DRAFT SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

TECHNICAL SPECIFICATIONS TASK FORCE TRAVELER

TSTF-554, REVISION 1, “REVISE REACTOR COOLANT LEAKAGE REQUIREMENTS”

USING THE CONSOLIDATED LINE ITEM IMPROVEMENT PROCESS

(EPID L-2019-PMP-0181)

1.0 INTRODUCTION

By letter dated January 16, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20016A233), the Technical Specifications Task Force (TSTF) submitted traveler TSTF-554, Revision 1, “Revise Reactor Coolant Leakage Requirements,” (TSTF-554) to the U.S. Nuclear Regulatory Commission (NRC). TSTF-554 proposes changes to the Standard Technical Specifications (STSs) for pressurized water reactor and boiling water reactor (BWR) plants. Upon approval, these changes will be incorporated into future revisions of NUREG-1430 through NUREG-1434, and NUREG-2194[1] and this traveler will be available to licensees for adoption through the consolidated line item improvement process.

The proposed changes would revise the technical specifications (TSs) related to reactor coolant system (RCS) operational leakage by adding a new Condition and Required Action when pressure boundary leakage exists and revise the definition of the term “LEAKAGE.”

[1]U.S. Nuclear Regulatory Commission, “Standard Technical Specifications, Babcock and Wilcox Plants,” NUREG-1430, Volume 1, “Specifications,” and Volume 2, “Bases,” Revision 4.0, dated April 2012 (ADAMS Accession Nos. ML12100A177 and ML12100A178, respectively).

U.S. Nuclear Regulatory Commission, “Standard Technical Specifications, Westinghouse Plants,” NUREG-1431, Volume 1, “Specifications,” and Volume 2, “Bases,” Revision 4.0, dated April 2012 (ADAMS Accession Nos. ML12100A222 and ML12100A228, respectively).

U.S. Nuclear Regulatory Commission, “Standard Technical Specifications, Combustion Engineering Plants,” NUREG-1432, Volume 1, “Specifications,” and Volume 2, “Bases,” Revision 4.0, dated April 2012 (ADAMS Accession Nos. ML12102A165 and ML12102A169, respectively).

U.S. Nuclear Regulatory Commission, “Standard Technical Specifications, General Electric BWR/4 Plants” NUREG-1433, Volume 1, “Specifications,” and Volume 2, “Bases,” Revision 4.0, dated April 2012 (ADAMS Accession Nos. ML12104A192 and ML12104A193, respectively).

U.S. Nuclear Regulatory Commission, “Standard Technical Specifications, General Electric BWR/6 Plants” NUREG-1434, Volume 1, “Specifications,” and Volume 2, “Bases,” Revision 4.0, dated April 2012 (ADAMS Accession Nos. ML12104A195 and ML12104A196, respectively).

U.S. Nuclear Regulatory Commission, "Standard Technical Specifications, Westinghouse Advanced Passive 1000 (AP1000) Plants," NUREG-2194, Volume 1 “Specifications,” and Volume 2, “Bases,” Revision 0, dated April 2016 (ADAMS Accession Nos. ML16110A277 and ML16110A369, respectively).

2.0 REGULATORY EVALUATION

2.1 Reactor Coolant System Description

Components that contain or transport the coolant to or from the reactor core make up the RCS. Materials can degrade as a result of the complex interaction of the materials, the stresses they encounter, and through operational wear or mechanical deterioration during normal and upset operating environments. Such material degradation could lead to leakage of reactor coolant into containment buildings.

RCS leakage falls under two main categories – identified leakage and unidentified leakage. Identifying sources of leakage is necessary for prompt identification of potentially adverse conditions, assessment of safety significance of the leakage, and quick corrective action. A limited amount of leakage from the reactor coolant pressure boundary (RCPB) directly into the containment/drywell atmosphere is expected as the RCS and other connected systems cannot be made 100 percent leak tight. This leakage is detected, located, and isolated from the containment atmosphere, so as to not interfere with measurement of unexpected RCS leakage detection.

Leakage from the RCPB inside the primary containment/drywell is detected by independently monitored parameters, such as sump level changes and containment/drywell gaseous and particulate radioactivity levels. Plant TSs identify at least two independent and diverse means and/or methods of detection. The primary means of quantifying significant leakage in the containment/drywell is the containment/drywell sump monitoring system. The containment atmosphere particulate and gaseous radioactivity monitors are sensitive to radioactivity in any RCS leakage, but do not provide a reasonably accurate means of quantifying leakage.

