UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 1, 2018

Technical Specifications Task Force
11921 Rockville Pike, Suite 100
Rockville, MD 20852

SUBJECT: DRAFT REVSIED MODEL SAFETY EVALUATION FOR TRAVELER TSTF-505, "PROVIDE RISK-INFORMED EXTENDED COMPLETION TIMES – RITSTF INITIATIVE 4B"

Dear Members of the Technical Specifications Task Force:

The availability of Technical Specifications Task Force (TSTF) Traveler TSTF-505, Revision 1, "Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4b," and a model safety evaluation (SE), were announced in the *Federal Register* (77 FR 15399) on March 15, 2012. The U.S. Nuclear Regulatory Commission (NRC) staff identified areas requiring further review related to TSTF-505, Revision 1, during its review of plant-specific license amendment requests to adopt a risk-informed completion time (RICT) program. The NRC staff notified the TSTF of its concerns in a letter dated November 15, 2016, and suspended its approval of Revision 1 at that time (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16281A021). The TSTF submitted a response to the NRC staff's identified issues in a letter dated September 27, 2017 (ADAMS Package Accession No. ML17290B229).

The NRC Staff has prepared a draft revised traveler denoted as TSTF-505, Revision 2 (Enclosure 1). Attached to the revised traveler are drafts of a table of revised retained TS actions (Table 1) and a table listing the TS actions that require additional justification if an applicant elects to include them in the scope of its RICT Program (Table 2). The NRC staff has enclosed a draft revised model SE (Enclosure 2), which supersedes the model SE from 2012 and a revised model application (Enclosure 3).

Sixty calendar days are provided to you to comment on any factual errors or clarity concerns contained in the enclosed documents. The final versions of the documents will be issued after making any necessary changes. To facilitate the NRC staff's review of your comments, please provide a marked-up copy of the documents showing proposed changes and provide a summary table of the proposed changes.

If you have any questions, please contact Michelle Honcharik at 301-415-1774 or via e-mail at Michelle.Honcharik@nrc.gov.

Sincerely,

/RA/

Victor G. Cusumano, Chief
Technical Specifications Branch
Division of Safety Systems
Office of Nuclear Reactor Regulation

Project No. 753

Enclosures:
1. Draft Traveler TSTF-505, Revision 2
2. Draft Revised Model SE
3. Revised Model Application

cc: See next page

SUBJECT: DRAFT REVISED MODEL SAFETY EVALUATION FOR TSTF-505, "PROVIDE RISK-INFORMED EXTENDED COMPLETION TIMES – RITSTF INITIATIVE 4B" DATED: May 1, 2018

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RBeaton

ADAMS Accession Nos.: Package: ML17290A003,
Draft TSTF-505, Revision 2 (Enclosure 1): ML17290A082,
Draft Revised Model SE (Enclosure 2): ML17290A005,
Draft TSTF-505, Table 1, Revised Retained TS Actions (Attachment 1 to Encl. 1): ML17290A097,
Draft TSTF-505, Table 2, TS Action Requiring Plant-Specific Justification (Attachment 2 to Encl. 1): ML17339A168
Revised Model Application: ML18115A482
***concurred via e-mail** **NRR-106**

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*General Directions: This Model SE provides the format and content to be used when preparing the plant-specific SE of an LAR to adopt TSTF-505. The **bolded** bracketed information shows text that should be filled in for the specific amendment; individual licensees would furnish plant-specific nomenclature or values for these bracketed items. The italicized wording provides guidance on what should be included in each section and should not be included in the SE.*

DRAFT REVISED MODEL SAFETY EVALUATION

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

OF TSTF-505,

"PROVIDE RISK-INFORMED EXTENDED COMPLETION TIMES – RITSTF INITIATIVE 4B"

1.0 INTRODUCTION

By application dated **[enter date]**, (Agencywide Documents Access and Management System (ADAMS) Accession No. **[MLXXXXXXXXX]**), **[name of licensee]** (the licensee) proposed changes to the technical specifications (TSs) for the **[name of facility and applicable units (abbreviated name)]**. Specifically, the licensee requested changes to the TS to adopt Traveler TSTF-505, "Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4b." **[Variations from TSTF-505, are described in Section 2.2.4 of this safety evaluation (SE).]**

The licensee requested the proposed changes to the TSs in accordance with Section 50.90 of Title 10 of the *Code of Federal Regulations* (10 CFR). **[The supplemental letters dated [enter date(s)], provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the U.S. Nuclear Regulatory Commission (NRC) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on [enter date] (cite FR reference).]**

The proposed amendment(s) would modify TS requirements to permit the use of risk-informed completion times (RICTs) for actions to be taken when limiting conditions for operation (LCOs) are not met. The methodology is based on the Nuclear Energy Institute (NEI) Topical Report 06-09, Revision 0-A (hereafter referred to as NEI 06-09-A), "Risk-Informed Technical Specifications Initiative 4b, Risk-Managed Technical Specifications (RMTS) Guidelines," (ADAMS Accession No. ML12286A322 (part of ADAMS Package Accession No. ML122860402)). The NEI developed the guidance in NEI 06-09-A as a methodology to evaluate and extend TS LCO Required Action Completion Times (CTs). The NRC staff's SE dated May 17, 2007 (ADAMS Accession No. ML071200238), found the guidance in NEI 06-09, Revision 0, to be acceptable, with clarification from the NRC staff positions, limitations, and conditions in the SE dated May 17, 2007. In its letter dated October 12, 2012 (ML12286A321), which provided the NRC with NEI 06-09, Rev. 0-A, the NEI stated that "[t]his version incorporates NRC's final safety evaluation, dated May 17, 2007, and is designated as the [']A[']version." The 93-page submittal (ADAMS Accession No. ML12286A322) included the entirety of the NRC's final SE (pages 6/93 to 32/93 of ADAMS Accession No. ML12286A322), and NEI 06-09, Revision 0, dated November 2006 (pages 33/93 to 93/93 of ADAMS Accession No. ML12286A322). The October 12, 2012, NEI letter did not include a marked-up version of NEI 06-09, Revision 0, that could have shown how NEI 06-09, Revision. 0 needed to be

changed to fit within the scope of the NRC's approval. This was in keeping with the topical report process at the time.

Traveler TSTF-505 was developed to provide a generic model for implementing the TS changes supported by the methodology in NEI 06-09-A. The availability of TSTF-505, Revision 1, was announced in the *Federal Register* (77 FR 15399) on March 15, 2012. The NRC staff identified concerns with TSTF-505, Revision 1, during its review of plant-specific license amendment requests (LARs) requesting adoption of a RICT program. The NRC staff determined that the precautions and limitations on the use of NEI 06-09-A were not appropriately reflected in Traveler TSTF-505. The NRC staff notified the TSTF of its concerns in a letter dated November 15, 2016, and suspended its approval of Revision 1 at that time (ADAMS Accession No. ML16281A021). The TSTF responded via letter dated September 27, 2017 (ADAMS Accession Package No. ML17290B229).

The NRC staff reviewed the changes described in the TSTF letter. The NRC staff developed Traveler TSTF-505, Revision 2, incorporating resolution of the issues; a table of revised retained TS actions (Table 1); a table of TS actions requiring plant-specific justification (Table 2) and a revised model SE. The draft Traveler TSTF-505, Revision 2, draft Tables 1 and 2, the draft revised model application, and the draft revised model SE are available in ADAMS at Accession Nos. ML17290A082, ML17290A097, ML17339A168, ML18115A482 and ML17290A005**,** respectively.

2.0 REGULATORY EVALUATION

2.1 DESCRIPTION OF RISK-INFORMED COMPLETION TIME PROGRAM

The TS LCOs are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When an LCO is not met, the licensee must shut down the reactor or follow any remedial or required action (e.g., testing, maintenance, or repair activity) permitted by the TSs until the condition can be met. The remedial actions (i.e., ACTIONS) associated with an LCO contain Conditions that typically describe the ways in which the requirements of the LCO can fail to be met. Specified with each stated Condition are Required Action(s) and CTs. The CTs are referred to as the "front stops" in the context of this SE. For certain Conditions, the TS require exiting the Mode of Applicability of an LCO.

{NOTE: This paragraph may be used for facilities that have not converted to STS.}
[The licensee's TS are not presented in the STS format. The term "Action Statement" is conventionally used to describe ways in which the requirements of the LCO can fail to be met (i.e., Condition) and the necessary Required Actions. Throughout this SE, the terms Condition and Required Actions are used to describe Action Statements. The term "Allowed Outage Time" is conventionally used to describe the length of time that equipment is permitted to be inoperable. For the purposes of this SE, the terms "CT" and "Allowed Outage Time" are used interchangeably.]

