



U.S. NUCLEAR REGULATORY COMMISSION

STANDARD REVIEW PLAN

10. 4. 3 TURBINE GLAND SEALING SYSTEM

REVIEW RESPONSIBILITIES

Primary - Organization responsible for the review of the turbine gland sealing system associated with the balance of the plant.

Secondary - None

I. AREAS OF REVIEW

The turbine gland sealing system (TGSS) is designed to provide a source of sealing steam to the annulus space where the turbine and large steam valve shafts penetrate their casings to prevent air leakage into and steam leakage out of these components. This includes the equipment to collect and route the systems effluents to the appropriate destination. Review of the TGSS is focused on the system features incorporated to monitor and control releases of radioactive materials in effluents.

The specific areas of review are as follows:

1. The 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. The review includes piping and instrumentation diagrams (P&IDs).

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USNRC STANDARD REVIEW PLAN

This Standard Review Plan, NUREG-0800, has been prepared to establish criteria that the U.S. Nuclear Regulatory Commission staff responsible for the review of applications to construct and operate nuclear power plants intends to use in evaluating whether an applicant/licensee meets the NRC's regulations. The Standard Review Plan is not a substitute for the NRC's regulations, and compliance with it is not required. However, an applicant is required to identify differences between the design features, analytical techniques, and procedural measures proposed for its facility and the SRP acceptance criteria and evaluate how the proposed alternatives to the SRP acceptance criteria provide an acceptable method of complying with the NRC regulations.

The standard review plan sections are numbered in accordance with corresponding sections in the Regulatory Guide 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (LWR Edition)." Not all sections of the standard format have a corresponding review plan section. The SRP sections applicable to a combined license application for a new light-water reactor (LWR) will be based on Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)," until the SRP itself is updated.

These documents are made available to the public as part of the NRC's policy to inform the nuclear industry and the general public of regulatory procedures and policies. Individual sections of NUREG-0800 will be revised periodically, as appropriate, to accommodate comments and to reflect new information and experience. Comments may be submitted electronically by email to NRR_SRP@nrc.gov.

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2. Inspection, Test, Analysis, and Acceptance Criteria (ITAAC). For design certification (DC) and combined license (COL) reviews, the applicant's proposed information on the ITAAC associated with the systems, structures, and components (SSCs) related to this SRP section is reviewed in accordance with SRP Section 14.3, "Inspections, Tests, Analyses, and Acceptance Criteria - Design Certification." The staff recognizes that the review of ITAAC is performed after review of the rest of this portion of the application against acceptance criteria contained in this SRP section. Furthermore, the ITAAC are reviewed to assure that all SSCs in this area of review are identified and addressed as appropriate in accordance with SRP Section 14.3.
3. COL Action Items and Certification Requirements and Restrictions. COL action items may be identified in the NRC staff's final safety evaluation report (FSER) for each certified design to identify information that COL applicants must address in the application. Additionally, DCs contain requirements and restrictions (e.g., interface requirements) that COL applicants must address in the application. For COL applications referencing a DC, the review performed under this SRP section includes information provided in response to COL action items and certification requirements and restrictions pertaining to this SRP section, as identified in the FSER for the referenced certified design.

Review Interfaces

The listed SRP sections interface with this section as follows:

1. Review of the acceptability of the seismic and quality group classifications is performed under SRP Sections 3.2.1 and 3.2.2.
2. Review of the potential effects of high energy pipe breaks within this system on safety-related equipment is performed under SRP Section 3.6.1.
3. Review of the provisions for controlling the release of radioactive materials from the gland seal condenser vent is performed under SRP Section 11.3.
4. Review of the provisions for process and effluent radiological monitoring of the TGSS is performed under SRP Section 11.5.
5. Review of the systems quality assurance programs is performed under SRP Chapter 17.

The specific acceptance criteria and review procedures are contained in the referenced SRP sections.

II. ACCEPTANCE CRITERIA

Requirements

Acceptance criteria are based on meeting the relevant requirements of the following Commission regulations:

1. General Design Criterion 60, "Control of Releases of Radioactive Materials to the Environment," as it relates to the TGSS design for the control of releases of radioactive materials to the environment.

2. 10 CFR 52.47(a)(1)(vi), as it relates to ITAAC (for design certification) sufficient to assure that the SSCs in this area of review will operate in accordance with the certification.
3. 10 CFR 52.97(b)(1), as it relates to ITAAC (for combined licenses) sufficient to assure that the SSCs in this area of review have been constructed and will be operated in conformity with the license and the Commission's regulations.

SRP Acceptance Criteria

Specific SRP acceptance criteria acceptable to meet the relevant requirements of the NRC's regulations identified above are as follows for each review described in Subsection I of this SRP section. The SRP is not a substitute for the NRC's regulations, and compliance with it is not required. However, an applicant is required to identify differences between the design features, analytical techniques, and procedural measures proposed for its facility and the SRP acceptance criteria and evaluate how the proposed alternatives to the SRP acceptance criteria provide acceptable methods of compliance with the NRC regulations.

There is no specific acceptance criteria associated with this SRP section.

