

# INTERIM STAFF GUIDANCE ON THE STREAMLINED REVIEW PROCESS FOR LICENSE RENEWAL FOR RESEARCH REACTORS

October 2009

## **Introduction**

In SECY-08-0161, "Review of Research and Test Reactor License Renewal Applications," dated October 24, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML082550140), the staff of the U.S. Nuclear Regulatory Commission (NRC) provided the Commission with plans to improve the review of license renewal applications for research and test reactors (RTRs). The Commission issued a Staff Requirements Memorandum (SRM) for SECY-08-0161 on March 26, 2009 (ADAMS Accession No. ML090850159). The SRM directs the staff to streamline the RTR renewal process, using some combination of the options presented in SECY-08-0161. The SRM also directs the staff to focus the streamlined renewal process on the most safety-significant aspects of the license renewal application. In addition, the SRM states that the staff should implement a graded approach with a scope commensurate with the risk posed by each facility and should use risk insights from the RTR security assessments to inform the establishment of a dose threshold as a measure of risk. The graded approach should incorporate elements of the alternative safety review approach discussed in Enclosure 1 of SECY-08-0161. In the alternative safety review approach, the staff considers the results of past NRC staff evaluations when determining the scope of the review. A basic requirement of the SRM is that licensees be in compliance with applicable regulations.

The purpose of this guidance is to present a streamlined review process that the staff will apply to license renewal applications in the backlog, in accordance with Commission and management direction. This guidance is a change in process for those licensees that will undergo the "focused review" described in detail below.

This guidance is based on the RTR license application format and content guidance and standard review plan (SRP) found in NUREG-1537, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors," issued February 1996.

## **General Approach to the Streamlined Review Process for License Renewal**

In keeping with the Commission's direction, a graded approach based on the licensed power level determines the license renewal process applied to each licensee. Facilities are divided into two tiers. Facilities with licensed power levels of 2 megawatts thermal (MW(t)) and greater undergo a full review using the SRP. Facilities with licensed power of less than 2 MW(t) undergo a review that focuses on the most safety-significant aspects of the renewal application and considers past NRC reviews.

A power level of 2 MW(t) or greater is a longstanding regulatory demarcation of risk. The inspection program uses this power level to define Class I reactors, where the staff completes the inspection program on an annual cycle rather than biennially, as is the case for reactors with a power level of less than 2 MW(t). In addition, these facilities have emergency planning zones that extend beyond the facility boundary, unlike lower powered RTRs. This demarcation also recognizes that fission product inventories increase with power levels. Fission product inventory

is related to the potential dose under accident conditions. This demarcation is also consistent with insights gained from the RTR security assessments. Reactors at or above this power level have enhanced security requirements and need to protect against sabotage, in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 73.60(f).

### **Focused License Renewal Review**

For reactors with power levels of less than 2 MW(t), the primary focus of the review is on the sections of the safety analysis report (SAR) that are most significant to safety:

- reactor design and operation
- accident analysis
- technical specifications (TSs)

The staff will also review radiation protection, waste management programs, and financial requirements. The review of the radiation protection and waste management programs will include the results of the RTR inspection program.

The NRC Staff will use the applicable sections of the SRP to perform the review. The attachment, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors, Part Two, Standard Review Plan and Acceptance Criteria, Focused License Renewal Review" (focused review plan), provides guidance to the NRC reviewer on using the SRP to conduct a focused review. The regulations in 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," also require an environmental assessment (EA).

The review of the reactor design and operation will focus on Chapter 4 of the SAR, which includes the reactor core; reactor fuel; control rods; neutron moderator and reflector; normal operating conditions, such as shutdown margin and excess reactivity; core physics parameters; operating limits; and, thermal-hydraulic design. Some reviews may require the NRC staff to develop independent neutronic and thermal-hydraulic models to verify the licensee's analysis. The accident analysis section, Chapter 13 of the SAR, includes an evaluation of the maximum hypothetical accident, and, if applicable to the design under review, insertion of reactivity, loss of coolant, loss of flow, mishandling of fuel, experiment malfunction, loss of electrical power, and external events.

Accident evaluation could involve the partial review of other chapters in the SAR; for example, engineered safety features, if credited to mitigate the consequences of an accident.

The TSs review is based on the guidance in Chapter 14 of the SRP and the American National Standards Institute/American Nuclear Society standard, ANSI/ANS-15.1-2007, "The Development of Technical Specifications for Research Reactors." The TSs review will ensure compliance with 10 CFR 50.36, "Technical Specifications." The review of the TSs and their bases may involve sections of many chapters of the SAR. However, the staff will review these other SAR chapters only to the extent needed to confirm that the proposed TSs are acceptable and have sufficient bases.

Except as needed to accomplish the review of the focus areas discussed above, the staff will not conduct an indepth review of site characteristics; design of structures, systems, and

components (SSCs); reactor coolant systems; instrumentation and control systems; electrical power systems; auxiliary systems; experimental facilities and programs; and conduct of operations. Generally, the NRC staff has already reviewed these areas, either as part of the initial licensing review for the facility or as part of a past license renewal, and found them acceptable. If, outside the scope of the current focused review, any changes were made in these areas since the last NRC initial or renewal review, the NRC may have reviewed them as part of a license amendment, or they were made under the authority of the regulations in 10 CFR 50.59, "Changes, Tests, and Experiments." The NRC would have inspected the licensee's process for conducting 10 CFR 50.59 reviews, and the facility project manager would have screened the technical evaluations. If the reviewer is not able to confirm that an acceptable review was completed in the past that can form the basis of a finding of reasonable assurance of protection of public health and safety, the reviewer should make management aware of this issue. A more indepth review may be necessary.

Because the focused review does not cover all areas of the SAR, the NRC reviewer should ascertain if the licensee has requested any changes to the facility in the renewal SAR, outside the areas of the focused review. The reviewer should send a request for additional information (RAI) to the licensee, asking it to identify changes, if any, other than in Chapters 4, 13, and 14 of the SAR (e.g., power increases). If the licensee identifies any changes, the staff will decide, on a case-by-case basis, either to review and approve the changes as part of license renewal or to require a separate license amendment request.

The license renewal reviews will meet the requirements of the National Environmental Policy Act. The regulations in 10 CFR 51.21, "Criteria for and Identification of Licensing and Regulatory Actions Requiring Environmental Assessments," require an EA for research reactor license renewal. Because of the low power levels of research reactors and consequent low water usage and heat dissipation, the EA review focuses on radiological environmental impacts. These include gaseous, liquid, and solid wastes and potential doses to members of the public and facility personnel from routine operations and accidents. As part of the EA, the NRC may need to review routine releases from the facility described in Chapter 11 of the SAR.

### **Regulations Applicable to License Renewal**

The following regulatory requirements apply to the RTR license renewal process:

- 10 CFR 50.30, "Filing of Application for Licenses; Oath or Affirmation," paragraph (f), requires an environmental report in the license renewal application for a test reactor but not for a research reactor.
- 10 CFR 50.32, "Elimination of Repetition," allows the licensee to incorporate by reference information filed previously.
- 10 CFR 50.33, "Contents of Applications; General Information," contains three major requirements:
  - Paragraphs (a) through (e) require information regarding identity, citizenship, affiliation, and proposed use.

- Paragraph (f) requires financial information to demonstrate that the licensee can support operation of the RTR facility for the duration of the license period.
- Paragraph (k) requires a report pursuant to 10 CFR 50.75, “Reporting and Recordkeeping for Decommissioning Planning,” giving assurance that funds will remain available for decommissioning the facility.
- 10 CFR 50.34, “Contents of Applications; Technical Information,” contains the following relevant parts pertaining to license renewal applications for RTRs:
  - Paragraph (b) requires a final SAR, the content of which is defined in the following subparts of the regulation and is similar to those specified in the SRP for RTRs:
    - (1) results of environmental and meteorological monitoring programs
    - (2) analysis of SSCs
    - (3) radioactive material inventory, effluents, and limiting exposure
    - (4) analysis and evaluation of SSCs and the emergency core cooling system
    - (5) facility operation, including:
      - organizational structure
      - personnel qualifications
      - management and administrative controls
      - conduct of operations, including maintenance, surveillance, and periodic testing of SSCs
      - emergency plans, pursuant to Appendix E
      - proposed technical specifications, pursuant to 10 CFR 50.36
    - (6) technical qualifications of the licensee
    - (7) reactor operator requalification program, pursuant to 10 CFR 55.59, “Requalification”
  - Paragraph (c) requires a physical security plan.
  - Paragraph (e) requires the protection of Safeguards Information.
- 10 CFR 50.40, “Common Standards [Standards for Licenses, Certificates, and Regulatory Approvals],” states that, in issuing an operating license, the Commission will be guided by the following considerations:

- Paragraph (a) requires a finding that “...the processes to be performed, the operating procedures, the facilities and equipment, the use of the facility, and other technical specifications...collectively provide reasonable assurance that the licensee will comply with the regulations in this chapter, including the regulations in part 20 of this chapter, and that the health and safety of the public will not be endangered.”
  - Paragraph (b) requires a finding that “The licensee...is technologically and financially qualified...”
  - Paragraph (c) requires a finding that the issuance of an operating license will not, in the opinion of the Commission, be inimical to the common defense and security or to public health and safety.
  - Paragraph (d) requires a finding that the requirements of Subpart A of 10 CFR Part 51 be met.
- 10 CFR 50.41, “Additional Standards for Class 104 Licenses,” adds that, in the case of Class 104 licenses [RTR licenses], the Commission will permit the widest amount of effective medical therapy possible and will permit the conduct of widespread and diverse research and development.
  - 10 CFR 50.51, “Continuation of License,” states that each license will be issued for a fixed period of time, not to exceed 40 years, and may be renewed by the Commission upon expiration of the period.
  - 10 CFR 50.54, “Conditions of Licenses,” requires (i) licensed operators at the controls, (i-1) a reactor operator requalification plan, (p) a security plan, and (q) an emergency plan. Licensees are allowed to make changes to plans that do not decrease their effectiveness.
  - 10 CFR 50.58, “Hearings and Report of the Advisory Committee on Reactor Safeguards,” states that the license renewal application for a test reactor must go before the Advisory Committee on Reactor Safeguards but has no such requirement for a license renewal application for a research reactor.
  - 10 CFR 50.64, “Limitations on the Use of Highly Enriched Uranium (HEU) in Domestic Non-Power Reactors,” does not allow construction of a non-power reactor using HEU, other than a unique-purpose reactor, and states the conversion implementation requirements for existing HEU-fueled reactors.
  - 10 CFR 50.91, “Notice for Public Comment; State Consultation,” states requirements for public notices regarding amendments to test reactor licenses. It does not apply to research reactors.
  - 10 CFR 51.20, “Criteria for and Identification of Licensing and Regulatory Actions Requiring Environmental Impact Statements,” paragraph (b)(2), requires an

environmental impact statement for a test reactor license renewal application. It does not apply to research reactors.

- 10 CFR 51.21, "Criteria for and Identification of Licensing and Regulatory Actions Requiring Environmental Assessments," requires EAs as part of the application process for the renewal of research reactor licenses.
- 10 CFR 51.22, "Criterion for Categorical Exclusion; Identification of Licensing and Regulatory Actions Eligible for Categorical Exclusion or Otherwise Not Requiring Environmental Review," delineates actions that do not require environmental reviews.

### **Use of Past NRC Licensing Reviews**

Washington State University, Texas A&M TRIGA, University of Florida, and Purdue University have converted their reactors from HEU fuel to low-enriched uranium (LEU) fuel. The reviews of the applications for conversion covered a substantial part of Chapters 4 and 13 of the SAR, and the safety evaluation reports (SERs) can be used directly in the renewal SER. The conversion SER for license conditions and TSs affected by the conversion can also be used for the license renewal, if the licensee has proposed no changes in those areas. Applicable sections of the focused review plan give additional information.

Some sections of the focused review plan give the reviewer the option of using the last NRC evaluation to assist in the review of the section. The past NRC review, unless identified as an HEU-to-LEU conversion in the focused review plan, is either the last license renewal, or, for those facilities where this is the first license renewal, the initial licensing review. License renewals performed since the early 1980s have complete SERs, usually in the form of a NUREG-series document, and their use may increase review efficiency. For those facilities where the last NRC review was the initial licensing dating back to the 1950s or 1960s, the Atomic Energy Commission (precursor to the NRC) staff review was usually a concise document that may not contain sufficient detail to allow the reviewer to reach clear conclusions. In this case, the reviewer may find it more efficient to perform a review based on the SAR.

### **Treatment of License Renewal Applications Already in Process**

Many of the backlogged license renewal applications have undergone some level of NRC staff review. Many of these reviews are at the RAI stage, where the staff has asked the licensee a substantial number of questions, many of which are technically complex.