The Topical Report NEI 06-09-A provides a methodology for extending existing CTs and thereby delay exiting the operational mode of applicability or taking Required Actions if risk is assessed and managed within the limits and programmatic requirements established by a RICT Program.

2.2 DESCRIPTION OF TS CHANGES

The licensee's submittal requested approval to add a RICT Program to the Administrative Controls section of the TS **[, add new conditions and associated actions in some TSs]**, and modify selected CTs to permit extending the CTs, provided risk is assessed and managed as described in NEI 06-09-A. The licensee's application for the changes proposed to use NEI 06-09-A and included documentation regarding the technical adequacy of the probabilistic risk assessment (PRA) models for the RICT Program, consistent with the guidance of Regulatory Guide (RG) 1.200, Revision 2, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," March 2009 (ADAMS Accession No. ML090410014).

2.2.1 Use and Application Example

The licensee has proposed to add the following example to the TSs as Example 1.3-8:

{NOTE: This is quoted from the TSTF letter dated September 27, 2017 (ADAMS Package Accession No. ML17290B229*). Be sure it matches what the licensee submitted.}*

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One subsystem inoperable.	A.1 Restore subsystem to OPERABLE status.	7 days OR In accordance with the Risk Informed Completion Time Program
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

When a subsystem is declared inoperable, Condition A is entered. The 7 day Completion Time may be applied as discussed in Example 1.3-2. However, the licensee may elect to apply the Risk Informed Completion Time Program which permits calculation of a Risk Informed Completion Time (RICT) that may be used to complete the Required Action beyond the 7 day Completion Time. The RICT cannot exceed 30 days. After the 7 day Completion Time has expired, the subsystem must be restored to OPERABLE status within the RICT or Condition B must also be entered.

The Risk Informed Completion Time Program requires recalculation of the RICT to reflect changing plant conditions. For planned changes, the revised RICT must be determined prior to

implementation of the change in configuration. For emergent conditions, the revised RICT must be determined within the time limits of the Required Action Completion Time (i.e., not the RICT) or 12 hours after the plant configuration change, whichever is less.

If the 7 day Completion Time clock of Condition A has expired and subsequent changes in plant condition result in exiting the applicability of the Risk Informed Completion Time Program without restoring the inoperable subsystem to OPERABLE status, Condition B is also entered and the Completion Time clocks for Required Actions B.1 and B.2 start.

If the RICT expires or is recalculated to be less than the elapsed time since the Condition was entered and the inoperable subsystem has not been restored to OPERABLE status, Condition B is also entered and the Completion Time clocks for Required Actions B.1 and B.2 start. If the inoperable subsystems are restored to OPERABLE status after Condition B is entered, Conditions A and B are exited, and therefore, the required actions of Condition B may be terminated.

2.2.2 Technical Specification **[5.5.15/5.5.18]** Risk-Informed Completion Time Program

Technical Specification **[5.5.15/5.5.18]**, which describes the RICT Program, would be added to the TS and reads as follows:

{NOTE: With the exception of items b. and e. below, this is quoted from the TSTF letter dated September 27, 2017 (ADAMS Package Accession No. ML17290B229), Attachment 1 (ADAMS Accession No. ML17290B238), pages 14 and 15. Be sure it matches what the licensee submitted. The wording in item b. was revised to reflect the modes of operation for BWRs. The wording in item e. below is acceptable to provide the appropriate administrative controls, which differs from the TSTF letter.}

Risk Informed Completion Time Program

This program provides controls to calculate a Risk Informed Completion Time (RICT) and must be implemented in accordance with NEI 06-09-A, Revision 0, "Risk-Managed Technical Specifications (RMTS) Guidelines." The program shall include the following:

a. The RICT may not exceed 30 days;

{NOTE: The RICT is only applicable in MODES supported by the licensee's PRA. Licensees applying the RICT Program to MODES other than Modes 1 and 2 must demonstrate that they have the capability to calculate a RICT in those MODES or that the risk indicated by their MODE 1 and 2 PRA model is bounding with respect to the lower MODE conditions.}

b. A RICT may only be utilized in MODE 1, 2 **[, and 3, and MODE 4 while relying on steam generators for heat removal][, and**

MODE 3 while relying on the main condenser for heat removal];

c. When a RICT is being used, any change to the plant configuration, as defined in NEI 06-09-A, Appendix A, must be considered for the effect on the RICT.

1. For planned changes, the revised RICT must be determined prior to implementation of the change in configuration.

2. For emergent conditions, the revised RICT must be determined within the time limits of the Required Action Completion Time (i.e., not the RICT) or 12 hours after the plant configuration change, whichever is less.

3. Revising the RICT is not required if the plant configuration change would lower plant risk and would result in a longer RICT.

d. For emergent conditions, if the extent of condition evaluation for inoperable structures, systems, or components (SSCs) is not complete prior to exceeding the Completion Time, the RICT shall account for the increased possibility of common cause failure (CCF) by either:

1. Numerically accounting for the increased possibility of CCF in the RICT calculation; or

2. Risk Management Actions (RMAs) not already credited in the RICT calculation shall be implemented that support redundant or diverse SSCs that perform the function(s) of the inoperable SSCs, and, if practicable, reduce the frequency of initiating events that challenge the function(s) performed by the inoperable SSCs.

e. The risk assessment approaches and methods shall be acceptable to the NRC. The plant PRA shall be based on the as-built, as-operated, and maintained plant; and reflect the operating experience at the plant, as specified in Regulatory Guide 1.200, Revision 2. Methods to assess the risk from extending the completion times must be PRA methods used to support this license amendment, or other methods approved by the NRC for generic use; and any change in the PRA methods to assess risk that are outside these approval boundaries require prior NRC approval.

2.2.3 Application of the RICT Program to Existing LCOs and Conditions

The typical CT is modified by the application of the RICT Program as shown in the following example. The changed portion is indicated in italics.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One subsystem inoperable.	A.1 Restore subsystem to OPERABLE status.	7 days *OR* *In accordance with the Risk Informed Completion Time Program*

Where necessary, conforming changes are made to CTs to make them accurate following use of a RICT. For example, most TSs have requirements to close/isolate containment isolation devices if one or more containment penetrations have inoperable devices. This is followed by a requirement to periodically verify the penetration is isolated. By adding the flexibility to use a RICT to determine a time to isolate the penetration, the periodic verifications must then be based on the time "following isolation."

Individual LCO Required Actions and CTs modified by the proposed change are identified below.

{NOTE: TSTF-505, Revision 2, Table 1 (ADAMS Accession No. ML17290A097), contains a list of the Required Actions and CTs from the STS that are included in TSTF-505. Insert a list of the Required Actions and CTs associated with each LCO that are proposed to be included in the RICT Program for the plant-specific submittal.

The suggested format is

LCO 3.X.X Title of LCO 3.X.X

- *Required Action X.1 (Describe Condition)}*

[2.2.4 Variations from TSTF-505]

[2.2.4.1 Application of the RICT Program to Modified Conditions, Required Actions, and Completion Times

The following Conditions are modified to permit the application of a RICT:]

{NOTE: These are Conditions that are applicable when one or more subsystems/channels are inoperable and there is no TS loss of function. The CT of these specific ACTIONS are modified to accommodate a RICT. Example:

LCO 3.x.x Title of LCO 3.x.x

The existing ACTIONS requirement states:

ACTIONS

CONDITION	*REQUIRED ACTION*	*COMPLETION TIME*
A. One or more [channel/subsystem/ train] inoperable.	*A.1 Restore [channel/ subsystem/train] to OPERABLE status.*	*[24 hours]*

The revised ACTIONS requirement states:

ACTIONS

CONDITION	*REQUIRED ACTION*	*COMPLETION TIME*
A. One or more [channel/subsystem/ train] inoperable.	*A.1 Restore [channel/ subsystem/train] to OPERABLE status.*	*[24 hours]* *OR* *--------NOTE----------* *Not applicable when [all/two/four/both] required [channel/subsystem/train] are inoperable.* *In accordance with the Risk Informed Completion Time Program*

}

[2.2.4.2 Application of the RICT to Additional ACTIONS Requirements]

{NOTE: TSTF-505, Revision 2, Table 2 (ADAMS Accession No. ML17339A168) lists the Conditions that should be evaluated on a plant-specific basis to confirm that the Condition does not represent a TS loss of function and to confirm that the Condition is appropriately modeled in the facility's PRA.

