REQUEST FOR ADDITIONAL INFORMATION NO. 103-1448 REVISION 0

11/20/2008

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 05.02.02 - Overpressure Protection
Application Section: 5.2.2

QUESTIONS for Reactor System, Nuclear Performance and Code Review (SRSB)

05.02.02-1

RAI 5.2.2-1
In section 5.2.2, Overpressure Protection, the applicant stated that the “Combinations of these systems provide compliance with the overpressure protection requirements of the ASME Boiler and Pressure Vessel Code, Section III, Paragraphs NB-7200, Overpressure Protection Report for pressurized water reactor systems.” The staff review, of the overpressure protection systems of DCD sections 5.2.2 and 5.4.11 with regard to compliance with ASME III NB-7200, concluded that additional documentation is required to support applicant's positions of the following ASME III NB-7200 requirements: “(c) the range of operating conditions, including the effect of discharge piping back pressure; (k) consideration of set pressure and blowdown limitations, taking into account opening pressure tolerances and overpressure of the pressure relief device; and (l) consideration of burst pressure tolerance and manufacturing design range of the rupture disk device.” Provide the references or documentation that supports compliance to the NB-7200 requirements discussed above.

05.02.02-2

RAI 5.2.2-2
In section 5.2.2, the applicant stated that the "RCS and main steam system overpressure protection during power operation are provided by the pressurizer safety valves and the main steam safety valves, ... Combinations of these systems provide compliance with the overpressure protection requirements of the ASME Boiler and Pressure Vessel Code...." Provide the references or documentation for the methodology, analysis, and results that support the applicant’s position that the ASME criteria are satisfied as stated.

05.02.02-3

RAI 5.2.2-3
In Subsection 5.2.2.1.2, the applicant states that “the LTOP is designed to meet the following requirements” of Branch Technical Position (BTP) 5-2 which requires that the “...system is designed and installed to prevent exceeding the applicable technical

specifications and Appendix G limits for the RCS while operating at low temperatures. The system is capable of relieving pressure during all anticipated over-pressurization events at a rate sufficient to satisfy the technical specification limits, particularly while the RCS is in a water-solid condition." Provide the references related to the analysis or supporting documentation which demonstrates how the above requirements are satisfied.

05.02.02-4

RAI 5.2.2-4

In Subsection 5.2.2.1.2, the applicant states that "the LTOP is designed to meet the following requirements" of Branch Technical Position (BTP) 5-2 which requires that, "The system should be able to perform its function assuming any single active component failure. Analyses using appropriate calculational techniques must demonstrate that the system will provide the required pressure relief capacity assuming the most limiting single active failure. The cause for initiation of the event (e.g., operator error, component malfunction) should not be considered as the single active failure. The analyses should assume the most limiting allowable operating conditions and systems configuration at the time of the postulated cause of the overpressure event." Provide the references or supporting documentation in regard to the analyses which demonstrates how the above requirements are satisfied.

05.02.02-5

RAI 5.2.2-5

In Subsection 5.2.2.1.2, the applicant states that the system satisfies the BTP 5-2 requirement that, "The design of the system should use Institute of Electrical and Electronics Engineers (IEEE) Standard 603 as guidance." In which the system may be manually enabled; however, an alarm should be provided to alert the operator to enable the system at the correct plant condition during cooldown. Positive indication should be provided to indicate when the system is enabled. An alarm should activate when the protective action is initiated. Identify the plant (condition) parameter that is monitored during cooldown to alert the operator to enable the system and, if applicable, the technical specifications (TS) related to the parameter.

05.02.02-6

RAI 5.2.2-6

From subsection 5.2.2.1.2, the applicant states that the BTP 5-2 requirements: (1) the overpressure protection system does not depend on the availability of offsite power to perform its function and (2), pressure relief is from a low-pressure system not normally connected to the primary system, ensure that the interlocks that would isolate the low

pressure system from the primary coolant system do not defeat the overpressure protection function are satisfied. From the information presented, the staff was unable to confirm the requirements were satisfied. Provide references or documents of detailed system description and P&IDs to support the statement that the above referenced BTP 5-2 requirements are satisfied.

05.02.02-7

RAI 5.2.2-7

In subsection 5.2.2.2.2.1, the applicant discussed low temperature transient evaluation during water solid conditions. The applicant stated that the most limiting mass input transient is an inadvertent safety injection, and the most limiting heat input transient is an inadvertent reactor coolant pump startup in a loop where the steam generator temperature is 50°F higher than the other temperatures in the loop. The range of RCS temperatures was 70°F to 280°F. And the anticipated mass and heat input transients are evaluated to demonstrate conformance with ASME III, Appendix G. Provide the references or documentation that demonstrates compliance with ASME III, Appendix G. Also, the analysis was based on a range of RCS temperatures from 70°F to 280°F, whereas the LTOP operation starts below approximately 350°F. Include an explanation of why the analysis was not based on a range of RCS temperatures from 70°F to 350°F.

05.02.02-8

RAI 5.2.2-8

The applicant designated RCS-MOV-118 and RCS-MOV-119 as depressurization valves in Tier 1, Table 2.4.2-2; however, only RCS-MOV-119 is listed as a component in Tier 1, Table 2.4.2-1. Explain the omission of RCS-MOV-118 in Table 2.4.2-1. Should RCS-MOV-118 be designated as a depressurization block valve?