The containment/drywell sump monitoring system monitors the liquid collected in the sump. This liquid consists of leakage from RCS, leakage from other systems inside primary containment (e.g., component cooling water), and condensation of steam released from the RCS or other high-temperature systems that is condensed by the containment/drywell coolers and directed to the sump. The containment sump instrumentation measures the rate of liquid accumulation in the sump, displays results in the main control room, and provides for an alarm for high rates of liquid accumulation. The rate of liquid accumulation may be determined by changes in measured level in the sump or by the time between periodic pump operation to drain the sump between known sump levels.

Gaseous and/or particulate primary containment atmospheric radioactivity monitors continuously monitor the containment atmosphere during reactor operation for indications of leakage. The RCS contains radioactivity that, when released to the primary containment, can be detected by the gaseous or particulate primary containment atmospheric radioactivity monitor. Radioactivity detection systems are included for monitoring particulate and/or gaseous activities because of their sensitivities and rapid responses to RCS leakage. Reactor coolant radioactivity levels will be low during initial reactor startup and for a few weeks thereafter, until activated corrosion products have been formed and fission products have been released from fuel elements. To enhance detection capability, radioactivity alarm settings are typically set to provide the most sensitive response without causing an excessive number of spurious alarms.

The safety significance of RCS leakage varies widely depending on its source, rate, and duration. Therefore, detecting and monitoring RCS leakage into the containment area is necessary. Separation of identified leakage from unidentified leakage, provides quantitative information to the operators, allowing them to take corrective action should leakage occur that is detrimental to the safety of the unit and the public.

2.2 Proposed Changes to Standard Technical Specifications

TSTF-554 proposes to revise the definition of "LEAKAGE" and STS **[3.4.13]** RCS Operational Leakage. Mark-ups of the proposed changes are provided in TSTF-554 (ADAMS Accession No. ML20016A233). The proposed changes would revise the requirements when pressure boundary leakage is detected and add a Required Action when pressure boundary leakage is identified. The proposed change is applicable to the following STSs:

- NUREG-1430, "Standard Technical Specifications, Babcock & Wilcox Plants," Section 1.1, "Definitions", and STS 3.4.13, "RCS Operational LEAKAGE"
- NUREG-1431, "Standard Technical Specifications, Westinghouse Plants," Section 1.1, "Definitions", and STS 3.4.13, "RCS Operational LEAKAGE"
- NUREG-1432, "Standard Technical Specifications, Combustion Engineering Plants," Section 1.1, "Definitions", and STS 3.4.13, "RCS Operational LEAKAGE"
- NUREG-1433, "Standard Technical Specifications, General Electric BWR/4 Plants," Section 1.1, "Definitions", and STS 3.4.4, "RCS Operational LEAKAGE"
- NUREG-1434, "Standard Technical Specifications, General Electric BWR/6 Plants," Section 1.1, "Definitions", and STS 3.4.5, "RCS Operational LEAKAGE"
- NUREG-2194, "Standard Technical Specifications, Westinghouse Advanced Passive 1000 (AP1000) Plants," Section 1.1, "Definitions", and STS 3.4.7, "RCS Operational LEAKAGE"

2.2.1 Section 1.1, "Definitions"

The identified LEAKAGE definition (a.2) would be revised to no longer exclude pressure boundary leakage from identified leakage by deleting the phrase "not to be pressure boundary LEAKAGE."

The pressure boundary LEAKAGE definition **[(c)]** would be revised to delete the word "nonisolable."[2] The sentence, "LEAKAGE past seals, packing, and gaskets is not pressure boundary LEAKAGE," would be relocated from the STS Bases and added to the definition.

Additionally, the LEAKAGE definition would be revised by other editorial and punctuation changes.

2.2.2 Reactor Coolant System Operational Leakage, STS **[3.4.13]**[3]

The ACTIONS section of STS **[3.4.13]** "RCS Operational LEAKAGE," would be revised to add a new Condition A to isolate pressure boundary leakage within 4 hours.

In NUREGs-1430, -1431, -1432, 1433, and -1434, existing Condition B would be revised to be applicable should any Action of limiting conditions for operation (LCO) **[3.4.13]** not be met by deleting "of Condition A **[or B]**."