The suggested format is:

LCO 3.X.X Title of LCO 3.X.X

- *Required Action X.1 (Describe Condition)}*

[2.2.4.3 Additional Variations from TSTF-505]

{NOTE: List any additional variations from TSTF-505

The suggested format is:

LCO 3.X.X Title of LCO 3.X.X

- *Required Action X.1 (Describe Condition)}*

2.3 REGULATORY REVIEW

2.3.1 Applicable Regulations

Under 10 CFR 50.90, whenever a holder of a license wishes to amend the license, including technical specifications in the license, an application for amendment must be filed, fully describing the changes desired. Under 10 CFR 50.92(a), determinations on whether to grant an applied-for license amendment are to be guided by the considerations that govern the issuance of initial licenses or construction permits to the extent applicable and appropriate.

The regulation under 10 CFR 50.36(c)(2) requires that TSs contain LCOs, which are the lowest functional capability or performance levels of equipment required for safe operation of the facility. 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 TSs until the LCO can be met. Typically, the TSs require restoration of equipment in a timeframe commensurate with its safety significance, along with other engineering considerations. In determining whether the proposed TSs remedial actions should be granted, the Commission will apply the "reasonable assurance" standards of 10 CFR 50.40(a) and 50.57(a)(3). The regulation at 10 CFR 50.40(a) states that in determining whether to grant the licensing request, the Commission will be guided by, among other things, consideration about whether "the processes to be performed, the operating procedures, the facility and equipment, the use of the facility, and other technical specifications, or the proposals, in regard to any of the foregoing collectively provide reasonable assurance that the applicant 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."

The regulation under 10 CFR 50.36(c)(5) states that administrative controls are the provisions relating to organization and management, procedures, recordkeeping, review and audit, and reporting necessary to assure operation of the facility in a safe manner.

The regulation under 10 CFR 50.55a(h), "Protection and safety systems," states in part

> Protection systems of nuclear power reactors of all types must meet the requirements specified in this paragraph. Each combined license for a utilization facility is subject to the following conditions.
>
> ...
>
> (2) *Protection systems*. For nuclear power plants with construction permits issued after January 1, 1971, but before May 13, 1999, protection systems must meet the requirements in IEEE Std 279-1968, "Proposed IEEE Criteria for Nuclear Power Plant Protection Systems," or the requirements in IEEE Std 279-1971, "Criteria for Protection Systems for Nuclear Power Generating Stations," or the requirements in IEEE Std 603-1991, "Criteria for Safety Systems for Nuclear Power Generating Stations, and the correction sheet dated January 30, 1995. For nuclear power plants with construction permits issued before January 1, 1971, protection systems must be consistent with their licensing basis or may meet the requirements IEEE Std. 603-1991 and the correction sheet dated January 30, 1995.

> (3) *Safety systems*. Applications filed on or after May 13, 1999, for construction permits and operating licenses under this part, and for design approvals, design certifications, and combined licenses under part 52 of this chapter, must meet the requirements for safety systems in IEEE Std. 603-1991 and the correction sheet dated January 30, 1995.

Both IEEE 279 and IEEE 603 stipulate aspects of diversity and defense-in-depth; for example, both require the protection system to include means for manual initiation of each automatically initiated protective action (i.e., an independent and diverse means of initiating the protective action).

Section 10 CFR 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants" (i.e., the Maintenance Rule), requires licensees to monitor the performance or condition of SSCs against licensee-established goals in a manner sufficient to provide reasonable assurance that these SSCs are capable of fulfilling their intended functions. The regulation under 10 CFR 50.65(a)(4) requires the assessment and management of the increase in risk that may result from a proposed maintenance activity.

The plant's design criteria are set forth in the current licensing basis of the plant, as documented in the updated Final Safety Analysis Report (FSAR). The plant's design criteria define minimum requirements that achieve aspects of the defense-in-depth philosophy; as a consequence, even a compromise of the intent of those design criteria can directly result in a significant reduction in the effectiveness of one or more of the layers of defense. When evaluating the effect of the proposed application of risk-informed completion times, the NRC staff evaluated continued adherence to the intent of the plant's design criteria.

2.3.2 Commission Policy

The NRC provided details concerning the use of PRA in the "Final Policy Statement: Use of Probabilistic Risk Assessment Methods in Nuclear Regulatory Activities," published in the *Federal Register* (60 FR 42622; August 16, 1995). In this publication, the Commission wrote, in part:

> The Commission believes that an overall policy on the use of PRA methods in nuclear regulatory activities should be established so that the many potential applications of PRA can be implemented in a consistent and predictable manner that would promote regulatory stability and efficiency. In addition, the Commission believes that the use of PRA technology in NRC regulatory activities should be increased to the extent supported by the state-of-the-art in PRA methods and data and in a manner that complements the NRC's deterministic approach….
>
> PRA addresses a broad spectrum of initiating events by assessing the event frequency. Mitigating system reliability is then assessed, including the potential for multiple and common cause failures. The treatment therefore goes beyond the single failure requirements in the deterministic approach. The probabilistic approach to regulation is, therefore, considered an extension and

> enhancement of traditional regulation by considering risk in a more coherent and complete manner….
>
> Therefore, the Commission believes that an overall policy on the use of PRA in nuclear regulatory activities should be established so that the many potential applications of PRA can be implemented in a consistent and predictable manner that promotes regulatory stability and efficiency. This policy statement sets forth the Commission's intention to encourage the use of PRA and to expand the scope of PRA applications in all nuclear regulatory matters to the extent supported by the state-of-the-art in terms of methods and data….
>
> Therefore, the Commission adopts the following policy statement regarding the expanded NRC use of PRA:
>
> (1) The use of PRA technology should be increased in all regulatory matters to the extent supported by the state-of-the-art in PRA methods and data and in a manner that complements the NRC's deterministic approach and supports the NRC's traditional defense-in-depth philosophy.
>
> (2) PRA and associated analyses (e.g., sensitivity studies, uncertainty analyses, and importance measures) should be used in regulatory matters, where practical within the bounds of the state-of-the-art, to reduce unnecessary conservatism associated with current regulatory requirements, regulatory guides, license commitments, and staff practices. Where appropriate, PRA should be used to support the proposal for additional regulatory requirements in accordance with 10 CFR 50.109 (Backfit Rule). Appropriate procedures for including PRA in the process for changing regulatory requirements should be developed and followed. It is, of course, understood that the intent of this policy is that existing rules and regulations shall be complied with unless these rules and regulations are revised.
>
> (3) PRA evaluations in support of regulatory decisions should be as realistic as practicable and appropriate supporting data should be publicly available for review.
>
> (4) The Commission's safety goals for nuclear power plants and subsidiary numerical objectives are to be used with appropriate consideration of uncertainties in making regulatory judgments on the need for proposing and backfitting new generic requirements on nuclear power plant licensees.

2.3.3 Regulatory Guidance

Revision 3 of RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," May 2011 (ADAMS Accession

No. ML100910006), describes an acceptable risk-informed approach for assessing the nature and impact of proposed permanent licensing basis changes by considering engineering issues and applying risk insights. This regulatory guide also provides risk acceptance guidelines for evaluating the results of such evaluations.

Revision 1 of RG 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications," May 2011 (ADAMS Accession No. ML100910008), describes an acceptable risk-informed approach specifically for assessing proposed TS changes. This regulatory guide identifies a three-tiered approach for a licensee's evaluation of the risk associated with a proposed TS CT change, as follows.

- Tier 1 assesses the risk impact of the proposed change in accordance with acceptance guidelines consistent with the Commission's Safety Goal Policy Statement, as documented in RG 1.174 and RG 1.177. The first tier assesses the impact on plant risk as expressed by on the change in core damage frequency (ΔCDF) and change in large early release frequency (ΔLERF). It also evaluates plant risk while equipment covered by the proposed CT is out-of-service, as represented by incremental conditional core damage probability (ICCDP) and incremental conditional large early release probability (ICLERP). The limits for ICCDP and ICLERP are consistent with the criteria for incremental core damage probability (ICDP) and incremental large early release probability (ILERP) from the Nuclear Management and Resources Council (NUMARC) 93-01, Revision 4A, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," April 2011 (ADAMS Accession No. ML11116A198), guidance for managing the risk of on-line maintenance activities. ICDP and ILERP are the limits on which licensee will base the RICT. This guidance was endorsed by the NRC staff in RG 1.160, Revision 3, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," May 2012 (ADAMS Accession No. ML113610098), for compliance with the Maintenance Rule, 10 CFR 50.65(a)(4). Tier 1 also addresses PRA quality, including the technical adequacy of the licensee's plant-specific PRA for the subject application. Cumulative risk of the proposed TS change is considered with uncertainty/sensitivity analysis with respect to the assumptions related to the proposed TS change.

- Tier 2 identifies and evaluates any potential risk-significant plant equipment outage configurations that could result if equipment, in addition to that associated with the proposed license amendment, is removed from service simultaneously, or if other risk-significant operational factors, such as concurrent system or equipment testing, are also involved. The purpose of this evaluation is to ensure that there are appropriate restrictions in place such that risk-significant plant equipment outage configurations will not occur when equipment associated with the proposed CT is implemented.

