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Topical Report (HI-2201064) Supplemental Information



Date: February 17, 2021

Presented By:

**SMR, LLC, A Holtec International Company
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Agenda



| Est. Time (EST) | Topic |
|-----------------|--------------------------------------|
| 1:00 to 1:10 PM | Opening Remarks (NRC/Holtec) |
| 1:10 – 1:30 PM | Holtec Presentation (Public) |
| 1:30 – 1:40 PM | Q&A (NRC/Public) |
| 1:40 – 1:55 PM | Holtec Presentation (Closed Meeting) |
| 1:55 – 2:15 PM | Q&A and Wrap-up |

Objectives of the Topical Report

- NRC approval that by following ASME B&PV Code Section III Subsection NB 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
- NRC approval of the SMR-160 LOCA acceptance criteria.

Rationale and Basis for First Objective

- PNNL concluded that “the ASME BPVC would allow the cross-duct to be constructed as a vessel or pipe” for a high temperature gas reactor of similar geometry (PNNL-20869) and that “the ASME BPVC allows the owner to select the preferred designation, and that either designation can be acceptable”
- Holtec approach is to design the RPV, SG, PZR, and RPV/SG Connection as one continuous vessel, referred to as the “Combined Vessel”, according to ASME B&PV Code Section III Subsection NB
- RPV/SG Connection is a communicating chamber joining the RPV to the SG
- The connecting welds are in compliance with NB-3350
- Geometry of the RPV/SG Connection

Rationale and Basis for First Objective (con't)



- All SMR-160 Reactor Coolant Pressure Boundary piping is postulated to break, and the break is evaluated as a LOCA as part of the SMR-160 Design Basis Accidents
 - ✓ See Table 3-1 of the Topical Report
- BTP 3-4 contains the NRC position on pipe rupture postulation for Class 1 piping
 - ✓ Based on actual piping failures that have occurred
 - ✓ Allows Leak Before Break to eliminate the postulation of a pipe break to meet GDC 4
- BTP 3-4 does not require postulation of a Class 1 vessel rupture, nor is there other regulatory precedence for postulating a Class 1 vessel rupture as a Design Basis Accident
 - ✓ Initiating event frequencies for pressure vessel ruptures are highly dependent on pressurized thermal shock (PTS) [NUREG-1829] and are well below the threshold for Design Basis Accidents; therefore, by design there is an extremely low probability of a Class 1 pressure vessel rupture occurring
 - ✓ Ruptures in the Combined Vessel are considered a Beyond Design Basis Accidents and will be analyzed with PRA

Acceptance Criteria for Combined Vessel



- Design will fully comply with NB-3200 and NB-3300
- Stress intensities shall not exceed limits in Section III Mandatory Appendix XIII
- Fatigue analysis shall be performed in accordance with XIII-3500
 - ✔ Cumulative usage factor shall not exceed 1.0

Questions?



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