DRAFT SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

TECHNICAL SPECIFICATIONS TASK FORCE TRAVELER

TSTF-582, REVISION 0, "RPV WIC ENHANCEMENTS"

USING THE CONSOLIDATED LINE ITEM IMPROVEMENT PROCESS

(EPID L-2019-PMP-0199)

1.0 INTRODUCTION

By letter dated August 28, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19240A260), the Technical Specifications Task Force (TSTF) submitted Traveler TSTF-582, Revision 0, "RPV [Reactor Pressure Vessel] WIC [Water Inventory Control] Enhancements," to the U.S. Nuclear Regulatory Commission (NRC); hereafter referred to as TSTF-582. TSTF-582 proposed changes to the Standard Technical Specifications (STSs) for boiling-water reactor (BWR) General Electric (GE) plant designs. Upon approval, these changes will be incorporated into future revisions of NUREG-1433 and NUREG-1434[1] and this traveler will be made available to licensees for adoption through the consolidated line item improvement process.

The proposed changes would revise technical specifications (TSs) related to RPV WIC to incorporate operating experience and to correct editorial errors in TSTF-542, Revision 2, "Reactor Pressure Vessel Water Inventory Control" (ADAMS Accession No. ML16074A448). TSTF-542, Revision 2, was approved by the NRC on December 20, 2016 (ADAMS Package Accession No. ML16343B066). Upon approval, TSTF-582 will be available to licensees that have already adopted TSTF-542, Revision 2.

2.0 REGULTORY EVALUATION

2.1 System Description

2.1.1 Reactor Pressure Vessel

The BWR RPVs have penetrations located below the top of active fuel (TAF). These penetrations provide entry for control rods, recirculation flow, reactor water cleanup (RWCU), and shutdown cooling. Since these penetrations are below the TAF, this creates a potential to drain the reactor vessel water inventory and lose effective core cooling. The loss of water inventory and effective core cooling can potentially lead to fuel cladding failure and radioactive release.

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[1] 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, 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, April 2012 (ADAMS Accession Nos. ML12104A195 and ML12104A196, respectively).

During operation in Mode 1 (Power Operation – Reactor Mode Switch in Run), Mode 2 (Startup – Reactor Mode Switch in Refuel[1] or Startup/Hot Standby), and Mode 3 (Hot Shutdown[1] - Reactor Mode Switch in Shutdown and average reactor coolant temperature greater than (>) [200] degrees Fahrenheit (°F)), the STS for instrumentation and emergency core cooling systems (ECCS) require operability of sufficient equipment to ensure large quantities of water will be injected into the vessel should the level decrease below the preselected value. These requirements are designed to mitigate the effects of a loss-of-coolant accident (LOCA), but also provide protection for other accidents and transients that involve a water inventory loss.

During BWR operation in Mode 4 (Cold Shutdown[1] – Reactor Mode Switch in Shutdown and average reactor coolant temperature less than or equal to (≤) [200] °F), and Mode 5 (Refueling[2] - Reactor Mode Switch in Shutdown or Refuel), the pressures and temperatures that could cause a significant mass and energy release due to a LOCA that would require an evaluation with respect to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," are not present. During certain phases of refueling (Mode 5), a large volume of water is available above the RPV (i.e., the RPV head is removed), the water level is greater than or equal to (≥) [23] feet over the top of the RPV flange, and the spent fuel storage pool gates are removed, or the upper containment pool is connected to the RPV. This large volume of water provides time for detection and manual operator action to mitigate an RPV draining event. However, at other times during a refueling outage, during Cold Shutdown (Mode 4) or Refueling (Mode 5), there may be a potential for significant drainage paths from certain outage activities, human error, and other events when it is more likely to have some normally available equipment, instrumentation, and systems inoperable due to maintenance and outage activities. This would result in less time for operator action relative to when there are large volumes of water above the RPV.

In comparison to Modes 1, 2, and 3, Modes 4 and 5 generally do not have the high pressure and temperature necessary for a LOCA from a high energy pipe failure. Thus, in Mode 4 and 5, while the potential sudden loss of large volumes of water from a LOCA are not expected, operators monitor for a BWR RPV water level decrease from potentially significant or unexpected drainage paths. In Modes 4 and 5 these would require less water replacement capability to maintain water above the TAF.

2.1.2 Emergency Core Cooling System

In NUREG-1433, the ECCS consists of the following:

- High pressure coolant injection (HPCI) system,
- Automatic depressurization system,
- Core spray (CS) system, and
- Low pressure coolant injection (LPCI) system, an operating mode of the residual heat removal (RHR) system.

[1] All reactor vessel head closure bolts fully tensioned.
[2] One or more reactor vessel head closure bolts less than fully tensioned.

In NUREG-1434, the ECCS consists of the following:

- High pressure core spray (HPCS) system,
- Automatic depressurization system,
- Low pressure core spray (LPCS) system, and
- LPCI system, an operating mode of the RHR system.

The ECCS is designed to limit clad temperature over the complete spectrum of possible break sizes in the nuclear system process barrier, including the design-basis break. The design-basis break is defined as the complete and sudden circumferential rupture of the largest pipe connected to the reactor vessel (i.e., one of the recirculation loop pipelines) with displacement of the ends so that blowdown occurs from both ends.

During Modes 4 and 5, two ECCS injection/spray subsystems are required to be OPERABLE in accordance with existing STS 3.5.2 limiting condition for operation (LCO).

2.1.3 Alternating Current Sources

The design of the Class 1E alternating current (AC) electrical power system provides independence and redundancy to ensure an available source of power to the engineered safety feature (ESF) systems. The Class 1E AC electrical power system includes offsite power sources and onsite standby power sources (i.e., diesel generators (DGs)) that supply electrical power to the plant load groups, with each load group powered by an independent Class 1E 4.16 kilovolt (kV) ESF bus. Each ESF bus has connections to offsite power sources and a DG.

A DG starts automatically on an ECCS signal (i.e., low reactor vessel water level signal or high drywell pressure signal) or on an ESF bus degraded voltage or undervoltage signal. After the DG starts, it automatically ties to its respective bus after offsite power is tripped because of ESF bus undervoltage or degraded voltage, independent of or coincident with a LOCA signal. In the event of a loss of offsite power (LOOP), the ESF electrical loads are automatically connected to the DG in time to provide for safe reactor shutdown and to mitigate the consequences of a design-basis accident such as a LOCA.

During shutdown conditions, the DG automatic start is tested in accordance with existing STS 3.8.2 Surveillance Requirement (SR) 3.8.2.1.