- Tier 3 addresses the licensee's configuration risk management program (CRMP) to ensure that adequate programs and procedures are in place for identifying risk-significant plant configurations resulting from maintenance or other operational activities and appropriate compensatory measures are taken to avoid risk-significant configurations that may not have been considered when the Tier 2 evaluation was performed. Compared with Tier 2, Tier 3 provides additional coverage to ensure risk-significant plant equipment outage configurations are identified in a timely manner and that the risk impact of out-of-service equipment is appropriately evaluated prior to performing any maintenance activity over extended periods of plant operation. Tier 3 guidance can be satisfied by the Maintenance Rule, which requires a licensee to assess

and manage the increase in risk that may result from activities such as surveillance testing and corrective and preventive maintenance, subject to the guidance provided in RG 1.177, Section 2.3.7.1 and the adequacy of the licensee's program and PRA model for this application. The CRMP ensures that equipment removed from service prior to or during the proposed extended CT will be appropriately assessed from a risk perspective.

Revision 2 of RG 1.200 describes an acceptable approach for determining whether the quality of the PRA, in total or the parts that are used to support an application, is sufficient to provide confidence in the results, such that the PRA can be used in regulatory decision making for light-water reactors. This RG provides guidance for assessing the technical adequacy of a PRA. Revision 2 of RG 1.200, endorses, with clarifications and qualifications, the use of the American Society of Mechanical Engineers (ASME)/American Nuclear Society (ANS) Standard, RA-Sa-2009, "Addenda to ASME RA-S-2008 Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications" (i.e., the PRA Standard).

As discussed in RG 1.177, Revision 1, and RG 1.174, Revision 3, a risk-informed application should be evaluated to ensure that the proposed changes meet the following key principles:

1. The proposed change meets the current regulations unless it is explicitly related to a requested exemption;

2. The proposed change is consistent with the defense-in-depth philosophy;

3. The proposed change maintains sufficient safety margins;

4. When proposed changes result in an increase in core damage frequency or risk, the increases should be small and consistent with the intent of the Commission's Safety Goal Policy Statement; and

5. The impact of the proposed change should be monitored using performance measurement strategies.

3.0 TECHNICAL EVALUATION

{NOTE: This SE can only be used when there are no TS or PRA loss of function conditions included in the RICT program.}

The licensee's adoption of TSTF-505, Revision 2, provides for the addition of a RICT Program to the Administrative Controls section of the TS and modifies selected Required Action CTs to permit extending the CTs, provided risk is assessed and managed as described in NEI 06-09-A. In accordance with NEI 06-09-A, PRA methods are used to justify each extension to a Required Action CT based on the specific plant configuration which exists at the time of the applicability of the Required Action and are updated when plant conditions change. The licensee's application for the changes proposed in TSTF-505, Revision 2, included documentation regarding the technical adequacy of the PRA models used in the CRMP, consistent with the requirements of RG 1.200.

Most TS identify one or more Conditions for which the LCO may not be met, to permit a licensee to perform required testing, maintenance, or repair activities. Each Condition has an associated Required Action for restoration of the LCO or for other actions, each with some fixed time

interval, referred to as the CT, which identifies the time interval permitted to complete the Required Action. Upon expiration of the CT, the licensee is required to shut down the reactor or follow the Required Action(s) stated in the ACTIONS requirements. The RICT Program provides the necessary administrative controls to permit extension of CTs and thereby delay reactor shutdown or Required Actions, if risk is assessed and managed within specified limits and programmatic requirements. The specified safety function or performance level of TS required equipment is unchanged, and the Required Action(s), including the requirement to shut down the reactor are also unchanged, only the CTs for the Required Actions are extended by the RICT Program.

3.1 REVIEW OF KEY PRINCIPLES

Revision 1 of RG 1.177 and RG 1.174, Revision 3, identify five key safety principles to be applied to risk-informed changes to the TSs. Each of these principles are addressed in NEI 06-09-A. The NRC staff's evaluation of the licensee's proposed use of RICTs against these key safety principles is discussed below.

3.1.1 Key Principle 1: Evaluation of Compliance with Current Regulations

As stated in 10 CFR 50.36(c)(2), "[l]imiting conditions for operation are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When a limiting condition for operation of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications until the condition can be met."

When the necessary redundancy is not maintained (e.g., one train of a two-train system is inoperable), the TSs permit a limited period of time to restore the inoperable train to OPERABLE status and/or take other remedial measures. If these actions are not completed within the CT, the TSs normally require that the plant exit the mode of applicability for the LCO. With one train of a two-train system inoperable, the TS safety function is accomplished by the remaining OPERABLE train. In the current TSs, the CT is specified as a fixed time period (termed the "front stop"). The addition of the option to determine the CT in accordance with the RICT Program would allow an evaluation to determine a configuration-specific CT. The evaluation would be done in accordance with the methodology prescribed in NEI 06-09-A and **[TS 5.5.18]**. The RICT is limited to a maximum of 30 days (termed the "back stop") and can only be used when there is no TS or PRA loss of function. The CTs in the current TSs were established using experiential data, risk insights, and engineering judgement. The RICT Program provides the necessary administrative controls to permit extension of CTs and thereby delay reactor shutdown or Required Actions, if risk is assessed and managed appropriately within specified limits and programmatic requirements.

When the necessary redundancy is not maintained and the system loses the capability to perform its safety function(s) without any further failures (e.g., two trains of a two-train system are inoperable), there is a TS loss of function and the plant must exit the mode of applicability for the LCO, or take remedial actions, as specified in the TSs. A configuration-specific RICT may not be determined and used following a TS loss of function because the system has lost the capability to perform its safety function(s). With the incorporation of the RICT Program, the required performance levels of equipment specified in LCOs are not changed. Only the required CT for the Required Actions are modified by the RICT Program.

3.1.1.1 Key Principle 1 Conclusions

Based on the discussion provided above, the NRC staff finds that the proposed changes meet the first key safety principle of RG 1.174, Revision 3, and RG 1.177, Revision 1.

3.1.2 Key Principle 2: Evaluation of Defense-in-Depth

Defense-in-depth is an approach to designing and operating nuclear facilities that prevents and mitigates accidents that release radiation or hazardous materials. The key is creating multiple independent and redundant layers of defense to compensate for potential human and mechanical failures so that no single layer, no matter how robust, is exclusively relied upon. Defense-in-depth includes the use of access controls, physical barriers, redundant and diverse key safety functions, and emergency response measures.

As discussed throughout RG 1.174, consistency with the defense-in-depth philosophy is maintained by the following:

- Preserve a reasonable balance among the layers of defense.
- Preserve adequate capability of design features without an overreliance on programmatic activities as compensatory measures.
- Preserve system redundancy, independence, and diversity commensurate with the expected frequency and consequences of challenges to the system, including consideration of uncertainty.
- Preserve adequate defense against potential CCFs.
- Maintain multiple fission product barriers.
- Preserve sufficient defense against human errors.
- Continue to meet the intent of the plant's design criteria.

The proposed change represents a robust technical approach that preserves a reasonable balance among avoidance of core damage, avoidance of containment failure, and consequence mitigation. The three-tiered approach to risk-informed TS CT changes provides additional assurance that defense-in-depth will not be significantly impacted by such changes to the licensing basis. The licensee is proposing no changes to the design of the plant or any operating parameter, no new operating configurations, and no new changes to the design-basis in the proposed changes to the TS.

The effect of the proposed changes when implemented will be that the RICT Program will allow CTs to vary based on the risk significance of the given plant configuration (i.e., the equipment out-of-service at any given time) provided that the system(s) retain(s) the capability to perform the applicable safety function(s) without any further failures (e.g., one train of a two-train system is inoperable). A configuration-specific RICT may not be determined and used following a TS loss of function because the system has lost the capability to perform its safety function(s). These restrictions on TS loss of function or inoperability of all required trains of a system ensure that consistency with the defense-in-depth philosophy is maintained by following existing guidance when the capability to perform TS safety function(s) is lost.

The proposed RICT Program uses plant-specific operating experience for component reliability and availability data. Thus, the allowances permitted by the RICT Program are directly reflective of actual component performance in conjunction with component risk significance. In some cases, the RICT Program may use compensatory actions to reduce calculated risk in some configurations. Where credited in the PRA, these actions are incorporated into station procedures or work instructions and have been modeled using appropriate human reliability considerations. Application of the RICT Program determines the risk significance of plant configurations. It also permits the operator to identify the equipment that has the greatest effect on the existing configuration risk. With this information, the operator can manage the out-of-service duration and determine the consequences of removing additional equipment from service.