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[2] The section number is bracketed to indicate that the numbering convention varies by NUREG. NUREGs-1430, -1431, -1432, and -2194 use "c" while NUREGs-1433 and -1434 use "d".

[3] The STS number is bracketed to indicate that the numbering convention varies by NUREG. STS 3.4.13 is used in NUREGs-1430, -1431, and -1432; STS 3.4.4 is used in NUREG-1433; STS 3.4.5 is used in NUREG-1434; STS 3.4.7 is used in NURE-2194. STS **[3.4.13]** will be used throughout this safety evaluation.

In NUREGs-1430, -1431, -1432, and -2194, existing Conditions A and B would be renumbered as Conditions B and C to reflect new Condition A. The existing Condition B would be revised to delete the condition pressure boundary leakage exists because pressure boundary leakage would be addressed by the new Condition A. Finally, the Required Actions associated with existing Conditions A and B would be renumbered accordingly.

In NUREGs-1433 and -1434, existing Conditions A, B, and C would be renumbered to reflect new Condition A. The existing Condition C would be revised to delete to the condition pressure boundary leakage exists because pressure boundary leakage would be addressed by the new Condition A. Finally, the Required Actions Associated with existing Conditions A and B would be renumbered accordingly.

2.2.3 STS Bases Changes

The STS Bases would be revised to reflect the changes to the STS. The Bases for LCO **[3.4.13]** would be revised to reflect changes in the definitions of RCS operational LEAKAGE. Mark-ups of the proposed changes to the Bases for LCO **[3.4.13]** are provided in TSTF-554 (ADAMS Accession No. ML20016A233).

Additionally, the TSTF proposed Bases for the new Action A.1 of LCO **[3.4.13]** Condition A. The Bases for Action A.1 are:

> If pressure boundary LEAKAGE exists, the affected component, pipe, or vessel must be isolated from the RCS by a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve within 4 hours. While in this condition, structural integrity of the system should be considered because the structural integrity of the part of the system within the isolation boundary must be maintained under all licensing basis conditions, including consideration of the potential for further degradation of the isolated location. Normal LEAKAGE past the isolation device is acceptable as it will limit RCS LEAKAGE and is included in identified or unidentified LEAKAGE. This action is necessary to prevent further deterioration of the RCPB.

2.3 Applicable Regulatory Requirements and Guidance

As described in the Commission's "Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors," (58 *Federal Register* 39132, dated July 22, 1993), the NRC and industry task groups for new STS recommended that improvements include greater emphasis on human factors principles in order to add clarity and understanding to the text of the STS, and should provide improvements to the Bases Section of TSs, which provides the purpose for each requirement in the specification. The improved vendor-specific STS were developed and issued by the NRC in September 1992.

Section IV, "The Commission Policy," of the Final Policy Statement on TS states, in part:

> The purpose of Technical Specifications is to impose those conditions or limitations upon reactor operation necessary to obviate the possibility of an abnormal situation or event giving rise to an immediate threat to the public health and safety by

identifying those features that are of controlling importance to safety and establishing on them certain conditions of operation which cannot be changed without prior Commission approval.

…[T]he Commission will also entertain requests to adopt portions of the improved STS [(e.g., TSTF-554)], even if the licensee does not adopt all STS improvements. …The Commission encourages all licensees who submit Technical Specification related submittals based on this Policy Statement to emphasize human factors principles.

…In accordance with this Policy Statement, improved STS have been developed and will be maintained for each NSSS [nuclear steam supply system] owners group. The Commission encourages licensees to use the improved STS as the basis for plant-specific Technical Specifications. …[I]t is the Commission intent that the wording and Bases of the improved STS be used …to the extent practicable.

The Summary section of the Final Policy Statement on TS states, in part that:

Implementation of the Policy Statement through implementation of the improved STS is expected to produce an improvement in the safety of nuclear power plants through the use of more operator-oriented Technical Specifications, improved Technical Specification Bases, reduced action statement induced plant transients, and more efficient use of NRC and industry resources.

The Final Policy Statement on TS provides the following description of the scope and the purpose of the STS Bases:

Each LCO, Action, and Surveillance Requirement should have supporting Bases. The Bases should at a minimum address the following questions and cite references to appropriate licensing documentation (e.g., Updated Final Safety Analysis Report (FSAR), Topical Report) to support the Bases.