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LCO 3.8.2 requires the operability of one offsite circuit and one DG to support the onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.10, “Distribution Systems – Shutdown.” The LCO 3.8.2 is applicable in Modes 4 and 5 and during movement of [recently] irradiated fuel assemblies in the [secondary] containment.

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LCO 3.8.2 requires the operability of one offsite circuit and one DG to support the Division 1 or 2 onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.10, “Distribution Systems – Shutdown,” and one offsite circuit or one DG to support the Division 3 onsite Class 1E AC electrical power distribution subsystem(s) when required by LCO 3.8.10.

The LCO 3.8.2 is applicable in Modes 4 and 5 and during movement of [recently] irradiated fuel assemblies in the [primary and secondary containment].

2.2 Proposed Changes to Standard Technical Specifications

The proposed changes include several improvements and address editorial errors in the STS changes approved in TSTF-542. These were identified during the development of plant-specific license amendments to adopt TSTF-542, and during subsequent refueling outages. TSTF-582 states that the proposed changes improve consistency, revise impractical requirements, and address issues with multiple-unit sites that share a secondary containment. The proposed changes include revisions to the Drain Time definition and allow manual valve alignment and pump start, by eliminating the STS 3.3.5.2 requirement for a manual ECCS initiation signal to start the required ECCS injection/spray subsystem. Additionally, TSTF-582 proposed corresponding changes to the STS Bases.

Since TSTF-542, Revision 2, has not yet been incorporated into a revision of NUREG-1433 and NUREG-1434, the changes approved in the TSTF-542, Revision 2, were used as the basis for the proposed changes inTSTF-582. The proposed changes discussed in this safety evaluation (SE) are identical and applicable to both NUREG-1433 and NUREG-1434, unless otherwise stated in this SE.

2.2.1 Drain Time Definition

The phrase “(e.g., seismic event, loss of normal power, single human error)” would be deleted from Item b) of STS 1.1 Drain Time definition. The phrase “closed and administratively controlled” would replace “locked, sealed, and otherwise secured” in Item b)1. of STS 1.1 Drain Time definition.

2.2.2 Reactor Pressure Vessel Water Inventory Control Instrumentation, STS 3.3.5.2

TSTF 582 proposes to revise STS 3.3.5.2, “RPV Water Inventory Control Instrumentation,” to eliminate the requirement for a manual ECCS initiation signal to start the required ECCS injection/spray subsystem, and to instead rely on manual valve alignment and pump start. STS 3.3.5.2 Functions, SRs, and Actions that only support manual initiation using an ECCS signal (including interlocks and minimum flow instruments) would be eliminated. Changes are proposed for STS 3.3.5.2 Table 3.3.5.2-1, Actions, and SRs.

2.2.2.1 Reactor Pressure Vessel Water Inventory Control Instrumentation, Table 3.3.5.2-1

NUREG-1433 (without setpoint control program)

Table 3.3.5.2-1, “RPV Water Inventory Control Instrumentation” (STS 3.3.5.2A (without setpoint control program)), would be revised to delete the CS and LPCI system Functions and the associated requirements (Applicable Modes or Other Specified Conditions, Required Channels per Function, and Conditions Referenced from Required Action A.1) and Note (a), and references to SRs 3.3.5.2.1, 3.3.5.2.2, and 3.3.5.2.3.

NUREG-1433 (with setpoint control program)

Table 3.3.5.2-1, “RPV Water Inventory Control Instrumentation” (STS 3.3.5.2B (with setpoint control program)), would be revised to delete the CS and LPCI system Functions and the

associated requirements (Applicable Modes or Other Specified Conditions, Required Channels per Function, and Conditions Referenced from Required Action A.1) and Note (a), and references to SRs 3.3.5.2.1, 3.3.5.2.2, and 3.3.5.2.3.

NUREG-1434 (without setpoint control program)

Table 3.3.5.2-1, "RPV Water Inventory Control Instrumentation" (STS 3.3.5.2A (without setpoint control program)), would be revised to delete the LPCI, LPCS, and HPCS system Functions and the associated requirements (Applicable Modes or Other Specified Conditions, Required Channels per Function, and Conditions Referenced from Required Action A.1) and Notes (a) and (b), and references to SRs 3.3.5.2.1, 3.3.5.2.2, and 3.3.5.2.3.

NUREG-1434 (with setpoint control program)

Table 3.3.5.2-1, "RPV Water Inventory Control Instrumentation" (STS 3.3.5.2B (with setpoint control program)), would be revised to delete LPCI, LPCS, and HPCS system Functions and the associated requirements (Applicable Modes or Other Specified Conditions, Required Channels per Function, and Conditions Referenced from Required Action A.1) and Notes (a) and (b), and references to SRs 3.3.5.2.1, 3.3.5.2.2, and 3.3.5.2.3.

2.2.2.2 Reactor Pressure Vessel Water Inventory Control Instrumentation, STS 3.3.5.2 Actions

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The Actions tables of both STS 3.3.5.2A and STS 3.3.5.2B would be revised to permit placing an inoperable isolation channel in trip with a Completion Time of "Immediately" (as proposed Action A.1) as an alternative (joined with an "OR") to declaring the associated penetration flow path incapable of automatic isolation (existing Action B.1). Existing Action A.2 is proposed to be revised to add "Initiate action to" to the required action of "Calculate DRAIN TIME." In addition, due to the proposed deletion of the CS and LPCI system Functions, Actions B, C, D, E, F, and G would no longer be necessary and would be deleted. Due to the deletions, the existing Action B is renumbered as Action A, existing Action B.1 is renumbered as Action A.2.1, and existing Action A.2 is renumbered as A.2.2.

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The Actions tables of both STS 3.3.5.2A and STS 3.3.5.2B would be revised to permit placing an inoperable isolation channel in trip with a Completion Time of "Immediately" (as proposed Action A.1) as an alternative (joined with an "OR") to declaring the associated penetration flow path incapable of automatic isolation (existing Action B.1). Existing Action A.2 is proposed to be revised to add "Initiate action to" to the required action of "Calculate DRAIN TIME." In addition, due to the proposed deletion of the LPCS, HPCS, and LPCI system Functions, Actions B, C, D, E, F, and G would no longer be necessary and would be deleted. Due to the deletions, the existing Action B is renumbered as Action A, existing Action B.1 is renumbered as Action A.2.1, and existing Action A.2 is renumbered as A.2.2.

2.2.2.3 Reactor Pressure Vessel Water Inventory Control Instrumentation, STS 3.3.5.2 Surveillance Requirements

The Note over SR 3.3.5.2 would be modified to delete "Refer to" and "to determine which SRs apply for each ECCS Function" and would add "These SRs apply to each Function in…" Additionally, SR 3.3.5.2.3, Perform Logic System Functional Test, and its specified frequency would be deleted.