{NOTE: This paragraph is only included if Section 3.1.2.2 is needed.}
[The application of the RICT Program places high value on key safety functions and works to ensure they remain a top priority over all plant conditions. The RICT will be applied to extend CTs on key electrical power distribution systems. Failures in electrical power distribution systems can simultaneously affect multiple safety functions; therefore, potential degradation to defense-in-depth during the extended CTs is discussed further below.]

3.1.2.1 Use of Compensatory Measures to Retain Defense-in-Depth

Application of the RICT Program provides a structure to assist the operator in identifying effective compensatory actions for various plant maintenance configurations to maintain and manage acceptable risk levels. Topical Report NEI 06-09-A addresses potential compensatory actions and RMA measures by stating, in generic terms, that compensatory measures may include but are not limited to the following:

- Reduce the duration of risk-sensitive activities.
- Remove risk-sensitive activities from the planned work scope.
- Reschedule work activities to avoid high risk-sensitive equipment outages or maintenance states that result in high-risk plant configurations.
- Accelerate the restoration of out-of-service equipment.
- Determine and establish the safest plant configuration.

Topical Report NEI 06-09-A requires that compensatory measures be initiated when the PRA calculated RMA time (RMAT) is exceeded, or for preplanned maintenance for which the RMAT is expected to be exceeded, RMAs shall be implemented at the earliest appropriate time.

3.1.2.2 Evaluation of Electrical Power Systems

According to the **[PLANT]** Updated FSAR, the plant is designed such that the safety functions are maintained assuming a single failure within the electrical power system. By incorporating an electrical power supply perspective, this concept is further reflected in a number of principal design criteria for **[PLANT]**. Single failure requirements are typically suspended for the time

that a plant is not meeting an LCO (i.e., in an ACTION statement). This section considers the plant configurations from a defense-in-depth perspective.

[Insert description of the facility's electrical power system design.]

The licensee has requested to use the RICT Program to extend the existing CT for the following TS 3.8, "Electrical Power Systems," condition(s). The NRC staff's evaluation of the proposed changes considered a number of potential plant conditions allowed by the proposed RICTs. The staff also considered the available redundant or diverse means to respond to various plant conditions. In these evaluations, the NRC staff examined the safety significance of different plant conditions resulting in both shorter and longer CTs. The plant conditions evaluated are discussed in more detail below.

[Insert a discussion of the plant conditions being evaluated as well as the criteria used to evaluate the condition. At a minimum, the evaluation of the plant condition shall include (a) the design success criteria for accomplishing safety functions, (b) the verification of remaining credited subsystem(s) (e.g., power source, inverter, etc.), (c) if applicable, the availability of additional power source(s)/SSCs, and (d) examples of the compensatory measures or RMAs.]

The NRC staff reviewed the licensee's proposed TS changes and supporting documentation. Based on the evaluations above, the staff finds that while the redundancy is not maintained (e.g., one train of a two train system is inoperable), the CT extensions in accordance with the RICT Program are acceptable because (a) the capability of the systems to perform their safety functions (assuming no additional failures) is maintained, and (b) the licensee's demonstration of identifying and implementing compensatory measures or RMAs, in accordance with the RICT Program, are appropriate to monitor and control risk.

3.1.2.3 Evaluation of Instrumentation and Control Systems

{NOTE: Include this section of the SE if the licensee proposed to include instrumentation and control TS in the RICT Program.}

The licensee has requested to use the RICT Program to extend the existing CT for the following TS conditions. The NRC staff's evaluation of the proposed changes considered a number of potential plant conditions allowed by the new TSs and considered what redundant or diverse means were available to assist the licensee in responding to various plant conditions. The plant conditions evaluated are discussed in more detail below.

[Insert a discussion of the plant conditions being evaluated as well as the criteria used to evaluate the conditions in light of the RICT Program. The evaluation of the plant condition(s) shall include the basis for the evaluation including the design success criteria, the capability of the instrumentation and control systems to perform their safety functions, and diverse means to accomplish the safety functions.]

Since the licensee did not propose any changes to the design basis, the independency and the fail-safe principle remain unchanged. The licensee stated in the LAR that the proposed changes did not include any TS loss of function conditions. However, it is recognized that while in an ACTION statement, redundancy of the given protective feature will be temporarily reduced, and, accordingly, the system reliability will be reduced. In the LAR, the licensee stated in the description of proposed changes to the instrumentation and control systems that at least

one redundancy or diverse means (e.g., other automatic features or manual action) to accomplish the safety functions (e.g., reactor trip, safety injection, or containment isolation) remain available during the use of the RICT. The NRC staff reviewed the licensee's proposed TS changes to assess the availability of the diverse means to accomplish the safety function(s). The NRC staff finds that the availability of diverse protective features provide sufficient defense-in-depth to accomplish the safety functions, allowing for the extension of CTs in accordance with the RICT Program.

The NRC staff reviewed the licensee's proposed TS changes and supporting documentation. The NRC staff finds that while the instrumentation and control redundancy is reduced, the CT extensions implemented in accordance with the RICT Program are acceptable because: (a) the capability of the instrumentation and control systems to perform their safety functions is maintained, (b) diverse means to accomplish the safety functions exist, and (c) the licensee will identify and implement risk management actions to monitor and control risk in accordance with the RICT Program.

3.1.2.4 Key Principle 2 Conclusions

The LAR proposes to modify the TS requirements to permit extending selected CTs using the RICT Program in accordance with NEI 06-09-A. The NRC staff has reviewed the licensee's proposed TS changes and supporting documentation. The NRC staff finds that extending the selected CTs with the RICT Program following loss of redundancy, but maintaining the capability of the system to perform its safety function, is an acceptable reduction in defense-in-depth provided that the licensee identifies and implements compensatory measures as appropriate during the extended CT. Therefore, quantitative risk analysis, the qualitative considerations, and the prohibition on loss of all trains of a required system assure a reasonable balance of defense-in-depth is maintained to ensure protection of public health and safety. The NRC staff finds that this proposed change meets the second key safety principle of RG 1.177 and is, therefore, acceptable.

Based on the preceding evaluation, the NRC staff concludes that the proposed changes are consistent with the defense-in-depth philosophy as described in RG 1.174.

3.1.3 Key Principle 3: Evaluation of Safety Margins

Section 2.2.2 of RG 1.177, Revision 1, states, in part, that sufficient safety margins are maintained when:

- Codes and standards … or alternatives approved for use by the NRC are met...
- Safety analysis acceptance criteria in the final safety analysis report (FSAR) are met or proposed revisions provide sufficient margin to account for analysis and data uncertainties.

In Section **[x.x]** of its submittal, the licensee confirmed that the use of the RICT Program to determine a RICT will not affect **[PLANT]** commitment to the codes and standards used in the design of **[PLANT]**. Further the licensee is not proposing in this application to change any quality standard, material, or operating specification. Acceptance criteria for operability of equipment are not changed and use of the RICT only when the system(s) retain(s) the capability to perform the applicable safety function(s) ensure that the current safety margins are retained. Safety margins are also maintained if PRA functionality is determined for the inoperable train

which would result in an increased CT. Credit for PRA functionality, as described in NEI 06-09-A, is limited to the inoperable train, loop, or component. The reduced but available functionality may support further increase in the CT consistent with available safety margin. The specified safety function is still being met by the operable train and therefore requires no evaluation of PRA functionality to meet the design basis success criteria.

3.1.3.1 Key Principle 3 Conclusions

As discussed above, the NRC staff finds that the design-basis analyses for **[PLANT]** remain applicable. Although the licensee will be able to have design-basis equipment out-of-service longer than the current TS allow and the likelihood of successful fulfillment of the function will be decreased when redundant train(s) are not be available, the capability to fulfill the function will be retained when the available equipment functions as designed. Any increase in unavailability because less equipment is available for a longer time is included in the RICT evaluation. Therefore, safety margins are not affected adversely by the implementation of the RICT Program. Based on the above, the NRC staff concludes that the proposed change meets the third key safety principle of RG 1.177 and is acceptable.

3.1.4 Key Principle 4: Change in Risk Consistent with the Safety Goal Policy Statement

In Section **[x.x]** of its submittal, the licensee described the guidelines that will be used to determine acceptable changes in risk. The NRC staff evaluated whether the change in risk from the proposed changes was small and consistent with the intent of the Commission's Safety Goal Policy Statement, as discussed below. The NRC staff evaluated the licensee's proposed changes against the three-tiered approach in RG 1.177, Revision 1, for the licensee's evaluation of the risk associated with a proposed TS CT change.

3.1.4.1 Tier 1: PRA Capability and Insights

The first tier evaluates the impact of the proposed changes on plant operational risk. The Tier 1 review involves two aspects: (1) the technical acceptability of the PRA models and their application to the proposed changes, and (2) a review of the PRA results and insights described in the licensee's application.

