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

May 23, 2019

Vice President, Operations
Entergy Operations, Inc.
Grand Gulf Nuclear Station
P.O. Box 756
Port Gibson, MS 39150

SUBJECT: GRAND GULF NUCLEAR STATION, UNIT 1 – ISSUANCE OF AMENDMENT NO. 218 TO REVISE TECHNICAL SPECIFICATIONS TO ADOPT TSTF-542, REVISION 2, "REACTOR PRESSURE VESSEL WATER INVENTORY CONTROL" (EPID L-2018-LLA-0105)

Dear Sir or Madam:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 218 to Renewed Facility Operating License No. NPF-29 for the Grand Gulf Nuclear Station, Unit 1. The amendment consists of changes to the Technical Specifications to adopt Technical Specifications Task Force (TSTF) Traveler TSTF-542, "Reactor Pressure Vessel Water Inventory Control," in response to your application dated April 10, 2018, as supplemented by letters dated October 23, 2018, and March 13, 2019.

The amendment replaces existing TS requirements related to "operations with the potential for draining the reactor vessel (OPDRVs)" with new requirements on reactor pressure vessel water inventory control to protect Safety Limit 2.1.1.3. Safety Limit 2.1.1.3 requires reactor vessel water level to be greater than the top of active irradiated fuel.

A copy of the related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

Siva P. Lingam

Siva P. Lingam, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-416

Enclosure:
1. Amendment No. 218 to NPF-29
2. Safety Evaluation

cc: Listserv

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

ENTERGY OPERATIONS, INC.

SYSTEM ENERGY RESOURCES, INC.

COOPERATIVE ENERGY, A MISSISSIPPI ELECTRIC COOPERATIVE

ENTERGY MISSISSIPPI, LLC

DOCKET NO. 50-416

GRAND GULF NUCLEAR STATION, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 218
Renewed License No. NPF-29

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Entergy Operations, Inc. (the licensee), dated April 10, 2018, as supplemented by letters dated October 23, 2018, and March 13, 2019, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-29 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 218 are hereby incorporated into this renewed license. Entergy Operations, Inc. shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance and shall be implemented within 120 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert J. Pascarelli, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Renewed Facility
Operating License No. NPF-29 and
the Technical Specifications

Date of Issuance: May 23, 2019

ATTACHMENT TO LICENSE AMENDMENT NO. 218

RENEWED FACILITY OPERATING LICENSE NO. NPF-29

GRAND GULF NUCLEAR STATION, UNIT 1

DOCKET NO. 50-416

Replace the following page of the Renewed Facility Operating License No. NPF-29 and the Appendix A, Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Facility Operating License

REMOVE	INSERT
-4-	-4-

Technical Specifications

REMOVE	INSERT	REMOVE	INSERT
1.0-3	1.0-3	3.3-58a	3.3-58a
1.03a	1.0-3a	3.3-62	3.3-62
3.3-32	3.3-32	3.3-73	3.3-73
3.3-33	3.3-33	3.5-1	3.5-1
3.3-35	3.3-35	3.5-6	3.5-6
3.3-39	3.3-39	---	3.5-6a
3.3-40	3.3-40	3.5-7	3.5-7
3.3-41	3.3-41	3.5-8	3.5-8
3.3-42	3.3-42	3.5-9	3.5-9
3.3-43	3.3-43	3.5-10	3.5-10
---	3.3-43a	3.6-9	3.6-9
---	3.3-43b	3.6-13	3.6-13
---	3.3-43c	3.6-42	3.6-42
---	3.3-43d	3.6-43	3.6-43
---	3.3-43e	3.6-45	3.6-45
3.3-44	3.3-44	3.6-47	3.6-47
3.3-45	3.3-45	3.6-49	3.6-49
3.3-46	3.3-46	3.6-50	3.6-50
3.3-47	3.3-47	3.7-6	3.7-6
3.3-50	3.3-50	3.7-7	3.7-7
3.3-51	3.3-51	3.7-8	3.7-8
3.3-52	3.3-52	3.7-9	3.7-9
3.3-53a	3.3-53a	3.7-10	3.7-10
3.3-54	3.3-54	3.7-11	3.7-11
3.3-55	3.3-55	3.8-19	3.8-19
3.3-56	3.3-56	3.8-20	3.8-20
3.3-57	3.3-57	3.8-33	3.8-33
3.3-58	3.3-58	3.8-41	3.8-41

amended, are fully applicable to the lessors and any successors in interest to those lessors, as long as the renewed license of GGNS Unit 1 remains in effect.

(b) SERI is required to notify the NRC in writing prior to any change in (i) the terms or conditions of any new or existing sale or lease agreements executed as part of the above authorized financial transactions, (ii) the GGNS Unit 1 operating agreement, (iii) the existing property insurance coverage for GGNS Unit 1 that would materially alter the representations and conditions set forth in the Staff's Safety Evaluation Report dated December 19, 1988 attached to Amendment No. 54. In addition, SERI is required to notify the NRC of any action by a lessor or other successor in interest to SERI that may have an effect on the operation of the facility.

C. The renewed license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

Entergy Operations, Inc. is authorized to operate the facility at reactor core power levels not in excess of 4408 megawatts thermal (100 percent power) in accordance with the conditions specified herein.

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 218 are hereby incorporated into this renewed license. Entergy Operations, Inc. shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

During Cycle 19, GGNS will conduct monitoring of the Oscillation Power Range Monitor (OPRM). During this time, the OPRM Upscale function (Function 2.f of Technical Specification Table 3.3.1.1-1) will be disabled and operated in an "indicate only" mode and technical specification requirements will not apply to this function. During such time, Backup Stability Protection measures will be implemented via GGNS procedures to provide an alternate method to detect and suppress reactor core thermal hydraulic instability oscillations. Once monitoring has been successfully completed, the OPRM Upscale function will be enabled and technical specification requirements will be applied to the function; no further operating with this function in an "indicate only" mode will be conducted.

1.1 Definitions

DOSE EQUIVALENT I-131 (continued)	be those listed in Federal Guidance Report (FGR) 11, "Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion," 1989.
DRAIN TIME	The DRAIN TIME is the time it would take for the water inventory in and above the Reactor Pressure Vessel (RPV) to drain to the top of the active fuel (TAF) seated in the RPV assuming:

a. The water inventory above the TAF is divided by the limiting drain rate;

b. The limiting drain rate is the larger of the drain rate through a single penetration flow path with the highest flow rate, or the sum of the drain rates through multiple penetration flow paths susceptible to a common mode failure (e.g., seismic event, loss of normal power, single human error), for all penetration flow paths below the TAF except:

   1. Penetration flow paths connected to an intact closed system, or isolated by manual or automatic valves that are locked, sealed, or otherwise secured in the closed position, blank flanges, or other devices that prevent flow of reactor coolant through the penetration flow paths;

   2. Penetration flow paths capable of being isolated by valves that will close automatically without offsite power prior to the RPV water level being equal to the TAF when actuated by RPV water level isolation instrumentation; or

   3. Penetration flow paths with isolation devices that can be closed prior to the RPV water level being equal to the TAF by a dedicated operator trained in the task, who is in continuous communication with the control room, is stationed at the controls, and is capable of closing the penetration flow path isolation devices without offsite power.

c. The penetration flow paths required to be evaluated per paragraph b) are assumed to open instantaneously and are not subsequently isolated, and no water is assumed to be subsequently added to the RPV water inventory;

1.1 Definitions

DRAIN TIME (continued)	d. No additional draining events occur; and e. Realistic cross-sectional areas and drain rates are used. A bounding DRAIN TIME may be used in lieu of a calculated value.
EMERGENCY CORE COOLING SYSTEM (ECCS) RESPONSE TIME	The ECCS RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its ECCS initiation setpoint at the channel sensor until the ECCS equipment is capable of performing its safety function (i.e., the valves travel to their required positions, pump discharge pressures reach their required values, etc.). Times shall include diesel generator starting and sequence loading delays, where applicable. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured.
END OF CYCLE RECIRCULATION PUMP TRIP (EOC-RPT) SYSTEM RESPONSE TIME	The EOC-RPT SYSTEM RESPONSE TIME shall be that time interval from initial movement of the associated turbine stop valve or the turbine control valve to complete suppression of the electric arc between the fully open contacts of the recirculation pump circuit breaker. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured, except for the breaker arc suppression time, which is not measured but is validated to conform to the manufacturer's design value.
INSERVICE TESTING PROGRAM	The INSERVICE TESTING PROGRAM is the licensee program that fulfills the requirements of 10 CFR 50.55a(f).
ISOLATION SYSTEM RESPONSE TIME	The ISOLATION SYSTEM RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its isolation initiation setpoint at the channel sensor until the isolation valves travel to their required positions. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured.
L_a	The maximum allowable primary containment leakage rate, L_a, shall be 0.682% of primary containment air weight per day at the calculated peak containment pressure (P_a).

(continued)

3.3 INSTRUMENTATION

3.3.5.1 Emergency Core Cooling System (ECCS) Instrumentation

LCO 3.3.5.1 The ECCS instrumentation for each Function in Table 3.3.5.1-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.5.1-1.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each channel.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required channels inoperable.	A.1 Enter the Condition referenced in Table 3.3.5.1-1 for the channel.	Immediately
B. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	B.1 ----------NOTE---------- Only applicable for Functions 1.a, 1.b, 2.a and 2.b. ---------- Declare supported feature(s) inoperable when its redundant feature ECCS initiation capability is inoperable.	1 hour from discovery of loss of initiation capability for feature(s) in both divisions
	AND	

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. (continued)	B.2	----------NOTE---------- Only applicable for Functions 3.a and 3.b. ----------	
		Declare High Pressure Core Spray (HPCS) System inoperable.	1 hour from discovery of loss of HPCS initiation capability
	AND		
	B.3	Place channel in trip.	24 hours
C. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	C.1	----------NOTE---------- Only applicable for Functions 1.c, 1.d, 2.c, and 2.d. ----------	
		Declare supported feature(s) inoperable when its redundant feature ECCS initiation capability is inoperable.	1 hour from discovery of loss of initiation capability for feature(s) in both divisions
	AND		
			(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
E. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	E.1	----------NOTE---------- Only applicable for Functions 1.e, 1.f, and 2.e. ----------	
		Declare supported feature(s) inoperable when its redundant feature ECCS initiation capability is inoperable.	1 hour from discovery of loss of initiation capability for feature(s) in both divisions
	AND		
	E.2	Restore channel to OPERABLE status.	7 days
F. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	F.1	Declare Automatic Depressurization System (ADS) valves inoperable.	1 hour from discovery of loss of ADS initiation capability in both trip systems
	AND		
			(continued)

Table 3.3.5.1-1 (page 1 of 5)
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Low Pressure Coolant Injection-A (LPCI) and Low Pressure Core Spray (LPCS) Subsystems					
a. Reactor Vessel Water Level - Low Low Low, Level 1	1,2,3	2[a]	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ -152.5 inches
b. Drywell Pressure - High	1,2,3	2[a]	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 1.44 psig
c. LPCI Pump A Start - Time Delay Relay	1,2,3	1	C	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≤ 5.25 seconds
d. Reactor Vessel Pressure - Low (Injection Permissive)	1,2,3	3	C	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 452 psig and ≤ 534 psig
e. LPCS Pump Discharge Flow - Low (Bypass)	1,2,3	1	E	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 1285 gpm
f. LPCI Pump A Discharge Flow - Low (Bypass)	1,2,3	1	E	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 1133 gpm
g. Manual Initiation	1,2,3	1	C	SR 3.3.5.1.6	NA

(continued)

(a) Also required to initiate the associated diesel generator.

Table 3.3.5.1-1 (page 2 of 5)
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
2. LPCI B and LPCI C Subsystems					
a. Reactor Vessel Water Level - Low Low Low, Level 1	1,2,3	2[a]	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ -152.5 inches
b. Drywell Pressure - High	1,2,3	2[a]	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 1.44 psig
c. LPCI Pump B Start - Time Delay Relay	1,2,3	1	C	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≤ 5.25 seconds
d. Reactor Vessel Pressure - Low (Injection Permissive)	1,2,3	3	C	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 452 psig and ≤ 534 psig
e. LPCI Pump B and LPCI Pump C Discharge Flow - Low (Bypass)	1,2,3	1 per pump	E	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 1133 gpm
f. Manual Initiation	1,2,3	1	C	SR 3.3.5.1.6	NA
3. High Pressure Core Spray (HPCS) System					
a. Reactor Vessel Water Level - Low Low, Level 2	1,2,3	4[a]	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ -43.8 inches

(continued)

(a) Also required to initiate the associated diesel generator.

Table 3.3.5.1-1 (page 3 of 5)
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
3. HPCS System (continued)					
b. Drywell Pressure - High	1,2,3	4[a]	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 1.44 psig
c. Reactor Vessel Water Level - High, Level 8	1,2,3	2	C	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 55.7 inches
d. Condensate Storage Tank Level - Low	1,2,3	2	D	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3[b][c] SR 3.3.5.1.5[b][c] SR 3.3.5.1.6	≥ 4.7 ft
e. Suppression Pool Water Level - High	1,2,3	2	D	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 7.0 inches
f. HPCS Pump Discharge Pressure - High (Bypass)	1,2,3	1	E	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 108 psig and ≤ 1282 psig
g. HPCS System Flow Rate - Low (Bypass)	1,2,3	1	E	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 1124 gpm and ≤ 1327 gpm

(continued)

(a) Also required to initiate the associated diesel generator.

(b) If the as-found channel setpoint is outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.

(c) The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the Nominal Trip Setpoint (NTSP) at the completion of the surveillance; otherwise the channel shall be declared inoperable. Setpoints more conservative than the NTSP are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance procedures to confirm channel performance. The NTSP and the methodologies used to determine the as-found and the as-left tolerances are specified in the Technical Requirements Manual.

Table 3.3.5.1-1 (page 4 of 5)
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
3. HPCS System (continued)					
h. Manual Initiation	1,2,3	1	C	SR 3.3.5.1.6	NA
4. Automatic Depressurization System (ADS) Trip System A					
a. Reactor Vessel Water Level – Low Low Low, Level 1	1,2[d],3[d]	2	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ -152.5 inches
b. Drywell Pressure – High	1,2[d],3[d]	2	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 1.44 psig
c. ADS Initiation Timer	1,2[d],3[d]	1	G	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≤ 115 seconds
d. Reactor Vessel Water Level - Low, Level 3 (Confirmatory)	1,2[d],3[d]	1	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 10.8 inches
e. LPCS Pump Discharge Pressure – High	1,2[d],3[d]	2	G	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 125 psig and ≤ 165 psig
f. LPCI Pump A Discharge Pressure – High	1,2[d],3[d]	2	G	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 115 psig and ≤ 135 psig

(continued)

(d) With reactor steam dome pressure > 150 psig.

Table 3.3.5.1-1 (page 5 of 5)
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
4. ADS Trip System A (continued)					
g. ADS Bypass Timer (High Drywell Pressure)	1,2[d],3[d]	2	G	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≤ 9.4 minutes
h. Manual Initiation	1,2[d],3[d]	2/system	G	SR 3.3.5.1.6	NA
5. ADS Trip System B					
a. Reactor Vessel Water Level - Low Low Low, Level 1	1,2[d],3[d]	2	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ -152.5 inches
b. Drywell Pressure - High	1,2[d],3[d]	2	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 1.44 psig
c. ADS Initiation Timer	1,2[d],3[d]	1	G	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≤ 115 seconds
d. Reactor Vessel Water Level - Low, Level 3 (Confirmatory)	1,2[d],3[d]	1	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 10.8 inches
e. LPCI Pumps B & C Discharge Pressure - High	1,2[d],3[d]	2 per pump	G	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 115 psig and ≤ 135 psig
f. ADS Bypass Timer (High Drywell Pressure)	1,2[d],3[d]	2	G	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≤ 9.4 minutes
g. Manual Initiation	1,2[d],3[d]	2/system	G	SR 3.3.5.1.6	NA

(d) With reactor steam dome pressure > 150 psig.

3.3 INSTRUMENTATION

3.3.5.2 Reactor Pressure Vessel (RPV) Water Inventory Control Instrumentation

LCO 3.3.5.2 The RPV Water Inventory Control instrumentation for each Function in Table 3.3.5.2-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.5.2-1.

ACTIONS

NOTE

Separate Condition entry is allowed for each channel.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more channels inoperable.	A.1	Enter the Condition referenced in Table 3.3.5.2-1 for the channel.	Immediately
B. As required by Required Action A.1 and referenced in Table 3.3.5.2-1.	B.1	Declare associated penetration flow path(s) incapable of automatic isolation.	Immediately
	AND		
	B.2	Calculate DRAIN TIME.	Immediately
C. As required by Required Action A.1 and referenced in Table 3.3.5.2-1.	C.1	Place channel in trip.	1 hour

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. As required by Required Action A.1 and referenced in Table 3.3.5.2-1.	D.1	Declare HPCS system inoperable.	1 hour
	OR		
	D.2	Align the HPCS pump suction to the suppression pool.	1 hour
E. As required by Required Action A.1 and referenced in Table 3.3.5.2-1.	E.1	Restore channel to OPERABLE status.	24 hours
F. Required Action and associated Completion Time of Condition C, D, or E not met.	F.1	Declare associated ECCS injection/spray subsystem inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

----------NOTE----------

Refer to Table 3.3.5.2-1 to determine which SRs apply for each ECCS Function.