2.2.3 Primary Containment Isolation Instrumentation, STS 3.3.6.1

The requirement to immediately initiation Action J.2 "Initiate action to isolate the Residual Heat Removal (RHR) Shutdown Cooling System" of STS 3.3.6.1A, "Primary Containment Isolation Instrumentation" (without setpoint control program), and STS 3.3.6.1B, "Primary Containment Isolation Instrumentation" (with setpoint control program) would be deleted.

2.2.4 Reactor Pressure Vessel Water Inventory Control, STS 3.5.2

STS 3.5.2 would be revised to allow manual valve alignment and pump start, in place of the requirement for a manual ECCS initiation signal to start the required ECCS injection/spray subsystem. STS 3.5.2 SRs related to manual initiation using the ECCS signal (such as verifying automatic alignment of valves on an initiation signal) would be deleted.

2.2.4.1 Reactor Pressure Vessel Water Inventory Control, STS 3.5.2, Condition D

STS 3.5.2, Condition D, which applies when Drain Time is < 8 hours, requires immediate action to isolate each [secondary] containment penetration flow path or to verify that it can be manually isolated from the control room. At some BWR sites, the secondary containment is shared between units and the secondary containment and the secondary containment isolation valves (SCIVs) may be required to be operable per STS 3.6.4.1 and STS 3.6.4.2 for the operating unit while STS 3.5.2 is applicable for a shutdown unit in Modes 4 and 5.

To accommodate this shared design, a bracketed (i.e., optional) proposed change shown in bold would be made to Required Action D.3, which will state, "Initiate action to isolate each [secondary] containment penetration flow path or verify it can be **[automatically or]** manually isolated from the control room." This will allow automatic closure of SCIVs for sites with a shared secondary containment. Automatic closure of the SCIVs provides protection equivalent to manual isolation of the SCIVs from the control room.

2.2.4.2 Reactor Pressure Vessel Water Inventory Control, STS 3.5.2, Surveillance Requirements

SR 3.5.2.5, "Verify, for the required ECCS injection/spry subsystem, each manual, power-operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position." and its specific frequency would be deleted. Two notes would be added to SR 3.5.2.6 which state "Operation may be through the test return line." and "Credit may be taken for normal system operation to satisfy this SR." SR 3.5.2.7 would be revised to replace "…actuates on a manual injection signal" with "…can be manually operated". Additionally, SRs 3.5.2.6, 3.5.2.7, and 3.5.2.8 would be renumbered as SRs 3.5.2.5, 3.5.2.6, and 3.5.2.7.

2.2.5 Primary Containment Isolation Valves, STS 3.6.1.3

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The proposed revision to the Applicability of STS 3.6.1.3, "Primary Containment Isolation Valves (PCIVS)," would delete the phrase, "When associated instrumentation is required to be OPERABLE per LCO 3.3.6.1, 'Primary Containment Isolation Instrumentation.'"

This change would make STS 3.6.1.3 only applicable in Modes 1, 2, and 3. Condition H, which is only applicable in Modes 4 and 5, and Condition G, which is only applicable during movement of irradiated fuel in the secondary containment, would be deleted.

The proposed change to STS 3.6.1.3, Condition F would delete "…in MODE 1, 2, or 3."

Existing Conditions G and H are shown below. These conditions are proposed to be deleted.

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. [Required Action and associated Completion Time of Condition A, B, C, D, or E not met for PCIV(s) required to be OPERABLE during movement of [recently] irradiated fuel assemblies in [secondary] containment.	G.1 ----------NOTE---------- LCO 3.0.3 is not applicable. ---------- Suspend movement of [recently] irradiated fuel assemblies in [secondary] containment.	Immediately]
H. [Required Action and associated Completion Time of Condition A, B, C, D, or E not met for PCIV(s) required to be OPERABLE during MODE 4 or 5.	H.1 Initiate action to restore valve(s) to OPERABLE status.	Immediately]

Notes stating that the SR is "Only required to be met in MODES 1, 2, and 3" on SR 3.6.1.3.1, SR 3.6.1.3.2, SR 3.6.1.3.7, SR 3.6.1.3.12, SR 3.6.1.3.13, SR 3.6.1.3.14, and SR 3.6.1.3.15 would be deleted.

2.2.6 Alternating Current Sources – Shutdown, STS 3.8.2

The proposed revision to STS 3.8.2, "AC Sources - Shutdown," SR 3.8.2.1, would no longer require SRs that test automatic DG start to be met in Modes 4 and 5. Note 1 of SR 3.8.2.1 would be revised to remove SRs 3.8.1.11, 3.8.1.13, and 3.8.1.19 from the list of SRs that are not required to be performed. Note 2 of SR 3.8.2.1, which states "SR 3.8.1.12 and SR 3.8.1.19 are not required to be met when associated SCS subsystem(s) are not required to be OPERABLE per LCO 3.5.2, "ECCS Shutdown." would be deleted. SR 3.8.2.1 would be revised to add SRs 3.8.1.11, 3.8.1.12, 3.8.1.13, and 3.8.1.19 to the list of SRs that are excepted from the applicability. Additionally, "NOTES" would be changed to "NOTE" and the numbering removed, since only one Note would remain in the SR.

2.2.7 Editorial Changes

Several editorial changes are proposed as described below.

In STS 3.5.2, Required Action C.3, the insertion of the acronym for standby gas treatment "(SGT)" between "standby gas treatment" and "subsystem."

In STS 3.5.2, Required Action D.3, "(SGT)" would replace "standby gas treatment," which would be deleted.

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SR 3.5.2.2 would be revised to delete "low pressure coolant injection (LPCI)," and replace it with "LPCI."

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STS 3.5.1, ECCS-Operating, Actions Note would be revised to define the acronym "HPCS" at its first use and to remove the definition from Condition B.

The proposed revised note is, "LCO 3.0.4.b is not applicable to High Pressure Core Spray (HPCS)."

The proposed revised Condition B is, "HPCS System inoperable."

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 FR 39132, dated July 22, 1993), the NRC and industry task groups for new STSs recommended that improvements include greater emphasis on human factors principles in order to add clarity and understanding to the text of the STSs, and provide improvements to the Bases of the STSs, which provides the purpose for each requirement in the STSs. The improved vendor-specific STSs were developed and issued by the NRC in September 1992.

Section IV, "The Commission Policy," of the Final Policy Statement on TSs 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-582)], 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:

> 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 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. Per 10 CFR 50.36(c)(2)(i), 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)(3) requires that TSs include items in the category of SRs, which are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the LCOs will be met.