3.1.4.1.1 PRA Quality

The objective of the PRA quality review is to determine whether the **[PLANT]** PRA used to implement the RICT Program is of sufficient scope, level of detail, and technical adequacy for this application.

The NRC staff evaluated the PRA quality information provided by the licensee in Section **[x.x]** of its submittal, including industry peer review results and the licensee's self-assessment of the plant PRA models for internal and external events, including fires **[seismic, other external hazards]** against the requirements of the currently applicable revision of RG 1.200, **[Revision 2]**.

[Insert the plant-specific evaluation of each PRA model. This is a detailed discussion of the peer reviews and other internal self-assessments to determine the conformance of the PRA models to capability Category II of the relevant PRA standards. Failure of a PRA

model to conform to one or more supporting requirements of a standard at capability Category II should be dispositioned for acceptability for use in the RICT Program.]

Based on the NRC staff's review of the licensee's submittal and assessments, the NRC staff determined that the **[PLANT]** PRA models for internal and external events, fires **[seismic, other external hazards]** used to implement the RICT Program satisfy the guidance of RG 1.200.

[Insert discussion of capability categories contrasted with NRC staff SE of NEI 06-09-A direction that all SRs adequately conform to capability Category II of the American Society of Mechanical Engineers/American Nuclear Society (ASME/ANS) standard for the supporting requirements.]

Based on the review of the provided information, the **[PLANT]** PRA models were determined to be of sufficient technical adequacy to support implementation of the RICT Program. **[Therefore, the NRC staff finds that the licensee has satisfied the intent of RG 1.177, Revision 1 (Sections2.3.1, 2.3.2, and 2.3.3), and RG 1.174, Revision 3 (Sections 2.3 and 2.5); and that the quality of the [PLANT] PRA is sufficient to implement RMTS in accordance with the RICT Program and NEI 06-09-A.]**

The NRC staff has reviewed the results of the peer reviews to assess whether the PRA is adequate to support the RICT Program. **[Insert discussion of conclusions.]** The issues have been resolved satisfactorily **[or will be resolved before implementation of the RICT Program]**. *{NOTE: If using bracketed option, staff should consider making this a license condition, discussing it in the cover letter, and including it in the implementation requirements.}*

The licensee has also established a periodic update and review process for the PRA and associated CRMP model. *{NOTE: Verify there are no changes to the change control processes for PRA methods. If so, insert a discussion of the change control process that is in the license condition or TS Section 5 requirement. The addition to TS Section 5 paragraph (e) requires that RICTs be calculated using NRC accepted methods. The NRC documents acceptance of PRA methods in a number of different ways including plant-specific SEs, topical reports, SEs, facts and observations (F&O) closures, FAQs, and through the proposed vetting panel process.}*

The licensee (1) has reviewed the PRA using endorsed guidance and adequately resolved all identified issues, (2) has established a periodic update and review process to update the PRA and associated CRMP model to incorporate changes made to the plant, and (3) will calculate RICTs using NRC-accepted PRA methods. Therefore, the NRC staff concludes that the licensee has and will maintain a PRA that is technically adequate to support implementation of the RICT Program.

3.1.4.1.2 Scope of the PRA

Topical Report NEI 06-09-A requires a quantitative assessment of the potential impact on risk due to impacts from internal and external events, including internal fires, floods, and other significant external events. As discussed in Section 3.2.4.1.1, the **[PLANT]** PRA used for the RICT Program includes contributions from internal and external events, including internal fires and floods**[, seismic events, and other external events]**. In addition, the NRC staff finds that the seismic and other external hazard analyses (i.e., do not have seismic margins analysis or seismic PRA models) provide a bounding approach for the RICT Program consistent with the NEI 06-09-A guidance on bounding analyses.

{NOTE: NRC would expect to establish additional requirements in the Administrative Controls TS and/or a license condition for incomplete PRAs that rely on bounding analysis.}

{NOTE: Provide a summary of how the PRA used for the RICT Program addresses seismic events and other external hazards if a full-scope plant-specific PRA model is not used. This may be a justification that the contribution from these hazards is not significant to the RICT calculations, or a justification for the use of bounding quantitative analyses.}

Because the RICT Program is not applicable in Modes **[4 and 5/5 and 6]**, risk evaluations for these modes are not relevant to the proposed change.

[Based on the above, the NRC staff finds that the licensee has satisfied the intent of RG 1.177, Revision 1 (Section 2.3.2), and RG 1.174, Revision 3 (Section 2.3), and that the scope of the PRA model is appropriate for this application.]

3.1.4.1.3 PRA Modeling

To evaluate a RICT for a given Required Action, the specific systems or components involved should be modeled in the PRA. For each TS LCO for which the RICT Program is proposed to apply, for any of its Required Actions, the licensee identified that: (1) the system is included in the PRA models, or has addressed systems not in the PRA either in the LAR or in response to an RAI; (2) the success criteria parameters used to determine PRA Functional determination are the same as the design basis success criteria parameters or, if different, a plant-specific analyses used to support the PRA are justified; (3) CCFs and surrogate identification**[, and plant-specific PRA modelling issues]** are appropriately addressed; and (4) the CRMP provides the capability to select the system as out of service in order to calculate a RICT, and the CRMP is maintained consistent with the baseline PRA model with modifications to the CRMP model to reflect the current plant versus the average plant.

[Insert a summary of the PRA system modeling and how the licensee provides that (1) the system is included in the PRA models, or has addressed systems not in the PRA either in the LAR or in response to a request for additional information (RAI); (2) the success criteria parameters used to determine PRA Functional determination are the same as the design basis success criteria parameters or, if different, a plant-specific analyses used to support the PRA are justified; and (3) common-cause failures, surrogates identification and plant specific PRA modelling issues (e.g., instruments) if any.]

With respect to Item (4), the PRA model serves as the model used by the CRMP tool, which is used to perform the RICT calculations. **[Insert discussion of tool.]** The tool used to perform the RICT calculations provides a user interface which supports the RICT Program by providing a method to evaluate the plant configuration.

The NRC staff reviewed the licensee's information and concluded that the PRA modelling used to support the RICT Program is able to treat alignments of components during periods when the RICT will be calculated. **[Therefore, the NRC staff finds that the licensee has satisfied the intent of RG 1.177, Revision 1 (Section 2.3.3), and RG 1.174, Revision 3 (Section 2.3), and that the PRA modeling is appropriate for this application.]**

3.1.4.1.4 Assumptions

Using PRAs to evaluate TS changes requires consideration of a number of assumptions made within the PRA that can have a significant influence on the ultimate acceptability of the proposed changes. With regard to changes to CTs, the following assumptions were evaluated:

{NOTE: Insert the plant-specific PRA assumptions and disposition of each for the RICT Program. This should include a description of the methods used to identify assumptions.}

[Based on the identification and disposition of the significant PRA assumptions described above, the NRC staff finds that the licensee has satisfied the intent of RG 1.177, Revision 1 (Section 2.3.4), and that the assumptions for risk evaluation of extended CTs are appropriate for this application.]

3.1.4.1.5 Sensitivity and Uncertainty Analyses

Risk-informed analyses of TS changes can be affected by uncertainties regarding the assumptions made during the PRA model's development and application. Typically, the risk resulting from TS CT changes is relatively insensitive to most uncertainties because the uncertainties tend to affect similarly both the base case and the changed case. The licensee considered PRA modeling uncertainties and their potential impact on the RICT Program and identified, as necessary, the applicable RMAs to limit the impact of these uncertainties. In Section **[x.x]** of its submittal, the licensee discussed sources of uncertainty and assumptions.

The licensee performed an evaluation of its PRA model for **[PLANT]** to identify the key assumptions and sources of uncertainty for this application consistent with the RG 1.200 definitions, using sensitivity and importance analyses to place bounds on uncertain processes, to identify alternate modeling strategies, and to provide information to users of the PRA.

{NOTE: Insert the plant-specific PRA uncertainties and disposition of each for the RICT program. This should also include a description of the methods used to identify uncertainties.}

The NRC staff's review indicates the licensee performed an adequate assessment to identify the potential sources of uncertainty, and the identification of the key assumptions and sources of uncertainty was appropriate and consistent with RG 1.174, Revision 3. The licensee's evaluation of the potential impact of these sources of uncertainty on the RICT Program is acceptable.

[Therefore, the NRC staff finds that the licensee has satisfied the intent of RG 1.177, Revision 1 (Section 2.3.5), and RG 1.174, Revision 3 (Section 2.2), and that the treatment of model uncertainties for risk evaluation of extended CTs is appropriate for this application and consistent with the guidance identified in NEI 06-09-A.]

