



NRC Meeting: Passive Containment Heat Removal System & GDC 40

October 18, 2022

Meeting Agenda



- Introductions
- Purpose & Outcome
- Overview of SMR-160 Passive Containment Heat Removal System
- GDC 40
- Questions provided to NRC
- Open Forum

Introductions



- NRC staff

- Holtec staff

Purpose & Outcome



PURPOSE: to give a high-level overview of Holtec's design of the SMR-160 Passive Containment Heat Removal (PCHR) system.

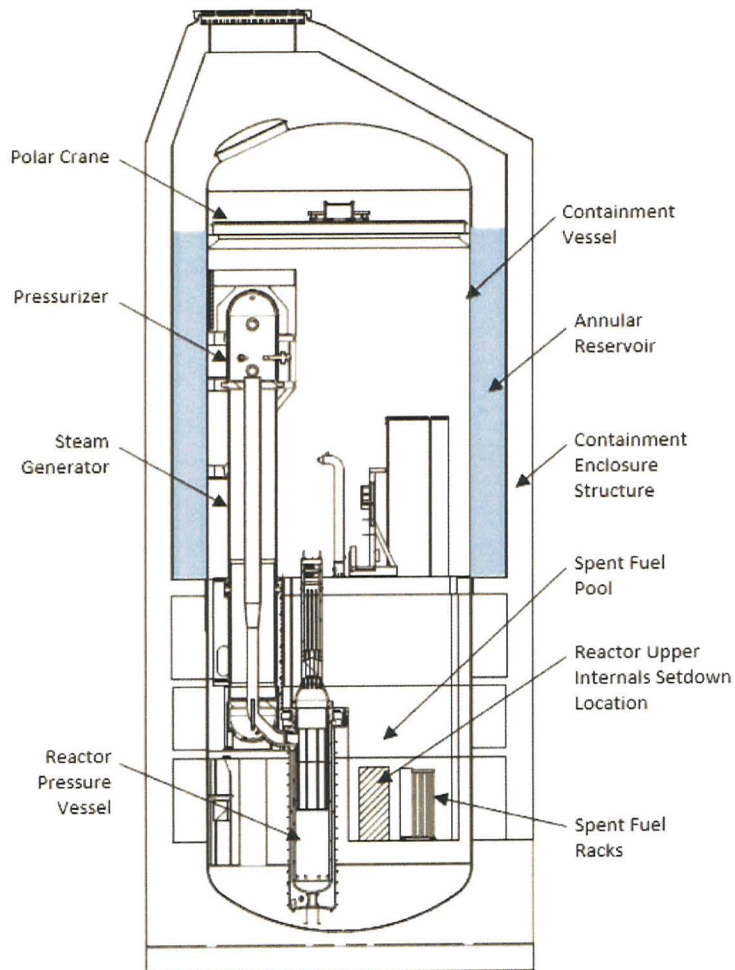
OUTCOME: To obtain feedback from the NRC staff on PCHR compliance with GDC 40.

Overview of SMR-160 PCHR



- The SMR-160 PCHR is a passive system that maintains containment pressure below its design limits.
- PCHR rejects heat from the containment atmosphere to the Containment Structure (CS), then to the Annular Reservoir (AR), and finally to the environment through a vent in the Containment Enclosure Structure (CES).
- PCHR does not rely on operator action, active components, or actuation signals.

Overview of SMR-160 SFP Makeup Systems



- PCHR consists of the AR as formed by the outer surface of the CS and the inner surface of the CES but does not include the CS or CES. PCHR also includes instruments and a nonsafety recirculation loop, not shown.

■ GDC 40, *Testing of containment heat removal system*, states:

- ✓ The containment heat removal system shall be designed to permit appropriate periodic pressure and functional testing to assure (1) the structural and leaktight integrity of its components, (2) the operability and performance of the active components of the system, and (3) the operability of the system as a whole, and under conditions as close to the design as practical the performance of the full operational sequence that brings the system into operation, including operation of applicable portions of the protection system, the transfer between normal and emergency power sources, and the operation of the associated cooling water system.

Compliance with GDC 40

- Regulation: The containment heat removal system shall be designed to permit appropriate periodic pressure and functional testing to assure (1) the structural and leaktight integrity of its components.
- SMR-160: The AR structural and leaktight integrity is assured by leakage rate testing of containment penetrations and hydrostatic pressure testing of the CS, in addition to visual inspections of the CES and monitoring for abnormal AR makeup.

Compliance with GDC 40

- Regulation: The containment heat removal system shall be designed to permit appropriate periodic pressure and functional testing to assure (2) the operability and performance of the active components of the system.
- SMR-160: The PCHR has no active components needed to perform its containment heat removal function.

Compliance with GDC 40

- Regulation: The containment heat removal system shall be designed to permit appropriate periodic pressure and functional testing to assure (3) the operability of the system as a whole, and under conditions as close to the design as practical the performance of the full operational sequence that brings the system into operation, including operation of applicable portions of the protection system, the transfer between normal and emergency power sources, and the operation of the associated cooling water system.

- SMR-160:
 - ✓ The operability of the PCHR relies on inherent heat transfer characteristics of the CS and AR water. Periodic inspections of the CS surface are performed to assure surface fouling or degradation does not impact assumed heat transfer characteristics.
 - ✓ There is no operational sequence that brings PCHR into operation as the PCHR does not rely on any actuation signal or active components.

Questions

- Is Holtec correctly interpreting GDC 40 and applying it to the SMR-160 PCHR system?
- Context: NuScale requested an exemption to GDC 40 as their design did not require periodic pressure and functional testing to ensure operability and performance of the containment heat removal function. SMR-160 has a similar passive design but Holtec believes it is compliant with GDC 40.

Open Forum