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 STSs (i.e., the current STSs), as modified by NRC-approved travelers. In addition, the guidance states that comparing the change to previous STSs can help clarify the STSs intent.

3.0 TECHNICAL EVALUATION

3.1 Drain Time Definition, STS 1.1

TSTF-582 proposed to delete "(e.g., seismic event, loss of normal power, single human error)" from STS 1.1 Drain Time definition, Item b. The NRC finds the deletion of these examples of common failures acceptable because this level of detail is not required by 10 CFR 50.36(a)(1). A conforming change is proposed to the bases to eliminate discussion of seismic events and snubbers, and to state that the maintenance controls described in NUMARC 93-01 to prevent a loss of inventory, and the licensee commitments to NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," are sufficient to prevent a failure related to maintenance and testing that could result in a draining event.

TSTF-582 proposed to replace "locked, sealed, or otherwise secured" with "closed and administratively controlled" in Item b)1 of the Drain Time definition.

The current STS definition requirement that closed manual or automatic valves must be locked, sealed, or otherwise secured cannot be practically implemented in a large population of valves, because the penetration flow paths are connected to systems, such as RHR and RWCU, that have tens or hundreds of manual valves, such as vents, drains, and sample connections. These manual valves are normally closed and are controlled under the licensee's administrative processes, such as system operating procedures. Additionally, accessing these valves to meet the current definition would lead to unnecessary radiation dose and foreign material control concerns in the drywell.

The NRC staff finds that revision of the Drain Time definition, Item b)1 to require that excluded penetration flow paths be isolated by manual or automatic valves that are closed and administratively controlled is acceptable, because accessing these valves to meet the current definition would lead to unnecessary radiation dose and foreign material control concerns in the drywell . The current definition requirement that closed manual or automatic valves must be locked, sealed, or otherwise secured cannot be practically implemented in a large population of valves, because the penetration flow paths are connected to systems, such as RHR and RWCU, that have tens or hundreds of manual valves, such as vents, drains, and sample connections. These manual valves are normally closed and are controlled under the licensee's administrative processes, such as system operating procedures. Administrative controls are acceptable because they are inspectable, are accepted methods to control system configuration during the dynamic conditions of a refueling outage, and provide assurance that the valves would be closed and controlled as needed to prevent flow of reactor coolant through the penetration flow paths in time such that the water inventory in the RPV to would not drain down to below TAF.

3.2 Reactor Pressure Vessel Water Inventory Control Instrumentation, STS 3.3.5.2

3.2.1 STS Table 3.3.5.2-1

The STS 3.3.5.2 functions that only support ECCS manual initiation via the ECCS instrumentation would be removed from Table 3.3.5.2-1 in LCO 3.3.5.2A and LCO 3.3.5.2B.

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Functions 1.a and 2.a, "CS System and LPCI System Reactor Steam Dome Pressure - Low (Injection Permissive)"

The low reactor steam dome pressure signals are used as permissives for the low pressure ECCS injection/spray subsystem manual initiation Functions. This function ensures that, prior to opening the injection valves of the low pressure ECCS subsystems, the reactor pressure has fallen to a value below these subsystems' maximum design pressure. In Modes 4 and 5, the reactor steam dome pressure is lower than the ECCS maximum design pressure. Therefore, the NRC staff finds that the functions are not necessary to ensure that the required ECCS subsystem can inject into the RPV.

Functions 1.b and 2.b, "CS System and LPCI System Pump Discharge Flow - Low (Bypass)"

The minimum flow instruments protect the associated low pressure ECCS pump from overheating when the pump is operating, and the associated injection valve is not fully open. The minimum flow line valve is opened when low flow is sensed, and the valve is automatically closed when the flow rate is adequate to protect the pump. Under the proposed change, the ECCS pump is started manually by the operator after aligning the valves needed to inject into the RPV. Therefore, the NRC staff finds that the automatic minimum flow protection is not needed.

Functions 1.c and 2.c, "CS System and LPCI System Manual Initiation"

The Manual Initiation push button channels introduce signals into the appropriate ECCS logic to provide manual initiation capability. Under the proposed change, the ECCS is aligned and started by the operators from the control room. Therefore, the NRC staff finds that the manual initiation function is not needed.

NUREG-1434 (with and without setpoint control program)

Functions 1.a and 2.a, "LPCS System and LPCI System Reactor Steam Dome Pressure - Low (Injection Permissive)"

The low reactor steam dome pressure signals are used as permissives for the low pressure ECCS injection/spray subsystem manual initiation Functions. This function ensures that, prior to opening the injection valves of the low pressure ECCS subsystems, the reactor pressure has fallen to a value below these subsystems' maximum design pressure. In Modes 4 and 5, the reactor steam dome pressure is lower than the ECCS maximum design pressure. Therefore, the NRC staff finds that the functions are not necessary to ensure the required ECCS subsystem can inject into the RPV.

Functions 1.b, 1.c, and 2.b, "LPCS and LPCI Systems Pump Discharge Flow - Low (Bypass)"

The minimum flow instruments protect the associated low pressure ECCS pump from overheating when the pump is operating, and the associated injection valve is not fully open. The minimum flow line valve is opened when low flow is sensed, and the valve is automatically closed when the flow rate is adequate to protect the pump. Under the proposed change, the ECCS pump is started manually by the operator after aligning the valves needed to inject into the RPV. Therefore, the NRC staff finds that the automatic minimum flow protection is not needed.

Functions 1.d and 2.c, "LPCS System and LPCI System Manual Initiation"

The Manual Initiation push button channels introduce signals into the appropriate ECCS logic to provide manual initiation capability. Under the proposed change, the ECCS is aligned and started by the operators from the control room. Therefore, the NRC staff finds that the manual initiation function is not needed.

Function 3.a, "HPCS System Reactor Vessel Water Level - High, Level 8"

The high RPV water level 8 signal is used to close the HPCS injection valve to prevent overflow into the main steam lines (MSLs). Under the proposed change, the ECCS pump is started and controlled manually by the operator. Therefore, the NRC staff finds that automatic protection to prevent overflow into the MSLs is not needed.

Function 3.b, "HPCS System Condensate Storage Tank (CST) Level – Low"

Low level in the CST indicates the unavailability of an adequate supply of makeup water from this normal source. Normally, the suction valves between HPCS and the CST are open and water for HPCS injection would be taken from the CST. However, if the water level in the CST falls below a preselected level, first the suppression pool suction valve automatically opens and then the CST suction valve automatically closes. This ensures that an adequate supply of makeup water is available to the HPCS pump. Under the proposed change, the ECCS subsystem is aligned and started manually by the operator in the control room, including selecting the water source for HPCS. Therefore, the NRC staff finds that this automatic swap-over to the suppression pool is not needed.

