REQUEST FOR ADDITIONAL INFORMATION 675-5231 REVISION 2

12/15/2010

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 14.03.07 - Plant Systems - Inspections, Tests, Analyses, and Acceptance Criteria
Application Section: Tier 1 Sections 2.7.5.1 - 2.7.5.5

QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects) (SPCV)

14.03.07-53

This is a follow-up RAI to OPEN ITEM -- RAI No. 54 Question No. 14.03.07-2, RAI 14.3.7.3.2-3 and RAI No. 381-2806 Question No.14.03.07-35.
The staff notes that Regulatory Guide 1.52 System Design Criterion 3.8 reads:

> ***"The power supply and electrical distribution system for the ESF atmosphere cleanup system should be designed in accordance with Regulatory Guide 1.32 (Ref. 13). All instrumentation and equipment controls should be designed to IEEE Standard 603-1991 (Ref. 14)."***

IEEE Standard 603-1991 states that "The design basis shall be consistent with the requirements of ANSI/ANS 51.1-1983…". The applicant elected to strike from DCD subsection 9.4.1.5 any reference to ANSI/ANS 51.1-1983 as part of the response to RAI No. 381-2806 Question No.14.03.07-35. Please explain why this is acceptable?
Item 4.4 states ..

> ***4.4 The variables or combinations of variables, or both, that are to be monitored to manually or automatically, or both, control each protective action; the analytical limit associated with each variable, the ranges (normal, abnormal, and accident conditions); and the rates of change of these variables to be accommodated until proper completion of the protective action is ensured.***

For the case in point the staff notes that the ESF filter trains are required to be capable of remaining operable for 30 days after the design base accident event. The filer train must be capable of maintaining 3600 cfm (+/- 10%) for the entire 30 days to match the criteria of the plant safety analysis. With no safety related instrumentation available, please explain how will plant operations know when the filter train is becoming flow limited by excessive filter media blockage. Please explain how the operators will monitor and control the system during an accident with the safety-related (Class 1E Power supplied) equipment available.

The staff also notes that Tier 1 Table 2.7.5.1-1 only lists temperature switches VRS-TS-146, 156, 166 and 176 as Class 1E which appears to trigger a high temperature alarm and sends a signal to the cooling coil flow control valve. The staff requests additional information about what role TE and TIC 141 through 171 (as displayed Figure 9.4.1-1) play in the control of

the CRE temperature and why these components are not included in Table 2.7.5.1-1.

14.03.07-54

This a follow-up question to RAI No. 54 Question No. 14.03.07-2, RAI 14.3.7.3.2-7.

The staff notes that Tier 1 Item 21 Table 2.2-4 requires an inspection and provides Acceptance Criteria which ensures that safety-related SSCs are protected from internal missile sources. The staff noted in Question No. 14.03.07-2, RAI 14.3.7.3.2-7 that specially designed protective gratings protect the MCR HVAC system's outside air intakes from external tornado-generated missiles.

Neither Figures 2.2-1 through 2.2-13 nor Table 2.2-2 referenced in Tier 1 Item 1 Table 2.2-4 detail these specially designed protective gratings. This fails to ensure an ITAAC inspection of the gratings.

For Tier 1 Table 2.2-4, the staff requests that the applicant amend either the Figure(s) or Table of Item 1 OR amend Item 21 with words that ensure an ITAAC inspection of the specially designed protective gratings for the MCR HVAC system's outside air intakes.

14.03.07-55

This is a follow-up question to RAI #54 Question No. 14.03.07-3, RAI 14.3.7.3.6-6.

