btu and mass of 502.7x 10^3 lb. Explain the reasons of the reduction in the LOCA blowdown mass and energy. FSAR Section 6.2.1.3.6 does not explain the reasons of the mass and energy reduction.

SCVB-RAI-7

FSAR Section 6.2.1.3.6 “Mass and Energy Release Data” refers to Reference 20, WCAP-10325-P-A, “Westinghouse LOCA Mass and Energy Release Model for Containment Design March 1979 Version," for the evaluation model used for the long term LOCA mass and energy release calculations. Westinghouse has issued Nuclear Safety Advisory Letters (NSALs)-06-6, -11-5, and -14-2 reporting errors in the WCAP-10325-P-A methodology and requires

containment analyses should be corrected. These specific NSALs have been addressed by other licensees in recent license amendments. Describe changes in the following containment analyses results using the corrected WCAP-10325-P-A methodology that incorporates corrections listed in the above NSALs: (a) containment peak pressure, (b) containment peak gas temperature for Environment Equipment Qualification (EEQ), (c) containment peak wall temperature, (d) containment sump peak water temperature, (e) pump Net Positive Suction Head Available (NPSHA) for the pumps that draw water from the containment sump during recirculation mode of safety injection and containment cooling, and (f) containment minimum pressure analysis for Emergency Core Cooling System (ECCS) performance capability. Also add statement in the FSAR stating corrected version of WCAP-10325-P which removed errors reported in NSALs-06-6, -11-5, and -14-2 was used for the containment LOCA M&E release analysis.