1. What is the justification for the Technical Specification, i.e., which Policy Statement criterion requires it to be in the Technical Specifications?

2. What are the Bases for each LCO, i.e., why was it determined to be the lowest functional capability or performance level for the system or component in question necessary for safe operation of the facility and, what are the reasons for the Applicability of the LCO?

3. What are the Bases for each Action, i.e., why should this remedial action be taken if the associated LCO cannot be met; how does this Action relate to other Actions associated with the LCO; and what justifies continued operation of the system or

> component at the reduced state from the state specified in the LCO for the allowed time period?
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> 4. What are the Bases for each Safety Limit?
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> 5. What are the Bases for each Surveillance Requirement and Surveillance Frequency; i.e., what specific functional requirement is the surveillance designed to verify? Why is this surveillance necessary at the specified frequency to assure that the system or component function is maintained, that facility operation will be within the Safety Limits, and that the LCO will be met?
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> Note: In answering these questions the Bases for each number (e.g., Allowable Value, Response Time, Completion Time, Surveillance Frequency), state, condition, and definition (e.g., operability) should be clearly specified. As an example, a number might be based on engineering judgment, past experience, or PSA [probabilistic safety assessment] insights; but this should be clearly stated.

The regulation under 10 CFR 50.36(a)(1) requires that:

> Each applicant for a license authorizing operation of a … utilization facility shall include in his application proposed technical specifications in accordance with the requirements of this section. A summary statement of the bases or reasons for such specifications, other than those covering administrative controls, shall also be included in the application, but shall not become part of the technical specifications.

The regulation under 10 CFR 50.36(b) requires that:

> Each license authorizing operation of a …utilization facility …will include technical specifications. The technical specifications will be derived from the analyses and evaluation included in the safety analysis report, and amendments thereto, submitted pursuant to [10 CFR] 50.34 ["Contents of applications; technical information"]. The Commission may include such additional technical specifications as the Commission finds appropriate.

The categories of items required to be in the TSs are listed in 10 CFR 50.36(c). The regulation at 10 CFR 50.36(c)(2) requires that TSs include LCOs. LCOs "are the lowest functional capability or performance levels of equipment required for safe operation of the facility." The regulation also requires that when an LCO of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the TS until the condition can be met.

The regulation at 10 CFR 50.36(c)(2)(ii)(B) requires that an LCO be established for a process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. Operational leakage is an input to containment pressure calculations during a loss of offsite power. It is also an input to containment heat load calculations for containment coolers assuring the containment bulk air temperature remains below the initial temperature assumed for containment pressure response during a loss-of-coolant accident evaluation. Operational leakage limits constitute an initial condition of transient analyses supporting exclusion of pipe rupture accident dynamic effects from the design basis. The STS contain an LCO that requires operational leakage be maintained within limits associated with conditions assumed in the analyses. The unidentified leakage limit is set as a fraction of the leakage rate calculated for a RCPB critical crack (i.e., a crack size approaching instability with the potential for rapid growth, as determined through experimental observations and application of fracture mechanics principles). The margin between the unidentified leakage limit and the critical crack leak rate provides time for operator action to shut down and cool down the reactor before hazardous degradation to the RCPB develops. The identified leakage limit ensures that the identified leakage would be low enough to avoid masking unidentified leakage and prevent increased identified leakage from causing significant pressure boundary degradation. The prohibition against pressure boundary leakage ensures that operation does not continue with existing significant degradation of the RCPB

The RCPB is defined in 10 CFR 50.2 as:

> …all those pressure-containing components of boiling and pressurized water-cooled nuclear power reactors, such as pressure vessels, piping, pumps, and valves, which are:
>
> (1) Part of the reactor coolant system, or
>
> (2) Connected to the reactor coolant system, up to and including any and all of the following:
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> (i) The outermost containment isolation valve in system piping which penetrates primary reactor containment,
>
> (ii) The second of two valves normally closed during normal reactor operation in system piping which does not penetrate primary reactor containment,
>
> (iii) The reactor coolant system safety and relief valves.
>
> For nuclear power reactors of the direct cycle boiling water type, the reactor coolant system extends to and includes the outermost containment isolation valve in the main steam and feedwater piping.