Technical Rationale

The technical rationale for application of these requirements and/or SRP acceptance criteria to the areas of review addressed by this SRP section is discussed in the following paragraphs:

1. 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.

GDC 60 is applicable to the design of the TGSS because one of the systems functions is to prevent the release of radioactive materials to the environment. Review under this SRP section, in conjunction with review under SRP Section 11.3, verifies that the design of the TGSS includes acceptable means to control the release of radioactive materials in gaseous effluents.

Meeting this criterion provides a level of assurance that the TGSS is designed with proper controls over normal releases of radioactive effluents to the environment.

III. REVIEW PROCEDURES

The reviewer will select and emphasize material from the procedures described below, as may be appropriate for a particular case.

For each area of review specified in subsection I of this SRP section, the review procedure is identified below. These review procedures are based on the identified SRP acceptance criteria. For deviations from these specific acceptance criteria, the staff should review the applicant's evaluation of how the proposed alternatives to the SRP criteria provide an acceptable method of complying with the relevant NRC requirements identified in subsection II.

The application as it relates to the TGSS is reviewed to verify that:

1. The P&IDs reflect the source of sealing steam and the disposition of steam and noncondensables vented from the gland seal.

2. For reviews of DC and COL applications under 10 CFR Part 52, the reviewer should follow the above procedures to verify that the design set forth in the safety analysis report, and if applicable, site interface requirements meet the acceptance criteria. For DC applications, the reviewer should identify necessary COL action items. With respect to COL applications, the scope of the review is dependent on whether the COL applicant references a DC, an ESP or other NRC-approved material, applications, and/or reports.

After this review, SRP Section 14.3 should be followed for the review of Tier I information for the design, including the postulated site parameters, interface criteria, and ITAAC.

IV. EVALUATION FINDINGS

The reviewer verifies that the applicant has provided sufficient information and that the review and calculations (if applicable) support conclusions of the following type to be included in the staff's safety evaluation report. The reviewer also states the bases for those conclusions.

The turbine gland sealing system (TGSS) 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 control releases of radioactive material in effluents.

The staff concludes that the TGSS design is acceptable in that the applicant has met the requirements of General Design Criteria 60 with respect to the design features in place to control releases of radioactive materials to the environment.

For DC and COL reviews, the findings will also summarize (to the extent that the review is not discussed in other SER sections) the staff's evaluation of the ITAAC, including design acceptance criteria, as applicable, and interface requirements and combined license action items relevant to this SRP section.

V. IMPLEMENTATION

The staff will use this SRP section in performing safety evaluations of DC applications and license applications submitted by applicants pursuant to 10 CFR Part 50 or 10 CFR Part 52. Except when the applicant proposes an acceptable alternative method for complying with specified portions of the Commission's regulations, the staff will use the method described herein to evaluate 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, unless superceded by a later revision.

VI. REFERENCES

1. 10 CFR Part 50, Appendix A, General Design Criterion 60, "Control of Releases of Radioactive Materials to the Environment."
2. 10 CFR Part 52 "Early Site Permits; Standard Design Certifications; And Combined Licenses For Nuclear Power Plants."

PAPERWORK REDUCTION ACT STATEMENT

The information collections contained in the draft Standard Review Plan are covered by the requirements of 10 CFR Part 50 and 10 CFR Part 52, and were approved by the Office of Management and Budget, approval number 3150-0011 and 3150-0151.

PUBLIC PROTECTION NOTIFICATION

The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid OMB control number.

SRP Section 10.4.3 Description of Changes

This SRP section affirms the technical accuracy and adequacy of the guidance previously provided in (Draft) Revision 3, dated June 1996 of this SRP. See ADAMS accession number ML052070591.

In addition this SRP section was administratively updated in accordance with NRR Office Instruction, LIC-200, Revision 1, "Standard Review Plan (SRP) Process." The revision also adds standard paragraphs to extend application of the updated SRP section to prospective submittals by applicants pursuant to 10 CFR Part 52.

The technical changes are incorporated in Revision 3, dated 2007:

Review Responsibilities - Reflects changes in review branches resulting from reorganization and branch consolidation. Change is reflected throughout the SRP.

I. AREAS OF REVIEW

Introduction re-written to be more inclusive, and for clarity and consistency.

Added interface with SRP section 3.2.1.

II. ACCEPTANCE CRITERIA

Removed GDC 64 because it is covered in SRP 11.5, Interface #4.

Removed Regulatory Guide 1.26 because it is covered in SRP Section 3.2.2, Interface #1.

Removed Regulatory Guides 1.33 and 1.123 because they are covered in SRP Chapter 17, Interface #5.

Removed quality group classifications and seismic criteria because they are covered in SRP Sections 3.2.1 and 3.2.2, Interface #1.

III. REVIEW PROCEDURES

Removed information about quality group classifications, and quality assurance because it is redundant, they are covered in SRP Sections 3.2.1 and 3.2.2, Interface #1 and SRP Chapter 17.

IV. EVALUATION FINDINGS

V. IMPLEMENTATION

VI. REFERENCES