A letter from the staff should inform affected licensees that work on any outstanding RAIs that have not been answered should be suspended. Some of these RAIs may be outside the scope of the focused review. The licensee will receive a new RAI if the focused review identifies the need for additional information. For those outstanding RAIs that will go unanswered because they are not repeated as part of the focused review RAIs, the NRC reviewer may prepare a short note to be placed on the docket explaining why the questions have been eliminated.

For those RAIs where the licensee has submitted answers, the NRC staff should review the answers for correct information. If the NRC believes that an answer is incorrect, the NRC reviewer can ask the question in a focused review RAI. This will prevent incorrect information

from remaining uncorrected on the docket. The staff may decide not to include discussions of out-of-scope RAIs in the SER.

### **Opportunity for Hearing**

If a notice has appeared in the *Federal Register* giving interested parties the opportunity for a hearing on a license renewal application, the application does not need to be renoticed because of the introduction of the streamlined review process. The streamlined review process does not change the contents of any license renewal application previously submitted and therefore should not affect the scope of issued *Federal Register* notices for license renewal applications.

### **Power Increases**

The applications for license renewal from the Dow Chemical Company, University of Utah, Reed College, and Purdue University also contain a request for an increase in the licensed power level. The staff will review the license renewal at the increased power level. Because the requested power increase has the potential to affect almost all chapters of the SAR, these applications will undergo a complete review, in accordance with the SRP.

### **Format of Renewal Safety Evaluation Report**

The conclusions of the focused review will be documented in an SER in much the same way as is currently done for the conclusions of a full review done under the SRP (NUREG-1537), with the exception that the traditional 18-chapter version will be reduced to a 7-chapter version of the SER, as follows:

Chapter 1	Introduction	(Similar to current Chapter 1)
Chapter 2	Reactor	(Similar to current Chapter 4)
Chapter 3	Radiation Protection	(Similar to current Chapter 11)
Chapter 4	Technical Specifications	(Contains a detailed discussion of TSs and basis)
Chapter 5	Accident Analysis	(Similar to current Chapter 13)
Chapter 6	Conclusions	(Similar to current Chapter 17)
Chapter 7	References	(Similar to current Chapter 18)

**NUREG-1537**

**GUIDELINES FOR PREPARING AND  
REVIEWING APPLICATIONS FOR THE LICENSING  
OF NON-POWER REACTORS**

**PART TWO**

**STANDARD REVIEW PLAN AND  
ACCEPTANCE CRITERIA**

**FOCUSED LICENSE RENEWAL REVIEW**

**OCTOBER 2009**

The following sections match the chapters in the standard review plan (SRP), NUREG-1537, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors," issued February 1996, by the U.S. Nuclear Regulatory Commission (NRC).

Many sections of this supplement discuss possible technical specifications (TSs). This discussion is based on the current version of the American National Standards Institute/American Nuclear Society standard on TSs, ANSI/ANS-15.1-2007, "The Development of Technical Specifications for Research Reactors." The licensee may have proposed additional TSs beyond those discussed in this supplement. The licensee's TSs may also be arranged and worded differently from the standard. The reviewer should consider the TSs in their entirety and use technical judgment to determine if the TSs, as proposed by the licensee, meet the requirements of the regulations.

For review areas not undergoing an indepth review, the detailed review in those areas is usually limited to TSs. However, for many review areas, there is not normally TSs. In that case, the review in that area is based on past NRC review and review of changes as discussed below.

The NRC reviewer must conclude that there is reasonable assurance that the activities authorized by the renewed license can be conducted without endangering the health and safety of the public and that the licensee will conduct such activities in compliance with the rules and regulations of the Commission. While this is a focused review, the NRC reviewer is expected to review the entire safety analysis report (SAR). This plan identifies which review areas are outside its scope. These areas will not be subject to an indepth review. If there is information in these areas of the SAR that would prevent the reviewer from reaching the primary conclusion above, he or she should bring the issue to management for disposition.

For many of the review areas, an indepth review is not required based on the reviewer concluding that NRC reached an acceptable conclusion during a past review and changes, if any, that have occurred since the last review are acceptable. If the reviewer is not able to confirm that an acceptable review was completed in the past that can form the basis of a finding of reasonable assurance of protection of public health and safety, the reviewer should make management aware of this issue. A more indepth review may be necessary.

## 1. INTRODUCTION

This chapter of the safety evaluation report (SER) provides an overview of the NRC staff's review. Because Chapter 1 of the SAR is an overview or an executive summary of topics covered in detail in other chapters, it is consistent with a focused review for the NRC reviewer to review this chapter for information only and not perform a detailed evaluation. The detailed chapters below discuss areas of review important to reaching safety conclusions. Chapter 1 of the focused SER should follow the format below to provide the reader with background information on the facility under review.

### 1.1 Overview

Section 1.1 of the SAR is an introduction and the NRC reviewer does not need to include it as part of a focused review. Section 1.1 of the SER is an overview and introduction to the SER. A template for Section 1.1 of the SER is presented below. Brackets contain review-dependent information that the NRC reviewer should address when it is pertinent to the license renewal application under review.

START OF SER SECTION 1.1 TEMPLATE.

### 1.1 Overview

By letter and supporting documentation dated [PROVIDE DATES], as supplemented, [LICENSEE NAME] ([LICENSEE ACRONYM] or the licensee) submitted to the U.S. Nuclear Regulatory Commission (NRC or the Commission) an application for a 20-year renewal of the Class 104c Facility Operating License No. [LICENSE NUMBER] (NRC Docket No. 50-[DOCKET NUMBER]) for the [REACTOR NAME] ([REACTOR NAME ACRONYM] or the facility).

The regulations in Title 10 of the *Code of Federal Regulations* (10 CFR) 50.51(a) state that each license will be issued for a period of time to be specified in the license but in no case to exceed 40 years from the date of issuance. The [LICENSEE NAME] facility license was issued on [PROVIDE DATE], for a period of [PROVIDE NUMBER OF YEARS] years, expiring on [PROVIDE DATE]. A renewal would authorize continued operation by issuance of a renewed license for the [PROVIDE TYPE (e.g., TRIGA)]-type research reactor facility. The facility is located in [PROVIDE BUILDING, BUILDING LOCATION, AND CITY, STATE]. Because the request for license renewal was filed in a timely manner, until the staff completes action on the renewal request, the licensee is permitted to continue operation of the [REACTOR NAME] under the terms and conditions of the existing license, in accordance with 10 CFR 2.109, "Effect of Timely Renewal Application."

The NRC staff's (the staff) review, with respect to renewing the [LICENSEE NAME] operating license, was conducted on the basis of information contained in the renewal application, as well as supporting supplements and licensee responses to requests for additional information (RAIs). Specifically, the renewal application included the safety analysis report (SAR), an environmental report, technical specifications (TSs) [LIST OTHER ASPECTS OF THE

APPLICATION—COULD INCLUDE OPERATOR REQUALIFICATION PROGRAM, EMERGENCY PLAN, AND SECURITY PLAN]. As part of the review, the staff also reviewed annual reports of the facility operation submitted by the licensee and inspection reports prepared by NRC personnel. Several site visits were conducted at the facility to observe facility conditions.

[ADD IF APPLICABLE “With the exception of the physical security plan and emergency plan,”] This material may be examined and/or copied, for a fee, at the NRC’s Public Document Room, located at One White Flint North, 11555 Rockville Pike (first floor), Rockville, MD. The NRC maintains an Agencywide Documents Access and Management System (ADAMS) that provides text and image files of the NRC’s public documents. Documents related to this license renewal may be accessed through the NRC’s Public Electronic Reading Room on the Internet at <http://www.nrc.gov>. If you do not have access to ADAMS, or if there are problems in accessing the documents located in ADAMS, contact the NRC Public Document Room reference staff at 1-800-397-4209 or 301-415-4737 or by e-mail to [pdr@nrc.gov](mailto:pdr@nrc.gov). [ADD, IF APPLICABLE, “The physical security plan is protected from public disclosure under 10 CFR 73.21, “Requirements for the Protection of Safeguards Information.” OR “The physical security plan is protected from public disclosure under 10 CFR 2.390(d)(1).” AND/OR “The emergency plan is withheld from public disclosure, as it is considered Security-Related Information.”] Parts of the SAR and RAI responses from the licensee contain Security-Related Information and are protected from public disclosure.

The dates and associated ADAMS accession numbers of the licensee’s renewal application and associated supplements are listed in Chapter 7, “References.”

In conducting its safety review, the staff evaluated the facility against the requirements of the regulations, including 10 CFR Parts 20, 30, 50, 51, and 70; applicable regulatory guides; and relevant accepted industry standards, such as the American National Standards Institute/American Nuclear Society (ANSI/ANS) 15 series. The staff also referred to the guidance contained in NUREG-1537, “Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors,” issued February 1996. Because there are no specific accident-related regulations for research reactors, the staff compared calculated dose values for accidents against the requirements in 10 CFR Part 20, “Standards for Protection Against Radiation” (i.e., the standards for protecting employees and the public against radiation).

The NRC used the focused review process to renew this license. In SECY-08-0161, “Review of Research and Test Reactor License Renewal Applications,” dated October 24, 2008 (ADAMS Accession No. ML082550140), the NRC staff provided the Commission with information regarding staff plans to improve the review of license renewal applications for research and test reactors (RTRs). The staff requirements memorandum (SRM) for SECY-08-0161 was issued on March 26, 2009 (ADAMS Accession No. ML090850159). The SRM directed the staff to streamline the RTR renewal process, using some combination of the options presented in SECY-08-0161. The focused review

process limits review to the most safety-significant aspects of the license renewal application. The SRM directs the staff to implement a graded approach with a scope commensurate with the risk posed by each facility. The graded approach incorporates elements of the alternative safety review approach discussed in Enclosure 1 of SECY-08-0161. In the alternative safety review approach, the staff considers the results of past NRC staff evaluations when determining the scope of the review. A basic requirement, as contained in the SRM, is that licensees be in compliance with applicable regulatory requirements.

The NRC developed interim staff guidance (ISG) (ADAMS Accession No. ML092240244) to assist its staff in the review of license renewal applications using a focused license renewal approach. The NRC made a draft of the ISG available for public comment and considered public comments in its development of the final ISG. This review was conducted using the final ISG.

The purpose of this safety evaluation report (SER) is to summarize the findings of the safety review of the [LICENSEE NAME REACTOR FACILITY] and to delineate the technical details considered in evaluating the radiological safety aspects of continued operation. This SER provides the basis for renewing the license for operation of the [LICENSEE NAME REACTOR FACILITY] at thermal power levels up to and including [GIVE FACILITY LICENSED POWER LEVEL AND PULSE LIMITS, IF APPLICABLE (e.g., "1.1 megawatt thermal (MW(t)), and short duration power pulses with reactivity insertions not to exceed \$2.55")].

This SER was prepared by [LIST MAJOR NRC CONTRIBUTORS]. [LIST CONTRACTORS WHO CONTRIBUTED TO THE REVIEW, AS APPLICABLE.]

END OF SER SECTION 1.1 TEMPLATE.

## **1.2 Summary and Conclusions on Principal Safety Considerations**

This section of the licensee's SAR summarizes the licensee's safety conclusions. The NRC reviewer should confirm that the summary of the licensee's safety conclusions is consistent with the reviewed sections of the SAR.

This section of the SER contains the principal staff findings from the review of the licensee's application. These findings should be supported by the NRC reviewer's discussion of the licensee's application in the SER. A template for Section 1.2 of the SER is presented below. This template is based on the reviewer reaching a conclusion of reasonable assurance of protection of the health and safety of the public. Brackets contain review-dependent information that the NRC reviewer should address when it is pertinent to the license renewal application.

START OF SER SECTION 1.2 TEMPLATE.