Function 3.c and 3.d, "HPCS Pump Discharge Pressure - High (Bypass) and HPCS System Flow Rate - Low (Bypass)"

The minimum flow instruments are provided to protect the HPCS pump from overheating when the pump is operating, and the associated injection valve is not fully open. The minimum flow line valve is opened when low flow and high pump discharge pressure are sensed, and the valve is automatically closed when the flow rate is adequate to protect the pump, or the discharge pressure is low (indicating that the HPCS pump is not operating). Under the proposed change, the ECCS pump is started manually by the operator after aligning the valves needed to inject into the RPV. Therefore, the NRC staff finds that the automatic minimum flow protection is not needed.

Function 3.e, "HPCS System Manual Initiation"

The Manual Initiation push button channel introduces a signal into the HPCS logic to provide manual initiation capability. Under the proposed change, the ECCS is aligned and started by the operators from the control room. Therefore, the NRC staff finds that the manual initiation function is not needed.

3.2.1.1 Summary of NRC Staff Evaluation of Proposed Changes to Table 3.3.5.2-1

The NRC staff finds that the safety features provided by the instrumentation functions for CS and LPCI systems (NUREG-1433) and LPCS, LPCI, and HPCS systems (for NUREG-1434) discussed above are not needed in Modes 4 and 5 when crediting manual alignment and pump start of the required ECCS injection/spray subsystem, because there is no specified safety function being performed that would require the functions to be operable. Therefore, the functions can be deleted from Table 3.3.5.2-1. If any of these functions are needed to satisfy manual alignment and pump start from the control room, the function will remain available although it is not required. The automatic function can be bypassed to allow manual operation. Plant-specific procedures which are inspected in accordance with Inspection Procedure 42700, from IMC 2515, "Light-Water Reactor Inspection Program," will ensure that no failed or inoperable instrumentation will prevent ECCS injection/spray subsystem injection when needed in the event of an unplanned drain down event. Proposed SR 3.5.2.7 provides assurance that the required ECCS injection/spray subsystem can be manually operated.

Manually aligning an ECCS injection/spray subsystem to a water source (CST or suppression pool) and injecting water into the RPV is an uncomplicated action and is similar to other actions performed during refueling outages in that they use procedures to perform these actions. Additionally, a draining event is a slow evolution and there is adequate time to take the necessary actions to manually align and start an ECCS injection/spray subsystem. The ECCS subsystems are routinely used to raise the RPV and refueling pool water level during refueling outages without the use of the ECCS manual initiation function.

The proposed change makes the treatment of instrumentation for the required ECCS injection/spray subsystem consistent with the treatment of RHR in Modes 4 and 5. Similar to the proposed treatment of the defense-in-depth ECCS subsystem, RHR is manually aligned and controlled by the operator in the control room. The RHR STSs describe the required functional capability of the system, but not the specific instruments and controls needed by the operator to accomplish the function.

The NRC staff finds it acceptable to remove the SRs and footnotes related to the above noted instrumentation from Table 3.3.5.2-1 because the functions they are surveilling are not necessary to ensure the required ECCS subsystem can inject into the RPV, automatic minimum flow protection, provide automatic protection to prevent overflow into the MSLs, automatic swap-over to the suppression pool, automatic minimum flow protection, and the manual initiation function. Instrumentation and controls required to support the needed functions will be available per the operability requirements in the plant-specific TSs in Section 1, "Definitions." The NRC staff also finds that proposed changes to Table 3.3.5.2-1 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).

3.2.2 Reactor Pressure Vessel Water Inventory Control Instrumentation, STS 3.3.5.2 Actions

STS 3.3.5.2 specifies the instrumentation requirements needed to satisfy the operability requirements of STS 3.5.2. There are two types of required instruments: those related to isolation of a penetration flow path on low water level in the RPV, and those functions that are needed to permit manual initiation of the required ECCS subsystem using the ECCS instrumentation.

As a result of the proposed deletion of instrumentation in Table 3.3.5.2-1, TSTF-582 proposes to delete from STS 3.3.5.2 Actions B, C, D, and E (NUREG-1433) and Actions B, C, D, E, F, and G (NUREG-1434), which are only applicable when these instrumentation functions are inoperable.

The NRC staff finds that the proposed revisions to STS 3.3.5.2 to remove Conditions related to instrumentation functions that are deleted from Table 3.3.5.2-1 are acceptable. STS 3.3.5.2 is revised to delete Actions B, C, D, and E (NUREG-1433) and Actions B, C, D, E, F, and G (NUREG-1434), which are only applicable when these instrumentation functions are inoperable. These instrumentation functions are not needed in Modes 4 and 5 when crediting manual alignment and pump start of the required ECCS injection/spray subsystem and therefore can be deleted.

Both RHR and RWCU serve to isolate the subject systems from the RPV on low water level to terminate a draining event before the water level reaches the TAF. Both functions require two channels in one trip system to be operable and are required to be operable when automatic isolation of the associated penetration flow path(s) is credited as an exclusion when calculating Drain Time. If a channel is inoperable, Action A requires immediately declaring the associated penetration flow path(s) incapable of automatic isolation and initiation of action to recalculate Drain Time. Both functions actuate on a two-out-of-two logic. If a channel is placed in the tripped condition, the remaining operable channel will isolate the associated penetration flow path if needed. If both channels are in trip, the penetration flow path will be automatically isolated, fulfilling the safety function. Therefore, the proposed new Required Action A.1 added to STS 3.3.5.2 would require initiating action immediately to place the channel in trip. This Required Action is joined by a logical “OR” as an alternative to the existing Required Actions. The NRC staff finds the proposed changes to STS 3.3.5.2 acceptable because instrumentation and controls required to support the needed functions will be available per the operability requirements in Section 1, Definitions, of the individual plant TSs.

3.2.3 Reactor Pressure Vessel Water Inventory Control Instrumentation, STS 3.3.5.2 Surveillance Requirements

STS 3.3.5.2 would be revised to delete SR 3.3.5.2.3, Logic System Functional Test, and to modify the SR NOTE. SR 3.3.5.2.3, which requires a Logic System Functional Test of the ECCS manual initiation function, is no longer necessary because these instrumentation functions are deleted. The Logic System Functional Test was applicable to Table 3.3.5.2 for CS and LPCI (NUREG-1433) and LPCS, LPCI, and HPCS (NUREG-1434) manual initiation instrumentation. The Note for STS 3.3.5.2 SRs would be revised to state, “These SRs apply to each Function in Table 3.3.5.2-1.”