The NRC staff's guidance for the review of TSs is in Chapter 16.0, "Technical Specifications," of NUREG-0800, Revision 3, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR [Light-Water Reactor] Edition" (SRP), March 2010 (ADAMS Accession No. ML100351425). As described therein, as part of the regulatory standardization effort, the NRC staff has prepared STSs for each of the LWR nuclear designs. Accordingly, the NRC staff's review includes consideration of whether the proposed changes are consistent with the applicable referenced STS, as modified by NRC-approved travelers. In addition, the SRP states that comparing the change to previous STSs can help clarify the STS intent.

Regulatory Guide (RG) 1.45, Revision 1, "Guidance on Monitoring and Responding to Reactor Coolant System Leakage," dated May 2008 (ADAMS Accession No. ML073200271), states:

> The safety significance of leakage from the RCS can vary widely, depending on the source of the leakage as well as the leakage rate and duration. Operating experience and research have indicated that very low levels of leakage could cause (or indicate) material degradation arising, for example, as a result of boric acid corrosion, primary water stress-corrosion cracking, and intergranular stress-corrosion cracking. Such forms of degradation could potentially compromise the integrity of a system, leading to a loss-of-coolant accident. To minimize the probability of rapidly propagating failure attributable to material degradation and gross rupture of the RCPB, plants should keep the leakage to a level that is as low as practical and take prompt action in responding to leakage to limit the safety consequences.

3.0 TECHNICAL EVALUATION

3.1 LEAKAGE Definition, STS 1.1

The change to the definition of identified leakage applies to leakage from an RCS component that would be released directly into the containment/drywell atmosphere where the leakage would be detectable by the RCS leakage detection systems. The revised definition of identified leakage removes the existing exclusion of leakage known to be pressure boundary leakage. It also clarifies that identified leakage is known to not impair leakage detection system operation, such as by masking other leakage. Therefore, all RCS leakage that is specifically located and known to not interfere with the operation of leakage detection systems would be considered identified leakage, regardless of the source of leakage.

Section B. Discussion "Leakage Separation" of RG 1.45 provides the following related to separation between identified and unidentified leakage:

> Procedures for separating the sources of leakage (i.e., leakage from an identified source versus leakage from an unidentified source) are necessary for prompt identification of potentially adverse conditions, assessment of the safety significance of the leakage, and quick corrective action.
>
> The reactor vessel closure seals and safety and relief valves should not have significant leakage; however, if leakage occurs through these paths or through pump and valve seals, it should be detectable and collectable, and the system should isolate it from the containment atmosphere to the extent practical so as not to mask any potentially serious leakage that may occur. This leakage is "identified leakage," and it should discharge to tanks or sumps so that the plant operator can measure or calculate, monitor, and analyze the flow rate and trend in flow rate during plant operation.

> Leakage to the containment atmosphere, which is not collected (such as from valve stem packing glands and other sources), increases the humidity of the containment. The moisture removed from the atmosphere by air coolers, together with any associated liquid leakage to the containment, is "unidentified leakage," and the system should collect it in tanks or sumps separate from the identified leakage so that the plant operator can establish, monitor, and analyze the flow rate and the trend in flow rate of the unidentified leakage during plant operation.

Thus, the distinction between identified and unidentified leakage is the capability to collect and measure identified leakage such that it does not impair the leakage detection system function to monitor unidentified leakage. The source of the leakage is not relevant to this capability provided that separate, appropriate limits on pressure boundary leakage have been established. Therefore, the proposed change to the definition of identified leakage is acceptable.

The proposed change to the definition of pressure boundary leakage deletes the word "nonisolable" and adds a sentence clarifying that pressure boundary leakage does not include leakage past seals, packing, and gaskets. RG 1.45 defines RCPB leakage as:

> leakage from a nonisolable fault in the material of an RCS component, pipe wall (including welds), or vessel wall. Leakage from seals, gaskets, and mechanical connections (e.g., bolts, valve seals) is not considered RCPB leakage although these components are part of the RCPB, as defined in 10 CFR 50.2, "Definitions" ... Thus, RCPB leakage is indicative of degradation of pressure-retaining components that could ultimately result in a loss of component structural integrity.