### **1.2 Summary and Conclusions Regarding the Principal Safety Considerations**

The staff's evaluation considered the information submitted by the licensee, including past operating history recorded in the licensee's annual reports to the

NRC, as well as inspection reports prepared by the NRC staff. [IF THE NRC STAFF USED GENERIC STUDIES, DISCUSS HERE (e.g., "In addition, as part of its licensing review of several TRIGA reactors, the staff obtained laboratory studies and analyses of several accidents postulated for the TRIGA-type reactor.")] On the basis of this evaluation and resolution of the principal issues reviewed for the [LICENSEE NAME REACTOR FACILITY], the staff reached the following findings:

- The design and use of the reactor structures, systems, and components important to safety during normal operation, discussed in Chapter 4 of the SAR, in accordance with the TSs, are safe, and safe operation can reasonably be expected to continue.
- The expected consequences of a broad spectrum of postulated credible accidents and a maximum hypothetical accident (MHA) have been considered, emphasizing those that could lead to a loss of integrity of fuel element cladding [AND/OR] a release of fission products. The licensee performed conservative analyses of the most serious credible accidents and the MHA and determined that the calculated potential radiation doses outside the reactor room would not exceed doses in 10 CFR Part 20, for unrestricted areas.
- The licensee's management organization, conduct of training, and research activities in accordance with the TSs are adequate to ensure safe operation of the facility.
- The systems provided for the control of radiological effluents when operated in accordance with the TSs are adequate to ensure that releases of radioactive materials from the facility are within the limits of the Commission's regulations and are as low as reasonably achievable (ALARA).
- The licensee's TSs, which provide limits controlling operation of the facility, are such that there is reasonable assurance that the facility will be operated safely and reliably. There has been no significant degradation of the reactor, as discussed in Chapter 4 of the SAR, and the TSs will continue to ensure that there will be no significant degradation of safety-related equipment.
- The licensee has reasonable access to sufficient resources to cover operating costs and eventually to decommission the reactor facility.

[IF THE LICENSEE HAS PROPOSED CHANGES TO THE SECURITY PLAN AS PART OF LICENSE RENEWAL, AND THE NRC STAFF HAS REVIEWED THE PLAN AS PART OF LICENSE RENEWAL, ADD THIS CONCLUSION.]

- The licensee’s program for providing for the physical protection of the facility and its special nuclear material complies with the requirements of 10 CFR Part 73, “Physical Protection of Plants and Materials.”

[IF THE LICENSEE HAS PROPOSED CHANGES TO THE EMERGENCY PLAN AS PART OF LICENSE RENEWAL, AND THE NRC STAFF HAS REVIEWED THE PLAN AS PART OF LICENSE RENEWAL, ADD THIS CONCLUSION.]

- The licensee maintains an emergency plan in compliance with 10 CFR 50.54(q) and Appendix E, “Emergency Planning and Preparedness for Production and Utilization Facilities,” to 10 CFR Part 50, “Domestic Licensing of Production and Utilization Facilities,” which provides reasonable assurance that the licensee will continue to be prepared to assess and respond to emergency events.

[IF THE LICENSEE HAS PROPOSED CHANGES TO THE REACTOR OPERATOR REQUALIFICATION PLAN AS PART OF LICENSE RENEWAL, AND THE NRC STAFF HAS REVIEWED THE PLAN AS PART OF LICENSE RENEWAL, ADD THIS CONCLUSION.]

- The licensee’s procedures for training reactor operators and the plan for operator requalification are acceptable. These procedures give reasonable assurance that the reactor facility will be operated with competence.

On the basis of these findings, the staff concludes that [LICENSEE NAME] can continue to operate the [REACTOR FACILITY], in accordance with the renewed license, without endangering the health and safety of the public, facility personnel, or the environment. The issuance of the renewed license will not be inimical to the common defense and security.

END OF SECTION 1.2 TEMPLATE.

### **1.3 General Description of the Facility**

This section of the SAR is a general description of information found elsewhere in the SAR and is outside the scope of a focused review. The NRC reviewer does not need to perform a detailed review of this section.

### **1.4 Shared Facilities and Equipment**

The reviewer should evaluate shared facilities and equipment to the extent they affect the review of the areas of focus: reactor, accident analyses, or the TSs. The reviewer should confirm that the discussion in the area of focus under review is consistent with this section of the SAR. Any SER discussion related to shared facilities and equipment should be in the SER section for the area of focus under review, rather than in this section.

### **1.5 Comparison with Similar Facilities**

This section of the SAR is outside the scope of a focused review. The NRC reviewer does not need to perform a detailed review of this section.

### **1.6 Summary of Operations**

This section of the SAR is a summary of information found elsewhere in the SAR and is outside the scope of a focused review. The NRC reviewer does not need to perform a detailed review of this section.

### **1.7 Compliance with the Nuclear Waste Policy Act of 1982**

If the NRC staff has reviewed and documented the licensee's compliance with the Nuclear Waste Policy Act of 1982 in the past, confirm that the SAR shows continued compliance and reference that review. If the NRC has not documented compliance with this Act, or the SAR does not indicate continued compliance, follow Section 1.7 of the SRP.

### **1.8 Facility Modifications and History**

This section of the SAR is outside the scope of a focused review. The NRC reviewer does not need to perform a detailed review of this section. The reviewer should note modifications since the last renewal or initial licensing, if this is the first renewal, and confirm that the focused areas of review are consistent with facility history. The NRC reviewer may include a short history of the facility in the SER.

## **2. SITE CHARACTERISTICS**

Most aspects of this chapter of the SAR are outside the scope of a focused review and do not receive a detailed review, because they have not changed in a manner that could significantly affect safety since the last NRC review. The detailed staff review of this chapter should be limited to initiating events for accidents discussed in Section 13.1.8, "External Events," and TSs related to site characteristics. For those aspects of site characteristics that contribute to the initiation of external events discussed in Chapter 13, as part of the Chapter 13 review, confirm that the discussion in this chapter and Chapter 13 are consistent. If new initiating events are identified, confirm that they are evaluated in Chapter 13. If the licensee uses attributes of the site to mitigate the consequences of accidents, such as the dispersion of accident releases, the reviewer should confirm that the discussion in this chapter and Chapter 13 are consistent.

### **2.1 Geography and Demography**

#### **2.1.1 Site Location and Description**

There should be a TS on design features for the site (See ANSI/ANS-15.1, Section 5.1). The definitions section of the TSs may also contain information on the location of the facility. The NRC reviewer should confirm that the licensed area is clearly defined and that the TSs are consistent with the SAR.

### **2.1.2 Population Distribution**

Dose calculations in the accident analysis are performed for the maximum exposed member of the public, at the nearest residence and at any other location of interest (e.g., a dormitory that is nearer to the reactor than the nearest residence). The NRC reviewer should confirm that the locations used in the accident analysis are consistent with the information in this section of the SAR.

### **2.2 Nearby Industrial, Transportation, and Military Facilities**

As part of the review of Chapter 13, the NRC reviewer should review this section to determine if any industrial, transportation, or military facilities that could become an initiator of external-event accidents are consistent with the accident analyses. It is possible that new facilities have been constructed in the 20 or more years since the last NRC review in this area. If potential initiators exist, the reviewer should determine if they have the potential to cause an accident at the RTR facility. If so, the reviewer should confirm that the licensee has properly considered the information in the external-event section of Chapter 13.

### **2.3 Meteorology**

The reviewer should confirm that the NRC reviewed meteorology during the last review of the license (either a renewal or the initial licensing) and found it acceptable. Meteorology is normally outside the scope of a focused review and does not need a detailed review because the possibility of a change that could significantly affect safety is small. However, if the licensee uses meteorological attributes of the site to mitigate the consequences of accidents, such as the dispersion of accident releases, the reviewer should confirm that the discussion in this section and Chapter 13 are consistent.

### **2.4 Hydrology**

The possibility of a safety-significant change in hydrology since the last NRC review is remote. The NRC reviewer should confirm that the SAR does not discuss any changes in hydrology that have occurred since the last NRC review (e.g., construction of a new dam upstream) that could subject the facility to flooding and be a potential external-accident initiator. If a new initiator has the potential to cause an accident, the reviewer should confirm that the licensee has properly considered the hydrology information in the external-event section of Chapter 13.

### **2.5 Geology, Seismology, and Geotechnical Engineering**

The possibility of a safety-significant change in geology, seismology, or geotechnical engineering since the last NRC review is remote. The NRC reviewer should confirm that the SAR does not discuss geological features that were discovered since the last NRC review (e.g., newly discovered faults) that could be a potential external-accident initiator. If a new initiator has the potential to cause an accident, the reviewer should confirm that the licensee has properly considered the information in the external-event section of Chapter 13.

### **3. DESIGN OF STRUCTURES, SYSTEMS, AND COMPONENTS**

This chapter of the SAR discusses design criteria in a general manner. It also discusses meteorological, water, and seismic damage. Most aspects of this chapter of the SAR are outside the scope of a focused review and do not receive a detailed review because they have not changed since the last NRC review in a manner that could significantly affect safety. The detailed staff review of this chapter should be limited to initiating events for accidents discussed in Chapter 13 and TSs related to the design of structures, systems, and components. For those aspects of meteorological, water, and seismic damage that contribute to the initiation of external events discussed in Chapter 13, as part of the Chapter 13 review, the NRC reviewer should confirm that the discussion in this chapter and Chapter 13 are consistent. If the reviewer identifies new initiating events, confirm that they are evaluated in Chapter 13.

#### **3.1 Design Criteria**

This section of the SAR discusses general design criteria applied to the facility. Specific design criteria, as applicable, will be reviewed as part of the review of SAR sections subject to the focused review process; therefore, the general design criteria do not need a detailed review, except as discussed below.

This section of the SAR can contain a description of the facility structure (e.g., reactor room or building). There should be design feature TSs for the reactor room or building (see ANSI/ANS-15.1, Section 5.1). Sometimes building design features that affect effluent releases are found as limiting conditions for operation (LCOs). The NRC reviewer should confirm that building design features that should not be changed except as a license amendment are clearly defined. The NRC reviewer should confirm that the TSs are consistent with the SAR.

The licensee may also have proposed TSs that control design changes to the facility by requiring that they be made to original or approved design specifications and that surveillance be performed after replacement, repair, or modification (see ANSI/ANS-15.1, Section 4).

#### **3.2 Meteorological Damage**

This section of the SAR describes the design for the protection from meteorological conditions of facility structures (e.g., buildings and cooling towers), systems (e.g., ventilation systems), and components that the SAR assumes are operable. The NRC reviewer should confirm that, as discussed in Section 2.3 above, an earlier NRC license review evaluated meteorology and found it acceptable. The NRC reviewer should confirm that the NRC had previously reviewed the ability of the facility to withstand meteorological damage and found it acceptable. As part of the focused review, meteorological damage does not need to be reviewed in detail unless the licensee discussed it in the external-event section of Chapter 13 or new meteorological accident initiating events are identified. In that case, the reviewer should confirm that the discussion here is consistent with that in Chapter 13 and follow Chapter 13 review guidance.

#### **3.3 Water Damage**

This section of the SAR describes the site and facility design to protect against water damage to structures, systems, and components assumed to function in the SAR. As discussed in

Section 2.4 above, if no new accident initiators have been identified, the NRC reviewer should confirm that the NRC previously reviewed hydrology and found it acceptable. The NRC reviewer should confirm that the NRC reviewed the ability of the facility to withstand water damage and found it acceptable. As part of the focused review, water damage does not need to be reviewed in detail, unless the licensee discussed it in the external-event section of Chapter 13 or new water caused accident initiating events are identified. In that case, the reviewer should confirm that the discussion here is consistent with that in Chapter 13 and follow Chapter 13 review guidance.

### **3.4 Seismic Damage**

This section of the SAR describes the structures, systems, and components that are required to maintain the necessary safety functions if a seismic event should occur, as well as the required facility seismic design criteria. As discussed in Section 2.5 above, if no new accident initiators have been identified, the NRC reviewer should confirm that the NRC previously reviewed geology, seismology, and geotechnical engineering and found them acceptable. The NRC reviewer should also confirm that the NRC reviewed the ability of the facility to withstand seismic damage and found it acceptable. As part of the focused review, seismic damage does not need a detailed review unless the licensee discussed it in the external-event section of Chapter 13 or new seismic accident initiating events are identified. In that case, the reviewer should confirm that the discussion here is consistent with that in Chapter 13 and follow Chapter 13 review guidance.

### **3.5 Systems and Components**

This section of the SAR describes the general design bases for the systems and components required to function for safe reactor operation and shutdown. Specific design bases, as applicable, will be reviewed as part of the review of SAR sections subject to the focused review process; therefore, the general design bases do not need to be reviewed.

## **4. REACTOR DESCRIPTION**

The reactor is an area of full review in the focused review process. This chapter of the SAR describes the principal features, operating characteristics, and parameters of the reactor. Some reactors subject to license renewal (University of Wisconsin, Washington State University, University of Florida, and Texas A&M University TRIGA) have undergone an HEU-to-LEU conversion that was reviewed using the SRP. The reviewer may use the SER from the conversion as a starting point for the Chapter 4 review. The reviewer should determine that the conversion SER continues to accurately reflect the reactor. In all cases, the conversion application was submitted after the renewal application. The discussion in the conversion SAR supersedes the matching discussion in the renewal SAR. The conversion SARs are narrowly focused on the issue of fuel conversion. The reviewer should ensure that he or she reviews sections of Chapter 4 that are outside the scope of the conversion, using the guidance in the SRP and this focused review plan. The reviewer should review the applicable TSs for sections of Chapter 4 and should explain why the TSs, including their bases, are acceptable.

