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US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 16 - Technical Specifications
Application Section: TS Section 3.5

QUESTIONS for Technical Specification Branch (CTSB)

16-48

TS SECTION 3.5 (EDITORIAL)

The following editorial errors were noted in US-APWR TS 3.5:

1. Page 3.5.1-3, SR 3.5.1.4, FREQUENCY, Insert hard return (space) before and after the word "OR". Also the word "OR" should be underlined and indented.

2. Page 3.5.1-3, SR 3.5.1.4, FREQUENCY, NOTE: The phrase "of indicated level" should be deleted unless a percentage value is also to be given.

3. Page B 3.5.2-1, first sentence of the last paragraph has two commas following the word "valves". Delete one of the commas.

4. Page B 3.5.2-3, APPLICABLE SAFETY ANALYSES (continued): the second sentence of the penultimate fourth paragraph states "The LCO ensures that an SIS train will deliver sufficient water to .." The sentence should state "The LCO ensures that at least 2 SIS trains are available to deliver sufficient water to ..".

5. Page B 3.5.2-3, LCO section: the first sentence of the first paragraph states " .. three independent (and redundant) SIS trains are required to ensure that sufficient SIS flow is available, assuming a single failure affecting either train." This should state ".. affecting one of the three required trains."

6. Page B 3.5.2-5. ACTIONS section, A1 and A.2: the last senrtence states "The 72 hour Completion Time refers to Chapter 19 (Ref. 5) and .." This should state "The 72 hour Completion Time is based on PRA analyses described in Chapter 19 (Ref. 5) and .."

7. Page B 3.5.3-1, LCO section: the last sentence of the third paragraph has two periods at the end of the sentence. Delete one of the periods.

8. Page B 3.5.4-1, BACKGROUND section, 4th paragraph: the "and" is missing between "..the SI and CS/RHR pumps.."

9. Page B 3.5.4-1, BACKGROUND section, bullet a.: should read "Sufficient borated water volume.."

10. Page B 3.5.4-2, APPLICABLE SAFETY ANALYSES section, first paragraph, third sentence: should read ".. B 3.5.3, "Safety Injection Systems (SIS) - Shutdown," and B 3.6.6, "Containment Spray System. .."

11. Page B 3.5.4-5, SURVEILLANCE REQUIREMENTS section, SR 3.5.4.1, second paragraph: delete this paragraph since there is no modifing Note in SR 3.5.4.1.

16-49

TS 3.5.1, Accumulators.

Justify within the BASES text (APPLICABLE SAFETY ANALYSES) for LCO 3.5.1 the specified volume of water required for the accumulator by SR 3.5.1.2. The BASES does not address the “dead volume” within the accumulator nor instrument uncertainty in the measurement of the volume. Within the BASES text, explain how the total volume specified in LCO 3.5.1, SR 3.5.1.2 is adequate to ensure the required volumes of water as identified in the safety analysis are available.

The BASES text states: "The contained water volume is slightly larger than the deliverable volume for the accumulators", however the term "slightly" is not defined. Without the "dead" volume, the total volume at the top of the standpipe required to ensure adequate volume for the low flow injection period following a large LOCA, and subsequently, the height of the standpipe within the vessel, can not be verified as a design feature. Without the "dead" volume and instrument uncertainty, the adequacy of the total volume measurement to ensure adequate water for the large flow injection condition can not be verified. Revise the BASES and provide a reference to appropriate analyses, as needed, to demonstrate the adequacy of the contained water volume referred to in SR 3.5.1.2.

16-50

TS 3.5.1, Accumulators.

Justify the selected Completion Time (CT) of 24 hours for Required Action B.1. Revise supporting information in the TS bases B 3.5.1, as appropriate, to include additional details.

Condition B is for one inoperable accumulator for reasons other than boron concentration with action to restore the accumulator to operable status within 24 hours. In the TS bases B 3.5.1, a mere reference to PRA is made to justify the CT of 24 hours. In the STS, the required justification is provided in the Westinghouse topical report

"WCAP-15049" which is listed as Reference 4 in the STS bases 3.5.1. The STS text reflects implementation of TSTF-370, "Increase accumulator Completion Time from 1 hour to 24 hours (WCAP-15049), Revision 0. TSTF-370 requirements should be followed if a CT of 24 hours is adopted in the APWR TS.

This information is needed to ensure adequacy of the assigned Completion Time and completeness of supporting information provided in the TS bases.

16-51

TS 3.5.2, SIS - Operating.

Justify only identifying 2 SIS valves in SR 3.5.2.1. The justification needs to address each of the applicable valves discussed in FSAR Section 6.3.2.2.6 [ECCS] Major Valves.

