U.S. NUCLEAR REGULATORY COMMISSION

STANDARD REVIEW PLAN

OFFICE OF NUCLEAR REACTOR REGULATION

10.4.3 TURBINE GLAND SEALING SYSTEM

REVIEW RESPONSIBILITIES

Primary - ~~Effluent Treatment Systems Branch (ETSB)~~Plant Systems Branch (SPLB)[1]

Secondary - ~~None~~Emergency Preparedness and Radiation Protection Branch (PERB)[2]

I. AREAS OF REVIEW

At the construction permit (CP) or standard design certification[3] stage of review, ~~ETSB~~SPLB reviews the information in the applicant's safety analysis report (SAR) in the specific areas that follow. At the operating license (OL) or combined license (COL)[4] stage of review, the ~~ETSB~~SPLB review consists of confirming the design accepted at the CP stage or standard design certification.[5]

The turbine gland sealing system design, design objectives, method of operation, and factors that influence gaseous radioactive material handling, e.g., source of sealing steam, system interfaces, and potential leakage paths are reviewed. The ~~ETSB~~SPLB review includes piping and instrumentation diagrams (P&IDs).

Review Interfaces[6]

1. The SPLB performs the following reviews as part of its primary review responsibility under the SRP section indicated:[7]

   A. SPLB reviews provisions for controlling the release of radioactive materials from the gland seal condenser vent ~~are reviewed in~~ as part of its primary responsibility for[8] SRP Section 11.3 ~~by ETSB~~[9].

B. SPLB reviews provisions for monitoring the release of radioactive materials from the gland seal condenser vent as part of its primary review responsibility for SRP Section 11.5.[10]

C. ~~The Auxiliary Systems Branch (ASB)~~SPLB[11] reviews the potential effect of high energy pipe breaks within this system on safety-related equipment as part of its primary review responsibility for SRP Section 3.6.1.[12]

2. In addition, the ~~ETSB~~SPLB will coordinate evaluations of other branches that interface with the overall review as follows:

A. Mechanical Engineering Branch ~~(MEB)~~(EMEB)[13] reviews systems quality group classifications as part of its primary review responsibility for SRP Section 3.2.2.

B. Quality Assurance and Maintenance Branch ~~(QAB)~~HQMB[14] reviews systems quality assurance programs as part of its primary review responsibility for SRP Sections 17.1 and 17.2.

~~The Auxiliary Systems Branch (ASB) reviews the potential effect of high energy pipe breaks within this system on safety-related equipment as part of its primary review responsibility for SRP Section 3.6.1.~~[15]

For those areas of review identified above as ~~being reviewed as~~[16] part of the primary review responsibility of other branches, the acceptance criteria necessary for the review and their methods of application are contained in the referenced SRP section of the corresponding primary review[17] branch.

II. ACCEPTANCE CRITERIA

~~ETSB~~SPLB will accept the turbine gland sealing system design if the following Commission regulations are met:

1. General Design Criterion 60, "Control of Releases of Radioactive Materials to the Environment,"[18] as it relates to the turbine gland sealing system design for the control of releases of radioactive materials to the environment.

~~2. General Design Criterion 64 as it relates to the turbine gland sealing system design for the monitoring of releases of radioactive materials to the environment.~~[19]

The requirements of ~~the Commission regulations~~GDC 60[20] ~~identified above~~ are met by using regulatory positions contained in the following regulatory guides:

A. Regulatory Guide 1.26 as it relates to the quality group classification and quality standards for the turbine gland sealing system. Group D includes water and steam containing components that contain or ~~that~~[21] may contain radioactive

materials, but are not part of the reactor coolant pressure boundary and are not important to safety.