### **4.1 Summary Description**

The reviewer should follow the guidance in the SRP.

## **4.2 Reactor Core**

The reviewer should follow the guidance in the SRP. This is a review area that may not have changed. If no change has occurred in the reactor core since the last license renewal review (or initial licensing, if this is the first license renewal), the reviewer may choose to restate the past evaluation in this area. If the reviewer decides to rely on a past evaluation, he or she should ensure that no TSs (see ANSI/ANS-15.1, Sections 1.3 and 3.1 (4)) or their bases have changed, that they are consistent with the guidance in ANSI/ANS-15.1 and the SRP, and that the NRC previously fully evaluated and approved them. For those facilities listed above that have undergone an HEU-to-LEU conversion, the reviewer should use the conversion SAR and SER to assist in the review of this section.

### **4.2.1 Reactor Fuel**

The reviewer should follow the guidance in the SRP. This is a review area that may not have changed. If no change has occurred in the area of reactor fuel since the last license renewal review (or initial licensing, if this is the first license renewal), the reviewer may choose to restate the past evaluation in this area. If the reviewer decides to rely on a past evaluation, he or she should ensure that no TSs (see ANSI/ANS-15.1, Sections 3.1 (6), 4.1 (3), and 5.3) or their bases have changed, that they are consistent with the guidance in ANS-15.1 and the SRP, and that the NRC previously fully evaluated and approved them. For those facilities listed above that have undergone an HEU-to-LEU conversion, the reviewer should use the conversion SAR and SER to assist in the review of this section. The reviewer should consider the prior use of the reactor fuel to verify that aging fuel will not be an issue during the renewal period.

### **4.2.2 Control Rods**

The reviewer should follow the guidance in the SRP. This is a review area that may not have changed. If no change has occurred in the area of control rods since the last license renewal review (or initial licensing, if this is the first license renewal), the reviewer may choose to restate the past evaluation in this area. If the reviewer decides to rely on a past evaluation, he or she should ensure that no TSs (see ANSI/ANS-15.1, Sections 3.2 (1), (2) and (3) and 4.2 (1), (2), (3), and (4)) or their bases have changed, that they are consistent with the guidance in ANSI/ANS-15.1 and the SRP, and that the NRC previously fully evaluated and approved them. For those facilities listed above that have undergone an HEU-to-LEU conversion, the reviewer should use the conversion SAR and SER to assist in the review of this section. The reviewer should consider the prior use of the control rods to verify that aging control rods will not be an issue during the renewal period.

### **4.2.3 Neutron Moderator and Reflector**

The reviewer should follow the guidance in the SRP. This is a review area that may not have changed. If no change has occurred to the neutron moderator and reflector since the last license renewal review (or initial licensing, if this is the first license renewal), the reviewer may choose to restate the past evaluation in this area. If the reviewer decides to rely on a past evaluation, he or she should ensure that no TSs or their bases have changed, that they are consistent with the guidance in ANSI/ANS-15.1 and the SRP, and that the NRC previously fully evaluated and approved them. For those facilities listed above that have undergone an HEU-to-

LEU conversion, the reviewer should use the conversion SAR and SER to assist in the review of this section.

#### **4.2.4 Neutron Startup Source**

The reviewer should follow the guidance in the SRP. This is a review area that may not have changed. If no change has occurred in the area of neutron startup source since the last license renewal review (or initial licensing, if this is the first license renewal), the reviewer may choose to restate the past evaluation in this area. If the reviewer decides to rely on a past evaluation, he or she should ensure that no TSs or their bases have changed, that they are consistent with the guidance in ANSI/ANS-15.1 and the SRP, and that the NRC previously fully evaluated and approved them. An HEU-to-LEU conversion does not normally affect this section of the SAR, and the conversion SER normally does not address this topic.

#### **4.2.5 Core Support Structure**

The reviewer should follow the guidance in the SRP. This is a review area that may not have changed. If no change has occurred to the core support structure since the last license renewal review (or initial licensing, if this is the first license renewal), the reviewer may choose to restate the past evaluation in this area. If the reviewer decides to rely on a past evaluation, he or she should ensure that no TSs or their bases have changed, that they are consistent with the guidance in ANSI/ANS-15.1 and the SRP, and that the NRC previously fully evaluated and approved them. An HEU-to-LEU conversion does not normally affect this section of the SAR, and the conversion SER normally does not address this topic.

#### **4.3 Reactor Tank or Pool**

The reviewer should follow the guidance in the SRP. This is a review area that may not have changed, except for tank or pool leakage, as discussed below. If no change has occurred to the reactor tank or pool since the last license renewal review (or initial licensing, if this is the first license renewal), the reviewer may choose to restate the past evaluation in this area. If the reviewer decides to rely on a past evaluation, he or she should ensure that no TSs or their bases have changed, that they are consistent with the guidance in ANSI/ANS-15.1 and the SRP, and that the NRC previously fully evaluated and approved them. An HEU-to-LEU conversion does not normally affect this section of the SAR, and the conversion SER normally does not address this topic.

As research reactors have aged, several have developed tank and pool leaks. The NRC staff focuses on this issue during license renewal to ensure that tank or pool leakage is an evaluated event. The fifth bullet under this section of the NUREG-1537 standard format and content guidance discusses this issue. However, it is not unusual for licensees not to address this issue in the SAR. The licensee should discuss how it would detect leakage of primary coolant from the tank or pool and the minimum level of leakage that can be detected, as well as the radiological impact on the environment and the public from a potential tank or pool leak. The impact should be within the limits of 10 CFR Part 20.

#### **4.4 Biological Shield**

The reviewer should follow the guidance in the SRP. This is a review area that may not have changed. If no change has occurred to the biological shield since the last license renewal review (or initial licensing, if this is the first license renewal), the reviewer may choose to restate the past evaluation in this area. If the reviewer decides to rely on a past evaluation, he or she should ensure that no TSs or their bases have changed, that they are consistent with the guidance in ANSI/ANS-15.1 and the SRP, and that the NRC previously fully evaluated and approved them. An HEU-to-LEU conversion does not normally affect this section of the SAR, and the conversion SER normally does not address this topic.

#### **4.5 Nuclear Design**

In this section of the SAR, the licensee should show how the systems described in this chapter function together to form a nuclear reactor that can be operated and shut down safely from any operating condition. Much of the information in this section of the SAR is derived from calculations performed by neutronic codes. The NRC staff may choose to model the reactor using current codes, as part of the NRC's independent review of the licensee's renewal application. The results of nuclear design calculations also can serve as input to thermal-hydraulic calculations. Staff evaluations performed for an HEU-to-LEU conversion can provide substantial input to this section of the SER. For those facilities listed above that have undergone an HEU-to-LEU conversion, the reviewer should use the conversion SAR and SER to assist in the review of this section.

##### **4.5.1 Normal Operating Conditions**

The reviewer should follow the guidance in the SRP. For possible TSs, see ANSI/ANS-15.1, Sections 1.3, 3.1 (1), (2), (3) and (5), and 4.1 (1) and (2).

##### **4.5.2 Reactor Core Physics Parameters**

The reviewer should follow the guidance in the SRP.

##### **4.5.3 Operating Limits**

The reviewer should follow the guidance in the SRP. For possible TSs, see ANSI/ANS-15.1, Section 2.

When reviewing the limiting safety system setting (LSSS) for TRIGA reactors, based on the temperature measured in an instrumented fuel element, the reviewer should confirm that the value of the LSSS protects the hot coolant channel in the core from burnout and protects the safety limit in the hot channel for all allowed core locations of the instrumented fuel element. The staff has reviewed cases where the instrumented fuel element could be located in a low-power area near the edge of the core, away from the hot coolant channel. During code calculation runs, when the instrumented fuel element reached the LSSS, the calculated heat produced in the hot channel could exceed that needed for the channel to burn out, allowing the safety limit to be exceeded in the hot channel. To demonstrate acceptable performance of the LSSS for the instrumented fuel element, neutronic and thermal-hydraulic code runs may be required.

#### **4.6 Thermal-Hydraulic Design**

The information in this section of the SAR should enable the reviewer to determine the limits on heat removal necessary to ensure that fuel integrity will not be lost under any reactor conditions (including pulsing, if applicable), including accidents. The reactors subject to this focused review plan have natural convection cooling or are Aerojet-General Nucleonics (AGN)-type reactors without engineered coolant systems.

The reviewer should follow the guidance in the SRP.

Much of the information in this section of the SAR should be derived from calculations using thermal-hydraulic codes. The neutronic calculations discussed in Section 4.5 above serve as inputs into the thermal-hydraulic codes. The NRC staff may choose to model the reactor using current codes, as part of its independent review of the licensee's renewal application.

The decision to perform an independent review based on code runs is dependent on the detail and depth of the thermal-hydraulic discussion in the SAR. For those facilities that were subject to an HEU-to-LEU conversion that was reviewed using NUREG-1537, the NRC staff has reviewed and accepted the licensee's code models and calculations. The staff evaluations performed for an HEU-to-LEU conversion can provide substantial input to this section of the SER. The NRC staff does not need independent code runs for these facilities. For those facilities listed above that have undergone an HEU-to-LEU conversion, the reviewer should use the conversion SAR and SER to assist in the review of this section.

For those SARs where the discussion is based on a review of a generic reactor that differs in such areas as core layout, fuel density, flux profile, and fuel enrichment and burnup, or for those where the departure from nucleate boiling ratio during operation and accidents is not clearly given and justified, the NRC staff would be well served by performing independent code runs to verify reactor performance and margins of safety.

### **5. REACTOR COOLANT SYSTEMS**

This chapter of the SAR discusses the design bases, descriptions, and functional analyses of the reactor coolant systems. With the exception of AGN-designed reactors, the reactors that are subject to this focused review plan are cooled by natural convection. The thermal-hydraulic analysis discussed in Section 4.6 above should show that the reactor can be sufficiently cooled and that acceptable safety margins exist. AGN-designed reactors do not have engineered coolant systems. In accordance with the standard format and content guidance and the SRP, this chapter does not discuss the disposition of heat produced by AGN-designed reactors, but it is discussed in Chapter 4. The NRC reviewer should follow Chapter 4 of the SRP for cooling AGN reactors.

As part of the focused review, most aspects of this chapter of the SAR do not receive detailed reviews. These systems do not normally undergo significant change after initial licensing. The reviewer should confirm that the NRC found these systems acceptable either during initial licensing, or, for those facilities that were subject to renewal, during the last renewal. The NRC should have approved license amendments for any safety-significant changes since initial licensing or the last renewal.

The detailed staff review of this chapter should be limited to TSs. The applicable TSs are in the areas of LCOs (see ANSI/ANS-15.1, Section 3.3), surveillance requirements (see ANSI/ANS-15.1, Section 4.3), and design features (see ANSI/ANS-15.1, Section 5.2). Given the reactor designs subject to this focused review, ANSI/ANS-15.1, Sections 3.3 (1), (6), and (7), and Sections 4.3 (1), (2), and (5) may be out of scope, and the reviewer should not expect to see TSs in these areas. The TSs control the safety-significant aspects of the reactor coolant systems. By performing an evaluation of the TSs, including their bases, using the SRP and concluding that the TSs and bases are acceptable, the NRC reviewer should be able to determine, with reasonable assurance, that the functioning of the reactor coolant systems will be acceptable. While failure of reactor coolant system components can be initiating events for accident scenarios, for the reactors that are subject to this focused review, loss of coolant and loss of coolant flow are the most likely initiating events (auxiliary uses of primary coolant could also be initiating scenarios for accidents). These events are reviewed as part of Chapter 13.

### **5.1 Summary Description**

As part of a focused renewal review, the NRC reviewer does not need to perform a detailed review of this section of the SAR.

### **5.2 Primary Coolant System**

As part of the focused renewal review process, the detailed review of this section of the SAR is limited to a review of the applicable TSs. The most likely TSs would consist of LCOs (see ANSI/ANS-15.1, Sections 3.3 (2), (3), (4), (5), and (9)), surveillance requirements (see ANSI/ANS-15.1, Sections 4.3 (3), (4) and (6)), and design feature TSs (see ANSI/ANS-15.1, Section 5.2). The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable.

### **5.3 Secondary Coolant Systems**

As part of the focused renewal review process, the detailed review of this section of the SAR is limited to a review of the applicable TSs. The most likely TSs would consist of LCOs (see ANSI/ANS-15.1, Sections 3.3 (4) and (8)), surveillance requirements (see ANSI/ANS-15.1, Section 4.3 (3)), and design feature TSs (see ANSI/ANS-15.1, Section 5.2), although it is not unusual to have no TSs related to the secondary coolant system. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable.