SURVEILLANCE		FREQUENCY
SR 3.3.5.2.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.5.2.2	Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.5.2.3	Perform LOGIC SYSTEM FUNCTIONAL TEST.	24 months

Table 3.3.5.2-1 (page 1 of 2)
RPV Water Inventory Control Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Low Pressure Coolant Injection-A (LPCI) and Low Pressure Core Spray (LPCS) Subsystems					
a. Reactor Vessel Pressure - Low (Injection Permissive)	4, 5	3[a]	C	SR 3.3.5.2.1 SR 3.3.5.2.2	≤ 534 psig
b. LPCS Pump Discharge Flow - Low (Bypass)	4, 5	1[a]	E	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 1285 gpm
c. LPCI Pump A Discharge Flow - Low (Bypass)	4, 5	1[a]	E	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 1133 gpm
d. Manual Initiation	4, 5	1[a]	E	SR 3.3.5.2.3	NA
2. LPCI B and LPCI C Subsystems					
a. Reactor Vessel Pressure - Low (Injection Permissive)	4, 5	3[a]	C	SR 3.3.5.2.1 SR 3.3.5.2.2	≤ 534 psig
b. LPCI Pump B and LPCI Pump C Discharge Flow - Low (Bypass)	4, 5	1 per pump[a]	E	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 1133 gpm
c. Manual Initiation	4, 5	1[a]	E	SR 3.3.5.2.3	NA

(continued)

(a) Associated with an ECCS subsystem required to be OPERABLE by LCO 3.5.2, "Reactor Pressure Vessel (RPV) Water Inventory Control."

Table 3.3.5.2-1 (page 2 of 2)
RPV Water Inventory Control Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
3. High Pressure Core Spray (HPCS) System					
a. Condensate Storage Tank Level - Low	4[b], 5[b]	1[a]	D	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 4.7 ft
b. HPCS Pump Discharge Pressure - High (Bypass)	4, 5	1[a]	E	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 108 psig and ≤ 1282 psig
c. HPCS System Flow Rate - Low (Bypass)	4, 5	1[a]	E	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 1124 gpm and ≤ 1327 gpm
4. RHR System Isolation					
a. Reactor Vessel Water Level - Low, Level 3	(c)	2 in one trip system	B	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 10.8 inches
5. Reactor Water Cleanup (RWCU) System Isolation					
a. Reactor Vessel Water Level - Low Low, Level 2	(c)	2 in one trip system	B	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ -43.8 inches

(a) Associated with an ECCS subsystem required to be OPERABLE by LCO 3.5.2, "Reactor Pressure Vessel (RPV) Water Inventory Control."

(b) When HPCS is OPERABLE for compliance with LCO 3.5.2, "Reactor Pressure Vessel (RPV) Water Inventory Control," and aligned to the condensate storage tank.

(c) When automatic isolation of the associated penetration flow path(s) is credited in calculating DRAIN TIME.

3.3 INSTRUMENTATION

3.3.5.3 Reactor Core Isolation Cooling (RCIC) System Instrumentation

LCO 3.3.5.3 The RCIC System instrumentation for each Function in Table 3.3.5.3-1 shall be OPERABLE.

APPLICABILITY: MODE 1,
MODES 2 and 3 with reactor steam dome pressure > 150 psig.

ACTIONS

-----NOTE-----
Separate Condition entry is allowed for each channel.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more channels inoperable.	A.1	Enter the Condition referenced in Table 3.3.5.3-1 for the channel.	Immediately
B. As required by Required Action A.1 and referenced in Table 3.3.5.3-1.	B.1	Declare RCIC System inoperable.	1 hour from discovery of loss of RCIC initiation capability
	AND		
	B.2	Place channel in trip.	24 hours
C. As required by Required Action A.1 and referenced in Table 3.3.5.3-1.	C.1	Restore channel to OPERABLE status.	24 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. As required by Required Action A.1 and referenced in Table 3.3.5.3-1.	D.1	----------NOTE---------- Only applicable if RCIC pump suction is not aligned to the suppression pool. ----------	
		Declare RCIC System inoperable.	1 hour from discovery of loss of RCIC initiation capability
	AND		
	D.2.1	Place channel in trip.	24 hours
	OR		
	D.2.2	Align RCIC pump suction to the suppression pool.	24 hours
E. Required Action and associated Completion Time of Condition B, C, or D not met.	E.1	Declare RCIC System inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

NOTES

1. Refer to Table 3.3.5.3-1 to determine which SRs apply for each RCIC Function.

2. When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed as follows: (a) for up to 6 hours for Functions 2 and 5; and (b) for up to 6 hours for Functions 1, 3, and 4 provided the associated Function maintains RCIC initiation capability.

SURVEILLANCE		FREQUENCY
SR 3.3.5.3.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.5.3.2	Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.5.3.3	Calibrate the trip units.	92 days
SR 3.3.5.3.4	Perform CHANNEL CALIBRATION.	24 months
SR 3.3.5.3.5	Perform LOGIC SYSTEM FUNCTIONAL TEST.	24 months

Table 3.3.5.3-1 (page 1 of 1)
Reactor Core Isolation Cooling System Instrumentation

FUNCTION	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Reactor Vessel Water Level - Low Low, Level 2	4	B	SR 3.3.5.3.1 SR 3.3.5.3.2 SR 3.3.5.3.3 SR 3.3.5.3.4 SR 3.3.5.3.5	≥ -43.8 inches
2. Reactor Vessel Water Level - High, Level 8	2	C	SR 3.3.5.3.1 SR 3.3.5.3.2 SR 3.3.5.3.4 SR 3.3.5.3.5	≤ 55.7 inches
3. Condensate Storage Tank Level - Low	2	D	SR 3.3.5.3.1 SR 3.3.5.3.2 SR 3.3.5.3.4[(a)(b)] SR 3.3.5.3.5	≥ 3.7 ft
4. Suppression Pool Water Level - High	2	D	SR 3.3.5.3.1 SR 3.3.5.3.2 SR 3.3.5.3.4 SR 3.3.5.3.5	≤ 7.0 inches
5. Manual Initiation	1	C	SR 3.3.5.3.5	NA

(a) If the as-found channel setpoint is outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.

(b) The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the Nominal Trip Setpoint (NTSP) at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the NTSP are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance procedures to confirm channel performance. The NTSP and the methodologies used to determine the as-found and the as-left tolerances are specified in the Technical Requirements Manual.

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
H. As required by Required Action C.1 and referenced in Table 3.3.6.1-1. OR Required Action and associated Completion Time of Condition F or G not met.	H.1	Be in MODE 3.	12 hours
	AND		
	H.2	Be in MODE 4.	36 hours
I. As required by Required Action C.1 and referenced in Table 3.3.6.1-1.	I.1	Declare associated Standby Liquid Control subsystem inoperable.	1 hour
	OR		
	I.2	Isolate the Reactor Water Cleanup System.	1 hour
J. As required by Required Action C.1 and referenced in Table 3.3.6.1-1.	J.1	Initiate action to restore channel to OPERABLE status.	Immediately
	OR		

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
J. (continued)	J.2.1 Initiate action to restore secondary containment to OPERABLE status.	Immediately
	AND	
	J.2.2 Initiate action to restore one standby gas treatment (SGT) subsystem to OPERABLE status.	Immediately
	AND	
	J.2.3 Initiate action to restore isolation capability in each required secondary containment penetration flow path not isolated.	Immediately
K. As required by Required Action C.1 and referenced in Table 3.3.6.1-1.	K.1 Isolate the affected penetration flow path(s).	Immediately
	OR	
	K.2 Suspend movement of recently irradiated fuel assemblies in the primary and secondary containment.	Immediately

Text Deleted

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.6.1.9	----------NOTE---------- Channel sensors may be excluded. ---------- Verify the ISOLATION SYSTEM RESPONSE TIME for the Main Steam Isolation Valves is within limits.	24 months on a STAGGERED TEST BASIS

Table 3.3.6.1-1 (page 1 of 6)
Primary Containment and Drywell Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Main Steam Line Isolation					
a. Reactor Vessel Water Level - Low Low Low, Level 1	1,2,3	2	D	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.7 SR 3.3.6.1.8 SR 3.3.6.1.9	≥ -152.5 inches
b. Main Steam Line Pressure - Low	1	2	E	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.7 SR 3.3.6.1.8 SR 3.3.6.1.9	≥ 837 psig
c. Main Steam Line Flow - High	1,2,3	2 per MSL	D	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.7 SR 3.3.6.1.8 SR 3.3.6.1.9	≤ 255.9 psid
d. Condenser Vacuum - Low	1,2[(a)], 3[(a)]	2	D	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.7 SR 3.3.6.1.8	≥ 8.7 inches Hg vacuum
e. Main Steam Tunnel Ambient Temperature - High	1,2,3	2	D	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.8	≤ 191°F
f. Manual Initiation	1,2,3	2	G	SR 3.3.6.1.8	NA

(continued)

(a) With any turbine stop valve not closed.

Table 3.3.6.1-1 (page 2 of 6)
Primary Containment and Drywell Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
2. Primary Containment and Drywell Isolation					
a. Reactor Vessel Water Level - Low Low, Level 2	1,2,3	2[b]	H	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.7 SR 3.3.6.1.8	≥ -43.8 inches
b. Drywell Pressure - High	1,2,3	2[b]	H	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.7 SR 3.3.6.1.8	≤ 1.43 psig
c. Reactor Vessel Water Level - Low Low Low, Level 1 (ECCS Divisions 1 and 2)	1,2,3	2[b]	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.7 SR 3.3.6.1.8	≥ -152.5 inches
d. Drywell Pressure – High (ECCS Divisions 1 and 2)	1,2,3	2	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.7 SR 3.3.6.1.8	≤ 1.44 psig
e. Reactor Vessel Water Level - Low Low, Level 2 (HPCS)	1,2,3	4	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.7 SR 3.3.6.1.8	≥ -43.8 inches
f. Drywell Pressure – High (HPCS)	1,2,3	4	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.7 SR 3.3.6.1.8	≤ 1.44 psig

(continued)

(b) Also required to initiate the associated drywell isolation function.

Table 3.3.6.1-1 (page 3 of 6)
Primary Containment and Drywell Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
2. Primary Containment and Drywell Isolation (continued)					
g. Containment and Drywell Ventilation Exhaust Radiation - High	1,2,3	2[b]	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 4.0 mR/hr
	(c)	2	K	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 4.0 mR/hr
h. Manual Initiation	1,2,3	2[b]	G	SR 3.3.6.1.8	NA
	(c)	2	G	SR 3.3.6.1.8	NA
3. Reactor Core Isolation Cooling (RCIC) System Isolation					
a. RCIC Steam Line Flow - High	1,2,3	1	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.7 SR 3.3.6.1.8	≤ 64 inches water
b. RCIC Steam Line Flow Time Delay	1,2,3	1	F	SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.8	≥ 3 seconds and ≤ 7 seconds
c. RCIC Steam Supply Line Pressure - Low	1,2[d],3[d]	1	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.7 SR 3.3.6.1.8	≥ 57 psig

(continued)

(b) Also required to initiate the associated drywell isolation function.

(c) During movement of recently irradiated fuel assemblies in primary or secondary containment.

(d) Not required to be OPERABLE in MODE 2 or 3 with reactor steam dome pressure less than 150 psig during reactor startup.

Table 3.3.6.1-1 (page 4 of 6)
Primary Containment and Drywell Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
3. RCIC System Isolation (continued)					
d. RCIC Turbine Exhaust Diaphragm Pressure - High	1,2,3	2	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.7 SR 3.3.6.1.8	≤ 20 psig
e. RCIC Equipment Room Ambient Temperature - High	1,2,3	1	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.8	≤ 191°F
f. Main Steam Line Tunnel Ambient Temperature - High	1,2,3	1	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.8	≤ 191°F
g. Main Steam Line Tunnel Temperature Timer	1,2,3	1	F	SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.8	≤ 30 minutes
h. RHR Equipment Room Ambient Temperature - High	1,2,3	1 per room	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.8	≤ 171°F
i. RCIC/RHR Steam Line Flow – High	1,2,3	1	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.7 SR 3.3.6.1.8	≤ 43 inches water
j. Drywell Pressure - High	1,2,3	1	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.7 SR 3.3.6.1.8	≤ 1.44 psig
k. Manual Initiation	1,2,3	1	G	SR 3.3.6.1.8	NA

(continued)

Table 3.3.6.1-1 (page 5 of 6)
Primary Containment and Drywell Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
4. Reactor Water Cleanup (RWCU) System Isolation					
a. Differential Flow - High	1,2,3	1	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.7 SR 3.3.6.1.8	≤ 89 gpm
b. Differential Flow - Timer	1,2,3	1	F	SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.8	≤ 57 seconds
c. RWCU Heat Exchanger Equipment Room Temperature – High	1,2,3	1	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.8	≤ 126°F
d. RWCU Pump Room Temperature – High	1,2,3	1 per room	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.8	≤ 176°F
e. RWCU Heat Exchanger Room Valve Nest Area Temperature - High	1,2,3	1	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.8	≤ 141°F
f. Main Steam Line Tunnel Ambient Temperature – High	1,2,3	1	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.8	≤ 191°F
g. Reactor Vessel Water Level - Low Low, Level 2	1,2,3	2	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.7 SR 3.3.6.1.8	≥ -43.8 inches
h. Standby Liquid Control System Initiation	1,2	1	I	SR 3.3.6.1.8	NA
i. Manual Initiation	1,2,3	2	G	SR 3.3.6.1.8	NA

(continued)

Table 3.3.6.1-1 (page 6 of 6)
Primary Containment and Drywell Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
5. RHR System Isolation					
a. RHR Equipment Room Ambient Temperature - High	1,2,3	1 per room	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.8	≤ 171°F
b. Reactor Vessel Water Level - Low, Level 3	1,2,3[e]	2	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.7 SR 3.3.6.1.8	≥ 10.8 inches
	3[f]	2	J	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.7 SR 3.3.6.1.8	≥ 10.8 inches
c. Reactor Steam Dome Pressure - High	1,2,3	2	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.7 SR 3.3.6.1.8	≤ 150 psig
d. Drywell Pressure - High	1,2,3	2	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.7 SR 3.3.6.1.8	≤ 1.43 psig
e. Manual Initiation	1,2,3	2	G	SR 3.3.6.1.8	NA

(e) With reactor steam dome pressure greater than or equal to the RHR cut-in permissive pressure.

(f) With reactor steam dome pressure less than the RHR cut-in permissive pressure.

Table 3.3.6.2-1 (page 1 of 1)
Secondary Containment Isolation Instrumentation

FUNCTION	APPLICABLE MODES AND OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Reactor Vessel Water Level - Low Low, Level 2	1,2,3	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.3 SR 3.3.6.2.5 SR 3.3.6.2.6	≥ -43.8 inches
2. Drywell Pressure - High	1,2,3	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.3 SR 3.3.6.2.5 SR 3.3.6.2.6	≤ 1.43 psig
3. Fuel Handling Area Ventilation Exhaust Radiation - High High	1,2,3, (a)	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.6 SR 3.3.6.2.7	≤ 4.0 mR/hr
4. Fuel Handling Area Pool Sweep Exhaust Radiation - High High	1,2,3, (a)	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.6 SR 3.3.6.2.7	≤ 35 mR/hr
5. Manual Initiation	1,2,3, (a)	2	SR 3.3.6.2.6	NA

(a) During movement of recently irradiated fuel assemblies in the primary or secondary containment.

3.3 INSTRUMENTATION

3.3.7.1 Control Room Fresh Air (CRFA) System Instrumentation

LCO 3.3.7.1 The CRFA System instrumentation for manual isolation shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

NOTE

Separate Condition entry is allowed for each channel.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more channels inoperable.	A.1 Place channel in trip.	24 hours
B. Required Action and associated Completion Time not met.	B.1 Close associated isolation dampers.	1 hour

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS), RPV WATER INVENTORY CONTROL, AND REACTOR CORE ISOLATION COOLING (RCIC) SYSTEM

3.5.1 ECCS – Operating

LCO 3.5.1 Each ECCS injection/spray subsystem and the Automatic Depressurization System (ADS) function of eight safety/relief valves shall be OPERABLE.

---NOTE---
Low pressure coolant injection (LPCI) subsystems may be considered OPERABLE during alignment and operation for decay heat removal with reactor steam dome pressure less than the residual heat removal cut in permissive pressure in MODE 3, if capable of being manually realigned and not otherwise inoperable.

APPLICABILITY: MODE 1,
MODES 2 and 3, except ADS valves are not required to be OPERABLE with reactor steam dome pressure ≤ 150 psig.

ACTIONS

---NOTE---
LCO 3.0.4.b is not applicable to HPCS.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One low pressure ECCS injection/spray subsystem inoperable.	A.1 Restore low pressure ECCS injection/spray subsystem to OPERABLE status.	7 days

(continued)

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS), RPV WATER INVENTORY CONTROL, AND REACTOR CORE ISOLATION COOLING (RCIC) SYSTEM

3.5.2 Reactor Pressure Vessel (RPV) Water Inventory Control

LCO 3.5.2 DRAIN TIME of RPV water inventory to the top of active fuel (TAF) shall be ≥36 hours

AND

One ECCS injection/spray subsystem shall be OPERABLE.

----------NOTE----------
A low pressure coolant injection (LPCI) subsystem may be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned and not otherwise inoperable.