3.1.4.1.6 PRA Results and Insights

The proposed change implements a process to determine TS RICTs rather than specific changes to individual TS CTs. Topical Report NEI 06-09-A requires periodic assessment of the risk incurred due to operation beyond the "front stop" CTs due to implementation of a RICT Program and comparison to the guidance of RG 1.174, Revision 3, for small increases in risk. As with other unique risk-informed applications, supplemental risk acceptance guidelines that complement the RG 1.174 guidance are appropriate.

Further, NEI 06-09-A requires that configuration risk be assessed to determine the RICT, and establishes the criteria for ICDP and ILERP on which to base the RICT. An ICDP of 1E-5 and an ILERP of 1E-6 are used as the risk measures for calculating individual RICTs. These limits are consistent with NUMARC 93-01, Revision 4A. The use of these limits in NEI 06-09-A aligns the TS CTs with the risk management guidance used to support plant programs for the Maintenance Rule, and the NRC staff accepted these supplemental risk acceptance guidelines for RMTS programs in its approval of NEI 06-09-A.

Topical Report NEI 06-09-A requires that the cumulative impact of implementation of an RMTS be periodically assessed and shown to result in: (1) a total risk impact below 1E-5/year for changes to core damage frequency (CDF), (2) a total risk impact below 1E-6/year for changes to large early release frequency (LERF), and (3) the total CDF and total LERF must be reasonably shown to be less than 1E-4/year and 1E-5/year, respectively. The licensee indicated in **[Enclosure X]** of its submittal that the estimated total CDF and LERF meet the 1E-4/year CDF and 1E-5/year LERF criteria of RG 1.174 consistent with the guidance in NEI 06-09-A and that these guidelines be satisfied whenever a RICT is implemented.

The licensee has incorporated NEI 06-09-A in the RICT Program of TS **[5.5.15/5.5.18]**, calculates the RICT consistently with its criteria, and assesses the RICT Program to assure any risk increases are small per the guidance of RG 1.174.

Based on satisfying the intent of RG 1.177, Revision 1 (Section 2.4), and RG 1.174, Revision 3 (Sections 2.4 and 2.5), the NRC staff finds the proposed changes are acceptable.

3.1.4.1.7 Implementation of the RICT Program

Because NEI 06-09-A involves the real-time application of PRA results and insights by the licensee, the NRC staff reviewed the licensee's description of programs and procedures associated with implementation of the RICT Program in Section **[x.x]** of its submittal. The administrative controls on the PRA and on changes to the PRA should provide confidence that the PRA results are reasonable, and the administrative controls on the plant personal using the RICT should provide confidence that the RICT program will be applied appropriately.

The quality assurance practices for the PRA models include meeting the ASME/ANS PRA standards and RG 1.200, which includes guidance for performing peer reviews and focused-scope peer reviews. The quality assurance practices for the PRA models are discussed by the licensee in **[Enclosure X]** of its submittal. According to Section **[x.x]** of its submittal, for maintenance of the baseline PRA model, changes made to the baseline PRA model in translation to the on-line model, and changes made to the on-line model configuration files are controlled and documented by plant procedures.

[Insert a summary of the process used to convert the baseline to the on-line PRA models.]

In Section **[x.x]** of its submittal, the licensee indicated that those procedures are intended to specify an acceptance test to be performed after every on-line model update. This test verifies proper translation of the baseline PRA models and acceptance of all changes made to the baseline PRA models into the on-line model. This test also verifies correct mapping of plant components into the on-line model.

[Insert a summary of these programs, procedures, and training.]

[The NRC staff found that the licensee has established appropriate programmatic and procedural controls for its RICT Program, consistent with the guidance of NEI 06-09-A.] NEI 06-09-A requires that stations implementing a RMTS program shall provide training in the programmatic requirements associated with the RMTS program and of the individual RICT evaluations to personnel responsible for determining TS operability decisions or conducting RICT assessments. Training of plant personnel shall be provided for those organizations with functional responsibilities for performing or administering the CRMP commensurate with each position's responsibilities, in accordance with 10 CFR 50.120(b)(3) and other applicable regulations, within the RICT Program, as described in NEI 06-09-A. In **[Enclosure 9]** of its submittal, the licensee described its program for providing training to its staff. The NRC staff reviewed the description of the training program provided in the license amendment request, and concluded that the program, if properly implemented, would be consistent with the training requirements set for the in NEI 06-09-A.

Therefore, the NRC staff finds that the licensee has proposed acceptable administrative controls on the PRA and on the personnel that will use the RICT Program.

3.1.4.2 Tier 2: Avoidance of Risk-Significant Plant Configurations

The second tier provides that a licensee should provide reasonable assurance that risk-significant plant equipment outage configurations will not occur when specific plant equipment is taken out-of-service in accordance with the proposed TS change.

Topical Report NEI 06-09-A does not permit voluntary entry into high-risk configurations, which would exceed instantaneous CDF and LERF limits of 1E-3/year and 1E-4/year, respectively. It further requires implementation of RMAs when the actual or anticipated risk accumulation during a RICT will exceed one-tenth of the ICDP or ILERP limit. Such RMAs may include rescheduling planned activities to lower risk periods or implementing risk-reduction measures. The limits established for entry into a RICT and for RMA implementation are consistent with the guidance of NUMARC 93-01, Revision 4A, endorsed by RG 1.160, Revision 3, as applicable to plant maintenance activities. The RICT Program requirements and criteria are consistent with the principle of Tier 2 to avoid risk-significant configurations.

Based on the licensee's incorporation of NEI 06-09-A in the TS as discussed in Section **[x.x]** of its submittal, and because the proposed changes are consistent with the guidance of RG 1.174, Revision 3, and RG 1.177, Revision 1, the NRC staff finds the licensee's Tier 2 program is acceptable and supports the proposed implementation of the RICT Program.

3.1.4.3 Tier 3: Risk-Informed Configuration Risk Management

The third tier provides that a licensee should develop a program that ensures that the risk impact of out-of-service equipment is appropriately evaluated prior to performing any maintenance activity.

Topical Report NEI 06-09-A addresses Tier 3 guidance by requiring assessment of the RICT to be based on the plant configuration of all SSCs that might impact the RICT, including safety-related and non-safety-related SSCs. A plant configuration is considered risk-significant when the ICDP or the ILERP exceeds one-tenth of the risk on which the RICT is based, generally 1E-5 and 1E-6 ICDP and ILERP, respectively. If a risk-significant plant configuration

exists, then NEI 06-09-A via the RICT Program in the TS, would require the licensee to implement compensatory measures and RMAs. Therefore, the NRC staff determined that the RICT Program provides a methodology to assess and address risk-significant configurations. The NRC staff also determined that the proposed changes will require reassessment of any plant configuration changes to be completed in a timely manner based on the more restrictive limit of any applicable TS action requirement or a maximum of 12 hours after the configuration change occurs.

Based on the licensee's incorporation of NEI 06-09-A in the TS, as discussed in Section **[x.x]** of its submittal, and because the proposed changes are consistent with the Tier 3 guidance of RG 1.177, Revision 1, the NRC staff finds that the proposed changes are acceptable.

3.1.4.4 Key Principle 4 Conclusions

The licensee has demonstrated the technical adequacy and scope of its PRA models, and that the models can support implementation of the RICT Program for determining CTs. Proper consideration of key assumptions and sources of uncertainty have been made. The risk metrics are consistent with the approved methodology of NEI 06-09-A and the RICT Program is controlled administratively through plant procedures and training. The RICT Program follows the NRC-approved methodology in NEI 06-09-A. The NRC staff concludes that the RICT Program satisfies the fourth key safety principle of RG 1.177 and is, therefore, acceptable.

3.1.5 Key Principle 5: Performance Measurement Strategies – Implementation and Monitoring Program

Revision 1 of RG 1.177 and RG 1.174, Revision 3, establish the need for an implementation and monitoring program to ensure that extensions to TS CTs do not degrade operational safety over time and that no adverse degradation occurs due to unanticipated degradation or common cause mechanisms. An implementation and monitoring program is intended to ensure that the impact of the proposed TS change continues to reflect the reliability and availability of SSCs impacted by the change. Revision 3 of RG 1.174 states that monitoring performed in conformance with the Maintenance Rule, 10 CFR 50.65, can be used when the monitoring performed is sufficient for the SSCs affected by the risk-informed application. **[According to [Enclosure X] of the submittal, the SSCs in the scope of the RICT Program are also in the scope of the Maintenance Rule.]**

Section 3.3.3 of NEI 06-09-A requires that the licensee track the risk associated with all entries beyond the "front stop" CT, and Section 2.3.1 provides a requirement for assessing cumulative risk, including a periodic evaluation of any increase in risk due to the use of the RMTS program to extend the CTs. According to **[Enclosure X]** of its submittal, the licensee calculates cumulative risk at least every refueling cycle, but the recalculation period does not exceed 24 months, which is consistent with an NEI 06-09-A program. The licensee converts the cumulative ICDP and the ILERP into average annual values which are then compared to the limits of RG 1.174. If any limits are exceeded, corrective actions are taken to ensure future plant operational risk is within the acceptance guidance. This evaluation assures that RMTS program implementation meets RG 1.174 guidance for small risk increases. The licensee is implementing NEI 06-09-A via the RICT Program and therefore complies with this RMTS program.