~~B. Regulatory Guides 1.33, and 1.123 as they relate to the quality assurance programs for the turbine gland sealing system components that may contain radioactive materials.~~[22]

Specific criteria necessary to meet the relevant requirements of ~~10 CFR Part 50, Appendix A,~~[23] General Design Criteria~~a~~on 60 ~~and 64~~[24] are as follows:

The turbine gland sealing system should be designed to provide for the collection and condensation of sealing steam and the venting and treatment ~~(as required in Ref. 1)~~[25] of noncondensables. Quality Group D as defined in Regulatory Guide 1.26 ~~(Ref. 2)~~[26] and a nonseismic design classification are acceptable design criteria for this system.

2. General Design Criterion 64, "Monitoring Radioactivity Releases," as it relates to the turbine gland sealing system design for the monitoring of releases of radioactive materials to the environment.[27]

Technical Rationale

The technical rationale for application of the above acceptance criteria to the review of the turbine gland sealing system is discussed in the following paragraphs.[28]

(a) General Design Criterion 60 requires that the nuclear power unit design include means to control suitably the release of radioactive materials in gaseous and liquid effluents produced during normal operation, including anticipated operational occurrences. Sufficient holdup capacity shall be provided for retention of gaseous and liquid effluents containing radioactive materials, particularly where unfavorable site environmental conditions can be expected to impose unusual operational limitations upon the release of such effluents to the environment.

GDC 60 applies to this SRP section in that review under this section, in conjunction with review under SRP Sections 11.3 and 11.5, verifies that the design of the turbine gland sealing system includes acceptable means to control the release of radioactive materials in gaseous effluents. Regulatory Guide 1.26 provides guidance regarding quality standards for the system.

Meeting this criterion provides a level of assurance that the turbine gland sealing system is designed with proper controls over normal releases of radioactive effluents to the environment.[29]

(b) General Design Criterion 64 requires that means be provided for monitoring the reactor containment atmosphere, spaces containing components for recirculation of loss-of-coolant accident fluids, effluent discharge paths, and the plant environs for radioactivity

that may be released from normal operations, including anticipated operational occurrences, and from postulated accidents.

This GDC is applicable here because review under this SRP section, in conjunction with review under SRP Sections 11.3 and 11.5, verifies that the design provides for monitoring of releases of steam and noncondensables from the turbine gland seal system.

Meeting this requirement provides a level of assurance that normal releases of effluents containing radioactive materials will be controlled to within acceptable limits.[30]

III. REVIEW PROCEDURES

The ~~ETSB~~SPLB reviewer selects and emphasizes material from this SRP section, as may be appropriate for a particular case.

1. ~~ETSB~~SPLB reviews the equipment quality group classification to meet the guidelines of Regulatory Guide 1.26 ~~(Ref. 2)~~[31]. Exceptions are transmitted to ~~MEB~~EMEB[32], which has primary responsibility under SRP Section 3.2.2.

2. ~~ETSB~~SPLB reviews the system P&IDs to determine the source of sealing steam and the disposition of steam and noncondensables vented from the gland seal. The review includes the radiological processing and monitoring provisions in accordance with SRP Sections 11.3 and 11.5.

3. ~~ETSB reviews the quality assurance for the design, construction, and operational phases for the turbine gland sealing system according to the guidelines of Regulatory Guides and 1.123 (Refs. 3 and 4). Exceptions are transmitted to QAB which has primary responsibility under SRP Sections 17.1 and 17.2.~~[33]

For standard design certification reviews under 10 CFR Part 52, the procedures above should be followed, as modified by the procedures in SRP Section 14.3 (proposed), to verify that the design set forth in the standard safety analysis report, including inspections, tests, analysis, and acceptance criteria (ITAAC), site interface requirements and combined license action items, meet the acceptance criteria given in subsection II. SRP Section 14.3 (proposed) contains procedures for the review of certified design material (CDM) for the standard design, including the site parameters, interface criteria, and ITAAC.[34]

IV. EVALUATION FINDINGS

~~ETSB~~SPLB 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 turbine gland sealing system includes the equipment and instruments to provide a source of sealing steam to the annulus space where the turbine and large steam valve shafts penetrate their casings. The scope of our review included the source of sealing

steam and the provisions incorporated to monitor and control releases of radioactive material in effluents.