APPLICABILITY: MODES 4 and 5

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required ECCS injection/spray subsystem inoperable.	A.1 Restore required ECCS injection/spray subsystem to OPERABLE status.	4 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action to establish a method of water injection capable of operating without offsite electrical power.	Immediately
C. DRAIN TIME < 36 hours and ≥ 8 hours.	C.1 Verify secondary containment boundary is capable of being established in less than the DRAIN TIME. AND	4 hours (continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. (continued)	C.2	Verify each secondary containment penetration flow path is capable of being isolated in less than the DRAIN TIME.	4 hours
	AND		
	C.3	Verify one standby gas treatment subsystem is capable of being placed in operation in less than the DRAIN TIME.	4 hours
D. DRAIN TIME < 8 hours.	D.1	---------- NOTE ---------- Required ECCS injection/spray subsystem or additional method of water injection shall be capable of operating without offsite electrical power. ----------	
		Initiate action to establish an additional method of water injection with water sources capable of maintaining RPV water level > TAF for ≥ 36 hours.	Immediately
	AND		
	D.2	Initiate action to establish secondary containment boundary.	Immediately
	AND		(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. (continued)	D.3 Initiate action to isolate each secondary containment penetration flow path or verify it can be manually isolated from the control room.	Immediately
	AND	
	D.4 Initiate action to verify one standby gas treatment subsystem is capable of being placed in operation.	Immediately
E. Required Action and associated Completion Time of Condition C or D not met. OR DRAIN TIME < 1 hour.	E.1 Initiate action to restore DRAIN TIME to ≥ 36 hours.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.2.1	Verify DRAIN TIME ≥ 36 hours.	12 hours
SR 3.5.2.2	Verify, for a required low pressure ECCS injection/spray subsystem, the suppression pool water level is ≥ 12 ft 8 inches.	12 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.2.3	Verify, for the required High Pressure Core Spray (HPCS) System, the: a. Suppression pool water level is ≥ 12 ft 8 inches; or b. Condensate storage tank water level is ≥ 18 ft.	12 hours
SR 3.5.2.4	Verify, for the required ECCS injection/ spray subsystem, locations susceptible to gas accumulation are sufficently filled with water.	31 days
SR 3.5.2.5	----------NOTE---------- Not required to be met for system vent flow paths opened under administrative control. ---------- Verify, for the required ECCS injection/spray 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.	 31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.2.6	Operate the required ECCS injection/spray subsystem through the test return line for ≥ 10 minutes.	92 days
SR 3.5.2.7	Verify each valve credited for automatically isolating a penetration flow path actuates to the isolation position on an actual or simulated isolation signal.	24 months
SR 3.5.2.8	----------NOTE---------- Vessel injection/spray may be excluded. ----------	
	Verify the required LPCI or LPCS subsystem actuates on a manual initiation signal, or the required HPCS System can be manually operated.	24 months

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS), RPV WATER INVENTORY CONTROL, AND REACTOR CORE ISOLATION COOLING (RCIC) SYSTEM

3.5.3 RCIC System

LCO 3.5.3 The RCIC System shall be OPERABLE.

APPLICABILITY: MODE 1,
MODES 2 and 3 with reactor steam dome pressure > 150 psig.

ACTIONS

----------NOTE----------
LCO 3.0.4.b is not applicable to RCIC.

CONDITION	REQUIRED ACTIONS		COMPLETION TIME
A. RCIC System inoperable.	A.1	Verify by administrative means High Pressure Core Spray System is OPERABLE.	1 hour
	AND		
	A.2	Restore RCIC System to OPERABLE status.	14 days
B. Required Action and associated Completion Time not met.	B.1	Be in MODE 3.	12 hours
	AND		
	B.2	Reduce reactor steam dome pressure to ≤ 150 psig.	36 hours

3.6 CONTAINMENT SYSTEMS

3.6.1.3 Primary Containment Isolation Valves (PCIVs)

LCO 3.6.1.3 Each PCIV shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
When associated isolation instrumentation is required to be OPERABLE per LCO 3.3.6.1 Function 2.g.

ACTIONS

NOTES

1. Penetration flow paths may be unisolated intermittently under administrative controls.
2. Separate Condition entry is allowed for each penetration flow path.
3. Enter applicable Conditions and Required Actions for systems made inoperable by PCIVs.
4. Enter applicable Conditions and Required Actions of LCO 3.6.1.1, "Primary Containment," when PCIV leakage results in exceeding overall containment leakage rate acceptance criteria in MODES 1, 2, and 3.

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
E. Required Action and associated Completion Time of Condition A, B, C, or D not met in MODE 1, 2, or 3.	E.1	Be in MODE 3.	12 hours
	AND		
	E.2	Be in MODE 4.	36 hours
F. Required Action and associated Completion Time of Condition A, B, C, or D not met for PCIV(s) required to be OPERABLE during movement of recently irradiated fuel assemblies in the primary or secondary containment.	F.1	----------NOTE---------- LCO 3.0.3 is not applicable. ---------- Suspend movement of recently irradiated fuel assemblies in primary and secondary containment.	Immediately

3.6 CONTAINMENT SYSTEMS

3.6.4.1 Secondary Containment

LCO 3.6.4.1 The secondary containment shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
During movement of recently irradiated fuel assemblies in the primary or secondary containment.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Secondary containment inoperable in MODE 1, 2, or 3.	A.1 Restore secondary containment to OPERABLE status.	4 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 ----------NOTE---------- LCO 3.0.4.a is not applicable when entering MODE 3. ---------- Be in MODE 3.	12 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Secondary containment inoperable during movement of recently irradiated fuel assemblies in the primary or secondary containment.	C.1 ----------NOTE---------- LCO 3.0.3 is not applicable. ---------- Suspend movement of recently irradiated fuel assemblies in the primary and secondary containment.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.4.1.1	Verify all auxiliary building and enclosure building equipment hatches and blowout panels are closed and sealed.	31 days
SR 3.6.4.1.2	Verify one auxiliary building and enclosure building access door in each access opening is closed, except when the access opening is being used for entry and exit.	31 days

(continued)

3.6 CONTAINMENT SYSTEMS

3.6.4.2 Secondary Containment Isolation Valves (SCIVs)

LCO 3.6.4.2 Each SCIV shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
During movement of recently irradiated fuel assemblies in the primary or secondary containment.

ACTIONS

NOTES

1. Penetration flow paths may be unisolated intermittently under administrative controls.
2. Separate Condition entry is allowed for each penetration flow path.
3. Enter applicable Conditions and Required Actions for systems made inoperable by SCIVs.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more penetration flow paths with one SCIV inoperable.	A.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve or damper, closed manual valve or damper, or blind flange. AND	8 hours (continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition A or B not met during movement of recently irradiated fuel assemblies in the primary or secondary containment.	D.1 ----------NOTE---------- LCO 3.0.3 is not applicable. ---------- Suspend movement of recently irradiated fuel assemblies in the primary and secondary containment.	Immediately

3.6 CONTAINMENT SYSTEMS

3.6.4.3 Standby Gas Treatment (SGT) System

LCO 3.6.4.3 Two SGT subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
During movement of recently irradiated fuel assemblies in the primary or secondary containment.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One SGT subsystem inoperable.	A.1 Restore SGT subsystem to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, or 3.	B.1 ----------NOTE---------- LCO 3.0.4.a is not applicable when entering MODE 3. ---------- Be in MODE 3.	12 hours
C. Required Action and associated Completion Time of Condition A not met during movement of recently irradiated fuel assemblies in the primary or secondary containment.	----------NOTE---------- LCO 3.0.3 is not applicable. ---------- C.1 Place OPERABLE SGT subsystem in operation. OR	Immediately

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. (continued)	C.2 Suspend movement of recently irradiated fuel assemblies in the primary and secondary containment.	Immediately
D. Two SGT subsystems inoperable in MODE 1, 2, or 3.	D.1 ----------NOTE---------- LCO 3.0.4.a is not applicable when entering MODE 3. ---------- Be in MODE 3.	12 hours
E. Two SGT subsystems inoperable during movement of recently irradiated fuel assemblies in the primary or secondary containment.	E.1 Suspend movement of recently irradiated fuel assemblies in the primary and secondary containment.	Immediately

3.7 PLANT SYSTEM

3.7.3 Control Room Fresh Air (CRFA) System

LCO 3.7.3 Two CRFA subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

NOTE

The Control Room Envelope (CRE) boundary may be opened intermittently under administrative control.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CRFA subsystem inoperable for reasons other than Condition B.	A.1 Restore CRFA subsystem to OPERABLE status.	7 days
B. One or more CRFA subsystems inoperable due to inoperable CRE boundary in MODE 1, 2, or 3.	B.1 Initiate action to implement mitigating actions.	Immediately
	AND	
	B.2 Verify mitigating actions ensure CRE occupant exposures to radiological chemical and smoke hazards will not exceed limits.	24 hours
	AND	
	B.3 Restore CRE boundary to OPERABLE status.	90 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of Condition A or B not met in MODE 1, or 2.	C.1 ----------NOTE---------- LCO 3.0.4.a is not applicable when entering MODE 3. ---------- Be in MODE 3.	12 hours
D. Two CRFA subsystems inoperable in MODE 1, 2, or 3 for reasons other than Condition B.	D.1 ----------NOTE---------- LCO 3.0.4.a is not applicable when entering MODE 3. ---------- Be in MODE 3.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.3.1	Operate each CRFA subsystem for ≥ 15 continuous minutes.	31 days
SR 3.7.3.2	Perform required CRFA filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP
SR 3.7.3.3	Verify each CRFA subsystem actuates on an actual or simulated initiation signal.	24 months
SR 3.7.3.4	Perform required CRE unfiltered air inleakage testing in accordance with the Control Room Envelope Habitability Program.	In accordance with the Control Room Envelope Habitability Program

Text Deleted

3.7 PLANT SYSTEMS

3.7.4 Control Room Air Conditioning (AC) System

LCO 3.7.4 Two control room AC subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One control room AC subsystem inoperable.	A.1 Restore control room AC subsystem to OPERABLE status.	30 days
B. Two control room AC subsystems inoperable.	B.1 Verify control room area temperature ≤ 90°F. AND B.2 Restore one control room AC subsystem to OPERABLE status.	Once per 4 hours 7 days
C. Required Action and associated Completion Time of Condition A or B not met in MODE 1, 2, or 3.	C.1 ----------NOTE---------- LCO 3.0.4.a is not applicable when entering MODE 3. ---------- Be in MODE 3.	 12 hours

Text Deleted

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.4.1	Verify each control room AC subsystem has the capability to remove the assumed heat load.	24 months

ACTIONS

NOTE

LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. LCO Item a not met.	NOTE Enter applicable Condition and Required Actions of LCO 3.8.8, when any required division is de-energized as a result of Condition A.	
	A.1 Declare affected required feature(s) with no offsite power available from a required circuit inoperable.	Immediately
	OR	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2.2 Suspend movement of recently irradiated fuel assemblies in the primary and secondary containment.	Immediately
	AND	
		(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.2.3	Initiate action to restore required offsite power circuit to OPERABLE status.	Immediately
B. LCO Item b not met.	B.1	Suspend CORE ALTERATIONS.	Immediately
	AND		
	B.2	Suspend movement of recently irradiated fuel assemblies in primary and secondary containment.	Immediately
	AND		
	B.3	Initiate action to restore required DG to OPERABLE status.	Immediately
C. LCO Item c not met.	C.1	Declare High Pressure Core Spray System inoperable.	72 hours

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. (continued)	C.2.2 Suspend movement of recently irradiated fuel assemblies in the primary and secondary containment.	Immediately
	AND	
	C.2.3 Initiate action to restore required DC electrical power subsystems to OPERABLE status.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.5.1	----------NOTE---------- The following SRs are not required to be performed: SR 3.8.4.4, SR 3.8.4.6, SR 3.8.4.7, and SR 3.8.4.8. ----------	
	For DC sources required to be OPERABLE, the following SRs are applicable: SR 3.8.4.1, SR 3.8.4.2, SR 3.8.4.3, SR 3.8.4.4, SR 3.8.4.5, SR 3.8.4.6, SR 3.8.4.7, SR 3.8.4.8.	In accordance with applicable SRs

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.3 Initiate actions to restore required AC and DC electrical power distribution subsystems to OPERABLE status.	Immediately
	AND	
	A.2.4 Declare associated required shutdown cooling subsystem(s) inoperable and not in operation.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.8.1	Verify correct breaker alignments and voltage to required AC and DC electrical power distribution subsystems.	7 days

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 218

TO RENEWED FACILITY OPERATING LICENSE NO. NPF-29

ENTERGY OPERATIONS, INC., ET AL.

GRAND GULF NUCLEAR STATION, UNIT 1

DOCKET NO. 50-416

1.0 INTRODUCTION

By application dated April 10, 2018 (Reference 1), as supplemented by letters dated October 23, 2018 (Reference 2), and March 13, 2019 (Reference 3), Entergy Operations, Inc. (the licensee) requested to adopt Technical Specifications Task Force (TSTF) Traveler TSTF-542, Revision 2, "Reactor Pressure Vessel Water Inventory Control" (Reference 4), for Grand Gulf Nuclear Station, Unit 1 (Grand Gulf). Revision 2 of TSTF-542 was approved by the U.S. Nuclear Regulatory Commission (NRC, the Commission) on December 20, 2016 (Reference 5).

The proposed changes would replace existing technical specification (TS) requirements related to "operations with a potential for draining the reactor vessel" (OPDRVs), with revised TSs providing an alternative requirement for Reactor Pressure Vessel (RPV) Water Inventory Control (WIC). These alternative requirements would protect TS Safety Limit 2.1.1.3, which states, "Reactor vessel water level shall be greater than the top of active irradiated fuel."

Additionally, a new definition for "DRAIN TIME" would be added to the Grand Gulf TS 1.1, "Definitions." The definition of DRAIN TIME would establish requirements for the licensee to make RPV water level inventory determinations and to calculate RPV water inventory drain rates for Modes 4 and 5 outage-related activities. Adequate licensee management of secondary containment requirements or mitigation of certain emergency core cooling system (ECCS) safety injection/spray systems during Modes 4 and 5 requires a properly calculated DRAIN TIME.

The licensee has proposed several variations from TSTF-542, Revision 2, or the NRC-approved TSTF-542 safety evaluation (SE). These are explained below in Section 2.2.5 and evaluated in Section 3.5 of this SE.

The supplemental letters dated October 23, 2018, and March 13, 2019, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the NRC staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on June 5, 2018 (83 FR 26103).

2.0 REGULATORY EVALUATION

2.1 System Description

Boiling-water reactor (BWR) RPVs have a number of 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 (SDC). 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.

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 TSs for instrumentation and 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 not only 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 the LOCA that would require an evaluation with respect to the Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.46 are not present. During certain phases of refueling (i.e., 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 (≥) 22 feet 8 inches over the top of the RPV flange, and the reactor cavity to the steam dryer gate is removed.

The large volume of water available in and above the RPV (during much of the time when in Mode 5) provides time for operator detection and manual operator action to stop and mitigate an RPV draining event. However, typically 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. There may not be as much time for operator action as compared to times when there are large volumes of water above the RPV.

---

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

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

To address the drain down potential during Modes 4 and 5, the current Grand Gulf TSs contain specifications that are applicable during OPDRV or require suspension of OPDRVs if certain equipment is inoperable. The term OPDRV is not specifically defined in the TSs and historically has been subject to inconsistent application by licensees. The changes discussed in this SE are intended to resolve any ambiguity by creating a new RPV WIC TS with attendant equipment operability requirements, required actions and surveillance requirements (SRs), and deleting references to OPDRVs throughout the TSs.

2.2 Proposed TS Changes

Section 2.2.1 of this SE describes the proposed addition of a new definition, "DRAIN TIME" (evaluated in Section 3.1 of this SE).

Section 2.2.2 of this SE describes: (1) the proposed revisions to TS 3.3, "Instrumentation," including the proposed revisions to TS 3.3.5.1, "Emergency Core Cooling System (ECCS) Instrumentation"; (2) the proposed addition of new TS 3.3.5.2, "Reactor Pressure Vessel (RPV) Water Inventory Control Instrumentation" (including TS Table 3.3.5.2-1); (3) the renumbering of existing TS 3.3.5.2, "Reactor Core Isolation Cooling (RCIC) System Instrumentation," to TS 3.3.5.3; and (4) the proposed revision to TS 3.3.6.1, "Primary Containment and Drywell Isolation Instrumentation" (including TS Table 3.3.6.1-1). The proposed changes to these limiting conditions for operation (LCOs) are evaluated in Sections 3.2 and 3.4 of this SE.

Section 2.2.3 of this SE describes the proposed revision to TS 3.5, "Emergency Core Cooling Systems (ECCS) and Reactor Core Isolation Cooling (RCIC) System," which includes the proposed revision to TS 3.5.2 "ECCS - Shutdown" (evaluated in Section 3.3. of this SE).

Section 2.2.4 of this SE describes the proposed deletion of existing TS references to OPDRVs (evaluated in Section 3.6 of this SE.).

Section 2.2.5 of this SE describes Grand Gulf plant-specific variations to TSTF-542, Revision 2 (evaluated in Section 3.5 of this SE.).

2.2.1 Addition of "DRAIN TIME" Definition

The following definition of "DRAIN TIME" would be added to Grand Gulf TS Section 1.1, "Definitions."

> The DRAIN TIME is the time it would take for the water inventory in and above the Reactor Pressure Vessel (RPV) to drain to the top of the active fuel (TAF) seated in the RPV assuming:
>
> a. The water inventory above the TAF is divided by the limiting drain rate;

b. The limiting drain rate is the larger of the drain rate through a single penetration flow path with the highest flow rate, or the sum of the drain rates through multiple penetration flow paths susceptible to a common mode failure (e.g., seismic event, loss of normal power, single human error), for all penetration flow paths below the TAF except:

1. Penetration flow paths connected to an intact closed system, or isolated by manual or automatic valves that are locked, sealed, or otherwise secured in the closed position, blank flanges, or other devices that prevent flow of reactor coolant through the penetration flow paths;

2. Penetration flow paths capable of being isolated by valves that will close automatically without offsite power prior to the RPV water level being equal to the TAF when actuated by RPV water level isolation instrumentation; or

3. Penetration flow paths with isolation devices that can be closed prior to the RPV water level being equal to the TAF by a dedicated operator trained in the task, who is in continuous communication with the control room, is stationed at the controls, and is capable of closing the penetration flow path isolation devices without offsite power.

c. The penetration flow paths required to be evaluated, per paragraph b) are assumed to open instantaneously and are not subsequently isolated, and no water is assumed to be subsequently added to the RPV water inventory;

d. No additional draining events occur; and

e. Realistic cross-sectional areas and drain rates are used.