### **5.4 Primary Coolant Cleanup System**

As part of the focused renewal review process, the detailed review of this section of the SAR is limited to a review of the applicable TSs. The most likely TSs would consist of LCOs (see ANSI/ANS-15.1, Section 3.3 (9)), surveillance requirements (see ANSI/ANS-15.1, Sections 4.3 (3) and (6)), and design feature TSs (see ANSI/ANS-15.1, Section 5.2). The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and

ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable.

### **5.5 Primary Coolant Makeup Water System**

As part of the focused renewal review process, the detailed review of this section of the SAR is limited to a review of the applicable TSs. The most likely TSs would consist of LCOs (see ANSI/ANS-15.1, Section 3.3 (9)), surveillance requirements (ANSI/ANS-15.1, Sections 4.3 (3) and (6)), and design feature TSs (ANSI/ANS-15.1, Section 5.2). However, the primary coolant makeup water system normally does not have associated TSs. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable.

### **5.6 Nitrogen-16 Control System**

As part of the focused renewal review process, the detailed review of this section of the SAR is limited to a review of the applicable TSs. The most likely TSs would consist of design feature TSs (see ANSI/ANS-15.1, Section 5.2). However, the nitrogen-16 control system normally does not have associated TSs. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable.

### **5.7 Auxiliary Systems Using Primary Coolant**

Auxiliary systems using primary coolant vary widely, depending on facility design. The failure of auxiliary systems could be initiators of accident scenarios. If this is the case, Chapter 13 should identify the affected systems. The following are some possible systems that use primary coolant:

- experiment cooling
- experimental facility cooling
- experimental facility shielding
- biological shield cooling
- thermal shield cooling
- fuel storage cooling or shielding

As part of the focused renewal process, a detailed review of this section of the SAR is normally limited to a review of the applicable TSs. The TSs could consist of LCOs, surveillance requirements, or design features. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable.

## **6. ENGINEERED SAFETY FEATURES**

This chapter of the SAR discusses active or passive engineered safety features (ESFs) of the reactor facility that are designed to mitigate the consequences of accidents. Because ESFs mitigate the consequences of accidents, they are directly related to the accident analysis in Chapter 13, one of the areas of full review in the focused review process.

The staff should limit its detailed review of this chapter to that needed to support the accident analysis in Chapter 13 and the TSs. If the licensee discusses a system in the accident analysis section of the SAR that does not mitigate accident consequences, then that system is not an ESF and is outside the scope of the accident review. For the reactors subject to this focused review plan, the primary ESFs discussed in the SAR, if any, will be the confinement and associated ventilation system.

There is a discussion in this section of the SRP and in the standard format and content guidance of acceptable doses during accident scenarios. Chapter 13 contains an update of that discussion.

### **6.1 Summary Description**

As part of the focused renewal process, the NRC reviewer does not need to perform a detailed review of this section of the SAR.

### **6.2 Detailed Descriptions**

This section of the SAR discusses in detail the particular ESFs incorporated into the reactor design.

#### **6.2.1 Confinement**

If the licensee uses the confinement and its associated ventilation system as an ESF, the reviewer should follow the SRP to review the confinement, associated ventilation system, and related TSs.

If the reviewer determines that the confinement and its associated ventilation system are not an ESF, then a detailed review of this section of the SAR is limited to a review of the applicable TSs. Chapter 9, "Auxiliary Systems," covers the non-ESF functions of the confinement and its associated ventilation system that are normally discussed in the SAR and that are discussed below.

In both cases, the most likely TSs would consist of LCOs (see ANSI/ANS-15.1, Sections 3.4 and 3.5 (2)) and surveillance requirements (see ANSI/ANS-15.1, Sections 4.4.2 and 4.5 (1)). The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable.

### **6.2.2 Containment**

None of the facilities subject to this focused review plan have a containment. As part of the review of the accident analysis, the reviewer should confirm that a containment ESF is not needed to reduce the consequences of accident scenarios to acceptable levels.

### **6.2.3 Emergency Core Cooling System**

None of the facilities subject to this focused review plan have an emergency core cooling system. As part of the review of the loss-of-coolant accident, the reviewer should confirm that an emergency core cooling system ESF is not needed to reduce the consequences of accident scenarios to acceptable levels.

## **7. INSTRUMENTATION AND CONTROL SYSTEMS**

Most aspects of this chapter of the SAR are not reviewed in detail as part of the focused renewal review process. The reviewer should confirm that the NRC evaluated these systems and found them acceptable during initial licensing or, for those facilities that were subject to renewal, during the last renewal. Most changes to instrumentation and control (I&C) systems because of obsolescence were like-function replacements with modern components (i.e., vacuum tubes being replaced with solid-state components); the licensee evaluated them under the requirements of 10 CFR 50.59, "Changes, Tests, and Experiments," and found that they did not need prior NRC review. The NRC reviewed significant changes, such as the introduction of digital technology into the safety function of I&C systems, and approved them by license amendment.

The detailed staff review for most parts of this chapter should be limited to TSs. I&C systems associated with ESFs may need additional review, as described below. Applicable TSs are in the areas of LCOs (see ANSI/ANS-15.1, Section 3.2) and surveillance requirements (see ANSI/ANS-15.1, Section 4.2). The TSs control the safety-significant aspects of the I&C systems. By performing an evaluation of the TSs, including their bases, using the SRP and concluding that the TSs and bases are acceptable, the NRC reviewer should be able to determine, with reasonable assurance, that the I&C systems will perform their functions acceptably.

While failure of I&C system components can be initiating accident events, these events, if they exist, are reviewed as part of Chapter 13.

### **7.1 Summary Description**

As part of the focused renewal review process, the NRC reviewer does not need to perform a detailed review of this section of the SAR.

### **7.2 Design of Instrumentation and Control Systems**

As part of the focused renewal review process, the NRC reviewer does not need to perform a detailed review of this section of the SAR.

### **7.3 Reactor Control System**

As part of the focused renewal review process, a detailed review of this section of the SAR is limited to the applicable TSs. The most likely TSs would consist of LCOs (see ANSI/ANS-15.1, Sections 3.2 (2), (3), (5), (6) and (8) (note that Sections 3.2 (2) and (3) may be discussed as part of Chapter 4) and surveillance requirements (see ANSI/ANS-15.1, Sections 4.2 (1), (2), (3), (6), (8) and (9) (note that Sections 4.2 (1), (2), (3), and (4) may be discussed as part of Chapter 4). The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable.

### **7.4 Reactor Protection System**

As part of the focused renewal review process, a detailed review of this section of the SAR is limited to the applicable TSs. The most likely TSs would consist of LCOs (see ANSI/ANS-15.1, Sections 3.2 (1), (4), (5), (7), and (8) (note that Sections 3.2 (1) and (4) may be discussed as part of Chapter 4) and surveillance requirements (see ANSI/ANS-15.1, Sections 4.2 (4), (5), (6) and (9) (note that Section 4.2 (4) may be discussed as part of Chapter 4). The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable.

### **7.5 Engineered Safety Features Actuation System**

The reviewer should refer to the discussion for Chapter 6 above. If ESFs are needed to mitigate the consequences of accidents, the reviewer should follow this section of the SRP to evaluate the I&C systems of the ESFs.

### **7.6 Control Console and Display Instruments**

As part of the focused renewal review process, a detailed review of this section of the SAR is limited to the applicable TSs. It is unusual to have TSs in this review area. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable.

### **7.7 Radiation Monitoring Systems**

As part of the focused renewal review process, a detailed review of this section of the SAR is limited to the applicable TSs. However, the NRC usually reviews the TSs concerning the radiation monitoring systems as part of Chapter 11. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable.

## **8. ELECTRICAL POWER SYSTEMS**

This chapter of the SAR describes the electrical power systems designed to support reactor operations at RTR facilities. The NRC does not review in detail most aspects of this chapter of the SAR as part of the focused renewal review process. The loss of normal electrical power is an initiating event evaluated as part of the accident analysis discussed in Chapter 13. A detailed review of this chapter of the SAR is limited to that needed to support the evaluation of the Chapter 13 accident caused by the loss of normal power and of the TSs. The reviewer should confirm that the NRC reviewed these systems and found them acceptable during initial licensing or, for those facilities that were subject to renewal, during the last renewal. The TSs control the safety-significant aspects of electrical power systems. By performing an evaluation of the TSs, including their bases, using the SRP and concluding that the TSs and bases are acceptable, the NRC reviewer should be able to determine, with reasonable assurance, that the electrical power systems will perform their functions acceptably.

### **8.1 Normal Electrical Power Systems**

As part of the focused renewal review process, a detailed review of this section of the SAR is limited to the applicable TSs and any aspects of normal electrical power systems that the NRC needs to review as part of Chapter 13. Note that TSs in the area of normal electrical power systems are not common. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable.

### **8.2 Emergency Electrical Power Systems**

As part of the focused renewal review process, a detailed review of this section of the SAR is limited to the applicable TSs and any aspects of emergency electrical power systems that the NRC needs to review as part of Chapter 13. For example, there may be ESFs that operate on emergency power. The most likely TSs would consist of LCOs (see ANSI/ANS-15.1, Section 3.6) and surveillance requirements (see ANSI/ANS-15.1, Section 4.6). The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable.

## **9. AUXILIARY SYSTEMS**

This chapter of the SAR discusses the auxiliary systems at the reactor facility. Common auxiliary systems are heating, ventilation, and air conditioning (HVAC) systems; fuel handling and storage systems; fire protection systems and programs; communications systems; primary coolant system cover gas control; other facility-specific auxiliary systems; and the possession and use of byproduct, source, and special nuclear material. The NRC does not review in detail most aspects of this chapter of the SAR as part of the focused renewal review process. A detailed review of this chapter of the SAR is limited to that needed to support the evaluation of the Chapter 13 accidents and TSs. The reviewer should confirm that the NRC reviewed these systems and found them acceptable during initial licensing or, for those facilities that were subject to renewal, during the last renewal. The TSs control the safety-significant aspects of auxiliary systems. By performing an evaluation of the TSs, including their bases, using the SRP

and concluding that the TSs and bases are acceptable, the NRC reviewer should be able to determine, with reasonable assurance, that the auxiliary systems will perform their functions acceptably.

### **9.1 Heating, Ventilation, and Air Conditioning Systems**

As part of the focused renewal review process, a detailed review of this section of the SAR is limited to the applicable TSs. As discussed in Chapter 6 above, some aspects of the HVAC system may perform ESF functions. However, ESF functions are not part of the review of this section. The auxiliary system HVAC functions are limited to the normal operation of the HVAC system. The most likely TSs would consist of LCOs (see ANSI/ANS-15.1, Section 3.5 (1)) and surveillance requirements (see ANSI/ANS-15.1, Section 4.5 (2)). The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable.

### **9.2 Handling and Storage of Reactor Fuel**

As part of the focused renewal review process, a detailed review of this section of the SAR is limited to the applicable TSs and accident analyses. The most likely TSs would consist of design features (see ANSI/ANS-15.1, Section 5.4). The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The guidance in the SRP can be used to determine if the TS bases are acceptable. Mishandling of fuel is an accident initiator discussed in Chapter 13. The reviewer should confirm that the licensee has properly considered information in this section in the accident analysis in Chapter 13.

### **9.3 Fire Protection Systems and Programs**

As part of the focused renewal review process, a detailed review of this section of the SAR is limited to the applicable TSs. However, it is not common to have TSs in this review area. If the licensee has proposed TSs, the reviewer should confirm that they are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable.

### **9.4 Communication Systems**

As part of the focused renewal review process, a detailed review of this section of the SAR is limited to the applicable TSs. However, it is not common to have TSs in this review area. If the licensee has proposed TSs, the reviewer should confirm that they are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable.

### **9.5 Possession and Use of Byproduct, Source, and Special Nuclear Material**

As part of the focused renewal review process, a detailed review of this section of the SAR is limited to the applicable TSs and license possession limits for special nuclear, byproduct, and if requested by the licensee, source material.

However, it is not common to have TSs in this review area. If the licensee has proposed TSs, the reviewer should confirm that they are consistent with the guidance in the SRP and

ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable. The reviewer should follow the SRP to confirm that the requested license possession limits are supported by the renewal application and are acceptable.

### **9.6 Cover Gas Control in Closed Primary Coolant Systems**

None of the facilities subject to this supplemental guidance have cover gas control in the primary coolant system. Therefore, this section is outside the scope of the renewal review.

### **9.7 Other Auxiliary Systems**

The SAR may identify auxiliary systems in addition to those discussed in the SRP. For example, some facility SARs discuss compressed air systems. If these other auxiliary systems play a role in the accident analysis in Chapter 13, then the reviewer should follow the SRP. This situation will be uncommon.