The NRC staff finds the deletion of the logic system functional testing (SR 3.3.5.2.3) associated with manual initiation instrumentation for CS and LPCI (NUREG-1433) and LPCS, LPCI, and

HPCS (NUREG-1434) acceptable. If manual operation of the required ECCS injection/spray subsystem is needed to add water to the RPV, it is a simple evolution that involves the manipulation of a small number of components by licensed operators in the control room and is described in plant procedures. Manual operation is acceptable because a draining event is a slow evolution and there is adequate time to take the necessary actions to manually align and start an ECCS injection/spray subsystem.

The NRC staff determined that the modified NOTEs to SRs 3.3.5.2.1 and 3.3.5.2.2 clarify the applicability of the SRs. Therefore, the NRC staff finds the proposed changes are acceptable because the changes continue to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the associated LCO will continue to be met in accordance with 10 CFR 50.36(c)(3).

3.3 Primary Containment Isolation Instrumentation, STS 3.3.6.1

NUREG-1433 (without and with setpoint control program)

STS 3.3.6.1A and STS 3.3.6.1B, Primary Containment Isolation Instrumentation Action J.2 is proposed for deletion.

TSTF-542 revised NUREG-1433 and NUREG-1434 STS 3.3.6.1, "Primary Containment Isolation Instrumentation," to relocate all functions applicable in Modes 4 and 5 to TS 3.3.5.2, "Reactor Pressure Vessel Water Inventory Control Instrumentation." TSTF-542 deleted STS 3.3.6.1, Required Action J.2, "Initiate action to isolate the Residual Heat Removal (RHR) Shutdown Cooling System," from NUREG-1434, but did not delete the same action from NUREG-1433.

The deletion of STS 3.3.6.1, Required Action J.2 was an inadvertent omission from the TSTF-542, NUREG-1433 changes. Because this action is no longer applicable after adoption of TSTF-542, since instrumentation actions for Modes 4 and 5 have been moved to STS 3.3.5.2, the NRC staff finds the deletion of the action from NUREG-1433 acceptable.

3.4 Reactor Pressure Vessel Water Inventory Control, STS 3.5.2

STS 3.5.2 would be revised to eliminate the requirement for a manual ECCS initiation signal to start the required ECCS injection/spray subsystem, and to instead rely on manual valve alignment and pump start.

3.4.1 STS 3.5.2, Condition D

At some BWR sites[1], the secondary containment is shared between units and the secondary containment and the SCIVs may be required to be operable per STS 3.6.4.1 and STS 3.6.4.2 for the operating unit while STS 3.5.2 is applicable for a shutdown unit in Modes 4 and 5). STS 3.5.2, Condition D, which applies when Drain Time is < 8 hours, requires immediate action to isolate each [secondary] containment penetration flow path or verify that it can be manually isolated from the control room.

[1] The following sites have a shared secondary containment: Browns Ferry, Brunswick, Dresden, Hatch, LaSalle, Limerick, Peach Bottom, Quad Cities, and Susquehanna.

To accommodate this shared design, a bracketed (i.e., optional) proposed change shown in bold would be made to Required Action D.3 which states, “Initiate action to isolate each [secondary] containment penetration flow path or verify it can be **[automatically or]** manually isolated from the control room.”

At sites with a shared secondary containment, the SCIVs may close automatically. A requirement to verify that the SCIVs can *only* be manually isolated from the control room is not needed, since automatic closure of the SCIVs provides protection equivalent to manual isolation of the SCIVs from the control room. Therefore, the NRC finds that it is acceptable to include in brackets the option of automatic isolation to address shared secondary containments. The action to be taken when the LCO is not met continues 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).

3.4.2 STS 3.5.2, Surveillance Requirements

STS 3.5.2 is revised to delete SRs related to manual initiation using the ECCS signal (such as verifying automatic alignment of valves on an initiation signal). There are no proposed changes to the SR 3.5.2 Frequency.

3.4.2.1 SR 3.5.2.5

SR 3.5.2.5 would be replaced with a new SR 3.5.2.7. SR 3.5.2.5 requires verification that each manual, power operated, and automatic valve in the required ECCS injection/spray subsystem flow path that is not locked, sealed, or otherwise secured in position is in the correct position. The requirement that the ECCS injection/spray subsystem valves continuously be in the correct position is replaced with the requirement that the required ECCS subsystem be capable of manual alignment and initiation from the control room. A manually operated ECCS injection/spray subsystem is proposed as new SR 3.5.2.7.

As a result of the deletion of SR 3.5.2.5, SR 3.5.2.6, SR 3.5.2.7, and SR 3.5.2.8 would be renumbered as SR 3.5.2.5, SR 3.5.2.6, and SR 3.5.2.7, respectively. The renumbering is acceptable because it appropriately reflects the deletion of SR 3.5.2.5.

There is no longer a specified “correct position” for the subsystem valves to support initiation from the ECCS instrumentation. The changes to STS 3.5.2 no longer credit the use of automatic valves that respond to an ECCS signal. The STS 3.5.2 permits the use of operator action to align power operated valves. Licensee control of manual valves will be as needed to support manual alignment and initiation of the ECCS subsystem from the control room. Therefore, the NRC staff finds that replacing SR 3.5.2.5 with SR 3.5.2.7, is acceptable because the changes continue to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the associated LCO will continue to be met in accordance with 10 CFR 50.36(c)(3).

3.4.2.2 SR 3.5.2.6 (renumbered as SR 3.5.2.5)

SR 3.5.2.6 requires operating the required ECCS subsystem for at least 10 minutes through the recirculation line. The purpose of the SR is to demonstrate that the subsystem is available to mitigate an event. One of the low pressure ECCS subsystems that can satisfy the LCO requirement is RHR Shutdown Cooling. One RHR Shutdown Cooling subsystem is typically in operation when in Mode 4 or Mode 5, which demonstrates that it is capable of injecting water into the RPV to mitigate an event.

The change would remove the phrase “through the recirculation line” from the SR and add two notes. The first proposed Note states that operation may be through the “test return line.” The second proposed Note states that credit may be taken for normal system operation to satisfy the SR. This Note permits crediting the normal operation of an RHR Shutdown Cooling subsystem to satisfy the SR.

The NRC staff finds that the revised SR continues to ensure that the ECCS injection/spray subsystem can inject water into the RPV if needed for defense-in-depth, while eliminating unnecessary testing. ECCS injection spray subsystem testing remains ≥ 10 minutes; however, the use of “test return line” terminology versus “recirculation line,” can prevent operator confusion. The two Notes clarify that operations may be through the return line and that credit is taken for normal operations of RHR System in shutdown cooling mode. Therefore, the NRC staff finds changes to SR 3.5.2.6 (renumbered as SR 3.5.2.5) are acceptable because they are appropriate for ensuring the operability of the equipment and instrumentation specified in LCO 3.5.2. Furthermore, the NRC staff concludes that each of the proposed SRs are acceptable, because the SRs continue to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the associated LCO will continue to be met in accordance with 10 CFR 50.36(c)(3).