The NRC staff concludes that the RICT Program satisfies the fifth key safety principle of RG 1.177, Revision 1, and is therefore, acceptable.

[3.2 VARIATIONS FROM TSTF-505

[Insert an evaluation of variations discussed in Section 2.2.4 of this SE. This would include any variations related to the treatment of new PRA methods as described in the RICT Program.]

[The traveler discusses the applicable regulatory requirements and guidance, including the 10 CFR Part 50, Appendix A, General Design Criteria. [PLANT] was not licensed to the 10 CFR Part 50, Appendix A, GDC. The [PLANT] equivalents to the referenced GDC are [discussion from licensee's application.] These differences do not alter the conclusion that the proposed change is applicable to [PLANT].]

3.3 TECHNICAL SPECIFICATION ADMINISTRATIVE CONTROLS SECTION

The NRC staff reviewed the licensee's proposed addition of a new program, the RICT Program, to the Administrative Controls section of the TS. The NRC staff evaluated the elements of the new program to ensure alignment with the requirements in 10 CFR 50.36(c)(5) and to ensure the programmatic controls are consistent with the RICT Program described in NEI 06-09-A.

[TS 5.5.15/TS 5.5.18] requires that the RICT Program be implemented in accordance with NEI 06-09-A. This is acceptable because NEI 06-09-A establishes a framework for an acceptable RICT Program.

The TS states that a RICT may not exceed 30 days. The NRC staff determined that 30-day backstop is appropriate because it allows sufficient time to restore SSCs to operable status while avoiding excessive out of service times for TS SSCs.

The TS states that the RICT may only be used in Mode 1, 2**[, and 3, and 4 while relying on steam generators for decay heat removal][, and Mode 3 while relying on the main condenser for heat removal]**. This provision ensures that the RICT is only used for determination of CDF and LERF for modes of operation modelled in covered by the PRA.

The TS requires that while in a RICT, any change in plant configuration as defined in NEI 06-09-A be considered for the effect on the RICT. The TS also specifies time limits for determining the effect on the RICT. These time limitations are consistent with those specified in NEI 06-09-A.

The TS contains requirements for the treatment of CCFs for emergent conditions in which the common cause evaluation is not complete. The requirements are to either numerically account for the increased probability of CCF or to implement RMAs that support redundant or diverse SSCs that perform the functions of the inoperable SSCs and, if practicable, reduce the frequency of initiating events that challenge the function(s) performed by the inoperable SSCs. Key Principle 2 of risk-informed decision making is that the change is consistent with defense-in-depth philosophy. The seven considerations supporting the evaluation of the impact of the change on defense-in-depth are discussed in RG 1.174, including one to preserve adequate defense against potential CCF. The NRC staff finds that numerically accounting for an increased probability of failure will shorten the estimated RICT based on the particular SSCs involved thereby limiting the time when a CCF could affect risk. Alternatively, implementing actions that can increase the availability of other mitigating SSCs or decrease the frequency of demand on the affected SSCs will decrease the likelihood that a CCF could affect risk. The

NRC staff concludes that both the quantitative and the qualitative actions minimize the impact of CCF and therefore support meeting Key Principle 2 as described in RG 1.174. These methods either limit the exposure time, help ensure the availability of alternate SSCs, or decrease the probability of plant conditions requiring the safety function to be performed. The NRC staff finds that these methods contribute to maintaining defense-in-depth because the methods limit the exposure time or ensure the availability of alternate SSCs.

The TS contains a provision that risk assessment approaches and methods shall be acceptable to the NRC. The plant PRA shall be based on the as-built, as-operated, and maintained plant; and reflect the operating experience at the plant, as specified in RG 1.200, Revision 2. Methods to assess the risk from extending the CTs must be PRA methods used to support this LAR, or other methods approved by the NRC for generic use, and any change in the PRA methods to assess risk that are outside these approval boundaries require prior NRC approval. As stated in the NRC staff's SE of NEI 06-09-A:

> TR NEI 06-09, Revision 0, requires an evaluation of the PRA model used to support the RMTS against the requirements of RG 1.200, Revision 1, and AMSE RA-S-2002, "Standard for Probabilistic Risk Assessment for Nuclear power Plant Applications", for capability Category II. This assures that the PRA model is technically adequate for use in the assessment of configuration risk. This capability category of PRA is sufficient to support the evaluation of risk associated with out of service SSCs and establishing risk-informed CTs.

[TS 5.5.15/5.5.18] was updated to reflect the current revision of RG 1.200. RG 1.200 incorporates ASME RA-S-2002 by reference.

The NRC staff's SE of NEI 06-09-A also states:

> As part of its review and approval of a licensee's application requesting to implement the RMTS, the NRC staff intends to impose a license condition that will explicitly address the scope of the PRA and non-PRA methods approved by the NRC staff for use in the plant-specific RMTS program. If a licensee wishes to change its methods, and the change is outside the bounds of the license condition, the licensee will need NRC approval, via a license amendment, of the implementation of the new method in its RMTS program. The focus of the NRC staff's review and approval will be on the technical adequacy of the methodology and analyses relied upon for the RMTS application.

This limitation and condition is being relocated from a license condition to the Administrative Controls section of TS. **[TS 5.5.15/5.5.18]** restates this limitation and condition from the NRC staff's SE in language appropriate for the Administrative Controls Section of TS. The staff finds that this requirement is appropriately reflected in the Administrative Controls section of TS.

The regulations in 10 CFR 50.36(c)(5) require the TS to contain administrative controls providing "provisions relating to organization and management, procedures, recordkeeping, review and audit, and reporting necessary to assure operation of the facility in a safe manner." for the contents of the Administrative Controls section of the TS. The NRC staff has determined

that Administrative Controls section of the TS is will assure operation of the facility in a safe manner when the facility is using the RICT program. Therefore, the NRC staff has determined that the requirements of 10 CFR 50.36(c)(5) are satisfied.

4.0 ADDITIONAL CHANGES TO THE OPERATING LICENSE

[Insert a discussion of any license conditions or implementation requirements.]

5.0 SUMMARY

The NRC staff finds that the licensee's proposed implementation of the RICT Program for the identified scope of Required Actions is consistent with the guidance of NEI 06-09-A**[, subject to the limitations and conditions evaluated in Section 4.0 of this SE]**. The licensee's methodology for assessing the risk impact of extended CTs, including the individual CT extension impacts in terms of ICDP and ILERP, and the overall program impact in terms of ΔCDF and ΔLERF, is accomplished using PRA models of sufficient scope and technical adequacy based on consistency with the guidance of RG 1.200, Revision 2. **[For external hazards which do not have PRA models, the licensee will use bounding analyses in accordance with NEI 06-09-A guidance and Administrative Control TS and/or license condition provided in this SE]**. The RICT calculation uses the PRA model as translated into the CRMP tool, and the licensee has an acceptable process in place to ensure the quality of the translation. In addition, the NRC staff finds that the proposed implementation of the RICT Program addresses the RG 1.177 defense-in-depth philosophy and safety margins to ensure that they are adequately maintained, and includes adequate administrative controls as well as performance monitoring programs.

The regulation at 10 CFR 50.36(a)(1) states, in part: "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." Accordingly, along with the proposed TS changes, the licensee also submitted TS Bases changes that corresponded to the proposed TS changes to provide the reasons for the TSs. The TS bases changes were consistent with the bases changes in the model application.

6.0 STATE CONSULTATION

This section is to be prepared by the plant project manager.

In accordance with the Commission's regulations, the **[Name of State]** State official was notified of the proposed issuance of the amendment(s) on **[date]**. The State official had **[no]** comments. **[If comments were provided, they should be addressed here.]**

7.0 ENVIRONMENTAL CONSIDERATION

This section is to be prepared by the plant project manager in accordance with current procedures.

8.0 CONCLUSION

This section is to be prepared by the plant project manager.

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment(s) will not be inimical to the common defense and security or to the health and safety of the public.

9.0 REFERENCES

Optional section to be prepared by the PM and primary reviewers. If document is publicly available, the ADAMS Accession No. should be listed for all references.

{NOTE: These are the principal contributors for the model SE of the traveler. Replace these names with those you prepared the plant-specific SE.}

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