The word "nonisolable" has been interpreted inconsistently in the definition of pressure boundary leakage. In some interpretations, it has been considered a means of emphasizing that the leakage fault is in the base material of the pressure boundary and, therefore, the leakage cannot be stopped by adjusting packing or seals. In such a case, the fault represents degradation of the pressure boundary material that could result in a loss of structural integrity. Another interpretation is that leakage through a fault in portions of the pressure boundary that can be separated from the RCS by an isolation device (typically an installed valve) need not be considered as pressure boundary leakage once the isolation device is performing its isolation function. This would allow certain small sections of the RCPB between the outermost two valves to be removed from consideration as RCPB leakage when the inner valve is closed.

Regardless of the interpretation, deletion of the word "nonisolable" does not alter the fundamental meaning that pressure boundary leakage represents degradation that could ultimately result in a loss of structural integrity. Therefore, the NRC staff finds that removing the term "nonisolable" provides a clearer definition of pressure boundary leakage and does not conflict with the RCPB definition in 10 CFR 50.2. Additionally, the NRC staff finds that the additional sentence "LEAKAGE past seals, packing, and gaskets is not pressure boundary LEAKAGE," is consistent with the RG 1.45 discussion that pressure boundary leakage is not leakage from seals, gaskets, or packing. The proposed punctuation changes to leakage definition are considered editorial and provide further clarity to the definitions of leakage in accordance with SRP Chapter 16.0. Therefore, the NRC staff finds the proposed change to the definition of leakage acceptable.

3.2 Reactor Coolant System Operational Leakage, STS **[3.4.13]**

The traveler proposes to add a new Condition A to STS **[3.4.13]**. This condition applies if pressure boundary leakage exists. The new Required Action A.1 requires isolation of the affected component, pipe, or vessel from the RCS by use of a closed manual valve, closed and de-activated automatic valve, blind flange, or check valve, within a Completion Time of 4 hours. This action may only be completed when the component is located where an existing isolation device or feature can be configured to provide the isolation function within the 4-hour Completion Time. If the 4-hour Completion Time cannot be met, the plant must initiate shutdown in accordance with existing Condition C (previously Condition B).

The proposed Completion Time of 4 hours for new Condition A is consistent with the existing Completion Time for Condition B (previously Condition A) for when the identified or unidentified leakage exceeds limit as defined in LCO **[3.4.13]**. If the leak cannot be isolated within the allotted time period, the plant will begin shutdown activities before any significant damage to the RCPB can take place. Therefore, the NRC staff finds that the 4-hour Completion Time is acceptable because it is a reasonable time frame for a leak to be isolated and provides a reasonable period to isolate the flaw while avoiding further damage to the RCPB

The new proposed Required Action requires the flaw to be isolated from the reactor coolant pressure source to prevent further degradation of the flaw, which could result in additional leakage. If the Required Action A.1 cannot be completed within the 4-hour Completion Time , STS **[3.4.13]** Condition C (previously Condition B) requires that the reactor be brought to lower pressure conditions to reduce the severity of the LEAKAGE and its potential consequences (i.e., be in Mode 3 within 6 hours and Mode 5 within 36 hours). Therefore, the NRC staff finds that proposed the new Condition A, including its associated Required Action A.1 and Completion Time, is acceptable because it continues to meet the requirements of 10 CFR 50.36(c)(2)(i), by providing remedial actions and shutting down the reactor if the remedial actions cannot be met.

Additionally, formatting and numbering changes were proposed to LCO **[3.4.13]** caused by the addition of a new Condition A. These NRC staff finds these proposed changes acceptable because they are editorial clarifications and do not substantively change the TS requirements.

3.3 Standard Technical Specification Bases

As discussed in Section 2.3 of this SE, the Final Policy Statement on TS describes the scope and purpose of the STS Bases. It does so by listing five questions the STS Bases must address. While the STS Bases as a whole must address these questions, not every question will be relevant to every change to the STS Bases. The NRC staff reviewed the proposed STS Bases changes in TSTF-554. The first, fourth, and fifth questions are not relevant to this evaluation because the STS changes proposed in TSTF-554, as evaluated above, do not affect the justification for the STSs, safety limits, or surveillance requirements.

The proposed addition of STS Bases supporting the new action statement of Condition A are discussed above in Section 2.2.3. As these proposed STS Bases support a new action statement, question three is relevant to the changes.