It is also uncommon to have TSs in this review area. However, if the licensee has proposed TSs, the reviewer should confirm that they are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable.

## **10. EXPERIMENTAL FACILITIES AND UTILIZATION**

This chapter of the SAR discusses the experimental facilities at the RTR facility, their intended use, and the experimental program. Experiment malfunction is an accident-initiating event considered in Chapter 13. This consideration is usually generic in nature and may be based on an experiment or experimental facility failure (e.g., failure of a beam tube may be an initiating event for a loss-of-coolant accident) or experimental TSs limits (e.g., rapid addition of positive reactivity into the reactor). While the reactivity addition may come from the failure of an experiment, the evaluation of the accident falls into the category of reactivity addition accidents.

The licensee normally reviews malfunctions of individual experiments as part of the experiment development and review process, using the regulations in 10 CFR 50.59. Experiments that cannot be successfully approved using the process in 10 CFR 50.59 would need NRC approval in the form of a license amendment before initiation.

For some low-powered research reactors, the failure of a fueled experiment with its subsequent release of fission products to the environment is the Maximum Hypothetical Accident (MHA). As

part of the MHA review in Chapter 13, the reviewer may need to review and refer to aspects of experimental facilities and their governing TSs discussed in this chapter.

Some SARs may contain a section on experimental TSs limits. The SRP does not have a specific section on experimental TSs limits, but Sections 10.2 and 10.3 below discuss them.

### **10.1 Summary Description**

As part of the focused renewal review process, the NRC reviewer does not need to perform a detailed review of this section of the SAR.

### **10.2 Experimental Facilities**

The detailed staff review for most parts of this section should be limited to TSs and information on accident-initiating events. The applicable TSs are in the areas of LCOs (see ANSI/ANS-15.1, Section 3.8) and surveillance requirements (see ANSI/ANS-15.1, Section 4.8). The TSs control safety-significant aspects of experimental facilities and associated experiments. By performing an evaluation of the TSs, including their bases, using the SRP and concluding that the TSs and bases are acceptable, the NRC reviewer should be able to determine, with reasonable assurance, that experimental facilities and associated experiments will perform their functions acceptably. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable. While failure of experimental facilities and associated experiments can be initiating-accident events, the NRC reviews them as part of Chapter 13.

### **10.3 Experiment Review**

This section of the SAR discusses the administrative procedures the licensee uses to review and approve experiments. The detailed staff review for most parts of this chapter should be limited to TSs. The applicable TSs are in the areas of surveillance requirements (see ANSI/ANS-15.1, Section 4.8) and administrative controls (see ANSI/ANS-15.1, parts of Section 6.2, and Section 6.5). The TSs control safety-significant aspects of experimental facilities and the associated experiments. By performing an evaluation of the TSs, including their bases, using the SRP (where applicable; Section 6 TSs do not normally have bases) and concluding that the TSs and bases (where applicable) are acceptable, the NRC reviewer should be able to determine, with reasonable assurance, that experimental facilities and the associated experiments will perform their functions acceptably. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and AN-S-15.1 and that the bases (where applicable) are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable.

## **11. RADIATION PROTECTION PROGRAM AND WASTE MANAGEMENT**

This chapter of the SAR discusses and analyzes all radiological consequences related to the normal operation of the reactor. The reviewer should review the licensee's methodology to determine the dose from normal airborne effluents. This chapter of the SAR may discuss the calculation methodologies used to determine doses to members of the reactor staff and the public from accident conditions. If that is the case, the reviewer may need to review the

calculation methodologies as part of the review of accidents in Chapter 13 of the SAR. Another potential review area is TSs.

The NRC inspection program reviews the licensee's environmental and radiation protection programs. The reviewer should confirm that the last five inspections of these programs concluded that they met the requirements of the regulations and were acceptable. If the inspection program identified Severity Level IV violations or significant open issues, the NRC reviewer should confirm that the corrective actions or steps taken by the licensee to address these issues were acceptable to the NRC. If there have been violations at Severity Level I, II, or III, or violations at Severity Level IV that were not properly corrected by the licensee, as indicated by continuing issues, the reviewer should consider conducting a review in the affected area, following the SRP. If the reviewer relies on inspection reports to support findings, the SER must include a discussion of the inspection reports.

The licensees subject to this focused review plan underwent initial licensing or their last license renewal occurred before the significant changes to 10 CFR Part 20 in 1994. Chapter 13 below discusses the changes, as they relate to the review of the SAR. The reviewer should confirm that all doses are in compliance with 10 CFR Part 20.

## **11.1 Radiation Protection**

This section of the SAR discusses radiation protection at the RTR facility.

### **11.1.1 Radiation Sources**

The detailed staff review for most parts of this section should be limited to TSs. The applicable TSs are in the areas of LCOs (see ANSI/ANS-15.1, Section 3.7.2) and surveillance requirements (see ANSI/ANS-15.1, Section 4.7.2). The TSs and the radiation protection program control the safety-significant aspects of radiation sources. The reviewer should review the licensee's methodology for calculating doses to the staff and members of the public. By performing an evaluation of the TSs, including their bases, using the SRP and reaching a conclusion that the TSs and bases are acceptable, and finding that the radiation protection program is acceptable, the NRC reviewer should be able to determine, with reasonable assurance, that radiation sources are being acceptably controlled. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable.

### **11.1.2 Radiation Protection Program**

The detailed staff review for this section is normally limited to a review of applicable TSs. The applicable TSs are in the area of administrative controls (see ANSI/ANS-15.1, Sections 6.1, 6.2 and 6.3). The NRC inspection program reviews the licensee's radiation protection program. The reviewer should review facility inspection reports, following the guidance above.

The TSs control the safety significant aspects of the radiation protection program. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases (if any) are complete and technically sound. The reviewer

can use the guidance in the SRP to determine if the TS bases are acceptable. By performing an evaluation of the TSs, including their bases, to the SRP and reaching a conclusion that the TSs and bases are acceptable, along with acceptable results from the NRC inspection program, the NRC reviewer should be able to determine, with reasonable assurance, that the radiation protection program functions acceptably.

### **11.1.3 ALARA Program**

The detailed staff review for this section is normally limited to a review of applicable TSs, usually the same TSs that are applicable to the radiation protection program. The applicable TSs are in the area of administrative controls (see ANSI/ANS-15.1, Sections 6.1, 6.2 and 6.3). The NRC inspection program reviews the licensee's ALARA program. The reviewer should review facility inspection reports, following the guidance above.

The TSs control the safety-significant aspects of the ALARA program. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases (if any) are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable. By performing an evaluation of the TSs, including their bases, using the SRP, and reaching a conclusion that the TSs and bases are acceptable, along with acceptable results from the NRC inspection program, the NRC reviewer should be able to determine, with reasonable assurance, that the ALARA program functions acceptably.

### **11.1.4 Radiation Monitoring and Surveying**

The detailed staff review for this section is normally limited to a review of applicable TSs. However, the radiation monitoring system may detect accident conditions and initiate actions by ESFs. If that is the case, the reviewer should review the applicable parts of the radiation monitoring system using the SRP. The applicable TSs are in the areas of LCOs (see ANSI/ANS-15.1, Section 3.7.1) and surveillance requirements (see ANSI/ANS-15, Section 4.7.1). The NRC inspection program reviews radiation monitoring and surveys. The reviewer should review facility inspection reports, following the guidance above.

The TSs control the safety-significant aspects of radiation monitoring and surveying. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable. By performing an evaluation of the TSs, including their bases, using the SRP, and reaching a conclusion that the TSs and bases are acceptable, along with acceptable results from the NRC inspection program, the NRC reviewer should be able to determine, with reasonable assurance, that the licensee's radiation monitoring and surveying programs are acceptable.

### **11.1.5 Radiation Exposure Control and Dosimetry**

As part of the focused review plan, a detailed review of this section of the SAR is limited to a review of the applicable TSs. However, it is not common to have TSs in this review area. The NRC inspection program reviews radiation exposure control and dosimetry. The reviewer should review facility inspection reports, following the guidance above.

If the licensee has proposed TSs, the reviewer should confirm that they are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable. By performing an evaluation of the TSs, including their bases, using the SRP and reaching a conclusion that the TSs and bases are acceptable, along with acceptable results from the NRC inspection program, the NRC reviewer should be able to determine, with reasonable assurance, that the licensee's radiation exposure control and dosimetry programs are acceptable. If there are no TSs, the review is based on the inspection reports.

#### **11.1.6 Contamination Control**

As part of the focused review plan, a detailed review of this section of the SAR is limited to a review of the applicable TSs. However, it is not common to have TSs in this review area. The NRC inspection program reviews contamination control. The reviewer should review facility inspection reports, following the guidance above.

If the licensee has proposed TSs, the reviewer should confirm that they are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable. By performing an evaluation of the TSs, including their bases, using the SRP and reaching a conclusion that the TSs and bases are acceptable, along with acceptable results from the NRC inspection program, the NRC reviewer should be able to determine, with reasonable assurance, that the licensee's contamination control program is acceptable. If there are no TSs, the review is based on the inspection reports.

#### **11.1.7 Environmental Monitoring**

As part of the focused review plan, a detailed review of this section of the SAR is limited to a review of applicable TSs. However, it is not common to have TSs in this review area. The NRC inspection program reviews environmental protection. The reviewer should review facility inspection reports, following the guidance above.

If the licensee has proposed TSs, the reviewer should confirm that they are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable. By performing an evaluation of the TSs, including their bases, using the SRP and reaching a conclusion that the TSs and bases are acceptable, along with acceptable results from the NRC inspection program, the NRC reviewer should be able to determine, with reasonable assurance, that the licensee's environmental monitoring program is acceptable. If there are no TSs, the review is based on the inspection reports.

### **11.2 Radioactive Waste Management**

This section of the SAR discusses the program and procedures that are designed to ensure that radioactive waste materials are identified, assessed, controlled, and disposed of in conformance with all applicable regulations and in a manner that protects the health and safety of the public and the environment. Acceptable radioactive waste management is normally shown by compliance with the regulations in 10 CFR Part 20, rather than by compliance with the TSs.

The review of the NRC inspection program results shows whether the licensee is meeting the regulations.

### **11.2.1 Radioactive Waste Management Program**

As part of the focused review plan, a detailed review of this section of the SAR is limited to a review of the applicable TSs. However, it is not common to have TSs in this review area. The NRC reviews the radioactive waste management program by inspecting the environmental and radiation protection programs. The reviewer should review facility inspection reports, following the guidance above.

If the licensee has proposed TSs, the reviewer should confirm that they are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable. By performing an evaluation of the TSs, including their bases, using the SRP and reaching a conclusion that the TSs and bases are acceptable, along with acceptable results from the NRC inspection program, the NRC reviewer should be able to determine, with reasonable assurance, that the licensee's radioactive waste management program is acceptable. If there are no TSs, the review is based on the inspection reports.

### **11.2.2 Radioactive Waste Controls**

Some aspects of radioactive waste controls, such as control of airborne waste, are integral to the facility ventilation system and may be included as part of the review of that area. As part of the focused review plan, a detailed review of this section of the SAR is limited to a review of the applicable TSs. However, it is not common to have TSs in this review area. The NRC reviews the radioactive waste controls by inspecting the environmental and radiation protection programs. The reviewer should review the facility inspection reports, following the guidance above.

If the licensee has proposed TSs, the reviewer should confirm that they are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable. By performing an evaluation of the TSs, including their bases, using the SRP and reaching a conclusion that the TSs and bases are acceptable, along with acceptable results from the NRC inspection program, the NRC reviewer should be able to determine, with reasonable assurance, that the licensee's radioactive waste controls are acceptable. If there are no TSs, the review is based on the inspection reports.

### **11.2.3 Release of Radioactive Waste**

The NRC reviews most aspects regarding the release of radioactive waste, such as effluents, as part of Section 11.1.1 above. As part of the focused review plan, a detailed review of this section of the SAR is limited to a review of the applicable TSs. However, it is not common to have TSs in this review area. The NRC reviews the release of radioactive waste by inspecting the environmental and radiation protection programs. The reviewer should review facility inspection reports, following the guidance above.

If the licensee has proposed TSs, the reviewer should confirm that they are consistent with the guidance in the SRP and ANSI/ANS-15.1 and that the bases are complete and technically sound. The reviewer can use the guidance in the SRP to determine if the TS bases are acceptable. By performing an evaluation of the TSs, including their bases, using the SRP and reaching a conclusion that the TSs and bases are acceptable, along with acceptable results from the NRC inspection program, the NRC reviewer should be able to determine, with reasonable assurance, that the licensee's release of radioactive waste is acceptable. If there are no TSs, the review is based on the inspection reports.