A bounding DRAIN TIME may be used in lieu of a calculated value.

2.2.2 Modifications to TS 3.3, "Instrumentation"

The following subsections describe the proposed changes to the Grand Gulf TS, Section 3.3, "Instrumentation."

2.2.2.1 TS 3.3.5.1, "Emergency Core Cooling System (ECCS) Instrumentation"

Proposed changes to TS 3.3.5.1 include the deletion of Note 1 in Required Actions B.1, B.2, C.1, and E.1, which states, "[o]nly applicable in MODES 1, 2, and 3." As a result, the numbering for Note 2 would be removed with no change in that note.

For TS Table 3.3.5.1-1, "Emergency Core Cooling System Instrumentation," the proposed changes delete the applicability in Modes 4 and 5 because the instrumentation requirements during shutdown would be consolidated into the new TS 3.3.5.2, "Reactor Pressure Vessel

(RPV) Water Inventory Control Instrumentation." Modes 4 and 5 Applicability would be deleted for the following functions:

1. Low Pressure Coolant Injection - A (LPCI) and Low Pressure Core Spray (LPCS) Subsystems:

   a. Reactor Vessel Water Level - Low Low Low, Level 1
   c. LPCI Pump A Start - Time Delay Relay
   d. Reactor Vessel Pressure - Low (Injection Permissive)
   e. LPCS Pump Discharge Flow - Low (Bypass)
   f. LPCI Pump A Discharge Flow - Low (Bypass)
   g. Manual Initiation

2. LPCI B and LPCI C Subsystems:

   a. Reactor Vessel Water Level - Low Low Low, Level 1
   c. LPCI Pump B Start - Time Delay Relay
   d. Reactor Vessel Pressure - Low (Injection Permissive)
   e. LPCI Pump B and LPCI Pump C Discharge Flow - Low (Bypass)
   f. Manual Initiation

3. High Pressure Core Spray (HPCS) System:

   a. Reactor Vessel Water Level - Low Low, Level 2
   c. Reactor Vessel Water Level - High, Level 8
   d. Condensate Storage Tank Level - Low
   f. HPCS Pump Discharge Pressure - High (Bypass)
   g. HPCS System Flow Rate - Low (Bypass)
   h. Manual Initiation

For TS Table 3.3.5.1-1, the following footnotes are deleted.

- Footnote (a), which states, "When associated ECCS subsystem(s) are required to be OPERABLE per LCO 3.5.2, ECCS - Shutdown."

- Footnote (c), which states, "When HPCS is OPERABLE for compliance with LCO 3.5.2, "ECCS - Shutdown," and aligned to the condensate storage tank while tank water level is not within the limit of SR 3.5.2.2."

As a result, existing Footnotes (b), (d), and (e) would be renumbered as Footnotes (a), (b), and (c), respectively.

2.2.2.2 New TS 3.3.5.2, "Reactor Pressure Vessel (RPV) Water Inventory Control Instrumentation"

The proposed new TS 3.3.5.2 would contain existing ECCS and Primary Containment Isolation instrumentation functions that are relocated from TSs 3.3.5.1 and 3.3.6.1, as well as new requirements. The proposed new TS 3.3.5.2 is shown below:

3.3.5.2 Reactor Pressure Vessel (RPV) Water Inventory Control Instrumentation

LCO 3.3.5.2 The RPV Water Inventory Control instrumentation for each Function in Table 3.3.5.2-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.5.2-1.

ACTIONS

----------NOTE----------

Separate Condition entry is allowed for each channel.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more channels inoperable.	A.1 Enter the Condition referenced in Table 3.3.5.2-1 for the channel.	Immediately
B. As required by Required Action A.1 and referenced in Table 3.3.5.2-1.	B.1 Declare associated penetration flow path(s) incapable of automatic isolation. AND B.2 Calculate DRAIN TIME.	Immediately Immediately
C. As required by Required Action A.1 and referenced in Table 3.3.5.2-1.	C.1 Place channel in trip.	1 hour
D. As required by Required Action A.1 and referenced in Table 3.3.5.2-1.	D.1 Declare HPCS system inoperable. OR D.2 Align the HPCS pump suction to the suppression pool.	1 hour 1 hour
E. As required by Required Action A.1 and referenced in Table 3.3.5.2-1.	E.1 Restore channel to OPERABLE status.	24 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Required Action and associated Completion Time of Condition C, D, or E not met.	F.1 Declare associated ECCS injection/spray subsystem inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

----------NOTE----------

Refer to Table 3.3.5.2-1 to determine which SRs apply for each ECCS Function.

SURVEILLANCE	FREQUENCY
SR 3.3.5.2.1 Perform CHANNEL CHECK.	12 hours
SR 3.3.5.2.2 Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.5.2.3 Perform LOGIC SYSTEM FUNCTIONAL TEST.	24 months

Table 3.3.5.2-1
RPV Water Inventory Control Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Low Pressure Coolant Injection - A (LPCI) and Low Pressure Core Spray (LPCS) Subsystems					
a. Reactor Vessel Pressure - Low (Injection Permissive)	4,5	3(a)	C	SR 3.3.5.2.1 SR 3.3.5.2.2	≤ 534 psig
b. LPCS Pump Discharge Flow - Low (Bypass)	4,5	1(a)	E	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 1285 gpm
c. LPCI Pump A Discharge Flow - Low (Bypass)	4,5	1(a)	E	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 1133 gpm
d. Manual Initiation	4,5	1(a)	E	SR 3.3.5.2.3	NA

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
2. LPCI B and LPCI C Subsystems					
a. Reactor Vessel Pressure - Low (Injection Permissive)	4,5	3(a)	C	SR 3.3.5.2.1 SR 3.3.5.2.2	≤ 534 psig
b. LPCI Pump B and LPCI Pump C Discharge Flow - Low (Bypass)	4,5	1 per pump(a)	E	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 1133 gpm
c. Manual Initiation	4,5	1 (a)	E	SR 3.3.5.2.3	NA
3. High Pressure Core Spray (HPCS) System					
a. Condensate Storage Tank Level - Low	4(b),5(b)	1(a)	D	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 4.7 ft
b. HPCS Pump Discharge Pressure - High (Bypass)	4,5	1(a)	E	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 108 psig and ≤ 1282 psig
c. HPCS System Flow Rate - Low (Bypass)	4,5	1(a)	E	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 1124 gpm and ≤ 1327 gpm
4. RHR System Isolation					
a. Reactor Vessel Water Level - Low, Level 3	(c)	2 in one trip system	B	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 10.8 inches
5. Reactor Water Cleanup (RWCU) System Isolation					
a. Reactor Vessel Water Level - Low, Level 2	(c)	2 in one trip system	B	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ - 43.8 inches

(a) Associated with an ECCS subsystem required to be OPERABLE by LCO 3.5.2, "Reactor Pressure Vessel (RPV) Water Inventory Control."

(b) When HPCS is OPERABLE for compliance with LCO 3.5.2, "Reactor Pressure Vessel Water (RPV) Water Inventory Control," and aligned to the condensate storage tank.

(c) When automatic isolation of the associated penetration flow path(s) is credited in calculating DRAIN TIME.

2.2.2.3 Modified TS 3.3.5.2, "Reactor Core Isolation Cooling (RCIC) System Instrumentation"

The existing Grand Gulf TS 3.3.5.2, "Reactor Core Isolation Cooling (RCIC) System Instrumentation," and its subsections would be renumbered to TS 3.3.5.3 in order to maintain the TS numbering conventions.

2.2.2.4 Modified TS 3.3.6.1, "Primary Containment and Drywell Isolation Instrumentation"

In Grand Gulf TS LCO 3.3.6.1 Required Action J.2, which is related to residual heat removal (RHR) SDC (Modes 4 and 5), would be deleted. Since Required Action J.2 would be deleted, existing Required Actions J.3.1, J.3.2, and J.3.3 would be renumbered as J.2.1, J.2.2, and J.2.3, respectively. The proposed deletion of Required Action J.2 is also described in Section 2.2.5.2 of this SE (Variation 2) and evaluated in Section 3.5 of this SE.

In addition, Required Action K.2.2 would be deleted. This Required Action is related to OPDRVs. Since Required Action K.2.2 would be deleted, existing Required Action K.2.1 would be renumbered as K.2.

SR 3.3.6.1.10 would be deleted since it is related to OPDRVs. SR 3.3.6.1.10 currently states:

> ----------NOTE----------
> Only required to be performed when Function 5.b is not OPERABLE as allowed by Note (h) of Table 3.3.6.1-1
> ---
> Verify the water level is the Upper Containment Pool is ≥ 22 feet, 8 inches above the reactor pressure vessel flange.

The proposed deletion of SR 3.3.6.1.10 is also described in Section 2.2.5.3 of this SE (Variation 3) and evaluated in Section 3.5 of this SE.

In Grand Gulf TS Table 3.3.6.1-1, "Primary Containment and Drywell Isolation Instrumentation," applicability Modes 4 and 5 would be deleted for the following instrumentation Function since it is associated with OPDRVs:

> 5. RHR System Isolation
>
> b. Reactor Vessel Water Level - Low, Level 3

Existing Footnote (c) for TS Table 3.3.6.1-1, which states "During movement of recently irradiated fuel assemblies in primary or secondary containment and operations with a potential for draining the reactor vessel," is proposed to be modified to remove the reference to OPDRVs. The proposed Footnote (c) would state, "During movement of recently irradiated fuel assemblies in primary or secondary containment."

Footnote (e) for TS Table 3.3.6.1-1, which states "Only one trip system required in MODES 4 and 5 with RHR Shutdown Cooling System Integrity maintained," is proposed to be deleted due to the reference to OPDRVs.

Also, Footnote (h) for TS Table 3.3.6.1-1, which states "Not applicable when the upper containment reactor cavity and transfer canal gates are removed and SR 3.3.6.1.10 is met," is

proposed to be deleted due to the reference to upper containment pool. The proposed deletion of SR 3.3.6.1.10 with its related Footnote (h) is also described in Section 2.2.5.3 of this SE (Variation 3) and evaluated in Section 3.5 of this SE.

Since both Footnotes (e) and (h) are proposed to be deleted, existing Footnotes (f) and (g) would be renumbered as Footnote (e) and Footnote (f), respectively.

2.2.3 Modified TS Section 3.5, "Emergency Core Cooling System (ECCS) and Reactor Core Isolation Cooling (RCIC) System"

The title of Grand Gulf TS Section 3.5 would be revised from "Emergency Core Cooling Systems (ECCS) and Reactor Core Isolation Cooling (RCIC) System" to "Emergency Core Cooling Systems (ECCS), RPV Water Inventory Control, and Reactor Core Isolation Cooling (RCIC) System."

The title of Grand Gulf TS Section 3.5.2 would be revised from "ECCS - Shutdown" to "Reactor Pressure Vessel (RPV) Water Inventory Control." Also, TS 3.5.2 would be revised as follows:

LCO 3.5.2 DRAIN TIME of RPV water inventory to the top of active fuel (TAF) shall be ≥ 36 hours.

AND

One ECCS injection/spray subsystem shall be OPERABLE.

----------NOTE----------
A low pressure coolant injection (LPCI) subsystem may be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned and not otherwise inoperable.

APPLICABILITY: MODES 4 and 5

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required ECCS injection/spray subsystem inoperable.	A.1 Restore required ECCS injection/spray subsystem to OPERABLE status.	4 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action to establish a method of water injection capable of operating without offsite electrical power.	Immediately

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. DRAIN TIME < 36 hours and ≥ 8 hours.	C.1 Verify secondary containment boundary is capable of being established in less than the DRAIN TIME.	4 hours
	AND	
	C.2 Verify each secondary containment penetration flow path is capable of being isolated in less than the DRAIN TIME.	4 hours
	AND	
	C.3 Verify one standby gas treatment subsystem is capable of being placed in operation in less than the DRAIN TIME.	4 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. DRAIN TIME < 8 hours.	D.1 ----------NOTE---------- Required ECCS injection/spray subsystem or additional method of water injection shall be capable of operating without offsite electrical power. ----------	
	Initiate action to establish an additional method of water injection with water sources capable of maintaining RPV water level > TAF for ≥ 36 hours.	Immediately
	AND	
	D.2 Initiate action to establish secondary containment boundary.	Immediately
	AND	
	D.3 Initiate action to isolate each secondary containment penetration flow path or verify it can be manually isolated from the control room.	Immediately
	AND	
	D.4 Initiate action to verify one standby gas treatment subsystem is capable of being placed in operation.	Immediately
E. Required Action and associated Completion Time of Condition C or D not met. OR DRAIN TIME < 1 hour.	E.1 Initiate action to restore DRAIN TIME to ≥ 36 hours.	Immediately

The proposed SRs for TS 3.5.2 are shown below:

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.2.1	Verify DRAIN TIME ≥ 36 hours.	12 hours
SR 3.5.2.2	Verify, for a required low pressure ECCS injection/spray subsystem, the suppression pool water level is ≥ 12 ft 8 inches.	12 hours
SR 3.5.2.3	Verify, for the required High Pressure Core Spray (HPCS) System, the: a. Suppression pool water level is ≥ 12 ft 8 inches; or b. Condensate storage tank water level is ≥ 18 ft.	12 hours
SR 3.5.2.4	Verify, for the required ECCS injection/spray subsystem, locations susceptible to gas accumulation are sufficiently filled with water.	31 days
SR 3.5.2.5	----------NOTE---------- Not required to be met for system vent flow paths opened under administrative control. ---------- Verify, for the required ECCS injection/spray 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.	31 days
SR 3.5.2.6	Operate the required ECCS injection/spray subsystem through the test return line for ≥ 10 minutes.	92 days
SR 3.5.2.7	Verify each valve credited for automatically isolating a penetration flow path actuates to the isolation position on an actual or simulated isolation signal.	24 months
SR 3.5.2.8	----------NOTE---------- Vessel injection/spray may be excluded. ---------- Verify the required LPCI or LPCS subsystem actuates on a manual initiation signal, or the required HPCS System can be manually operated.	24 months

2.2.4 Deletion of References to OPDRVs Terms

The licensee proposed to delete references to OPDRVs (or terms related to OPDRVs) throughout the Grand Gulf TSs because:

(1) the TSs contain one or more OPDRVs references, such as, the conditional Applicability "during operations with a potential for draining the reactor vessel," or

(2) if certain conditions are not met, the required actions direct the licensee to: "
   (a) initiate action to suspend OPDRVs,
   (b) initiate action to suspend operations with a potential for draining the reactor,
   (c) initiate action to suspend operations with a potential for draining the reactor vessel (OPDRVs).

The following table lists these TSs and their affected sections:

Grand Gulf TS	Location of OPDRVs Reference
3.3.6.1, "Primary Containment and Drywell Isolation Instrumentation"	Table 3.3.6.1-1, "Primary Containment and Drywell Isolation Instrumentation," Footnote (c) (see also SE Section 2.2.2.4 for the deletion of Footnotes (e) and (h) and Footnote renumbering)
3.3.6.2, "Secondary Containment Isolation Instrumentation"	Table 3.3.6.2-1, "Secondary Containment Isolation Instrumentation" Footnote (a) is deleted (Footnote (b) is renumbered as Footnote (a))
3.3.7.1, "Control Room Fresh Air (CRFA) System Instrumentation"	Applicability
3.6.1.3, "Primary Containment Isolation Valves (PCIVs)"	Applicability (deletion of: "MODES 4 and 5 for RHR Shutdown Cooling System suction from the reactor vessel isolation valves when associated isolation instrumentation is required to be OPERABLE per LCO 3.3.6.1, "Primary Containment and Drywell Isolation Instrumentation," Function 5.b"), Condition G
3.6.4.1, "Secondary Containment"	Applicability, Condition C
3.6.4.2, "Secondary Containment Isolation Valves (SCIVs)"	Applicability, Condition D

3.6.4.3, "Standby Gas Treatment (SGT) System"	Applicability, Condition C, Condition E
3.7.3, "Control Room Fresh Air (CRFA) System"	Applicability, Condition D, Condition F (Condition E is renumbered as Condition D) (See also Variation 5, SE Section 2.2.5.5)
3.7.4, "Control Room Air Conditioning (AC) System"	Applicability, Condition D, Condition E (See also Variation 6, SE Section 2.2.5.6)
3.8.2, "AC Sources – Shutdown"	Required Action A.2.3, Required Action B.3
3.8.5, "DC Sources – Shutdown"	Required Action C.2.3
3.8.8, "Distribution Systems – Shutdown"	Required Action A.2.3

2.2.5 Grand Gulf Plant-Specific TSTF-542 TS Variations

In the LAR dated April 10, 2018, the licensee identified several Grand Gulf plant-specific TS variations from TSTF-542, Revision 2 (Reference 4), or from the NRC-approved TSTF-542 SE (Reference 5). The licensee stated these variations do not affect the applicability of TSTF-542 or the NRC staff's SE to the proposed license amendment. Section 3.5 of this SE includes the staff's evaluation for each variation.

2.2.5.1 Variation 1, HPCS Functions, Reactor Vessel Water Level - High, Level 8, and Manual initiation

Function 3, High Pressure Core Spray (HPCS) System, Function 3.a, "Reactor Vessel Water Level - High, Level 8," and Function 3.e, "Manual initiation," in accordance with TSTF-542, would not be included in the proposed Grand Gulf TSs. This corrects an error in TSTF-542 that affects the BWR/5 and BWR/6 ECCS instrumentation requirements.