The NRC staff reviewed the proposed changes to the STS Bases. The STS Bases state that if leakage is detected the licensee must isolate the affected component. In doing so, the proposed addition describes the remedial actions to be taken if the associated LCO cannot be met. The proposed bases also state that normal leakage past the isolation device is acceptable because it limits RCS leakage and is included in identified or unidentified leakage. It also explains that this action prevents further deterioration of the RCPB. Finally, the proposed addition also explains that, while in this condition, licensees should consider the system's structural integrity because structural integrity must be maintained. This justifies continued operation at the reduced state from the state specified in the LCO because structural integrity of the system will be maintained by isolating the leak within 4 hours and any normal leakage past the isolated component would be included as identified or unidentified leakage. This means that continued operation while the LCO is not met is acceptable because the structural integrity of the system will be maintained since the leak will be isolated within 4 hours and any normal leakage past the isolated component will be accounted for in the identified or unidentified leakage limits.

With regard to the 4-hour completion time, the NRC staff notes revised Action B.1[4] has an identical completion time.[5] The NRC staff has reviewed the information in the STS Bases about the Action B.1's completion time—i.e. it allows time to verify leakage rates and either identify unidentified LEAKAGE or reduce LEAKAGE to within limits to prevent further deterioration of the RCPB; if that cannot be done, then the reactor must be shutdown. The NRC staff finds that those statements apply equally to new Action A.1's completion time. Further, the STS Bases do not exclude applying those statements as the basis for Action A.1's competition time. Therefore, the proposed additions to the STS Bases need not address that question with regard to new Action A.1 because the STS Bases already include a relevant discussion. Finally, the STS Bases already explain how the new remedial action relates to other actions associate with the LCO, meaning the changes to the STS Bases need not provide an explanation. Therefore, the NRC staff finds the proposed STS Bases changes adequately address Question 3 with regard to the new action statement.

The other proposed changes would revise the existing STS Bases consistent with the associated proposed Definition and LCO changes; renumber action statements to account for the proposed new action statement; revise the basis for an action statement to reflect that fact that an action has been removed; and correct typographical errors. Updating the STS Bases consistent with the proposed definition and LCO changes ensures that they properly explain why this LCO was chosen as the lowest functional capability or performance level for the system in question. As the proposed changes do not affect the applicability of the LCO, the STS Bases, therefore, address Question 2 as it relates to TSTF-554's proposed changes. In addition, the correction of typographical errors improves the clarity of the STS Bases. Finally, administrative changes like renumbering action statements and deleting sentences that are no longer applicable ensure the STS Bases adequately describe the STS. Therefore, the NRC staff finds that the proposed revisions to the STS Bases are consistent with the Final Policy Statement on TS and 10 CFR 50.36.

Furthermore, the NRC staff review determined that the proposed STS Bases changes enhance and/or clarify the current STS Bases, which follow the guidance of RG 1.45, Revision 1. Regulatory Guide 1.45 describes acceptable methods for selecting leakage detection systems. The NRC staff's review concluded that the proposed STS Bases changes adhere to the Final Policy Statement and 10 CFR 50.36 specified above, and therefore the changes are acceptable.

[4] Note that in NUREGs-1433 and -1434 the condition under which the relevant action applies is different. It applies when unidentified LEAKAGE is not within the limit or total LEAKAGE is not within the limit. This difference does not change the analysis of the completion time justification.

[5] The TSTF-554 Traveler notes that new Action A.1's completion time was chosen for consistency with revised Action B.1's completion time.

4.0 SUMMARY

The NRC staff finds that the changes to STS 1.1 Definition and STS **[3.4.13]** correctly specify the lowest functional capability or performance levels of equipment required for safe operation of the facility in accordance with 10 CFR 50.36(c)(2)(i). Also, the remedial actions to be taken until each LCO can be met provide protection to the health and safety of the public, thereby satisfying 10 CFR 50.36(c)(2)(i). Additionally, the NRC staff determined that the changes are technically clear and consistent with customary terminology and format in accordance with SRP Chapter 16.0.

Therefore, the NRC staff concludes that all the proposed changes in TSTF-554 are acceptable and thus, approved.

Principal Reviewers: Ravinder Grover, NRR/DSS/STSB
Ian Young, NRR/DNRL/NPHB
Steve Jones, NRR/DSS/SCPB

Date: