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Request for Additional Information 9846 (eRAI 9846)

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Application Title: Holtec Licensing Topical Reports
Operating Company: Holtec International
Docket No. 99902049
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Application Section: LOCA Related Topical Report

QUESTIONS

NONE-2

Licensing Topical Report (LTR) HI-2201064, Revision 2, " Elimination of the Large Break Loss of Coolant Accident (LOCA) and Establishment of LOCA Acceptance Criteria," Section 7.1.1, references 10 CFR 50.34(f). The topical report states "10 CFR 50.34(f), "Additional TMI-related requirements" [5], requires that each applicant for a design certification, design approval, combined license, or manufacturing license under Part 52 of this chapter shall demonstrate compliance with the technically relevant portions of the requirements in paragraphs (f)(1) through (3) of this section, except for paragraphs (f)(1)(xii), (f)(2)(ix), and (f)(3)(v). The following requirements are evaluated as they are related to the LOCA and LOCA acceptance criteria."

The following questions are related to 10 CFR 50.34(f):

i. 10 CFR 50.34(f)(1)(iii) requires an evaluation of the potential for and impact of reactor coolant pump seal damage following small-break LOCA with loss of offsite power. If damage cannot be precluded, provide an analysis of the limiting small-break loss-of- coolant accident with subsequent reactor coolant pump seal damage.

Section 7.1.1 of the topical report states that "the SMR-160 does not include reactor coolant pumps for normal operation, as this plant relies on natural circulation. Therefore, this requirement is not technically relevant to the SMR-160."

The staff notes that SMR-160 contains reactor coolant startup pumps (RCSP). Additionally, the staff notes that all modes of normal operation should be considered including startup, run, and shutdown. How are the RCSP evaluated with respect to LOCA? How are the RCSP seals addressed with respect to this requirement? Provide the basis for why this requirement is not technically relevant considering that the SMR-160 contains RCSPs.

ii. 10 CFR 50.34(f)(1)(iv) requires an analysis of the probability of a small-break loss-of-coolant accident (LOCA) caused by a stuck-open power-operated relief valve (PORV). If this probability is a significant contributor to the probability of small-break LOCA's from all causes, provide a description and evaluation of the effect on small-break LOCA probability of an automatic PORV isolation system that would operate when the reactor coolant system pressure falls after the PORV has opened.

Section 7.1.1 of the topical report states that "The SMR-160 design does not include any PORVs on the pressurizer. The pressurizer is sufficiently sized such that the plant can

accommodate normal power maneuvers without needing a PORV. The ADS Stage 1 valves are connected to the pressurizer, however each of the two ADS Stage 1 trains have two valves in series, so that a single failure of one of the valves would not result in inadvertent depressurization or a failure to isolate the pressurizer in the event that ADS is terminated. Therefore, this requirement is not technically relevant to the SMR-160."

Topical report section 4.1.1.1.3 states that "the ADS has two stages of depressurization with two trains in each stage. Only one train of each stage is needed to perform the depressurization function." and "[[]]"

Provide the basis for why this requirement is not technically relevant considering that the SMR-160 contains ADS stage 1 and ADS stage 2 depressurization valves that can be opened and remain stuck open during an inadvertent actuation of the ADS system given all potential significant contributors to the probability of small-break LOCA's from all causes should be considered (i.e. common cause failures and inadvertent actuations).

iii. 10 CFR50.34(f)(2)(vi) requires the provision of the capability of high point venting of non-condensable gases from the reactor coolant system, and other systems that may be required to maintain adequate core cooling. Systems to achieve this capability shall be capable of being operated from the control room and their operation shall not lead to an unacceptable increase in the probability of loss-of-coolant accident or an unacceptable challenge to containment integrity.

Section 7.1.1 of the topical report states that "for the SMR-160 the capability for remotely operated high point venting of the reactor coolant system is provided by [[]]"

According to NUREG-0737, Clarification of TMI Action Plan Requirements, the purpose of the system is to vent non-condensable gases from the RCS which may inhibit core cooling during natural circulation. Additionally, NUREG-0737 states (1) Each PWR licensee should provide the capability to vent the reactor vessel head (2) The reactor vessel head vent should be capable of venting non-condensable gas from the reactor vessel hot legs and cold legs (3) Additional venting capability is required for those portions of each hot leg that cannot be vented through the reactor vessel head vent or pressurizer.

Provide the information that shows that the ADS is able to vent all the high point locations including the vessel head, or provide the criteria or method that would be used in a bounding loss of coolant analysis that shows that the amount of venting provided by the ADS provides adequate core cooling.

NONE-3

Licensing Topical Report (LTR) HI-2201064, " Elimination of the Large Break Loss of Coolant Accident (LOCA) and Establishment of LOCA Acceptance Criteria," states the objective of the topical report is to seek NRC approval that a postulated break in the Combined Vessel is not required as a design basis accident, thus eliminating a large break LOCA for the SMR-160.

LTR Section 7.1 identifies applicable regulations and general design criteria (GDC) for the SMR-160. The staff notes that the primary and secondary decay heat removal systems and passive containment heat removal system are described in the LTR to facilitate a basic understanding of the design. However, GDC 34 and GDC 38 are identified in Section 7.1 and are outside the scope and purpose of the LTR. Currently, the LTR does not contain sufficient information for the staff to fully evaluate whether the SRM-160 design can comply with GDC 34 and GDC 38.

The applicant is requested to either remove the aforementioned regulatory requirements that are outside the scope of the LTR or expand the scope of the LTR to include consideration of non-LOCA events and containment performance. This would necessitate additional information related to design descriptions and requirements for the decay heat removal systems and containment systems.

NONE-4

Licensing Topical Report (LTR) HI-2201064, " Elimination of the Large Break Loss of Coolant Accident (LOCA) and Establishment of LOCA Acceptance Criteria," Section 4.1.1 states, "[t]he PCCS [passive core cooling system] is designed to provide emergency core heat removal and makeup water during postulated Design Basis Accidents (DBAs)." Further, it explains the PCCS consists of sub-systems including the primary decay heat removal system (PDHR) and secondary heat removal system (SDHR).

i. Sections 4.1.1.1.1 and 4.1.1.1.2 provide descriptions of the PDHR and SDHR, respectively. The primary function of both systems is identified as providing passive core cooling for non-LOCA events. Additionally, the LTR states the PDHR and SDHR are [[]]. Based on this statement it is unclear how these two systems will be credited within the LOCA analysis.

The staff requests the applicant to clarify in the LTR how the PDHR and SDHR will be considered within the LOCA analysis.

ii. Based on their frequency, non-LOCA events tend to be classified as anticipated operational occurrences (AOOs). It is unclear to the staff whether this is consistent with Section 4.1.1 which seems to imply the PCCS is only designed to mitigate design basis accidents.

The staff requests the applicant to revise Section 4.1.1 and clarify whether the PCCS is designed for both AOOs and accidents and evaluate whether a more inclusive term such as "design basis events" is appropriate.

NONE-5

Licensing Topical Report (LTR) HI-2201064, " Elimination of the Large Break Loss of Coolant Accident (LOCA) and Establishment of LOCA Acceptance Criteria," Section 7.1.13 states, "[t]hese passive systems

[[]]."

[[]]

]] and is subject to appropriate regulations, such as 10 CFR 50, Appendix A, General Design Criteria 17 and 18. The staff requests the applicant to correct this contradictory statement in the LTR and clarify in the LTR what is meant by no reliance on [[]].