2.2.5.2 Variation 2, TS 3.3.6.1, Required Action J.2

Grand Gulf TS 3.3.6.1, "Primary Containment and Drywell Isolation Instrumentation," Required Action J.2, which states, "Initiate action to isolate the Residual Heat Removal (RHR) Shutdown Cooling System suction from the reactor vessel," would be deleted (and subsequent required actions renumbered).

The direction to initiate action to close the RHR SDC isolation valves in Mode 3 is in direct conflict with TS 3.4.9, "Residual Heat Removal (RHR) Shutdown Cooling System - Hot Shutdown," which requires two RHR SDC subsystems to be operable, and if not, to take immediate action to restore an RHR SDC subsystem to operable status, as required by Required Action A.1. Therefore, Required Action A.1 is proposed to be deleted.

2.2.5.3 Variation 3, TS Table 3.3.6.1-1, Function 5.b, Footnote (h) and TS SR 3.3.6.1.10

The following Grand Gulf TSs would be deleted since they are related to a drain down event:

- TS Table 3.3.6.1-1, Function 5.b, Footnote (h), which states:

  > Not applicable when the upper containment reactor cavity and transfer canal gates are removed and SR 3.3.6.1.10 is met.

  Footnote (h) is affixed to the Mode 5 Applicability of Function 5.b (RHR System Isolation - Reactor Vessel Water Level - Low, Level 3) that is proposed to be deleted.

- SR 3.3.6.1.10 states, which states:

  > Verify the water level in the Upper Containment Pool is ≥ 22 feet, 8 inches above the reactor pressure vessel flange.

  This SR is currently modified by the Note, which states, "Only required to be performed when Function 5.b is not Operable as allowed by Note (h) of Table 3.3.6.1.1." With the deletion of Footnote (h), this SR would no longer be required.

2.2.5.4 Variation 4, TS 3.6.1.3, Applicability and Condition G

The following Grand Gulf TSs would be deleted:

- TS 3.6.1.3 Applicability, which states:

  > MODES 4 and 5 for RHR Shutdown Cooling System suction from the reactor vessel isolation valves when associated isolation instrumentation is required to be Operable per LCO 3.3.6.1, 'Primary Containment and Drywell Isolation Instrumentation,' Function 5.b.

- TS 3.6.1.3 Condition G, which states:

  > Required action and associated Completion Time of Condition A, B, C, or D not met for PCIV(s) required to be Operable during Modes 4 or 5 or during operations with a potential for draining the reactor vessel (OPDRVs).

2.2.5.5 Variation 5, TS 3.7.3, Condition D and Condition F

The following Grand Gulf TSs would be deleted:

- TS 3.7.3 Condition D, which states: "Required Action and associated Completion Time of Condition A not met during OPDRVs."

- TS 3.7.3 Condition F, which states:

  > Two CRFA subsystems inoperable during OPDRVs.

OR

One or more CRFA subsystems inoperable due to inoperable CRE boundary during OPDRVs.

2.2.5.6 Variation 6, TS 3.7.4, Condition D and Condition E

The following Grand Gulf TS would be deleted:

- TS 3. 7.4 Condition D, which states, "Required Action and associated Completion Time of Condition A not met during OPDRVs."
- TS 3.7.4 Condition E, which states, "Required Action and associated Completion Time of Condition B not met during OPDRVs."

2.2.5.7 Variation 7, SR 3.5.2.6, ECCS Injection/Spray Subsystem Flow Testing

The term "recirculation line" is replaced with "test return line" in proposed SR 3.5.2.6 and associated Bases. This proposed change is to avoid confusion with the reactor recirculation piping.

2.3 Applicable Regulatory Requirements and Guidance

The regulation at 10 CFR 50.36(a)(1), requires an applicant for an operating license to include in the application proposed TSs in accordance with the requirements of 10 CFR 50.36. The applicant must also include in the application, a "summary statement of the bases or reasons for such specifications, other than those covering administrative controls." However, per 10 CFR 50.36(a)(1), these TS bases "shall not become part of the technical specifications."

As required by 10 CFR 50.36(c), TSs will include, among other things:

> (1) Safety limits, limiting safety system settings, and limiting control settings.
> (i)(A) Safety limits for nuclear reactors are limits upon important process variables that are found to be necessary to reasonably protect the integrity of certain of the physical barriers that guard against the uncontrolled release of radioactivity. If any safety limit is exceeded, the reactor must be shut down. The licensee shall notify the Commission, review the matter, and record the results of the review, including the cause of the condition and the basis for corrective action taken to preclude recurrence. Operation must not be resumed until authorized by the Commission.

As required by 10 CFR 50.36(c)(2)(i), the TSs will include LCOs, which are the lowest functional capability or performance levels of equipment required for safe operation of the facility. Per 10 CFR 50.36(c)(2)(i), 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 condition can be met.

The regulation at 10 CFR 50.36(c)(3) requires TSs to 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.

Under 10 CFR 50.90, whenever a holder of an operating license desires to amend the license, application for an amendment must be filed with the Commission fully describing the changes desired, and following as far as applicable, the form prescribed for original applications. The technical information to be included in an application for an operating license is specified by 10 CFR 50.34(b).

As described in 10 CFR 50.92(a), in determining whether an amendment to a license will be issued to the applicant, the Commission will be guided by the considerations which govern the issuance of initial licenses to the extent applicable and appropriate. The general considerations that guide the Commission include, as stated in 10 CFR 50.40(a), that the TSs provide reasonable assurance that the health and safety of the public will not be endangered. Also, to issue an operating license, of which TSs are a part, the Commission must make the findings of 10 CFR 50.57, including the 10 CFR 50.57(a)(3)(i) finding that there is reasonable assurance that the activities authorized by the operating license can be conducted without endangering the health and safety of the public.

The NRC staff's guidance for review of TSs is in Chapter 16, "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," dated March 2010 (Reference 6).

Volumes 1 and 2 of NUREG-1434, Revision 4 (References 7 and 8), contain the Standard Technical Specifications (STS) for BWR/6 plants and are part of the regulatory standardization effort. The NRC staff has prepared STS for each of the LWR nuclear designs. Grand Gulf is a BWR/6 plant and is aligned with BWR/6 STS (NUREG-1434), without a setpoint control program.

2.3.1 Grand Gulf Applicable Design Requirements

The Grand Gulf Updated Final Safety Analysis Report (UFSAR) Section 3.1. "Conformance with NRC General Design Criteria," describes an evaluation of the design basis of Grand Gulf as measured against the NRC General Design Criteria for Nuclear Power Plants, Appendix A to 10 CFR Part 50, effective May 21, 1971, and subsequently amended July 7, 1971.

The following criteria from the Grand Gulf UFSAR are related to this LAR:

> Criterion 13 – Instrumentation and Control
>
> Instrumentation shall be provided to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions as appropriate to assure adequate safety; including those variables and systems that can affect the fission process, the integrity of the reactor core, the reactor coolant pressure boundary, and the containment and its associated systems. Appropriate controls shall be provided to maintain these variables and systems within prescribed operating ranges.

Criterion 14 – Reactor Coolant Pressure Boundary

The reactor coolant pressure boundary shall be designed, fabricated, erected, and tested so as to have an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture.

Criterion 30 – Quality of Reactor Coolant Pressure Boundary

Components which are part of the reactor coolant pressure boundary shall be designed, fabricated, erected, and tested to the highest quality standards practical. Means shall be provided for detecting and, to the extent practical, identifying the location of the source of reactor coolant leakage.

Criterion 33 – Reactor Coolant Makeup

A system to supply reactor coolant makeup for protection against small breaks in the reactor coolant pressure boundary shall be provided. The system safety function shall be to assure that specified acceptable fuel design limits are not exceeded as a result of reactor coolant loss due to leakage from the reactor coolant pressure boundary and rupture of small piping or other small components which are part of the boundary. The system shall be designed to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available), the system safety function can be accomplished using the piping, pumps, and valves used to maintain coolant inventory during normal reactor operation.

Criterion 35 – Emergency Core Cooling

A system to provide abundant emergency core cooling shall be provided. The system safety function shall be to transfer heat from the reactor core following any loss of reactor coolant at a rate such that:

a. Fuel and clad damage that could interfere with continued effective core cooling is prevented

b. Clad metal-water reaction is limited to negligible amounts.

Suitable redundancy in components and features, and suitable interconnections, leak detection, isolation, and containment capabilities shall be provided to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) the system safety function can be accomplished, assuming a single failure.

3.0 TECHNICAL EVALUATION

Section 2.2 of this SE lists the proposed TS changes, as described in the LAR and its supplements dated April 10, 2018, October 23, 2018, and March 13, 2019 (References 1, 2, 3, respectively), for the licensee to adopt TSTF-542, Revision 2. The following sections summarize the NRC staff's evaluation of each of these proposed changes.

3.1 Staff Evaluation of Proposed "DRAIN TIME" Definition

As discussed above in Section 2.2.1, the "DRAIN TIME" is the time it would take the RPV water inventory to drain from the current level to the TAF assuming the most limiting of the RPV penetrations flow paths with the largest flow rate, or a combination of penetration flow paths that could open due to a common mode failure, were to open and the licensee took no mitigating action.

The NRC staff reviewed the proposed DRAIN TIME definition from TSTF-542, Revision 2. For the purpose of NRC staff considerations, the term "break" describes a pathway for water to drain from the RPV that has not been prescribed in the "DRAIN TIME" definition proposed in TSTF-542. Based on information furnished by the licensee, the NRC staff determined that the licensee is appropriately adopting the principles of DRAIN TIME as specified in TSTF-542, Revision 2.

The NRC staff has reasonable assurance that the licensee will include all RPV penetrations below the TAF in the determination of DRAIN TIME as potential pathways. As part of this evaluation, the staff reviewed requests for additional information used during the development of TSTF-542, Revision 2, which provided examples of bounding DRAIN TIME calculations for three examples: (1) water level at or below the RPV flange; (2) water level above RPV flange with fuel pool gates installed, and; (3) water level above RPV flange with fuel pool gates removed. The DRAIN TIME is calculated by taking the water inventory above the break and dividing by the limiting drain rate until the TAF is reached. The limiting drain rate is a variable parameter depending on the break size and the reduction of elevation head above the break location during the drain down event. The discharge point will depend on the lowest potential drain point for each RPV penetration flow path on a plant-specific basis. This calculation provides a conservative approach to determining the DRAIN TIME of the RPV.

The NRC staff concluded that the licensee will use methods resulting in conservative calculation to determine RPV DRAIN TIME, thereby, protecting TS Safety Limit 2.1.1.3, which meets the requirements of 10 CFR 50.36(c)(1)(i)(A). Based on these considerations, the NRC staff determined that the licensee's proposed addition of the DRAIN TIME definition to the Grand Gulf TSs is acceptable.

3.2 Staff Evaluation of Proposed TS 3.3.5.2, "Reactor Pressure Vessel (RPV) Water Inventory Control Instrumentation"

The existing TS 3.3.5.2, "Reactor Core Isolation Cooling (RCIC) System Instrumentation," is renumbered as TS 3.3.5.3. This is an editorial change which maintains consistency within the Grand Gulf TS, and, therefore, the NRC staff finds this acceptable.

The purpose of the proposed new TS 3.3.5.2 regarding RPV WIC instrumentation is to support the requirements of new TS LCO 3.5.2, and the proposed new definition of DRAIN TIME. There are instrumentation and controls that are required for manual pump starts or required as a

permissive for operational controls on the equipment of the systems that provide water injection capability, certain start commands, pump protection, and isolation functions. These instruments and controls are required to be operable if the systems that provide water injection and isolation functions are to be considered operable, as described in Section 3.3 of this SE for revised TS 3.5.2.

For Grand Gulf, reactor operators have alternate means, often requiring several more steps, to start and inject water than the preferred simple push button start, but these actions can still be accomplished within the timeframes assumed during the development of TSTF-542. For Grand Gulf, operators have manual push buttons that automatically align reactor injection for Modes 1, 2, and 3 (LPCS, LPCI, and HPCS subsystems). Grand Gulf proposed to maintain manual push buttons that automatically align reactor injection for Modes 4 and 5 for LPCS and LPCI only. For the HPCS, reactor operators will perform manual alignment of components if injection is needed.

Specifically, the proposed new TS 3.3.5.2 supports operation of LPCI A, LPCI B, LPCI C, LPCS, and HPCS. Also, TS 3.3.5.2 supports the system isolation of the RHR and the RWCU systems. The equipment involved with each of these systems is described in the NRC staff's evaluation of TS 3.5.2 in Section 3.3 of this SE. The following sections evaluate the various parts of the new TS 3.3.5.2.

3.2.1 Staff Evaluation of Proposed TS 3.3.5.2 LCO and Applicability

In the LAR dated April 10, 2018, the licensee proposed a new TS 3.3.5.2 to provide alternative instrumentation requirements to support manual alignment of the ECCS injection/spray subsystem and for automatic isolation of penetration flow paths that may be credited in the determination of DRAIN TIME. The current TSs contain instrumentation requirements related to OPDRVs in TS LCOs 3.3.5.1, 3.3.6.1, 3.3.6.2, and 3.3.7.1. The requirements from TS Table 3.3.5.1-1 and TS Table 3.3.6.1-1 would be consolidated into the new TS 3.3.5.2. The references to OPDRVs instrumentation requirements in TS LCO 3.3.7.1, TS Table 3.3.6.1-1, and TS Table 3.3.6.2-1 would be deleted, as discussed in Section 3.6 of this SE.

The proposed LCO 3.3.5.2 would state:

> The RPV Water Inventory Control instrumentation for each Function in Table 3.3.5.2-1 shall be OPERABLE.

The proposed Applicability would state:

> According to Table 3.3.5.2-1.

Revision 2 of TSTF-542, specifies TS Table 3.3.5.2-1 to contain those instrumentation Functions needed to support manual alignment of the ECCS injection/spray subsystem, required by LCO 3.5.2, and for automatic isolation of penetration flow paths that may be credited in a calculation of DRAIN TIME. Creation of TS 3.3.5.2 places these Functions in a single location with requirements appropriate to support the safety function for TS 3.5.2.

The NRC staff concluded that the licensee's proposed alternative is acceptable for Grand Gulf since either HPCS, LPCS, or LPCI (or all three) subsystems' support instrumentation would be available to perform the intended function to inject water into the RPV; therefore, the intent of the NRC-approved TSTF-542, Revision 2, is met.

3.2.2 Staff Evaluation of Proposed TS 3.3.5.2 Actions

Section 2.2.2.2 of this SE lists the licensee's proposed new TS 3.3.5.2 Actions. The NRC staff reviewed these Actions to determine whether they provide effective remedial measures when one or more instrument channels are inoperable and cannot complete the required function in the normal manner. The Actions are described as follows:

Action A would be applicable when one or more instrument channels are inoperable from Table 3.3.5.2-1 and directs the licensee to immediately enter the Condition referenced in Table 3.3.5.2-1 for that channel.

Action B (concerning the RHR system isolation and RWCU system isolation Functions) would be applicable when automatic isolation of the associated penetration flow path is credited as a path for potential drainage in calculating DRAIN TIME. If the instrumentation is inoperable, Required Action B.1 directs an immediate declaration that the associated penetration flow path(s) are incapable of automatic isolation. Required Action B.2 requires a recalculation of DRAIN TIME, but automatic isolation of the affected penetration flow paths cannot be credited.

Action C (concerning LPCS and LPCI reactor pressure low reactor vessel pressure signals) is for the permissives for the low pressure ECCS injection/spray subsystem manual initiation functions. If this permissive is inoperable, then manual initiation of ECCS is prohibited. Therefore, the permissive must be placed in the trip Condition within 1 hour. With the permissive in trip condition, manual initiation may be performed. Prior to placing the permissive in the tripped condition, the operator can take manual control of the pump and the injection valve to inject water into the RPV. The 1-hour completion time is acceptable since it allows the operator time to evaluate any discovered inoperability and to place the channel in trip.

Action D (concerning loss of adequate water supply for the HPCS System), addresses an event in which there is an inadequate water supply. The instrumentation functions are intended to ensure that appropriate actions are taken if multiple, inoperable channels within the same function result in a loss of automatic suction swap for the HPCS system from the condensate storage tank to the suppression pool. The HPCS system must be declared inoperable within 1 hour, or the HPCS pump suction must be realigned to the suppression pool, since, if realigned, the function is already performed. The 1-hour completion time is acceptable because it minimizes the risk of HPCS being needed, without an adequate water source, while allowing time for restoration or alignment of HPCS pump suction to the suppression pool.

Action E (concerning LPCS/LPCI/HPCS pump discharge flow bypass functions; HPCS high discharge pressure, bypass function) addresses an event in which the bypass is inoperable and there is a risk that the associated ECCS pump could overheat when the pump is operating, and the associated injection valve is not fully open. In this condition, the operator can take manual control of the pump and the injection valve to ensure the pump does not overheat. Also, Action E (concerning LPCS/LPCI manual initiation) addresses an event in which the control room manual pushbutton is inoperable. In this situation, the operator can take manual control of the pump and the injection valve. Similar to the justification provided for Action C, while this is not the preferred method, the ECCS subsystem pumps can be started manually and the valves can be opened

manually. The 24-hour completion time was chosen to allow time for the operator to evaluate and repair any discovered inoperability. The completion time is appropriate given the ability to manually start the ECCS pumps and open the injection valves and to manually ensure the pump does not overheat.

Action F would apply if the required actions and associated completion times of Condition C, D, or E are not met. If they are not met, then the associated ECCS injection/spray subsystem may be incapable of performing its intended function, and the ECCS subsystem must be declared inoperable immediately.