## **12. CONDUCT OF OPERATIONS**

This chapter of the SAR discusses the conduct of operations at the reactor facility. The conduct of operations involves the administrative aspects of facility operation, such as the facility organization, review and audit activities, organizational aspects of radiation safety, facility procedures, required actions in case of license or TS violations, reporting requirements, and recordkeeping. This chapter of the SAR forms the basis of Section 6 of the TSs, "Administrative Controls." Section 6 of the TSs usually does not have bases. If the licensee has proposed bases, they should be reviewed along with the TSs, using the applicable section of the SRP.

### **12.1 Organization**

The detailed staff review for this section should be limited to TSs. The applicable TSs are in the area of administrative controls (see ANSI/ANS-15.1, Section 6.1). The TSs control the safety-significant aspects of the organization. Concluding that the TSs are acceptable should allow the NRC reviewer to determine, with reasonable assurance, that the organization is acceptable. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1.

#### **12.1.1 Structure**

The detailed staff review for this section should be limited to TSs. The applicable TSs are in the area of administrative controls (see ANSI/ANS-15.1, Section 6.1.1). The TSs control the safety-significant aspects of the organizational structure. Concluding that the TSs are acceptable should allow the NRC reviewer to determine, with reasonable assurance, that the organizational structure is acceptable. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1.

#### **12.1.2 Responsibility**

The detailed staff review for this section should be limited to the applicable TSs, which are in the area of administrative controls (see ANSI/ANS-15.1, Section 6.1.2). The TSs control the safety-significant aspects of the organizational responsibilities. Concluding that the TSs are acceptable should allow the NRC reviewer to determine, with reasonable assurance, that the organizational responsibilities are acceptable. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1.

### **12.1.3 Staffing**

The detailed staff review for this section should be limited to TSs and to ensuring that staffing for reactor operations meets the requirements of the regulations in Sections 10 CFR 50.54(i) to 10 CFR 50.54(m)(1). The applicable TSs are in the area of administrative controls (see ANSI/ANS-15.1, Section 6.1.3). The TSs control the safety-significant aspects of staffing. Concluding that the TSs are acceptable and that the regulations in Sections 10 CFR 50.54(i) to 10 CFR 50.54(m)(1) are met should allow the NRC reviewer to determine, with reasonable assurance, that the organizational staffing is acceptable. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1.

### **12.1.4 Selection and Training of Personnel**

The detailed staff review for this section should be limited to TSs. The applicable TSs are in the area of administrative controls (see ANSI/ANS-15.1, Section 6.1.4). The TSs control the safety-significant aspects of the selection and training of personnel. Concluding that the TSs are acceptable should allow the NRC reviewer to determine, with reasonable assurance, that the selection and training of personnel are acceptable. This finding does not include the requalification program, which is discussed below. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1.

### **12.1.5 Radiation Safety**

The detailed staff review for this section should be limited to TSs. Chapter 11 above also discusses the administrative aspects of the radiation safety program. The applicable TSs are in the area of administrative controls (see ANSI/ANS-15.1, Section 6.3). The TSs control the safety-significant aspects of the radiation safety organization. Concluding that the TSs are acceptable, along with the review of Chapter 11 discussed above, should allow the NRC reviewer to determine, with reasonable assurance, that the administrative aspects of radiation safety are acceptable. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1.

## **12.2 Review and Audit Activities**

The detailed staff review for this section should be limited to TSs. The applicable TSs are in the area of administrative controls (see ANSI/ANS-15.1, Section 6.2). The TSs control the safety-significant aspects of review and audit activities. Concluding that the TSs are acceptable should allow the NRC reviewer to determine, with reasonable assurance, that review and audit activities are acceptable. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1.

### **12.2.1 Composition and Qualifications**

The detailed staff review for this section should be limited to TSs. The applicable TSs are in the area of administrative controls (see ANSI/ANS-15.1, Section 6.2.1). The TSs control the safety-significant aspects of the composition and qualifications of the review and audit function. Concluding that the TSs are acceptable should allow the NRC reviewer to determine, with reasonable assurance, that the composition and qualifications of the review and audit function

are acceptable. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1.

### **12.2.2 Charter and Rules**

The detailed staff review for this section should be limited to TSs. The applicable TSs are in the area of administrative controls (see ANSI/ANS-15.1, Section 6.2.2). The TSs control the safety-significant aspects of the charter and rules for the review and audit function. Concluding that the TSs are acceptable should allow the NRC reviewer to determine, with reasonable assurance, that the charter and rules of the review and audit function are acceptable. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1.

### **12.2.3 Review Function**

The detailed staff review for this section should be limited to TSs. The applicable TSs are in the area of administrative controls (see ANSI/ANS-15.1, Section 6.2.3). The TSs control the safety-significant aspects of the review function. Concluding that the TSs are acceptable should allow the NRC reviewer to determine, with reasonable assurance, that the review function is acceptable. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1.

### **12.2.4 Audit Function**

The detailed staff review for this section should be limited to TSs. The applicable TSs are in the area of administrative controls (see ANSI/ANS-15.1, Section 6.2.4). The TSs control the safety-significant aspects of the audit function. Concluding that the TSs are acceptable should allow the NRC reviewer to determine, with reasonable assurance, that the audit function is acceptable. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1.

## **12.3 Procedures**

The detailed staff review for this section should be limited to TSs. The applicable TSs are in the area of administrative controls (see ANSI/ANS-15.1, Section 6.4). The TSs control the safety-significant aspects of procedures. Concluding that the TSs are acceptable should allow the NRC reviewer to determine, with reasonable assurance, that the procedures are acceptable. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1.

## **12.4 Required Actions**

The detailed staff review for this section should be limited to TSs and to confirming that the licensee's required actions meet the requirements in 10 CFR 50.36, "Technical Specifications." The applicable TSs are in the area of administrative controls (see ANSI/ANS-15.1, Section 6.6). The TSs control the safety-significant aspects of the required actions. If the required actions are consistent with Section 6.6 of ANSI/ANS-15.1, the actions will meet the requirements of

10 CFR 50.36. Concluding that the TSs are acceptable should allow the NRC reviewer to determine, with reasonable assurance, that the required actions are acceptable. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1.

### **12.5 Reports**

The detailed staff review for this section should be limited to TSs and to confirming that the licensee's required reports meet the requirements in 10 CFR 50.36. Note that there are other reporting requirements in the regulations if certain requirements are not met. If certain initiating events occur, the TSs do not cover all reports that licensees could be required to make under the regulations. The applicable TSs are in the area of administrative controls (see ANSI/ANS-15.1, Section 6.7). The TSs control the safety-significant aspects of reporting. If the reporting is consistent with Section 6.7 of ANSI/ANS-15.1, the actions will meet the requirements of 10 CFR 50.36. Concluding that the TSs are acceptable should allow the NRC reviewer to determine, with reasonable assurance, that reporting is acceptable. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1.

### **12.6 Records**

The detailed staff review for this section should be limited to TSs and to confirming that the licensee's required records meet the requirements in 10 CFR 50.36. The applicable TSs are in the area of administrative controls (see ANSI/ANS-15.1, Section 6.8). The TSs control the safety-significant aspects of records. In addition to the records to be retained for the lifetime of the reactor facility, stated in Section 6.8.3 of ANSI/ANS-15.1, 10 CFR 50.36 requires the licensee to retain, for the life of the facility, records of reviews of violations of safety limits, LSSSs, and LCOs. Concluding that the TSs are acceptable should allow the NRC reviewer to determine, with reasonable assurance, that the records are acceptable. The reviewer should confirm that the proposed TSs are consistent with the guidance in the SRP and ANSI/ANS-15.1, with the addition discussed above.

### **12.7 Emergency Planning**

All licensees subject to this focused review plan have NRC-approved emergency plans in place. If a licensee has submitted a revision to its emergency plan as part of the license renewal application, the NRC will decide, on a case-by case basis, if it will review the revised plan as part of license renewal.

If the licensee has proposed no changes to the emergency plan as part of license renewal, then the NRC-approved plan remains in place, and any review of the emergency plan is outside the scope of a focused renewal review.

### **12.8 Security Planning**

All licensees subject to this focused review plan have NRC-approved security plans or procedures in place. The NRC has focused on and has enhanced security at RTRs in the wake of the September 11, 2001, attacks. If a licensee has submitted a revision to its security plan or

procedures as part of the license renewal application, the NRC will decide, on a case-by case basis, if it will review the revised plan or procedures as part of license renewal.

If the licensee has proposed no changes to the security plan or procedures as part of license renewal, then the NRC-approved plan or procedures remains in place, and any review of the security plan or procedures is outside the scope of a focused renewal review.

### **12.9 Quality Assurance**

None of the licensees subject to this focused review plan require reviews of quality assurance. This section of the SRP is outside the scope of a focused renewal review.

### **12.10 Operator Training and Regualification**

All licensees subject to this focused review plan have NRC-approved operator training and requalification plans in place. Section 12.1.4 above discusses the administrative aspects of training. If a licensee has submitted a revision to its operator training and requalification plan as part of the license renewal application, the NRC will decide, on a case-by case basis, if it will review the revised plan as part of license renewal.

If the licensee has proposed no changes to the operator training and requalification plan as part of license renewal, then the NRC-approved plan remains in place, and any review of the operator training and requalification plan is outside the scope of a focused renewal review.

### **12.11 Startup Plan**

None of the licensees subject to this focused review plan require a review of startup plans. This section of the SRP is outside the scope of a focused renewal review.

### **12.12 Environmental Reports**

The NRC must comply with the National Environmental Protection Act of 1969, as amended, and recognizes a continuing obligation to conduct its domestic licensing in a manner that is receptive to environmental concerns. This means that, in licensing actions, the NRC asks RTR licensees to address environmental concerns to assist the NRC in its evaluations. For this review topic, the reviewer should follow the guidance in the SRP.

## **13. ACCIDENT ANALYSES**

The accident analyses chapter of the SAR is one of the primary review areas of the focused review plan. The reviewer should follow the guidance in the SRP for this chapter. In this chapter, the licensee should show that the health and safety of the public and workers are protected and that the licensee has considered both the potential radiological consequences in the event of malfunctions and the capability of the facility to accommodate such disturbances.

The major purpose of this chapter is for the licensee to demonstrate that the facility design features, safety limits, LSSSs, and LCOs have been selected to ensure that no credible accident could lead to unacceptable radiological consequences to the public or the environment.

The accident analysis, in most cases, depends on other sections of the SAR. For example, the licensee may take credit for the operation of ESFs to mitigate the consequences of accidents. In that case, the NRC staff would review the design and operation of the ESFs discussed in Chapter 6. Other chapters of this focused review plan identify sections of the SAR that affect the accident analysis. The reviewer should review these additional SAR sections where they are pertinent to the reactor under review. The discussion in the SAR will help the reviewer decide what additional areas need review and the depth of review needed.

The following discussion of initiating events refers to other chapters of the SAR that the reviewer may need to review. However, because of the large number of potential initiating events, the references may not be complete, and the reviewer should still evaluate each SAR on a case-by-case basis.

Postulated events are placed in categories as shown in the introduction to Chapter 13. An MHA, which in most cases involves the escape of fission products from fuel or fueled experiments and their release to the unrestricted environment, is the most hazardous radiological accident conceivable at a research reactor. The MHA bounds all credible accidents. The evaluation of other categories of postulated events should show that the MHA is bounding.

The acceptance criteria portion of this section of the SRP discusses the application of differing occupational and public dose standards for accidents at research reactors, based on the date of the initial license. That guidance does not apply to the licensees subject to this focused review plan. The requirements in 10 CFR 50.51(a) impose a limit of 40 years on the length of an operating license. At the end of 40 years, the NRC must issue a new license. If the proposed duration of the requested license renewal, when added to the amount of time that has passed since the operating license was issued, exceeds 40 years (which is the case for all of the license renewal requests subject to this focused review plan), then the renewal is issued as a superseding license (however, the license number and docket number are not changed).

Because this is a new license, acceptance criteria based on the date of the initial license, as discussed in the SRP, are no longer applicable. Only the requirements of Sections 10 CFR 20.1001 through 10 CFR 20.2402 apply (what the SRP calls the new 10 CFR Part 20). The occupational and public dose limits changed with the adoption of revisions to 10 CFR Part 20 in 1994, and the NRC reviewer should ensure that the results of the accident analysis meet the revised regulations. The most significant change resulted in a change to the public dose limits from a whole body dose of 0.005 Sievert (0.5 rem) and a thyroid dose of 0.03 Sievert (3 rem) to a total effective dose equivalent of 0.001 Sievert (0.1 rem) (10 CFR 20.1301).