3.4.2.3 SR 3.5.2.8 (renumbered as SR 3.5.2.7)

SR 3.5.2.8 requires verification that the ECCS injection/spray subsystem actuates on a manual initiation signal. SR 3.5.2.8 would be revised to state, “Verify the required ECCS injection/spray subsystem can be manually operated.” This proposed change reflects the proposed change to the LCO and is consistent with the approved TSs of plants that requested a variation from TSTF-542 for manual ECCS initiation (e.g., Hatch 1 and 2 approval, ADAMS Accession No. ML18123A368).

Some plants have in their design the capability to manually initiate with a push button. For plants that do not have a push button manual initiation, the RPV injection function (including pumps and valves) would be tested within this SR. This SR verifies that the required ECCS injection/spray subsystem (including the associated pump switches and valve(s)) can be manually operated to provide additional RPV water inventory, if needed. The NRC staff finds the change to SR 3.5.2.8 (renumbered as SR 3.5.2.7) acceptable because it is appropriate for ensuring the operability of the equipment and instrumentation specified in LCO 3.5.2. Furthermore, the NRC staff concluded that change continues to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the associated LCO will continue to be met in accordance with 10 CFR 50.36(c)(3).

3.5 Primary Containment Isolation Valves, STS 3.6.1.3

NUREG-1433

Applicability of STS 3.6.1.3, “Primary Containment Isolation Valves (PCIVs),” would be revised to delete the phrase, “When associated instrumentation is required to be OPERABLE per LCO 3.3.6.1, “‘Primary Containment Isolation Instrumentation.’” TSTF-542 revised the NUREG-1433 Table 3.3.6.1-1, Function 6.b, "Shutdown Cooling Isolation, Reactor Vessel Water Level - Low, Level 3," to relocate the Modes 4 and 5 applicability to STS 3.3.5.2. As a result, all instruments required by LCO 3.3.6.1 are only applicable in Modes 1, 2, or 3. With this change, STS 3.6.1.3 would only be applicable in Modes 1, 2, and 3.

Condition H, which is only applicable in Modes 4 and 5, and Condition G, which is only applicable during movement of irradiated fuel in the secondary containment, would be deleted. Condition F, would be revised to delete the reference to “Mode 1, 2, and 3.” Notes stating that the SR is “Only required to be met in MODES 1, 2, and 3,” on SR 3.6.1.3.1, SR 3.6.1.3.2, SR 3.6.1.3.7, SR 3.6.1.3.12, SR 3.6.1.3.13, SR 3.6.1.3.14, and SR 3.6.1.3.15 would also be deleted.

The proposed changes are consistent with the approved TSs of plants that requested a variation from TSTF-542 (e.g., Columbia Generating Station approval, ADAMS Accession No. ML18255A350).

The NRC staff finds that the proposed changes to LCO 3.6.1.3 are acceptable because the changes 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), since the requirements for Shutdown Cooling Isolation instrumentation in Mode 4 and 5 was relocated by the approval of TSTF-542. Additionally, the SR changes continue to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the associated LCO will continue to be met in accordance with 10 CFR 50.36(c)(3). The NRC staff finds that the deletion of Conditions H and G and revision to Condition F and deletion of the SR note are acceptable, because these items were only applicable in Modes 4 and 5 consistent with the relocation of requirements approved in TSTF-542.

3.6 Alternating Current Sources - Shutdown, STS 3.8.2

SR 3.8.2.1 requires the performance of the SRs in STS 3.8.1, ”AC Sources - Operating,” with some exceptions listed in SR 3.8.2.1 and its Notes 1 and 2. SR 3.8.2.1 would be revised to: 1) add SRs 3.8.1.11, 3.8.1.12, 3.8.1.13, and 3.8.1.19 to the list of exceptions; 2) modify Note 1; and 3) delete Note 2.

The STS 3.8.2 Bases states that the LCO 3.8.2 ensures the capability of supporting systems necessary for avoiding immediate difficulty in the event of an accident during shutdown assuming either a loss of all offsite power or a loss of all onsite DG power. The operability of the required offsite circuit and DG ensures the availability of sufficient AC sources to operate the plant in a safe manner and to mitigate the consequences of postulated events (e.g., fuel handling accidents (FHAs) involving recently irradiated fuel) during shutdown).

With the approval of TSTF-542, SR 3.8.1.12 verifies, in part, the automatic start of a DG on an ECCS initiation signal. The DG starts automatically on an ECCS initiation signal for low reactor

vessel water level conditions in Operating Modes 1 through 3. This ECCS initiation signal also starts certain ECCS equipment automatically. STS 3.5.2, "Reactor Pressure Vessel Water Inventory Control (RPV WIC)," does not require automatic ECCS initiation to mitigate a draining event in Modes 4 and 5, and the ECCS initiation signal related to the automatic ECCS initiation is removed from the STS. Because the automatic ECCS initiation and related ECCS initial signal in Modes 4 and 5 are eliminated, the automatic start of the DG on an ECCS initiation signal is not required in Modes 4 and 5. The deletion of SR 3.8.2.12 was an inadvertent omission from TSTF-542 changes. The NRC staff finds the deletion of SR 3.8.1.12 from SR 3.8.2.1 is consistent with changes previously found acceptable in the SE approving TSTF-542 and, therefore, acceptable.

SR 3.8.1.11 and SR 3.8.1.19 test, in part, the automatic start and loading of a DG on a LOOP signal and a LOOP signal in conjunction with an ECCS initiation signal, respectively. SR 3.8.1.13 verifies each DG's non-critical automatic trips are bypassed on actual or simulated loss of voltage signal on the emergency bus concurrent with an actual or simulated ECCS initiation signal. The DG non-critical trips are bypassed during an automatic DG start.

STS 3.5.2 considered a LOOP that can cause a draining event in Modes 4 and 5. If the Drain Time decreases from 36 hours to< 8 hours, then STS 3.5.2 Required Action D.1 requires that an additional method of water injection be established to maintain required RPV water level and that the ECCS injection/spray subsystem or the additional method of water injection be capable to operate without offsite power. In addition, in a LOOP event, the STS 3.8.2 requires declaring the affected required features inoperable. In this case, the affected instrumentation or ECCS injection/spray subsystem in STS 3.5.2 will be declared inoperable and the applicable Actions followed. If the required inoperable ECCS injection/spray subsystem cannot be restored to operable status within 4 hours, then STS 3.5.2 Required Action B.1 requires a method of water injection capable to operate without offsite power.