SR 3.5.2.1 identifies two Accumulator Makeup Valves as being in the closed position with power removed, however Chapter 6 identifies two Safety Injection Pump Accumulator Makeup Valves (SIS-AOV-201A and D) as being closed with control power locked out. Chapter 6 identifies four Accumulator Makeup Valves (SIS-AOV-215A, B, C, and D) which are normally closed but not locked out. Chapter 6 also identifies the Safety Injection Pump Full-flow Test line Stop Valves as being normally closed with control power locked out. It is not clear which of these valves should be included in SR 3.5.2.1. If not included in SR 3.5.2.1, identify the SR which verifies the valve position.

16-52

TS 3.5.2, SIS - Operating.

Clarify in SR 3.5.2.1 whether power to the valve operator is removed or if there are other acceptable means of securing the valves in position (e.g., key locking the control).

The information provided in the FSAR on securing these valves in position is inconsistent . SR 3.5.2.1 states the valve will be in the identified position with power to the valve operator removed. The BASES section states that either removal of power or key locking the control provides an adequate control. FSAR Chapter 6 identifies (for the valves identified in RAI 16.3.5.2-03) that the control power is locked out. The FSAR needs to be internally consistent on the acceptable means of securing the valve to prevent inadvertent misalignment.

16-53

TS 3.5.2, SIS - Operating.

Justify not including a SR to verify valves in the SIS system actuate to the required position on demand or include a SR for this verification.

The SIS includes valves that actuate in response to operator actions to properly align the system (e.g. the transfer from cold leg injection to hot leg injection) or isolate a train of the SIS in the event of a line break. The concern is that if surveillance of these valves is not required, the accident analysis should not credit them to perform their identified safety functions.

16-54

TS 3.5.2, SIS - Operating.

Provide the event(s) in the BASES text (APPLICABLE SAFETY ANALYSIS) for LCO 3.5.2 (page B 3.5.2-3) which establishes the performance requirements for the SI pumps.

The BASES is not consistent with NUREG-1431, Rev. 3.1, TS LCO 3.5.2, BASES - APPLICABLE SAFETY ANALYSES in that it does not address the safety analyses establishing the flow and discharge head requirements for the SI pumps.

For the small LOCA, the SI pumps are credited in the safety analysis and must be capable of maintaining the flow rate and pressure discussed in FSAR Chapter 6.3.2.2.1. This event or other bounding event should be included in the BASES similar to the discussion of the centrifugal charging pumps and SI pumps in this section of NUREG-1431, Rev. 3.1.

16-55

TS 3.5.2, Safety Injection System (SIS) - 0perating.

Clarify the following statement in the TS Bases B 3.5.2, Applicable Safety Analyses section, first paragraph: "The LCO helps to ensure that the following acceptance criteria for the ECCS, establised by 10 CFR 50.46 (Ref. 2), will be met following a LOCA: ... e. Adequate long term core cooling capacity is maintained."

This statement is a repeat of the STS Bases B 3.5.2 text for ECCS pumps in the Westinghouse design in which the Residual Heat Removal (RHR) function for long term cooling is combined with the Low Head Safety Injection (LHSI) function. The APWR design, however, does not have a LHSI pump, and the RHR function is combined with the Containment Spray (CP) function which is covered separately in APWR TS 3.6.6.

The RHR function should be discussed in the APWR TS Bases B 3.5.2 for long term core cooling capacity.

16-56

TS 3.5.2, SIS - Operating.

Provide the unique identifier, function, and position for the SIS valves in SR 3.5.2.1 on separate lines. The comparable section in NUREG-1431, Rev. 3.1, specifies this information requirement for each valve.

16-57

TS 3.5.4, RWSP.

Clarify in BASES (APPLICABLE SAFETY ANALYSIS) for LCO 3.5.4 (page B 3.5.4-3) whether the inadvertent ECCS actuation accident analysis sets performance requirements for the RWSP (water boron concentration and temperature) and, if applicable, describe these performance requirements. The concern is that the BASES is not consistent with the accident analysis (FSAR Section 15.5.1) which states the inadvertent ECCS actuation accident is not applicable to the US-APWR.

16-58

TS 3.5.5, pH Adjustment.

Clarify the applicability of the LCO 3.5.5 COMPLETION TIMES for ACTIONS A and B, restore the mass of NaTB to within limit within 72 hours while in Modes 1 through 4. The clarification needs to address this COMPLETION TIME in relation to the corresponding SR 3.5.5.1 surveillance frequency to verify the mass of the NaTB every 24 months consistent with the BASES of the 24 month SURVEILLANCE interval established to coincide with plan refueling.

The BASES for SR 3.5.5.1 states that access to the NATB pH adjustment baskets is only feasible during outages. It is unclear how the Condition A 72 hour completion time is feasible for Modes 1 through 4 if the mass of the NaTB can only be verified during an outage.