



**U.S. NUCLEAR REGULATORY COMMISSION**  
**STANDARD REVIEW PLAN**  
**OFFICE OF NUCLEAR REACTOR REGULATION**

SECTION 10.4.8

STEAM GENERATOR BLOWDOWN SYSTEM (PWR)

REVIEW RESPONSIBILITIES

Primary - Effluent Treatment Systems Branch (ETSB)

Secondary - Auxiliary and Power Conversion Systems Branch (APCSB)

I. AREAS OF REVIEW

At the construction permit (CP) stage, ETSB reviews the steam generator blowdown system (SGBS), as described in the applicant's safety analysis report (SAR), in the specific areas that follow. At the operating license (OL) stage, the ETSB review consists of confirming the design accepted at the CP stage.

1. ETSB reviews the SGBS design objectives in terms of expected and design flows, process design parameters and equipment design capacities, expected and design temperatures for temperature-sensitive treatment processes (e.g., demineralization and reverse osmosis), and process instrumentation and controls for maintaining operations within established parameter ranges.
2. ETSB reviews the seismic design and quality group classifications for equipment, piping, and components.

The liquid and gaseous waste treatment aspects of the SGBS are reviewed under Standard Review Plans (SRP) 11.2 and 11.3. Liquid and gaseous process and effluent radiological monitoring is reviewed under SRP 11.5.

APCSB evaluates, under SRP 3.6.1, the effect of system failures to assure that safety-related equipment will not be made inoperable.

II. ACCEPTANCE CRITERIA

ETSB accepts the design of the steam generator blowdown system if the following conditions are met.

1. The SGBS is sized to accommodate the design blowdown flow needed to maintain secondary coolant chemistry parameters for normal operation, including anticipated operational occurrences. Equipment capacities are based on design blowdown rates and are such that temperature limits for heat-sensitive processes are not exceeded. Instrumentation and automatic controls ensure operation within design parameters.

**USNRC STANDARD REVIEW PLAN**

Standard review plans are prepared for the guidance of the Office of Nuclear Reactor Regulation staff responsible for the review of applications to construct and operate nuclear power plants. These documents are made available to the public as part of the Commission's policy to inform the nuclear industry and the general public of regulatory procedures and policies. Standard review plans are not substitutes for regulatory guides or the Commission's regulations and compliance with them is not required. The standard review plan sections are keyed to Revision 2 of the Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants. Not all sections of the Standard Format have a corresponding review plan.

Published standard review plans will be revised periodically, as appropriate, to accommodate comments and to reflect new information and experience.

Comments and suggestions for improvement will be considered and should be sent to the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Washington, D.C. 20546.

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2. The blowdown system downstream of the outer containment isolation valves is designed according to the provisions of Branch Technical Position ETSB 11-1 (Revision 1).

### III. REVIEW PROCEDURES

The reviewer selects and emphasizes material from this review plan as may be appropriate for a particular case.

1. ETSB considers the pressure, temperature, flow rate, secondary coolant chemistry limits, main condenser water inleakage, and primary to secondary leakage to determine whether the SGBS design has included the effects of normal operation and anticipated operational occurrences (e.g., main condenser inleakage or primary to secondary leakage). ETSB determines that the design parameters are reasonable. If the proposed system includes processes which are heat-sensitive (e.g., demineralization or reverse osmosis), ETSB verifies that the design includes instrumentation and controls to protect the temperature sensitive elements. ETSB ensures that instrumentation and process controls are provided to control flashing, liquid levels, and process flow through the proper components for the radioactivity levels expected.
2. ETSB compares the quality group and seismic design classifications of SGBS components to the guidelines of Branch Technical Position ETSB 11-1 (Revision 1).
3. ETSB reviews the waste treatment and radiological process and effluent monitoring aspects of the SGBS in SRP's 11.2, 11.3 and 11.5. ETSB reviews the proposed piping and instrumentation diagrams (P&IDs) and process flow diagrams, the method of operation, the processing to be provided, and the interfaces between the blowdown system and other plant systems to determine: (1) whether unusual design conditions exist which could lead to safety problems, and (2) that the system is capable of performing its intended functions.

### IV. EVALUATION FINDINGS

ETSB verifies that sufficient information has been provided and that the review is adequate to support conclusions of the following type, to be included in the staff's safety evaluation report:

"The steam generator blowdown system (SGBS) controls the concentration of chemical impurities and radioactive materials in the secondary coolant. The scope of review of the SGBS included piping and instrumentation diagrams, seismic and quality group classifications, design process parameters, and instrumentation and process controls. The review has included the applicant's evaluation of the proposed system operation and the applicant's estimate of the controlling process parameters.

"We have reviewed the capability of the system to process blowdown flows and to maintain secondary coolant chemical and radiological limits, and the capability of the instrumentation and process controls to maintain system operation within the proposed limits.

"The basis for acceptance in our review has been conformance of the applicant's designs and design criteria to applicable regulatory guides, staff technical positions, and industry standards.

"Based on the foregoing evaluation, we conclude that the proposed steam generator blowdown system is acceptable."

V. REFERENCES

1. Branch Technical Position ETSB 11-1 (Revision 1), "Design Guidance for Radioactive Waste Management Systems installed in Light Water Cooled Nuclear Power Reactor Plants," attached to SRP 11.2.

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SRP 10.4-9