These Actions direct the licensee to take appropriate actions and enter into the Conditions referenced in Table 3.3.5.2-1. The NRC staff has determined that these Actions satisfy the requirements of 10 CFR 50.36(c)(2)(i) by providing a remedial action permitted by the TS until the LCO can be met. The staff has concluded there is reasonable assurance that the licensee will take appropriate actions during an unexpected drain event to either prevent or to mitigate RPV water level being lowered to the TAF and, therefore, the proposed actions are acceptable.

3.2.3 Staff Evaluation of Proposed TS 3.3.5.2 Surveillances Requirements

The proposed new TS 3.3.5.2 SRs include Channel Checks, Channel Functional Tests, and Logic System Functional Tests numbered SR 3.3.5.2.1, SR 3.3.5.2.2, and SR 3.3.5.2.3, respectively.

Surveillance Requirement 3.3.5.2.1 would require a Channel Check and applies to all functions, except the manual initiation function. Performance of the channel check ensures that a failure of instrumentation has not occurred. A channel check is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the instrument channels could be an indication of excessive instrument drift in one of the channels or something even more serious. A channel check guarantees that undetected channel failure is limited; thus, it is key to verifying the instrumentation continues to operate properly between each channel functional test. The Frequency of 12 hours is based upon operating experience that demonstrates channel failure is rare.

Surveillance Requirement 3.3.5.2.2 would require a Channel Functional Test and applies to all functions, except manual initiation functions. A Channel Functional Test is performed on each required channel to ensure that the entire channel will perform the intended function. Any setpoint adjustment shall be consistent with the assumptions of the current plant-specific setpoint methodology. The Frequency of 92 days is based upon operating experience that demonstrates channel failure is rare.

Surveillance Requirement 3.3.5.2.3 requires a Logic System Functional Test that demonstrates the operability of the required initiation logic for a specific channel. The system functional testing performed in LCO 3.5.2 overlaps with this surveillance to complete testing of the assumed safety function. The 24-month Frequency is based on operating experience, which has shown that these components usually pass the surveillance when performed at the 24-month Frequency. The LPCI/LPCS subsystem functional manual initiation signal testing performed in proposed SR 3.5.2.8 overlaps with this surveillance to fully test the subsystem actuation. This will complete testing of the safety function.

Revision 2 of TSTF-542 did not include SRs to verify or adjust the instrument setpoint derived from the allowable value using a Channel Calibration or a surveillance to calibrate the trip unit. This is because a draining event in Modes 4 or 5 is not an analyzed accident and, therefore, there is no accident analysis on which to base the calculation of a setpoint.

The purpose of TS 3.3.5.2 functions, requiring this SR, is to allow ECCS manual alignment or to automatically isolate a penetration flow path, but no specific RPV water level is assumed for those actions. Therefore, the allowable value for Mode 3 was chosen for use in Modes 4 and 5 as it will perform the desired function. Calibrating the Functions in Modes 4 and 5 is not necessary, as TS 3.3.5.1 and TS 3.3.6.1 continue to require the Functions to be calibrated on an established interval. The NRC staff concludes that the Mode 3 allowable value and established calibration intervals are adequate to ensure the channel will respond with the required accuracy to allow manual initiation of the pumping systems to inject water and automatic isolation of penetration flow paths.

The ECCS Response Time (currently Grand Gulf TS 3.5.1, "ECCS-Operating," SR 3.5.1.8) and Isolation System Response Time (currently Grand Gulf TS 3.3.6.1, "Primary Containment and Drywell Isolation Instrumentation," SR 3.3.6.1.9) testing ensures that the individual channel response times are less than or equal to the maximum values assumed in the accident analysis. Proposed TS 3.3.5.2 does not include SRs to participate in any ECCS response time testing and isolation system response time testing. This is acceptable because the purpose of these tests is to ensure that the individual channel response times are less than or equal to the maximum values assumed in the accident analysis. However, a draining event in Mode 4 or 5 is not an analyzed accident and there are alternate manual methods for achieving the safety function. A potential draining event in Modes 4 and 5 is a slower event than a LOCA. More significant protective actions are required as the calculated DRAIN TIME decreases.

The NRC staff finds that these tests are sufficient and adequate, because they will ensure that the Functions of TS 3.3.5.2 are operable (i.e., capable of performing the specified safety function in support of TS 3.5.2, DRAIN TIME, and the protection from a potential drain down of the RPV in Modes 4 and 5). The NRC staff concludes that the proposed SRs of LCO 3.3.5.2, satisfy 10 CFR 50.36(c)(3) by providing specific SRs relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained and are, therefore, acceptable.

3.2.4 Staff Evaluation of Proposed Table 3.3.5.2-1, "RPV Water Inventory Control Instrumentation"

In order to support the requirements of proposed TS 3.5.2, the associated instrumentation requirements are designated in TS Table 3.3.5.2-1. These instruments are required to be operable if the systems that provide water injection and isolation functions are considered operable as described in the NRC staff's evaluation of TS 3.5.2 (Section 3.3 of this SE).

The NRC staff finds this table acceptable because it sufficiently identifies the functions, the applicability, the number of required channels, the references to the Condition to be entered by letter (e.g., A, B, C) if the function is inoperable, the applicable SRs, the allowable value for each trip function, and footnotes concerning items in the table.

The Reactor Pressure Vessel (RPV) Water Inventory Control (WIC) Instrumentation is acceptable to respond by permitting pump systems to inject water when needed and

activating isolation equipment when commanded to support prevention or mitigation of a potential RPV draining event.

The low pressure coolant injection (LPCI) and low pressure core spray (LPCS) emergency core cooling system (ECCS) subsystems in Modes 4 and 5 can be started by manual push button. Also, in Modes 4 and 5, each of the ECCS subsystems (including high pressure core spray (HPCS)) can be started by aligning a small number of components. Automatic initiation of an ECCS injection/spray subsystem may be undesirable because it could lead to overflowing the RPV cavity, due to injection rates of thousands of gallons per minute. Thus, manual actuation is preferable and there is adequate time to perform manual actions (e.g., hours versus minutes). Considering the Action statements as the DRAIN TIME decreases (the proposed TS 3.5.2, Action E, prohibits plant conditions that could result in a DRAIN TIME less than 1 hour), there is sufficient time for the reactor operators to take manual action to stop the draining event, and to manually start an ECCS injection/spray subsystem or additional method of water injection as needed. Consequently, there is no need for automatic initiation of the ECCS to respond to an unexpected draining event. The NRC staff finds this acceptable, because a draining event is a slow evolution when compared to a design basis loss-of-coolant accident (LOCA) assumed to occur at a significant power level.

3.2.4.1 Staff Evaluation of Proposed Table 3.3.5.2-1 Functions

Functions 1.a and 2.a in proposed TS Table 3.3.5.2-1, are low pressure reactor vessel instrumentation for LPCI A and LPCI B/C, respectively. They are used as permissives for the low pressure ECCS subsystems. This 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. While it is assured during Modes 4 and 5 that the reactor vessel pressure will be below the ECCS maximum design pressure, the Reactor Vessel Pressure - Low signals are assumed to be operable and capable of permitting initiation of the ECCS. The Reactor Vessel Pressure - Low signals are initiated from four pressure transmitters that sense the reactor vessel pressure. Each of the four pressure transmitters drives a master and slave trip unit. The outputs of the trip units are connected to relays whose contacts are arranged in a one-out-of-two taken twice logic for each division. The Allowable Value is low enough to prevent over pressuring the low pressure ECCS. At least three channels of Reactor Vessel Pressure - Low Function, per associated ECCS Division, are required to be operable in Modes 4 and 5 when ECCS manual initiation is required to be operable, since these channels support the manual initiation function. In addition, the channels are only required when the associated ECCS subsystem is required to be operable by TS LCO 3.5.2.

The proposed allowable value would be ≤ 534 pounds per square inch gauge (psig), with three required channels per function, as it is currently in Grand Gulf TS Table 3.3.5.1-1. The proposed allowable value is revised to eliminate the low-pressure limit and to retain the high-pressure limit. The RPV pressure is well below the lower limit in Modes 4 and 5, so the low-pressure limit is not needed.

The instruments for Table 3.3.5.2-1 include Functions 1.b, 1.c, and 2.b, and correspond to LPCS and LPCI Systems, Pump Discharge Flow - Low (Bypass). These instruments are provided to 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. One flow transmitter per ECCS pump is used to detect

the associated subsystems' flow rates. The logic is arranged such that each transmitter causes its associated minimum flow valve to open. The logic will close the minimum flow valve once the closure setpoint is exceeded. The LPCI minimum flow valves are time delayed such that the valves will not open for 10 seconds after the switches detect low flow. The time delay is provided to limit reactor vessel inventory loss during the startup of the residual heat removal (RHR) shutdown cooling (SDC) mode (for RHR A and RHR B). The Pump Discharge Flow - Low Allowable Value is to be set high enough to ensure that the pump flow rate is sufficient to protect the pump.

For LPCS Function 1.b, the existing allowable value is ≥ 1285 gallons per minute (gpm) with one required channel per function as indicated in Grand Gulf TS Table 3.3.5.1-1. The proposed allowable value remains as ≥ 1285 psig with one required channel per function.

For LPCI A subsystem, Function 1.c, the existing allowable value is ≥ 1133 gpm with one required channel per function as indicated in Grand Gulf TS Table 3.3.5.1-1. The proposed allowable value remains as ≥ 1133 psig with one required channel per function.

For LPCI B, and C subsystems, Function 2.b, the existing allowable value is ≥ 1133 gpm with one per pump required channel per function as indicated in Grand Gulf TS Table 3.3.5.1-1. The proposed allowable value remains as ≥ 1133 psig and the proposed number of required channels per function remains one per pump.

TS Table 3.3.5.2-1, Functions 1.d and 2.c, represent Manual Initiation for the LPCS and LPCI subsystems. The manual initiation push button channels introduce signals into the appropriate ECCS logic to provide manual initiation capability. There is one push button for each division of low pressure ECCS (i.e., Division 1 ECCS, LPCS and LPCI A; and Division 2 ECCS, LPCI B and LPCI C). The only manual initiation function required to be operable is that associated with the ECCS subsystem required to be operable by LCO 3.5.2. There is no allowable value for this function since the channels are mechanically actuated based solely on the position of the push buttons. The proposed number of required channel per function remains one (from TS Table 3.3.5.1-1.)

For TS Table 3.3.5.2-1 Function 3.a, HPCS System, Condensate Storage Tank Level - Low, the low level signal in the condensate storage tank (CST) indicates the unavailability of an adequate supply of makeup water from the 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. To prevent losing suction to the pump, the suction valves are interlocked so that the suppression pool suction valve must be open before the CST suction valve automatically closes.

Condensate Storage Tank Level - Low signals are initiated from two level transmitters. The logic is arranged such that either transmitter and associated trip unit can cause the suppression pool suction valve to open and the CST suction valve to close. The Condensate Storage Tank Level - Low Function Allowable Value is to be set high enough to ensure adequate pump suction head while water is being taken from the CST. One channel of the Condensate Storage Tank Level - Low Function is only required to be operable when HPCS is required to be operable to fulfill the requirements of LCO 3.5.2 and HPCS is aligned to the CST. The existing allowable value from TS Table 3.3.5.1-1 and proposed allowable value are ≥ 4.7 feet.

For TS Table 3.3.5.2-1 Functions 3.b and 3.c, HPCS Pump Discharge Pressure - High (Bypass) and HPCS System Flow Rate - Low (Bypass), respectively, 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 the HPCS pump is not operating).

One flow transmitter is used to detect the HPCS System's flow rate. The logic is arranged such that the transmitter causes the minimum flow valve to open, provided the HPCS pump discharge pressure, sensed by another transmitter, is high enough (indicating the pump is operating). The logic will close the minimum flow valve once the closure setpoint is exceeded. (The valve will also close upon HPCS pump discharge pressure decreasing below the setpoint.)

TS Table 3.3.5.2-1, Function 3.b, allowable value is set high enough to ensure that the valve will not be open when the pump is not operating. One channel of each Function associated with one pump is required to be operable when HPCS is required to be operable by LCO 3.5.2 in Modes 4 and 5. The existing HPCS Pump Discharge Pressure - High allowable value is ≥ 108 psig and ≤ 1282 psig with one required channel per function as indicated in Grand Gulf TS Table 3.3.5.1-1. The proposed allowable value remains at ≥ 108 psig and ≤ 1282 psig with one required channel per function.

TS Table 3.3.5.2-1, Function 3.c, allowable value is to be set high enough to ensure that pump flow rate is sufficient to protect the pump, yet low enough to ensure that the closure of the minimum flow valve is initiated to allow full flow into the core. The existing HPCS System Flow Rate - Low allowable value is ≥ 1124 gpm and ≤ 1327 gpm with one required channel per function as indicated in Grand Gulf TS Table 3.3.5.1-1. The proposed allowable value remains at ≥ 1124 gpm and ≤ 1327 gpm with one required channel per function.

TS Table 3.3.5.2-1 Function 4.a, RHR System Isolation, Reactor Vessel Water Level - Low, Level 3, is only required to be operable when automatic isolation of the associated RHR system penetration flow path is credited in calculating DRAIN TIME. The definition of DRAIN TIME allows crediting the closing of penetration flow paths that are capable of being automatically isolated by RPV water level isolation instrumentation prior to the RPV water level being equal to the TAF.

Reactor Vessel Water Level - Low, Level 3 signals are initiated from four level transmitters (two per trip system) that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. While four channels of the Reactor Vessel Water Level - Low, Level 3 Function are available, only two channels in the same trip system are required for operability. The Reactor Vessel Water Level - Low, Level 3 Allowable Value was chosen to be the same as the current Function 5.b in TS Table 3.3.6.1-1, since the capability to cool the fuel may be threatened. The existing allowable value is ≥ 10.8 inches with two required channels per function as indicated in Grand Gulf TS Table 3.3.6.1-1. The proposed allowable value remains at ≥ 10.8 inches and the proposed required number of channels per function is changed to two channels in one trip system.

TS Table 3.3.5.2-1 Function 5.a, RWCU System Isolation, Reactor Vessel Water Level - Low Low, Level 2, is only required to be operable when automatic isolation of the associated RWCU system penetration flow path is credited in calculating DRAIN TIME. The definition of DRAIN

TIME allows crediting the closing of penetration flow paths that are capable of being automatically isolated by RPV water level isolation instrumentation prior to the RPV water level being equal to the TAF. The Reactor Vessel Water Level - Low Low, Level 2 Function associated with RWCU System isolation may be credited for automatic isolation of penetration flow paths associated with the RWCU System. Reactor Vessel Water Level - Low Low, Level 2 is initiated from two channels per trip system that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. While four channels of the Reactor Vessel Water Level - Low, Level 2 Function are available, only two channels in the same trip system are required for operability.

The existing allowable value for Function 5.a is ≥ -43.8 inches with two required channels per function as indicated in Grand Gulf TS Table 3.3.6.1-1. The proposed allowable value remains at ≥ -43.8 inches and the proposed required number of channels per function is changed to two channels in one trip system.

Based on the above considerations, the NRC staff finds that proposed TS LCO 3.3.5.2 correctly specifies the lowest functional capability or performance levels of equipment required for safe operation of the facility. There is reasonable assurance that the required actions to be taken when the LCO is not met are adequate to protect the health and safety of the public. This meets the requirements of 10 CFR 50.36(c)(2)(i) and, therefore, the staff has determined the licensee's proposed change to LCO 3.3.5.2 are acceptable.

3.3 Staff Evaluation of TS 3.5.2 – Reactor Pressure Vessel (RPV) Water Inventory Control

The NRC staff reviewed the water sources that would be applicable to the proposed new TS 3.5.2.

The licensee's proposed LCO 3.5.2 would state, in part:

> One ECCS injection/spray subsystem shall be OPERABLE.

One ECCS injection/spray subsystem is defined as either one of the three LPCI subsystems (LPCI A, LPCI B, or LPCI C), one LPCS System, or one HPCS system. The LPCI subsystems and the LPCS system consist of one motor-driven pump, piping, and valves to transfer water from the suppression pool to the RPV. The HPCS system consists of one motor-driven pump, piping, and valves to transfer water from the suppression pool or CST to the RPV.

The ECCS pumps are high-capacity pumps, with flow rates of thousands of gpm. Most RPV penetration flow paths would have a drain rate on the order of tens or hundreds of gpm. The manual alignment and start of an ECCS pump would provide the necessary water source to counter these expected drain rates. The LPCI subsystems (only LPCI A or LPCI B subsystems) are to be considered operable to perform its safety function during alignment and operation for decay heat removal if capable of being manually realigned (existing Note in LCO 3.5.2). Decay heat removal in Modes 4 and 5 is not affected by the proposed change in TSTF-542 as the requirements on the number of RHR shutdown cooling subsystems that must be operable to ensure adequate decay heat removal from the core are unchanged. These requirements can be found in Grand Gulf TS 3.4.10, "Residual Heat Removal (RHR) Shutdown Cooling (SDC) System - Cold Shutdown"; TS 3.9.7, "Reactor Pressure Vessel (RPV) Water Level - New Fuel or Control Rods"; TS 3.9.8, "Residual Heat Removal (RHR) - High Water Level"; and TS 3.9.9, "Residual Heat Removal (RHR) - Low Water Level." These Grand Gulf decay heat removal

requirements are similar to the STSs and can be found in NUREG-1434, TS 3.4.10, "Residual Heat Removal (RHR) Shutdown Cooling System - Cold Shutdown," TS 3.9.7, "Reactor Pressure Vessel (RPV) Water Level - New Fuel or Control Rods," and TS 3.9.8, "Residual Heat Removal (RHR) - High Water Level," and TS 3.9.10, "Residual Heat Removal (RHR) - Low Water Level" (Reference 7). Based on these considerations, the NRC staff finds that the water sources provide reasonable assurance that the lowest functional capability required for safe operation is maintained and the safety limit is protected.