Meeting this lower public dose limit for accident scenarios may be a challenge for some licensees that designed their facilities in accordance with the former 10 CFR Part 20 dose limits. In that case, the requirements of 10 CFR 20.1301(d) may be considered. This regulation allows a higher public dose limit as follows:

- (d) A licensee or license applicant may apply for prior NRC authorization to operate up to an annual dose limit for an individual member of the public

of 0.5 rem (5 mSv). The licensee or license applicant shall include the following information in this application:

- (1) Demonstration of the need for and the expected duration of operations in excess of the limit in paragraph (a) of this section;
- (2) The licensee's program to assess and control dose within the 0.5 rem (5 mSv) annual limit; and
- (3) The procedures to be followed to maintain the dose as low as is reasonably achievable.

The licensee must apply for the higher dose limit as part of its renewal application and include the required information (the reviewer may need an RAI). The licensee's accident analysis should demonstrate the need for a 0.5 rem annual limit and the program to assess and control the dose (these are the steps the licensee takes such as compliance with TSs and regulations to ensure that a accident events occurs very infrequently, if ever); the NRC staff's finding should confirm that the analysis is acceptable. The expected duration is for the period of the renewal. As discussed in Chapter 11, the NRC inspection program should review the licensee's ALARA program. A conclusion by the inspection program that the licensee's procedures meet the requirements of 10 CFR 20.1101(b) is sufficient for the NRC reviewer to determine that condition (3) above is met.

For those facilities that have undergone HEU-to-LEU fuel conversions under NUREG-1537, a conversion SAR and an NRC staff SER discuss some aspects of accident analysis. The NRC reviewer may use the conversion SER as input to the renewal SER, after verifying that the information and conclusions in the SER remain accurate and valid.

### **13.1 Accident-Initiating Events and Scenarios**

This section of the SAR discusses potential accident-initiating events and scenarios. While the SRP treats the determination of consequences in a separate section, the SAR discusses initiating events, accident analysis, and consequence determination together.

#### **13.1.1 Maximum Hypothetical Accident**

The reviewer should follow the guidance in the SRP. The evaluation of the MHA could involve other chapters of the SAR. For example, fuel element failure and release of fission product scenarios could involve the identification of the maximum powered fuel element in the reactor core and calculations of the fission product inventory in the element from Chapter 4 of the SAR, "Reactor Description." For MHAs that involve the failure of fueled experiments, the reviewer may need to refer to Chapter 10, "Experimental Facilities and Utilization." If the MHA scenario involves the use of ESFs to mitigate the consequences of the MHA, the reviewer would refer to the applicable parts of Chapter 6, "Engineered Safety Features." The reviewer may need to refer to Chapter 11, "Radiation Protection Program and Waste Management," to verify the calculation methodology for doses to the reactor staff and members of the public.

### **13.1.2 Insertion of Excess Reactivity**

The reviewer should follow the guidance in the SRP. Evaluation of an accident involving an insertion of excess reactivity may require the reviewer to refer to parts of Chapter 4, "Reactor Description," for information on equipment such as control rods; Chapter 6, "Engineered Safety Features," if the licensee takes credit for ESFs; Chapter 7, "Instrumentation and Control Systems," if the I&C system is involved in the accident scenario; and Chapter 10, "Experimental Facilities and Utilization," if experiment failure initiates the insertion of excess reactivity.

### **13.1.3 Loss of Coolant**

The reviewer should follow the guidance in the SRP. Evaluation of this accident may require the reviewer to refer to parts of Chapter 4, "Reactor Description," for information on the reactor pool, the biological shield, and the fission product inventory generating decay heat; Chapter 5, "Reactor Coolant Systems," if reactor coolant system failure is an initiating event; Chapter 6, "Engineered Safety Features," if the licensee takes credit for ESFs; Chapter 10, "Experimental Facilities and Utilization," if an experimental facility failure, such as a beam tube, is an initiating event; and Chapter 11, "Radiation Protection Program and Waste Management," to verify the calculation methodology for doses to the reactor staff and members of the public.

### **13.1.4 Loss of Coolant Flow**

Because the licensees subject to this focused review plan cool their reactor cores by natural convection, this is not a bounding or significant accident. However, it is still evaluated, and the reviewer should follow the guidance in the SRP. Evaluation of this accident may require the reviewer to refer to parts of Chapter 5, "Reactor Coolant Systems," for an initiating event and system response.

### **13.1.5 Mishandling or Malfunction of Fuel**

The reviewer should follow the guidance in the SRP. The evaluation of this accident may require the reviewer to refer to parts of Chapter 4, "Reactor Description," for calculations of the fission product inventory in fuel elements; Chapter 6, "Engineered Safety Features," if the licensee takes credit for ESFs to mitigate the consequences of the accident; Chapter 9, "Auxiliary Systems," for information on the handling and storage of fuel; and Chapter 11, "Radiation Protection Program and Waste Management," to verify the calculation methodology for doses to the reactor staff and members of the public.

### **13.1.6 Experiment Malfunction**

The reviewer should follow the guidance in the SRP. The evaluation of this accident may require the reviewer to refer to parts of Chapter 10, "Experimental Facilities and Utilization." Because of the wide variety of experiments performed at RTRs, a number of other SAR chapters could also be involved.

### **13.1.7 Loss of Normal Electrical Power**

The reviewer should follow the guidance in the SRP. The evaluation of this accident may require the reviewer to refer to parts of Chapter 8, "Electrical Power Systems."

### **13.1.8 External Events**

This class of accidents is initiated by some outside effect on the facility, either caused by nature or humans. The NRC reviewer should follow the guidance in the SRP. If the last NRC review in this area was comprehensive, this review can be limited to determining if there have been any changes to the site characteristics that would result in a new initiating event or if there have been changes to structures and components that would change their response to an external event. These should be identified in the SAR. An evaluation of this accident may require the reviewer to refer to part of Chapter 2, "Site Characteristics," for initiating events and Chapter 3, "Design of Structures, System, and Components," if external events could cause the failure of structures, systems, or components.

### **13.1.9 Mishandling or Malfunction of Equipment**

The NRC reviewer should follow the guidance in the SRP. The specific equipment mishandled or malfunctioning will determine what other sections of the SAR need to be reviewed.

### **13.2 Accident Analysis and Determination of Consequences**

The NRC reviewer should follow the guidance in the SRP. If the reviewer identifies issues during the review of the determination of consequences (doses) for accident events, there is a very high chance that similar issues exist in the licensee's calculations of doses from routine effluents in Chapter 11. The reviewer should also evaluate the licensee's treatment of routine doses, if problems are discovered in the area of accident doses.

### **13.3 Summary and Conclusions**

The NRC reviewer should follow the guidance in the SRP.

## **14. TECHNICAL SPECIFICATIONS**

TSs is one of the primary review areas of the focused review plan. The reviewer should follow the guidance in Chapter 14 of the SRP. The current version of ANSI/ANS-15.1 is the 2007 version that is used in this focused review plan and that the reviewer should use. However, for the majority of TSs submitted with renewal applications subject to this focused review plan, if the licensee used ANSI/ANS-15.1 for guidance, it most likely used the 1990 version of the standard. The reviewer should understand the differences, which are minor, between the two versions of the standard.

The applicable sections of the SAR, the SRP, and this focused review plan discuss the TSs and their bases. However, because the focused renewal review process has primary focus areas, the SER should contain a TSs chapter that discusses all facility TSs that do not fall under the SER sections in the reactor, radiation protection and accident analysis. The reviewer should present the TSs and, where applicable, their bases, along with a discussion and justification of why the NRC finds the proposed TSs to be acceptable.

The reviewer can use the standard conclusion section for the review of TSs in this section of the SER. A template for the conclusions section of Chapter 14 of the SER is presented below.

Brackets contain review-dependent information that the NRC reviewer should address when it is pertinent to the license renewal application under review.

#### START OF SECTION 14 CONCLUSION TEMPLATE

The staff has evaluated the TSs as part of its review of the application for renewal of Facility License No. R-[LICENSE NUMBER]. The TSs define certain features, characteristics, and conditions governing the operation of the [REACTOR FACILITY]. The TSs are explicitly included in the renewed license as Appendix A. The staff reviewed the format and content of the TSs for consistency with the guidance found in ANSI/ANS-15.1-2007 and NUREG-1537. The staff specifically evaluated the content of the TSs to determine if they meet the requirements in 10 CFR 50.36. The staff concluded that the [REACTOR FACILITY] TSs meet the requirements of the regulations. The staff based this conclusion on the following findings:

- To satisfy the requirements of 10 CFR 50.36(a), the licensee provided proposed TSs with the application for license renewal. As required by the regulations, the proposed TSs included appropriate summary bases for the TSs. Those summary bases are not part of the TSs.
- The [REACTOR FACILITY] is a facility of the type described in 10 CFR 50.21(c), and therefore, as required by 10 CFR 50.36(b), the facility license will include the TSs. To satisfy the requirements of 10 CFR 50.36(b), the licensee provided TSs derived from analyses in the [REACTOR FACILITY] SAR.
- To satisfy the requirements of 10 CFR 50.36(c)(1), the licensee provided TSs specifying a safety limit on the fuel temperature and LSSSs for the reactor protection system to preclude reaching the safety limit.
- The TSs contain LCOs for each item that meets one or more of the criteria specified in 10 CFR 50.36(c)(2)(ii).
- The TSs contain surveillance requirements that satisfy the requirements of 10 CFR 50.36(c)(3).
- The TSs contain design features that satisfy the requirements of 10 CFR 50.36(c)(4).
- The TSs contain administrative controls that satisfy the requirements of 10 CFR 50.36(c)(5). The licensee's administrative controls contain requirements for initial notification, written reports, and records that meet the requirements specified in 10 CFR 50.36(c)(1),(2),(7), and (8).

The staff finds the TSs to be acceptable and concludes that normal operation of the [REACTOR FACILITY] within the limits of the TSs will not result in radiation exposures in excess of the limits specified in 10 CFR Part 20 for members of the

general public or occupational exposures. The staff also finds that the TSs provide reasonable assurance that the facility will be operated as analyzed in the [REACTOR FACILITY] SAR, and adherence to the TSs will limit the likelihood of malfunctions and the potential accident scenarios discussed in the accident analysis in Chapter 13 of this SER.

END OF SECTION 14 CONCLUSION TEMPLATE

## **15. FINANCIAL QUALIFICATIONS**

The Financial, Policy, and Rulemaking Branch will review the financial qualifications.

## **16. OTHER LICENSE CONSIDERATIONS**

### **16.1 Prior Use of Reactor Components**

This section of the SAR discusses how components were used in the past. The components referred to in this section are fuel elements, control rods, and safety-related components of the reactor protection system. The reviewer should include the aging of fuel elements and control rods as part of Chapter 4.

The TS requirements for I&C systems provide reasonable assurance that degradation of system components will be detected. If the aging failure of the reactor protection system is identified as an accident initiator in Chapter 13, the reviewer should review the identified components using the SRP.

### **16.2 Medical Use of Nonpower Reactors**

This section of the SRP is outside the scope of the focused review plan, and none of the reactors subject to the focused review plan are used for medical purposes.

## **17. DECOMMISSIONING AND POSSESSION-ONLY LICENSE AMENDMENTS**

This chapter of the SRP is outside the scope of the focused review plan. Chapter 15 includes the financial aspects of decommissioning.

## **18. HIGHLY ENRICHED TO LOW-ENRICHED URANIUM CONVERSIONS**

This chapter of the SRP is outside the scope of the focused review plan.

## **OVERALL CONCLUSION SECTION OF THE SER**

Note that the SRP does not include this section.

The license renewal SER has a chapter that contains the overall conclusions of the NRC staff's review. A template for this section of the SER is given below. This template is based on the reviewer reaching a conclusion of reasonable assurance of protection of the health and safety of the public. Brackets contain review-dependent information that the NRC reviewer should address when it is pertinent to the license renewal application under review.

START OF THE SER CONCLUSION TEMPLATE

On the basis of its evaluation of the application, as discussed in the previous chapters of this SER, the staff concludes the following:

- The application for license renewal dated [PROVIDE DATE], as supplemented, complies with the standards and requirements of the Atomic Energy Act and the Commission's rules and regulations set forth in Title 10 of the *Code of Federal Regulations*.
- The facility will operate in conformity with the application, as well as the provisions of the Atomic Energy Act and the rules and regulations of the Commission.
- There is reasonable assurance that (1) the activities authorized by the renewed license can be conducted at the designated location without endangering the health and safety of the public, and (2) such activities will be conducted in compliance with the rules and regulations of the Commission.
- The licensee is technically and financially qualified to engage in the activities authorized by the renewed license, in accordance with the rules and regulations of the Commission.
- The issuance of the renewed license will not be inimical to the common defense and security or to the health and safety of the public.

END OF THE SER CONCLUSION TEMPLATE