



# **Holtec SMR**

## **Chapter 16 PSAR Content**

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**[Not Export Controlled]**

# Meeting Agenda



- Introductions
- Purpose & Outcome
- Summary of October 27, 2022 meeting
- Review of Regulation and Regulatory Guidance
- Discussion on Holtec SMR Ch 16 Level of Detail for PSAR
- Open Forum

# Purpose and Outcome

## ■ Purpose:

- ✓ Present the scope, content, and format for Holtec's SMR PSAR Chapter 16

## ■ Outcome:

- ✓ Align with the Staff on the level of detail for Holtec's SMR PSAR Chapter 16

# October 27, 2022 TS Meeting Summary



- “In response to the applicant’s question of the staff’s expectations of TS in the preliminary safety analysis report (PSAR) accompanying the CP application, the NRC staff responded that fully developed TS are not expected during the CP application stage.”
  
- At the CP application stage, an applicant should identify the items to potentially be the subject of TS requirements for the categories stated in 10 CFR 50.36(c):
  - ✓ safety limits
  - ✓ limiting safety system settings
  - ✓ limiting conditions for operation
  - ✓ surveillance requirements
  - ✓ design features
  - ✓ administrative controls
  
- The selection of structures, systems, and components (SSCs), and process parameters should be based on ensuring the validity of the design and analysis assumptions used in the preliminary safety analysis report (PSAR).

## ■ [10CFR50.34(a)(5)]

- ✓ An identification and justification for the selection of those variables, conditions, or other items which are determined as the result of preliminary safety analysis and evaluation to be probable subjects of technical specifications for the facility, with special attention given to those items which may significantly influence the final design.
- ✓ **The CP applicant may also propose TS in Section 16 of the PSAR; such TS should be based on the current STS and any approved STS changes not yet incorporated, or the generic DCD TS (DCD GTS) if referencing a certified plant design.**

# Regulatory Guidance

## ■ RG 1.70

- ✓ Describes submitting a complete set of preliminary TS at PSAR
- ✓ The TS for most of the LWR vendors were already available and fully described for use by a customer/applicant

## ■ RG 1.206

- ✓ Does not specifically address content for a CPA.

## ■ SRP Ch. 16

- ✓ Correctly reflects the 10 CFR requirements for a PSAR.

## ■ Holtec is proposing documentation in Chapter 16 that identifies the following:

- ✓ Tech Spec Number
- ✓ Section Name
- ✓ Limited Condition of Operation
- ✓ Justification for its inclusion for Holtec SMR

# FSAR TS

## Level Of Detail



### 3.9 REFUELING OPERATIONS

#### 3.9.1 Boron Concentration

LCO 3.9.1 Boron concentration of the Reactor Coolant System (RCS), the fuel transfer canal, and the refueling cavity shall be maintained within the limit specified in COLR.

APPLICABILITY: MODE 6.

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**- NOTE -**  
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Only applicable to the fuel transfer canal and the refueling cavity when connected to the RCS.  
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#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Boron concentration not within limit.	A.1 Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>	
	A.2 Suspend positive reactivity additions.	Immediately
	<u>AND</u>	
	A.3 Initiate actions to restore boron concentration to within limits.	Immediately

#### SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.1.1	Verify boron concentration is within the limit specified in the COLR.	72 hours

# Holtec SMR PSAR Chapter 16 Content

- SMR PSAR will address:
  - ✓ Modes of Operation
  - ✓ Limiting Condition for Operation
  - ✓ SMR justification for LCO
  - ✓ Commitment to fully developed TS at OLA
  
- SMR PSAR will NOT include:
  - ✓ Use and Application Section
  - ✓ Specific LCO or Condition parameters
  - ✓ LCO Completion Times
  - ✓ TS Surveillances
  - ✓ Surveillance Frequency
  - ✓ Formatting of TS consistent with STS
  - ✓ Detailed Tables and Curves
  - ✓ Administrative Controls