The proposed TS 3.5.2, "Reactor Pressure Vessel (RPV) Water Inventory Control," LCO contains two parts. The first part states that "DRAIN TIME of RPV water inventory to the top of active fuel (TAF) shall be ≥ 36 hours," and the second part states, "[o]ne ECCS injection/spray subsystem shall be OPERABLE." The proposed applicability for TS 3.5.2 is Modes 4 and 5.

The proposed LCO 3.5.2 note, states:

> A low pressure coolant injection (LPCI) subsystem may be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned and not otherwise inoperable.

The NRC staff reviewed the proposed TS 3.5.2, focusing on ensuring that the fuel remains covered with water and on the changes proposed to the current TS. The proposed TS 3.5.2 contains Conditions A through E based on either required ECCS injection/spray subsystem operability or DRAIN TIME.

The current TS LCO states that "[t]wo ECCS injection/spray subsystems shall be OPERABLE," whereas the proposed LCO 3.5.2 states that "[o]ne ECCS injection/spray subsystem shall be OPERABLE." This change is reflected in Condition A. The change from two ECCS injection/spray subsystems to one ECCS injection/spray subsystem is acceptable because this redundancy is not required. With one ECCS injection/spray subsystem and nonsafety-related injection sources, defense-in-depth will be maintained. The defense-in-depth measure is consistent with other events considered during shutdown with no additional single failure assumed. The DRAIN TIME controls, in addition to the required ECCS injection/spray subsystem, provide reasonable assurance that an unexpected draining event can be prevented or mitigated before the RPV water level would be lowered to the TAF.

The proposed Modes 4 and 5 Applicability of TS 3.5.2 is appropriate given the unaffected TS requirements on ECCS in Modes 1, 2, and 3.

The proposed Condition A states that if the required ECCS injection/spray subsystem is inoperable, it is to be restored to operable status within 4 hours.

The proposed Condition B states that if Condition A is not met, a method of water injection capable of operating without offsite electrical power shall be established immediately. The proposed Condition B provides adequate assurance of an available water source should Condition A not be met within the 4-hour completion time.

The proposed Condition C states that for a DRAIN TIME < 36 hours and ≥ 8 hours, to (Required Action C.1) verify the secondary containment boundary is capable of being established in less than the DRAIN TIME with a completion time of 4 hours, and (Required Action C.2) verify each secondary containment penetration flow path is capable of being isolated less than the DRAIN TIME with a completion time of 4 hours, and (Required Action C.3) verify one standby gas

treatment subsystem is capable of being placed in operation in less than the DRAIN TIME with a completion time of 4 hours. The proposed Condition C provides adequate protection should the DRAIN TIME be < 36 hours and ≥ 8 hours because of the ability to establish secondary containment and isolate additional flow paths.

The proposed Condition D states that when DRAIN TIME < 8 hours to (Required Action D.1) immediately initiate action to establish an additional method of water injection with water sources capable of maintaining RPV water level > TAF for ≥ 36 hours, and (Required Action D.2) immediately initiate action to establish secondary containment boundary, and (Required Action D.3) immediately initiate action to isolate each secondary containment penetration flow path or verify it can be manually isolated from the control room, and (Required Action D.4) immediately initiate action to verify one standby gas treatment system is capable of being placed in operation. Additionally, there is a note stating that required ECCS injection/spray subsystem or additional method of water injection shall be capable of operating without offsite electrical power, which is similar to proposed Condition B. The current Grand Gulf Condition D (Required Action C.2 and associated Completion Time not met) is similar to the proposed Condition D. The proposed Condition D provides adequate protection should the DRAIN TIME be < 8 hours because of the ability to establish additional method of water injection (without offsite electrical power), establish secondary containment and isolate additional flow paths, and have a standby gas treatment subsystem capable of being placed in operation.

The proposed Condition E states that when the Required Action and associated completion time of Condition C or D is not met, or the DRAIN TIME is < 1 hour, then immediately initiate action to restore DRAIN TIME to ≥ 36 hours. The proposed Condition E is new, as it is not present in the current Grand Gulf TS. The proposed Condition E is acceptable as it provides the necessary step to restore the DRAIN TIME to ≥ 36 hours should the other conditions not be met, or if the DRAIN TIME is < 1 hour.

The NRC staff reviewed the proposed changes to TS 3.5.2 and finds them acceptable based on the actions taken to mitigate the water level reaching the TAF with the water sources available and maintaining DRAIN TIME ≥ 36 hours. The LCO correctly specifies the lowest functional capability or performance levels of equipment required for safe operation of the facility. There is reasonable assurance that the required actions to be taken when the LCO is not met can be conducted without endangering the health and safety of the public and, therefore, they are acceptable.

3.3.1 Staff Evaluation of Proposed TS 3.5.2 Surveillance Requirements

The proposed TS 3.5.2 SRs include:

- verification of DRAIN TIME,
- verification of water levels/volumes that support the LPCS system and LPCI injection subsystems,
- verification of water levels/volumes that support the HPCS system,
- verification of water filled pipes to preclude water hammer events,
- verification of correct valve positions for the required ECCS injection/spray subsystem,
- operations of ECCS injection/spray systems through the test line,
- verification of valves credited for automatic isolation actuated to the isolation position, and

- verification that the required ECCS injection/spray subsystem can be manually initiated or operated.

Each of the eight SRs are described and evaluated below.

- SR 3.5.2.1: The DRAIN TIME would be determined or calculated and required to be verified to be ≥ 36 hours with a Frequency of 12 hours. The Frequency of 12 hours is sufficient in view of indications of RPV water level available to the operator. This surveillance would verify that the LCO for DRAIN TIME is met. Numerous indications of changes in RPV level are available to the operator. The period of 36 hours is considered reasonable to identify and initiate action to mitigate draining of reactor coolant (normally 3 operator shifts). Changes in RPV level would necessitate recalculation of the DRAIN TIME.

  Any changes in plant conditions that would change the DRAIN TIME requires that a new DRAIN TIME be determined. The exclusion of penetration flow paths from the determination of DRAIN TIME must consider the potential effects of a single operator error or initiating event on items supporting maintenance and testing (rigging, scaffolding, temporary shielding, piping plugs, snubber removal, freeze seals, etc.).

- SR 3.5.2.2 (previously SR 3.5.2.1): The suppression pool water level (≥ 12 feet 8 inches) for a required low pressure ECCS injection/spray subsystem is required to be verified to ensure pump net positive suction head and vortex prevention. Indications are available either locally or in the control room regarding suppression pool water level. The Frequency for SR 3.5.2.2 is 12 hours. The 12-hour Frequency was developed considering operating experience related to suppression pool and CST water level variations and instrument drift during the applicable Modes. Furthermore, the 12-hour Frequency is considered adequate in view of other indications available in the control room, including alarms, to alert the operator to an abnormal suppression pool water level condition.

- SR 3.5.2.3 (previously SR 3.5.2.2): The suppression pool water level (≥ 12 feet 8 inches) or CST level (≥ 18 feet) for a required HPCS system is required to be verified to ensure pump net positive suction head and vortex prevention. Indications are available either locally or in the control room regarding suppression pool water level and CST water level. The Frequency for SR 3.5.2.3 is 12 hours. The 12-hour Frequency was developed considering operating experience related to suppression pool and CST water level variations and instrument drift during the applicable Modes. Furthermore, the 12-hour Frequency is considered adequate in view of other indications available in the control room, including alarms, to alert the operator to an abnormal suppression pool or CST water level condition.

- SR 3.5.2.4 (previously SR 3.5.2.3): The SR to verify the ECCS injection/spray subsystem piping is sufficiently filled with water would be retained from the existing TS 3.5.2. The proposed change would update the SR to reflect the change to LCO 3.5.2, which would require, in part, one ECCS injection/spray subsystem to be operable instead of two. SR 3.5.2.4 wording would change from "[v]erify, for each required ECCS..." to "[v]erify, for the required ECCS..." This change clarifies the requirement to maintain consistency with the proposed LCO. The flow path piping has the potential to develop voids and pockets of entrained air. Maintaining the pump discharge lines of the

required ECCS injection/spray subsystems full of water ensures that the ECCS subsystem will perform properly. This may also prevent a water hammer following an ECCS initiation signal. The Frequency for SR 3.5.2.3 is 31 days. One acceptable method of ensuring that the lines are full is to vent at the high points. The 31-day Frequency is based on the gradual nature of void buildup in the ECCS piping, the procedural controls governing system operation, and operating experience.

- SR 3.5.2.5 (previously SR 3.5.2.4): The SR to verify the correct alignment for manual, power operated, and automatic valves in the required ECCS subsystem flow path would be retained from the existing TS 3.5.2. Similar to the change discussed above for proposed SR 3.5.2.4, changes to SR 3.5.2.5, would clarify a proposed requirement for LCO 3.5.2. The proposed SR wording, "[v]erify, for the required ECCS injection/spray subsystem, each manual..." would replace "[v]erify each required ECCS injection/spray subsystem manual..." Verifying the correct alignment for manual, power-operated, and automatic valves in the required ECCS subsystem flow paths provides assurance that the proper flow paths will be available for ECCS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position since these valves were verified to be in the correct position prior to locking, sealing, or securing. A valve that receives an initiation signal is allowed to be in a non-accident position provided the valve will automatically reposition in the proper stroke time. This SR does not require any testing or valve manipulation; rather, it involves verification that those valves capable of potentially being mispositioned are in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves. The Frequency for SR 3.5.2.5 is 31 days. The 31-day Frequency is appropriate because the valves are operated under procedural control and the probability of their being mispositioned during this time period is low.

SR 3.5.2.5 includes a Note, which states:

> Not required to be met for system vent flow paths opened under administrative control.

This note provides for administratively controlling the system vent flow paths while maintaining compliance with this SR.

- SR 3.5.2.6: The required ECCS injection/spray subsystem would require that the ECCS injection/spray subsystem can be manually started and operate for at least 10 minutes, demonstrating that the subsystem is available to mitigate a draining event. Testing the ECCS injection/spray subsystem through the test return line is necessary to avoid overfilling the refueling cavity. The minimum operating time of 10 minutes was based on engineering judgement. The performance Frequency of 92 days is consistent with similar at-power testing required by SR 3.5.1.7 (ECCS - Operating). See also Variation 7, SE Section 3.5.7.

- SR 3.5.2.7: Verification that each valve credited for automatically isolating a penetration flow path actuates to the isolation position on an actual or simulated RPV water level isolation signal is required to prevent RPV water inventory from dropping below the TAF should an unexpected draining event occur. The Frequency for SR 3.5.2.7 is 24 months. The 24-month Frequency is based on the need to perform this surveillance under the conditions that apply during a plant outage, and the potential for an unplanned transient if the surveillance was performed with the reactor at power. Operating

experience has shown these components usually pass the surveillance when performed at the 24-month Frequency.

- SR 3.5.2.8 (previously SR 3.5.2.6): This SR would state, "Verify the required LPCI or LPCS subsystem actuates on a manual injection signal, or the required HPCS subsystem can be manually operated." The required ECCS subsystem is required to have a manual start capability. This surveillance verifies that a manual initiation signal will cause the required LPCI subsystem or LPCS system to start and operate as designed, including pump startup and actuation of all automatic valves to their required positions.

  The HPCS system will be started manually from a standby configuration and includes the ability to override the RPV Level 8 injection valve isolation. The manual initiation push button for the HPCS system is not used to satisfy this SR (see Variation 1, Sections 2.2.5.1 and 3.5.1 of this SE). The Frequency for SR 3.5.2.8 is 24 months. The 24-month Frequency is based on the need to perform the surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the surveillance was performed with the reactor at power. Operating experience has shown that these components usually pass the SR when performed at the 24-month Frequency, which is based on the refueling cycle. This SR is modified by a Note that excludes vessel injection/spray during the surveillance. Since all active components are testable and full flow can be demonstrated by recirculation through the test line, coolant injection into the RPV is not required during the surveillance.

The NRC staff evaluated each of these proposed SRs associated with the proposed TS LCO 3.5.2 and concluded that they are appropriate for ensuring the operability of the equipment and instrumentation specified in LCO 3.5.2. The NRC staff concluded that each of the proposed SRs is acceptable since they meet the requirements of 10 CFR 50.36(c)(3) for SRs by ensuring that the necessary quality of systems and components are maintained. There is reasonable assurance that the health and safety of the public will not be endangered and therefore, the SRs are acceptable.

3.4 Staff Evaluation of TS Table 3.3.5.1-1, "Emergency Core Cooling System (ECCS) Instrumentation"

The TS LCO 3.3.5.1 currently states that, "[t]he ECCS instrumentation for each Function in Table 3.3.5.1-1 shall be OPERABLE," and the Applicability states, "[a]ccording to Table 3.3.5.1-1. TS Table 3.3.5.1-1, "Emergency Core Cooling System Instrumentation," contains requirements for function operability during Modes 4 and 5 when the associated ECCS subsystem(s) are required to be operable per TS 3.5.2, "ECCS - Shutdown."

For the following Functions in TS Table 3.3.5.1-1, the requirements during Modes 4 and 5 would be either deleted or relocated to the proposed TS Table 3.3.5.2-1. Conforming changes were also proposed for the Actions table of LCO 3.3.5.1.

FUNCTION	MODES 4 AND 5 APPLICABILITY DELETED	FUNCTION RELOCATED TO TABLE 3.3.5.2-1
1. Low Pressure Coolant Injection - A (LPCI) and Low Pressure Core Spray (LPCS) Subsystems		
a. Reactor Vessel Water Level - Low Low Low, Level 1	Yes	
c. LPCI Pump A Start - Time Delay Relay	Yes	
d. Reactor Vessel Pressure - Low (Injection Valve Permissive)	No	Function 1.a
e. LPCS Pump Discharge Flow - Low (Bypass)	No	Function 1.b
f. LPCI Pump A Discharge Flow - Low (Bypass)	No	Function 1.c
g. Manual Initiation	No	Function 1.d
2. LPCI B and LPCI C Subsystems		
a. Reactor Vessel Water Level - Low Low Low, Level 1	Yes	
c. LPCI Pump B Start - Time Delay Relay	Yes	
d. Reactor Vessel Pressure - Low (Injection Permissive)	No	Function 2.a
e. LPCI Pump B and LPCI Pump C Discharge Flow - Low (Bypass)	No	Function 2.b
f. Manual Initiation	No	Function 2.c
3. High Pressure Core Spray (HPCS) System		
a. Reactor Vessel Water Level - Low Low, Level 2	Yes	
c. Reactor Vessel Water Level - High, Level 8	Yes	
d. Condensate Storage Tank Level - Low	No	Function 3.a
f. HPCS Pump Discharge Pressure - High (Bypass)	No	Function 3.b
g. HPCS System Flow Rate - Low (Bypass)	No	Function 3.c
h. Manual Initiation	Yes	

As shown in the table above, seven functions would be deleted to support the consolidation of RPV WIC Instrumentation requirements into proposed new TS 3.3.5.2. The other ten functions would be moved to the proposed TS Table 3.3.5.2-1, as discussed in Section 3.2.4.1 of this SE.

The Grand Gulf TSs currently requires automatic initiation of ECCS pumps on low reactor vessel water level. However, in Modes 4 and 5, automatic initiation of ECCS pumps could result in overfilling the refueling cavity or water flowing into the main steam lines, potentially damaging plant equipment. The NRC staff finds the deletion acceptable because manual ECCS initiation is preferred over automatic initiation during Modes 4 and 5. In addition, the manual initiation/start of an ECCS pump would provide the necessary water source to counter these expected drain rates without an overfilling event, which would be caused with automatic initiation.

For TS Table 3.3.5.1-1, the following footnotes are deleted.

- Footnote (a), which states, "When associated ECCS subsystem(s) are required to be OPERABLE per LCO 3.5.2, ECCS Shutdown."

- Footnote (c), which states, "When HPCS is OPERABLE for compliance with LCO 3.5.2, 'ECCS - Shutdown,' and aligned to the condensate storage tank while tank water level is not within the limits of SR 3.5.2.2."

The NRC staff finds it acceptable to delete TS Table 3.3.5.1-1 Functions 1.a, 2.a, and 3.a and associated Footnote (a) because manual ECCS alignment is preferred over automatic initiation during Modes 4 and 5, and the operator would be able to use other, more appropriately sized pumps if needed to mitigate a draining event. In addition, the manual initiation/start of an ECCS pump would provide the necessary water source to counter these expected drain rates without an overfilling event, which would be caused with automatic initiation. The NRC staff finds it acceptable to delete of TS Table 3.3.5.1-1 Footnote (c) because this is no longer needed in this Table (in accordance with TSTF-542 for Modes 4 and 5), since a similar note is added to TS Table 3.3.5.2-1 as Footnote (b).

In addition, the NRC staff finds the deletion of TS Table 3.3.5.1-1 Functions 1.c and 2.c acceptable for the LPCI A and B pump start time delay relays. The purpose of these time delays is to stagger the automatic start of LPCI pumps thus limiting the starting transients on the emergency buses. The staggered starting of ECCS pumps is unnecessary for manual ECCS operation because unlike automatic starts, which initiate all of the ECCS pumps requiring the delay logic, the operator will control which ECCS pumps to start, one at a time, as needed for water inventory control. The deletion of HPCS Reactor Vessel Water High Level 8 interlock (Function 3.c) and HPCS Manual Initiation (Function 3.h) are evaluated in Section 3.5.1 of this SE.

