



August 17, 2021

NRC Legal

RE: Holtec's SMR-160 and RAI # 9832 (eRAI 9832)

To Whom it May Concern:

I am the Vice-President of Law and Human Resources at Holtec International. I write on behalf of Holtec International ("Holtec") with respect to certain legal questions raised in Request for Additional Information 9832 (eRAI 9832). In particular, there appears to be a difference of opinion regarding the application of Large Break Loss of Coolant Accident ("LOCA") criteria to the relevant parts of the SMR-160 design as well as the possible application of special considerations or special safety significance. In short, Holtec is of the opinion that; (1) the design in question is a vessel and that LOCAs are for pipes, not vessels; and (2) that special considerations do not apply to the proposed design. To extent the NRC has legal support for its current positions, we would greatly appreciate a follow-up letter with such information so that we can fully understand that NRC's position.

A. LOCAs Are for Pipes, Not Vessels

As set forth in more detail in Holtec's Response to RAI # 9832 and the Holtec Position Paper attached to that submission, the forging which connects the reactor pressure vessel and the steam generator ("SG"), referred to as the Planar Inter-vessel Forging ("PIF"), is welded to the RPV shell and SG bottom head forming the "RPV/SG Connection". The NRC's position is that its "staff does not consider this component to be a vessel." See, eRAI 9832 at fn 2. Holtec believes that the NRC's classification of the PIF and the forgings that constitute the SG Riser as pipes is inappropriate on both technical and regulatory grounds. This designation is particularly important because, per the relevant regulatory definition, LOCAs only apply to pipes.

Title 10, Part 50.46 of the Code of Federal Regulations is titled "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors." Section (c) sets forth the following definition:

(1) Loss-of-coolant accidents (LOCA's) are hypothetical accidents that would result from the loss of reactor coolant, at a rate in excess of the capability of the reactor coolant makeup system, *from breaks in pipes in the reactor coolant pressure boundary* up to and including a break equivalent in size to the double-ended rupture *of the largest pipe* in the reactor coolant system.

(emphasis added.) It should be noted that there is no mention of vessels in the definition of LOCAs in this section of the Code.

That LOCAs apply to pipes when evaluating light-water nuclear power reactors is a principle that routinely has been recognized by the NRC. For example, in the Westinghouse AP1000 Design Control Document (“DCD”) review Section 15.6.5.1, the NRC approved Westinghouse’s statement that “A LOCA is the result of a *pipe rupture of the reactor coolant system pressure boundary*.” See, AP1000 DCD § 15.6.5.1 (emphasis added.) The NRC also approved Mitsubishi’s DCD section 15.6.5.1 that stated “Loss-of-coolant accidents (LOCAs) are postulated accidents (PAs) that would result from the loss of reactor coolant, at a rate in excess of the capability of the normal reactor coolant makeup system. *The coolant loss occurs from piping breaks in the reactor coolant pressure boundary* (RCPB) up to and including a break equivalent in size to the double-ended rupture of the largest pipe in the reactor coolant system (RCS).” See, US-APWR DCD § 15.5.6.1 (emphasis added.)

Some additional guidance on the issue can be found from the Pacific Northwest National Laboratory (“PNNL”) in 2011. In PNNL-20869, PNNL assessed a similar arrangement in the high temperature gas reactor (“HTGR”). In relevant part, it noted:

The question of terminology for the cross-duct structure between the RPV and power conversion vessel is discussed, considering the differences in regulatory requirements that apply depending on whether this structure is designated as a “vessel” or as a “pipe”. We conclude that designing this component as a “pipe” is the more appropriate choice, but that the ASME BPVC allows the owner of the facility to select the preferred designation, and that either designation can be acceptable.

See PNNL-20869 at iv. The HTGR “cross-duct” is much longer and has a significantly smaller diameter, than the PIF. Notwithstanding the geometry of the “cross-duct”, the conclusion by PNNL for the HTGR was that designing the “cross-duct” as a “pipe” is the more appropriate choice. It is important to note that PNNL also stated that the ASME BPV code allows the owner of the facility to select the preferred designation, and that either designation can be acceptable.

In short, Holtec believes there is ample support for its position that LOCAs only apply to pipes and that because the design in question is more accurately described as a vessel, LOCAs do not apply in this instance.

B. Special Considerations Do Not Apply to Holtec’s Design

Holtec understands and agrees with the concept that protection against pressure vessel failures is subject to the licensing process *if special considerations are present or*

special safety significance is necessary. There is clear legal support for this concept. For example, the Atomic Safety and Licensing Board's ("ASLB") 1973 decision to grant Indian Point Unit No. 2 the approval to operate at full power stated:

Although the potential consequences of a pressure vessel failure at the Indian Point site might be greater than for other sites that have been approved, *the term 'special safety significance' generally refers to considerations directed to the design, mode of manufacture and proposed limits of operation of the reactor vessel.* The intervenor CCPE did not contend that any features of the reactor vessel or of other parts of the plant or of their construction or operation might increase the likelihood of failure of the vessel or the consequences of such a failure. The Board, however, examined the evidence submitted by Applicant in response to the Board's inquiries related to the design, fabrication, and testing of the reactor vessel for Unit No. 2. On the basis of all the evidence, the Board finds that the reactor vessel for Unit No. 2 was designed and constructed and will be operated in accordance with the requirements of the rules and regulations of the Commission and that there is reasonable assurance that it can be operated without undue risk to the health and safety of the public.

See LBP-73-33, September 25, 2973 (emphasis added).

A few months later, on April 4, 1974, the Atomic Safety and Licensing Appeal Board upheld the ASLB's decision to grant Indian Point Unit No. 2's approval and stated:

It would appear that the term "special safety significance" as used by the Commission referred to such matters as design, mode of manufacture and proposed limits of operation of the reactor vessel."

Critically, as set forth in Holtec's Response to RAI # 9832, Holtec believes that there is no special safety significance associated with the proposed design embodiments. Holtec has designed, constructed, and will be operating a pressure vessel in accordance with the requirements of the rules and regulations of the NRC. Thus, there are no special considerations or matters of special safety significance, and there is reasonable assurance that such a pressure vessel can be operated without undue risk to the public.

The NRC's position appears to be that Holtec's "design" – by which Holtec believes the NRC is referring to our "geometry" - does not match other RPVs in operation. NRC's position, however, is neglecting the critical fact that Holtec's design meets the ASME Code. Designing the relevant embodiments to meet the ASME code means that the subject configuration is inherently acceptable.

The relevant design embodiments also meet the regulations set out in 10 CFR 50.55a. Compartment with those regulations is support for the concept that special



considerations do not apply to the design. In other words, if a design follows all the NRC's "Codes and Standards" set forth in 10 CFR 50.55a, the design should not be subject to special safety significance.

We ask that NRC legal address these contentions so that a more fulsome discussion can occur. Please feel free to me if you have any questions or concerns.

Very truly yours,

HOLTEC INTERNATIONAL

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