The staff concludes that the turbine gland sealing system design is acceptable in that the applicant has met the requirements of General Design Criteria 60 and 64 with respect to the control and monitoring of releases of radioactive materials to the environment by providing a controlled and monitored turbine gland sealing system.

For design certification reviews, the findings will also summarize, to the extent that the review is not discussed in other safety evaluation report sections, the staff's evaluation of inspections, tests, analyses, and acceptance criteria (ITAAC), including design acceptance criteria (DAC), site interface requirements, and combined license action items that are relevant to this SRP section.[35]

V. IMPLEMENTATION

The following is intended to provide guidance to applicants and licensees regarding the NRC staff's plans for using this SRP section.

This SRP section will be used by the staff when performing safety evaluations of license applications submitted by applicants pursuant to 10 CFR 50 or 10 CFR 52.[6] Except in those cases in which the applicant proposes an acceptable alternative method for complying with specified portions of the Commission's regulations, the method described herein will be used by the staff in its evaluation of conformance with Commission regulations.

The provisions of this SRP section apply to reviews of applications docketed six months or more after the date of issuance of this SRP section.[37]

Implementation schedules for conformance to parts of the method discussed herein are contained in the referenced regulatory guides.

VI. REFERENCES

1. 10 CFR Part 50, Appendix A, General Design Criterion 60, "Control of Releases of Radioactive Materials to the Environment~~," and General Design Criterion 64, "Monitoring Radioactivity Releases~~."

2. 10 CFR Part 50, Appendix A, General Design Criterion 64, "Monitoring Radioactivity Releases."[38]

3. Regulatory Guide 1.26, "Quality Group Classifications and Standards for Water-, Steam-, and Radioactive-Waste-Containing Components of Nuclear Power Plants."

~~4. Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation)."~~

~~5. Regulatory Guide 1.123, "Quality Assurance Requirements for Control of Procurement of Items and Services for Nuclear Power Plants."~~[39]

[This Page Intentionally Left Blank]

SRP Draft Section 10.4.3
Attachment A - Proposed Changes in Order of Occurrence

Item numbers in the following table correspond to superscript numbers in the redline/strikeout copy of the draft SRP section.

Item	Source	Description
1.	Current PRB name and abbreviation.	Editorial change to reflect current PRB name and abbreviation, SPLB (global change for this section).
2.	SRP-UPD format item.	Added secondary review branch (PERB) per guidance from NRC. Note that no responsibility for PERB appears anywhere in the SRP.
3.	SRP-UDP format item	Added reference to standard design certification stage of review.
4.	SRP-UDP format item	Added reference to the combined license (COL) stage of review.
5.	SRP-UDP format item	Added reference to standard design certification stage of review.
6.	SRP-UDP Update item.	Added Review Interfaces subsection under Areas of Review.
7.	SRP-UPD format item.	Added boiler plate introductory paragraph for review interfaces.
8.	Editorial revision.	Changed the order of the related SRP sections and added words as necessary for consistent interface descriptions.
9.	Current PRB designation.	This review is now the responsibility of the PRB, SPLB.
10.	Editorial addition.	Added a review interface for SRP 11.5 because SRP 11.5 is mentioned in the Review Procedures Section.
11.	Current PRB designation.	Changed the PRB designation to SPLB.
12.	Edited for clarity.	This paragraph was moved forward in the text to group SPLB primary responsibilities together and SPLB coordinating responsibilities together.
13.	Current interfacing review branch designation.	Changed the interfacing review branch designation to EMEB.
14.	Current interfacing review branch designation.	Changed the interfacing review branch designation to HQMB.
15.	Editorial revision.	Moved review of SRP Section 3.6.1 up in the list of interfaces since SPLB now has primary responsibility for this review.
16.	Editorial deletion.	Deleted excess verbiage for clarity.
17.	Editorial addition.	Changed "primary branch" to "primary review branch" for clarity.
18.	Editorial addition.	Added title of GDC 60 to aid reviewer.