The staff notes that SR 3.7.11.4 was revised as part of the resolution to Question No. 14.03.07-3, RAI 14.3.7.3.6-6 but the revision still lacks technical consistency with the Acceptance Criteria of Tier 2 preoperational test 14.2.12.1.70 and Tier 1 Item 4.a.ii of ITAAC Table 2.7.5.2-3. In particular, the staff notes SR 3.7.11.4 reads:

> *"Verify the associated room can be maintained at a pressure ≤ -0.25 inches water gauge relative to atmospheric pressure using one Annulus Emergency Exhaust System train during the accident condition at a flow rate of ≤ 5600 cfm within 240 seconds after a start signal."*

The Acceptance Criteria D.3 of preoperational test 14.2.12.1.70 reads:

> *"The system can establish a -1/4 inch water gauge pressure in the penetration areas and safeguard component areas with respect to the surrounding areas within 240 sec and maintain that pressure (Subsection 6.5.1)."*

The Acceptance Criteria of Tier 1 Item 4.a.ii of ITAAC Table 2.7.5.2-3

reads:

"The as-built annulus emergency exhaust system is capable of drawing down all four penetration areas and all four safeguard component areas to less than or equal to -0.25 inches w.g. relative to adjacent areas within the arrival time identified in Subsection 2.7.5.2.1.1 on both divisions."

The staff asks that the applicant revise the DCD acceptance criterion and/or SR 3.7.11.4 and its Bases to: (a) establish a technical consistency with each other and (b) to establish a technical accuracy with the outcomes of MNES Calculation N0-EE23201 and MNES Calculation N0-EE23201.

14.03.07-56

This is a follow-up question to RAI No. 54 Question No. 14.03.07-5, RAI 14.3.7.3.6-3 and RAI No. 381-2806 Question No. 14.03.07-42.

The staff's review of DCD Revision 2 found that subsection 9.4.5.5 still contains the referencing errors lined out in the amendment specified in the "Impact on DCD" section of RAI No. 381-2806 Question No. 14.03.07-42. In addition "Table 3.D-2" should read "Table 3D-2". The staff requests that the applicant correct these errors in Revision 3 of the DCD.

In addition the applicant has failed to justify that instrumentation used by the Control Room operators to monitor the status and manipulate the annulus emergency exhaust system annulus during an accident need not be safety related.

The staff notes that Regulatory Guide 1.52 System Design Criterion 3.8 reads:

"The power supply and electrical distribution system for the ESF atmosphere cleanup system should be designed in accordance with Regulatory Guide 1.32 (Ref. 13). All instrumentation and equipment controls should be designed to IEEE Standard 603-1991 (Ref. 14)."

The opening paragraph of "4 Safety System Designation" in IEEE Standard 603-1991 reads that "The design basis shall be consistent with the requirements of ANSI/ANS 51.1-1983…". The applicant elected to strike from DCD subsection 9.4.5.5 any reference to ANSI/ANS 51.1-1983 as part of the response to RAI No. 381-2806 Question No. 14.03.07-42. Please explain why this is acceptable?

Item 4.4 states ...

4.4 The variables or combinations of variables, or both, that are to be monitored to manually or automatically, or both, control each protective action; the analytical limit associated with each variable, the ranges (normal, abnormal, and accident conditions); and the rates of change of these variables to be accommodated until proper completion of the protective action is ensured.

It appears that the instrumentation (i.e. flow indication, filter bed differential pressure instrumentation, the four safeguard component area differential pressure monitors and the four penetration area differential pressure monitors) associated with the annulus emergency exhaust system fits the definition of Safety Class 3 (SC-3) as they support the nuclear safety functions d, i, k, m and p.

Please explain how the plant operations will monitor and operate the system with the safety-related instrumentation during an accident. The four penetration areas, four safeguard component areas impact the Annulus Emergency Exhaust System. Please explain how plant operators, during an accident, will verify the the associated room boundary based on each of the eight area differential pressure monitors using safety-related instrumentation.

The staff requests that the applicant provide a justification that the instrumentation associated with the Annulus Emergency Exhaust System does not need to be safety-related Class 1E using the guidance in ANSI/ANS 51.1-1983 and IEEE Standard 603-1991.