The required DG must operate to supply power to the STS 3.5.2 water injection equipment that is to operate without offsite power. Based on its review of the above-mentioned STS 3.5.2 Actions statements, the NRC staff finds that STS 3.5.2 provides enough time from the onset of the LOOP event for the operator to manually start the DG required to supply power to the water injection equipment to mitigate the draining event in Modes 4 and 5. In addition, STS 3.5.2 does not require the automatic initiation of the ECCS injection/spray subsystem or the additional method of water injection. Therefore, since STS 3.5.2 allows enough time to manually start the DG and the equipment for water injection, the NRC staff finds that the automatic start and loading of the DG are not necessary on a LOOP signal or LOOP concurrent with an ECCS initiation signal to mitigate a draining event in Modes 4 and 5.

Furthermore, the NRC staff notes that other events postulated in Modes 4 and 5 (e.g., FHA, waste gas tank rupture) and during movement of [recently] irradiated fuel assemblies in the [primary and secondary containment] do not assume a LOOP event or an automatic ECCS initiation.

In summary, the NRC staff finds that since the DG automatic start is not required to mitigate the consequences of postulated events (e.g., draining event, FHA) in shutdown conditions, testing of the DG non-critical automatic trips bypass is not required to demonstrate the operability of the DG during shutdown conditions. Therefore, the NRC staff finds that the proposed addition of SR 3.8.1.11, SR 3.8.1.12, SR 3.8.13, and SR 3.8.1.19 to the list of SRs that are not applicable for SR 3.8.2.1 is acceptable since testing of the DG automatic start and the bypass of DGs

non-critical automatic trips are no longer required to demonstrate the operability of the DG in shutdown conditions.

Note 1 would be revised to delete SR 3.8.1.11, SR 3.8.1.13, and SR 3.8.1.19 from the list of SRs that are not required to be performed to meet SR 3.8.2.1. As discussed above, it is acceptable to remove these SRs from SR 3.8.2.1. Therefore, the NRC staff finds the deletion of these SRs from Note 1 of SR 3.8.2.1 acceptable since testing of the DG automatic start and the bypass of DGs non-critical automatic trips are no longer required to demonstrate the operability of the DG in shutdown conditions.

Note 2 of the SR 3.8.2.1 states, "SR 3.8.1.12 and SR 3.8.1.19 are not required to be met when associated ECCS subsystem(s) are not required to be OPERABLE per LCO 3.5.2, 'ECCS Shutdown.'" TSTF-582 proposed to delete Note 2 from the existing SR 3.8.2.1. Since SR 3.8.1.12 and SR 3.8.1.19 will no longer apply to SR 3.8.2.1, the NRC staff finds the deletion of Note 2 from the existing STS SR 3.8.2.1 acceptable since testing of the DG automatic start and the bypass of DGs non-critical automatic trips are no longer required to demonstrate the operability of the DG in shutdown conditions.

The NRC staff finds that the proposed changes to SR 3.8.2.1 are acceptable because the DG automatic start is not required in Modes 4 and 5. Therefore, the NRC staff finds that the revised SR 3.8.2.1 will continue to assure that the necessary quality of the onsite standby power systems and components is maintained, that facility operation will be within safety limits, and that the associated LCO 3.8.2 will be met in accordance with 10 CFR 50.36(c)(3).

3.7 Editorial Changes

The NRC staff finds that the proposed acronym changes in STS 3.5.2, SR 3.5.22, and STS 3.5.1 are acceptable because they are editorial clarifications and do not substantively change TS requirements.

3.8 Standard Technical Specification Bases

The Commission's Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors (Commission's Final Policy Statement), dated July 2, 1993 (58 FR 39132) 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?

4. What are the Bases for each Safety Limit?

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?

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 insights; but this should be clearly stated.

TSTF-582 proposed that a new Action A.1 be added to the Reactor Pressure Vessel Water Inventory Control Instrumentation, STS 3.3.5.2 Actions. The NRC staff determined the proposed STS Bases for Action A.1 describes why this remedial action should be taken if the associated LCO cannot be met, that it relates to other Actions associated with the LCO, and provides justification for continued operation of the system or component at the reduced state from the state specified in the LCO for the allowed time period. The STS Bases explain that the licensee should take immediate action to place the channel in trip when the LCO is not met because the remaining channel will isolate the penetration flow path on low water level. The STS Bases explain that taking immediate action to place the channel in trip relates to immediately declaring the associated flow path(s) incapable of automatic isolation and immediately initiating action to calculate the drain time, because the calculation cannot credit automatic isolation of the affected penetration flow paths. The STS Bases further explain that even though the LCO 3.3.5.2 is not met, the plant can continue to operate in Modes 1, 2, or 3 for six hours because there are appropriate compensatory measures for separate Condition entry for each inoperable RPV Water Inventory Control instrumentation channel.

The other proposed changes would delete or revise the STS Bases consistent with the associated proposed LCO and SR changes and correct typographical errors. The NRC staff finds that the proposed STS Bases deletions are appropriate to reflect the proposed deletions to the LCOs and SRs that are no longer applicable after adoption of TSTF-542. TSTF-542 deleted Operations with a Potential for Draining the Reactor Vessel (OPDRVs). Therefore, information on OPDRVs are not needed. In addition, the correction of typographical errors improves the clarity of the STS Bases. Therefore, the NRC staff finds that the proposed revisions to the STS Bases are consistent with the Commission's Final Policy Statement and 10 CFR 50.36.

4.0 CONCLUSION

The NRC staff finds that proposed changes to STS 1.1 Definition and LCOs 3.3.5.2, 3.3.6.1, 3.5.2, and 3.6.1.3 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 NRC staff finds that proposed changes to the Action of LCOs 3.3.5.2A, 3.3.5.2B, and 3.6.13 are adequate 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).

The NRC staff finds that the proposed revisions to SRs 3.3.5.2, 3.5.2, 3.6.1.3, and 3.8.2 continue to provide requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the LCOs will be met in accordance with 10 CFR 50.36(c)(3). Accordingly, the NRC staff finds TSTF-582 changes acceptable.

Principal Reviewers: Tarico Sweat, NRR/DSS/STSB
Gursharan Singh, NRR/DE/EICB
Khadijah West, NRR/DE/EICB (prior to joining NRR/DSS/STSB)
Adakou Foli, NRR/DE/EEOB
Larry Wheeler, NRR/DSS/SCVB

Date: July 29, 2020