Item	Source	Description
19.	Editorial deletion.	This paragraph which addresses GDC 64 is moved to the bottom of the Acceptance Criteria section so that the material applicable only to GDC 60 will appear together.
20.	Editorial revision.	Limited the reference to GDC 60 since the regulatory guides which follow do not address the concerns of GDC 64.
21.	Editorial addition.	Added information explaining the applicability of Regulatory Guide 1.26.
22.	SPLB recommendation	Deleted references to Regulatory Guides from 1.123 and 1.33. Primary basis: Quality Assurance is adequately covered by HQMB as part of its primary review responsibility for SRP Sections 17.1 and 17.2.
23.	Editorial deletion.	Deleted unnecessary citation of 10 CFR Part 50, Appendix A as location of GDC 60.
24.	Editorial deletion.	Deleted the reference to GDC 64 because nothing that follows is relevant to GDC 64. GDC 64 requires monitoring of releases.
25.	Editorial deletion.	Deleted the reference because referring to GDC 60 twice in the same paragraph is repetitive and confusing.
26.	Editorial deletion.	Deleted obvious reference for Regulatory Guide 1.26.
27.	Editorial revision.	Moved this paragraph on GDC 64 here from nearer the top of the Acceptance Criteria section to separate it from the GDC 60 guidance. The title of GDC 64 is inserted to aid the reviewer.
28.	SRP-UPD format item.	Added subsection titled "Technical Rationale." Inserted standard introductory paragraph.
29.	SRP-UPD format item to develop technical rationale for acceptance criteria.	Added technical rationale related to GDC 60, Control of Releases of Radioactive Materials to the Environment.
30.	SRP-UPD format item to develop technical rationale for acceptance criteria.	Added technical rationale related to GDC 64, Monitoring Radioactivity Releases.
31.	Editorial deletion.	Deleted obvious reference to Regulatory Guide 1.26.
32.	Current interfacing review branch designation.	Changed the interfacing review branch designation to EMEB.
33.	SPLB recommendation	Deleted references to Regulatory Guides from 1.123 and 1.33. Primary basis: Quality Assurance is adequately covered by HQMB as part of its primary review responsibility for SRP Sections 17.1 and 17.2.

Item	Source	Description
34.	SRP-UDP Guidance, Implementation of 10 CFR 52	Added standard paragraph to address application of Review Procedures in design certification reviews.
35.	SRP-UPD format item.	Inserted standard paragraph giving additional findings for a design certification review.
36.	SRP-UDP Guidance, Implementation of 10 CFR 52	Added standard sentence to address application of the SRP section to reviews of applications filed under 10 CFR Part 52, as well as Part 50.
37.	SRP-UDP Guidance	Added standard paragraph to indicate applicability of this section to reviews of future applications.
38.	Editorial addition.	Listed a separate reference to GDC 64. Renumbered remaining references.
39.	SPLB recommendation	Deleted references to Regulatory Guides from 1.123 (Reference 5) and 1.33 (Reference 4). Primary basis: Quality Assurance is adequately covered by HQMB as part of its primary review responsibility for SRP Sections 17.1 and 17.2.

[This Page Intentionally Left Blank]

Integrated Impact No.	Issue	SRP Subsections Affected
538	Delete reference to Regulatory Guide 1.123 and substitue Regulatory Guide 1.28 therefor. The proposed action was preempted by an SPLB recommendation to delete all references to RGs 1.123 and 1.33 within SRP Sections 10.4.2 and 10.4.3, primarily on the basis that Quality Assurance is adequately covered in SRP Sections 17.1 and 17.2.	II.2; III.4; VI.4 and 5.