# Holtec SMR PSAR Chapter 16 Level of Detail



Reference NUREG-2194 (AP1000)	Section Name	Specification Title & LCO	Discussion
3.9	Refueling Operations		
3.9.1	Boron Concentration	<p>Boron concentration of the RCS and the refueling cavity (which includes the spent fuel pool) shall be maintained within the limit specified in the COLR.</p> <p>Applicability: MODE 6</p>	<p>The LCO requires that boron concentration be maintained within limit in the RCS and the refueling cavity which includes the spent fuel pool for the Holtec SMR while in MODE 6. Refueling boron concentration is the soluble boron concentration in the coolant in each of these volumes having direct access to the reactor core during refueling. The soluble boron concentration offsets the core reactivity and is measured by chemical analysis of a representative sample of the coolant in each of the volumes. The boron concentration limit specified in the COLR ensures that a core <math>k_{eff} \leq 0.95</math> is maintained during fuel handling operations with control rods and fuel assemblies assumed to be in the most adverse configuration (least negative reactivity) allowed by procedures. Violation of the LCO could lead to an inadvertent criticality during MODE 6.</p> <p>The reactor is brought to shutdown conditions before beginning operations to open the reactor vessel for refueling. After the RCS is cooled down and depressurized, the vessel head is unbolted and slowly removed. The refueling cavity and the fuel transfer canal are then flooded with borated water from Refueling Water Storage Tank (RWST) by the use of the Spent Fuel Pool Cooling System (SFP).</p> <p>During refueling, the water volumes in the RCS, the refueling cavity and spent fuel pool are contiguous. However, the soluble boron concentration is not necessarily the same in each volume. If additions of boron are required during refueling, the Chemical and Volume Control System (CVS) provides the borated makeup.</p>

# Open Forum

# Backup Slides

# Holtec SMR Process

- Holtec does not have a historical basis of existing TS, nor design-specific operating experience to inform the content of the TS.
  - ✔ No new or unique design features
  
- Holtec TS are being developed directly from
  - ✔ Design, safety analysis, and planned operations.
  - ✔ TS development is informed by industry operating experience
  - ✔ TS content for which similar or parallel functions and features exist in current fleet designs.
  
- These factors are compared with the criteria for inclusion as TS.

# Holtec SMR Process



- Holtec TS are being developed consistent with the Holtec SMR-specific safety analyses and the design-specific probabilistic risk analyses.
  
- The STS are published by the NRC as six NUREGs tailored to various reactor designs and are used as a basis for the content and format of the proposed Holtec SMR STS.
  
- The versions of the STS that are considered during TS development include:
  - ✓ NUREG-1431 Westinghouse
  - ✓ NUREG-1432 Combustion Engineering
  - ✓ NUREG-2194 Westinghouse AP1000
  - ✓ NUSCALE GTS

# Holtec SMR Process

- Holtec applies the TS inclusion criteria consistent with:
  - ✓ the final NRC policy,
  - ✓ considerations detailed in the Split Report,
  - ✓ the Writer's Guide for Plant-Specific Improved Technical Specifications,
  - ✓ the content of the current versions of the STS, and
  - ✓ the refinements to the STS developed by the TSTF as travelers to the extent they are applicable

# 10CFR50.36



- **a)(1)** Each applicant for a license authorizing operation of a production or utilization facility shall include in his application proposed technical specifications in accordance with the requirements of this section. A summary statement of the bases or reasons for such specifications, other than those covering administrative controls, shall also be included in the application, but shall not become part of the technical specifications.
  
- **(2)** Each applicant for a design certification or manufacturing license under part 52 of this chapter shall include in its application proposed generic technical specifications in accordance with the requirements of this section for the portion of the plant that is within the scope of the design certification or manufacturing license application.
  
- **(b)** Each license authorizing operation of a production or utilization facility of a type described in § 50.21 or § 50.22 will include technical specifications. **The technical specifications will be derived from the analyses and evaluation included in the safety analysis report, and amendments thereto, submitted pursuant to § 50.34.** The Commission may include such additional technical specifications as the Commission finds appropriate.

# Holtec SMR PSAR Chapter 16 Level of Detail

- **[RG 1.70]** An application for a construction permit should include preliminary Technical Specifications that identify and provide justification for the selection of variables, conditions, or other limitations that are determined to be probable subjects of the final Technical Specifications.
  
- **[SRP Ch 16]** An applicant for a construction permit (CP) under 10 CFR Part 50 is required by 10 CFR 50.34(a)(5) to include in the preliminary safety analysis report (PSAR)
  - ✓ “An identification and justification for the selection of those variables, conditions, or other items which are determined as the result of preliminary safety analysis and evaluation to be probable subjects of TS for the facility, with special attention given to those items which may significantly influence the final design.”
  - ✓ The CP applicant may also propose TS in Section 16 of the PSAR; such TS should be based on the current STS and any approved STS changes not yet incorporated.