3.5 Staff Evaluation of Proposed Technical Variations

The licensee proposed the following technical variations from the TS changes described in TSTF-542 or the applicable parts of the NRC staff's SE for TSTF-542. The licensee stated in the LAR that these variations do not affect the applicability of TSTF-542 or the NRC staff's SE for TSTF-542 to the proposed license amendment. The NRC staff evaluated each variation as described below.

3.5.1 Variation 1, HPCS Functions, Reactor Vessel Water Level - High, Level 8, and Manual initiation

The TS Table 3.3.5.2-1 is revised to reflect the Grand Gulf design. Function 3, "High Pressure Core Spray (HPCS) System," Function 3.a, "Reactor Vessel Water Level - High, Level 8," and Function 3.e, "Manual Initiation," that appear in TSTF-542, Revision 2, are not included in the proposed TSs. This corrects an error in TSTF-542 that affects the BWR/5 and BWR/6 ECCS instrumentation requirements.

The purpose of the manual initiation function is to allow manual actuation of the ECCS subsystem required by TS 3.5.2 to mitigate a draining event. The Reactor Vessel Water Level - High, Level 8 signal prevents overfilling of the reactor vessel into the main steam lines by closing the HPCS injection valves when the water level is above the Level 8 setpoint. Therefore, if HPCS is the required ECCS subsystem and the water level is above Level 8,

manually actuating Function 3.e will not inject inventory water into the reactor vessel. This is not the desired response. If the Level 8 function is retained in proposed Table 3.3.5.2-1, the function would need to be rendered inoperable in order to inject water when the water level is above Level 8. This would not be consistent with including the function in proposed Table 3.3.5.2-1.

Grand Gulf has the capability to manually start the HPCS pump and to open the HPCS injection valve if needed, not utilizing Functions 3.a and 3.e. If it is desirable to inject water into the RPV using the HPCS, the reactor operator can follow procedural steps to take manual control of the pump and injection valve to add inventory. If the water level is above Level 8, then manual override of the Level 8 function can be performed to allow the HPCS injection valve to be opened. These actions can be performed from the control room and can be accomplished well within the 1-hour minimum DRAIN TIME, which specified in TS 3.5.2, Condition E. Consequently, Functions 3.a and 3.e instrumentations are not needed to actuate the HPCS subsystem components to mitigate a draining event.

The ability to override the HPCS Level 8 isolation is already part of the Grand Gulf Emergency Operating Procedures and is practiced during operator training. SR 3.5.2.8 is revised to assure that the HPCS manual start capability (including the HPCS Level 8 isolation override feature) is tested.

HPCS Function 3.a is the only function resulting in TSTF-542, TS 3.3.5.2 Condition E. Therefore, the removal of Function 3.a results in the deletion of Condition E and the redesignation of Conditions F and G.

Based on the above considerations, the NRC staff finds that proposed HPCS Manual Initiation Functions and HPCS Vessel Water Level 8 Function can be deleted.

The NRC staff finds the deletion of the Manual Initiation and RPV Water Level 8 Functions for HPCS acceptable because TS Table 3.3.5.2-1, Functions 3.a and 3.e, as described in TSTF-542, Revision 2 (Reference 4) are not needed to actuate the HPCS subsystem components to mitigate a draining event and are not included in the proposed Table 3.3.5.2-1 for Grand Gulf. Also, the staff finds that TS 3.3.5.2, Condition E and associated Required Actions E.1 and E.2 are deleted since Level 8 function can be intentionally defeated, by procedure, to allow the HPCS injection valve to be opened, if needed to control inventory. Therefore, the NRC staff finds that Variation 1 is acceptable.

3.5.2 Variation 2, TS 3.3.6.1, Required Action J.2

Grand Gulf TS 3.3.6.1, "Primary Containment and Drywell Isolation Instrumentation," Required Action J.2, which states to "[i]nitiate action to isolate the Residual Heat Removal (RHR) Shutdown Cooling System suction from the reactor vessel," will be deleted.

Required Action J.2 is an 'OR' action directly below J.1 which states to immediately "[i]nitiate action to restore channel to OPERABLE status."

The direction to initiate the 'OR' action to close the RHR SDC isolation valves in Mode 3 is in direct conflict with TS 3.4.9, "Residual Heat Removal (RHR) Shutdown Cooling System - Hot Shutdown," that requires two RHR SDC subsystems to be operable, and if not, to take immediate action to restore an RHR SDC subsystem to operable status (Required Action A.1). Therefore, Required Action J.2 will be deleted.

Removing the 'OR' Required Action J.2 is also appropriate to protect plant safety. As discussed in the TS Bases to TS Table 3.3.6.1-1 Function 5.b, the Reactor Vessel Water Level - Low, Level 3 Function associated with the RHR SDC subsystem is not directly assumed in the safety analyses because a break of the RHR SDC subsystem is bounded by breaks of the reactor recirculation system and main steam lines. Specifically, for the RHR SDC isolation valves to be open in Mode 3, reactor steam dome pressure would need to be below the RHR cut in permissive pressure. Should a LOCA occur inside primary containment, TS 3.5.1, "ECCS -Operating," explicitly credits the manual closing of the RHR SDC isolation valves and alignment of RHR in the LPCI mode. Similarly, if the break is on the RHR SDC subsystem outside primary containment, credit can still be given for manual closing of the RHR SDC isolation valves and alignment of an intact LPCI loop. In either case, core uncovering would not result, and radiological consequences are bounded by the LOCA and main steamline break accidents. For these reasons, it is not critical to immediately initiate action to close the RHR SDC isolation valves (Required Action J.2) if Function 5.b is inoperable.

The NRC finds that it is not critical to immediately initiate action to close the RHR SDC isolation valves (Required Action J.2) if Function 5.b is inoperable since Required Action J.1 remains to initiate action to restore channel to operable status. In addition, based on (1) the requirements of Grand Gulf TS 3.3.6.1 Required Action J.2 being similar to credited actions for manual isolation of RHR/SDC in current Grand Gulf TS 3.5.1, and TS 3.3.6.1 and (2) Required Action J.2 not aligning with the RHR/SDC requirements in Grand Gulf TS 3.4.9, the NRC staff finds Variation 2 (the deletion of Required Action J.2) acceptable.

3.5.3 Variation 3, TS Table 3.3.6.1-1, Function 5.b, Footnote (h) and TS SR 3.3.6.1.10

The following Grand Gulf TS Table 3.3.6.1-1 Function 5.B, Footnote (h) and SR 3.3.6.1.10 TS will be deleted since they are related to a drain down event (TSTF-542):

- TS Table 3.3.6.1-1, Function 5.b, Footnote (h) states, "[n]ot applicable when the upper containment reactor cavity and transfer canal gates are removed and SR 3.3.6.1.10 is met." Footnote (h) is affixed to the Mode 5 Applicability of Function 5.b (RHR System Isolation - Reactor Vessel Water Level - Low, Level 3) that is proposed to be deleted.

- SR 3.3.6.1.10 states, "[v]erify the water level in the Upper Containment Pool is ≥ 22 feet, 8 inches above the reactor pressure vessel flange." This SR is currently modified by the Note, which states: "[o]nly required to be performed when Function 5.b is not OPERABLE as allowed by Note (h) of Table 3.3.6.1.1." With the deletion of Footnote (h), this SR is no longer required.

These TS requirements were introduced in Amendment No. 163, dated January 23, 2004 (Reference 9). The objective of this amendment was to create an exception for requiring the operability of the RHR System Isolation function on low reactor water level during Mode 5 provided there was sufficient RPV water inventory (as demonstrated by having the upper containment reactor cavity and transfer canal gates removed and upper containment pool water level being surveilled as acceptable every 4 hours). The basis for this exception was an analysis of a hypothetical drain down event through the RHR shutdown cooling piping. This analysis is superseded by the RPV vessel water inventory control requirements in TSTF-542. Accordingly, it is unnecessary to transfer Footnote (h) to the new proposed Table 3.3.5.2-1 Function 4.a with the associated performance of SR 3.3.6.1.10; therefore, Footnote (h) and SR 3.3.6.1.10, will be deleted.

The NRC finds that the Primary Containment and Drywell Isolation Instrumentation, Function 5.b, Footnote (h) and TS SR 3.3.6.1.10 are no longer needed with the proposed adoption of TSTF-542, Revision 2. TS Table 3.3.6.1-1 Footnote (h) and SR 3.3.6.1.10 are related to RHR/SDC automatic isolation on low reactor water level (Level 3) which are proposed to be deleted. Consequently, there is no need for Modes 4 and 5 automatic isolation under TS 3.6.1 since proposed TS 3.3.5.2-1 Function 4.a has this RHR System isolation function. Therefore, the NRC staff finds that Variation 3 is acceptable.

3.5.4 Variation 4, TS 3.6.1.3, Applicability and Condition G

The following Grand Gulf TSs are proposed to be deleted, which are not deleted by TSTF-542:

- TS 3.6.1.3 Applicability, "MODES 4 and 5 for RHR Shutdown Cooling System suction from the reactor vessel isolation valve when associated isolation instrumentation is required to be operable per LCO 3.3.6.1, 'Primary Containment and Drywell Isolation Instrumentation,' Function 5.b."

- TS 3.6.1.3 Condition G, "Required Action and associated Completion Time of Condition A, B, C, or D not met for PCIV(s) required to be operable during Modes 4 or 5 or during operations with a potential for draining the reactor vessel (OPDRVs)."

With the deletion of Footnote (h), as described previously in Section 3.5.3 of this SE, and the TSTF-542 deletion of the Modes 4 and 5 Applicability for Table 3.3.6.1-1 Function 5.b, the TS 3.6.1.3 Applicability requirement is no longer needed and will be deleted. In turn, with the deletion of Modes 4 and 5 Applicability requirements, there are no other operability requirements for PCIVs during Modes 4 or 5, or during OPDRVs. Therefore, Condition G is no longer needed and can be deleted.

The NRC staff evaluated the licensees proposed variation related to TS 3.6.1.3 Applicability and Condition G. The staff determined that since the RPV WIC requirements would be consolidated into proposed TSs 3.3.5.2 and 3.5.2, the Modes 4 and 5 requirements in TS 3.6.1.3 would no longer be applicable. The NRC staff have concluded that the proposed variation is consistent with the requirements of TSTF-542, Revision 2; therefore, the NRC staff finds that Variation 4 is acceptable.

3.5.5 Variation 5, TS 3.7.3, Condition D and Condition F

The following plant-specific TSs are proposed to be deleted, which are not deleted by TSTF-542:

- TS 3.7.3 Condition D, which states:

  > Required Action and Associated Completion Time of Condition A not met during OPDRVs.

- TS 3.7.3 Condition F, which states:

  > Two CRFA subsystems inoperable during OPDRVs

OR

One or more CRFA subsystems inoperable due to inoperable CRE boundary during OPDRVs.

Amendment No. 145, dated March 14, 2001 (Reference 10), implemented the Alternative Source Term, which no longer credited the CRFA system to mitigate the radiological consequences of a fuel handling accident. This amendment removed the movement of irradiated fuel from the attributes of LCO 3.7.3 Applicability, and Conditions C and E (which were renumbered as Conditions D and F in a subsequent license amendment). With the TSTF-542 additional deletion of OPDRVs from the LCO 3.7.3 Applicability, and Conditions D and F, these Conditions are no longer needed and will be deleted. Condition E is being renumbered as Condition D.

The NRC finds that for TS 3.7.3, conditions that are referenced to "OPDRV," can be deleted, since these are unnecessary giving the new requirements set forth in TSTF-542, DRAIN TIME and WIC for Modes 4 and 5. TSTF-542 deletes the OPDRV Applicability and applicable Conditions for STS 3.7.3 [Control Room Fresh Air (CRFA)] System. Therefore, Conditions D and E can be deleted, and, the NRC staff concludes that Variation 5 is acceptable.

3.5.6 Variation 6, TS 3.7.4, Condition D and Condition E

The following Grand Gulf TSs are proposed to be deleted, which are not deleted by TSTF-542:

- TS 3.7.4 Condition D, "Required Action and associated Completion Time of Condition A not met during OPDRVs."

- TS 3.7.4 Condition E, "Required Action and associated Completion Time of Condition B not met during OPDRVs."

Amendment No. 145 (Reference 10) implemented the Alternative Source Term, which no longer credited the control room AC system to mitigate the radiological consequences of a fuel handling accident. This amendment removed the movement of irradiated fuel from the attributes of LCO 3.7.4 Applicability, and Conditions D and E. With the TSTF-542 additional deletion of OPDRVs from the LCO 3.7.4 Applicability, and Conditions D and E, these Conditions are no longer needed and will be deleted.

The NRC finds that for TS 3.7.4, conditions that are referenced to "OPDRV," can be deleted, since these are unnecessary giving the new requirements set forth in TSTF-542, DRAIN TIME and WIC for Modes 4 and 5. TSTF-542 deletes the OPDRV Applicability and applicable conditions for STS TS 3.7.4 [Control Room Air Conditioning (AC)] System. Therefore, Conditions D and E can be deleted, and the NRC concludes that Variation 6 is acceptable.

3.5.7 Variation 7, SR 3.5.2.6, ECCS Injection/Spray Subsystem Flow Testing

The term "recirculation line" is replaced with "test return line" in proposed SR 3.5.2.6 and the associated Bases. This proposed change is to avoid confusion with the reactor recirculation piping.

The NRC staff has determined that the deletion of the phrase "through the recirculation line" is acceptable since the intent of this SR was to verify LPCI, LPCS, and HPCS pump flow is

available to mitigate a drain down event. Flow verification can be performed through the test return line from the ECCS injection/spray suction source to avoid overfilling the reactor cavity. The suctions source includes the suppression pool for LPCI, LPCS, and HPCS subsystems and the condensate storage tank for only the HPCS subsystem. Therefore, the NRC staff concludes that Variation 7 is acceptable.

3.6 Staff Evaluation of Proposed Deletion of Reference to OPDRVs

Sections 2.2.2.4 and 2.2.4 of this SE lists numerous OPDRVs references proposed for deletion. The proposed changes would replace the existing requirements related to OPDRVs with revised specifications for RPV WIC. For example, the proposed change removes:

- ...and operations with a potential for draining the reactor vessel.
- Only one trip system required in MODES 4 and 5 with RHR Shutdown Cooling System Integrity maintained.
- During operations with a potential for draining the reactor vessel.
- During operations with a potential for draining the reactor vessel (OPDRVs).
- Initiation action to suspend OPDRVs.
- MODES 4 and 5 for RHR Shutdown Cooling System suction from the reactor vessel isolation valves when associated isolation instrumentation is required to be OPERABLE per LCO 3.3.6.1, "Primary Containment and Drywell Isolation Instrumentation," Function 5.b [Variation 4].
- Required Action and associated Completion Time of Condition A, B, C, or D not met for PCIV(s) required to be OPERABLE during MODE 4 or 5 or during operations with a potential for draining the reactor vessel (OPDRVs) [see Variation 4].
- ...during OPDRVs.
- Initiation action to suspend operations with a potential for draining the reactor vessel (OPDRVs)

The term OPDRVs is not specifically defined in the current Grand Gulf TSs and historically has been subject to inconsistent application by licensees. The changes discussed in this SE are intended to resolve any ambiguity by creating a new RPV WIC TS with attendant equipment operability requirements, required actions and SRs, and deleting references to OPDRVs throughout the TS.

The current Grand Gulf TSs contain instrumentation requirements related to OPDRVs in four TS sections. The proposed TS 3.3.5.2 consolidates the instrumentation requirements into a single location to simplify the presentation and provide requirements consistent with TS 3.5.2. The remaining TSs with OPDRVs requirements are for PCIVs, secondary containment, secondary containment isolation valves (SCIVs), SGT system, CRFA system, control room AC system, AC sources - shutdown, DC sources - shutdown, and distribution systems - shutdown. The licensee proposed to consolidate each of these systems' requirements during OPDRVs into

revised TS 3.5.2 for RPV WIC, based on the appropriate plant conditions and calculated DRAIN TIME.

The NRC staff concludes that the deletion of OPDRVs references, along with the corresponding editorial and titles changes, are appropriate because the proposed TSs governing RPV WIC and the associated instrumentation, TSs 3.5.2 and 3.3.5.2, respectively, are simplified as an alternative set of controls for ensuring water level is maintained above the TAF. Therefore, the staff finds that these changes are acceptable.

3.7 TS 3.10, "Special Operations" and TSTF-484

The current Grand Gulf TS LCO 3.10.1, "Inservice Leak and Hydrostatic Testing Operation," allows performance of an inservice leak or hydrostatic test with the average reactor coolant temperature greater than 200 °F, while considering operational conditions to still be in Mode 4, provided certain secondary containment LCOs were met.

TSTF-484, Revision 0, "Use of TS 3.10.1 for Scram Time Testing Activities," revised LCO 3.10.1 to expand its scope to include operations where the temperature exceeds 200 °F: (1) as a consequence of maintaining adequate reactor pressure for an inservice leak or hydrostatic test, or (2) as a consequence of maintaining adequate reactor pressure for control rod scram time testing initiated in conjunction with an inservice leak or hydrostatic test.

In Amendment No. 172, dated February 21, 2007 (Reference 11), the NRC approved changes to Grand Gulf TS LCO 3.10.1 in accordance with TSTF-484. The NRC staff's SE for this amendment stated, in part, that "two low-pressure emergency core cooling systems (ECCS) injected/spray subsystems are required to be operable in Mode 4 by TS 3.5.2, 'ECCS-Shutdown.'" For Grand Gulf, the ECCS injection/spray subsystems are defined as: three LPCI subsystems, the low pressure core spray system, and the HPCS system. However, per the proposed new LCO 3.5.2, only "[o]ne ECCS injection/spray subsystem...." would be required to be operable in Mode 4.

The NRC staff concludes that changing from two ECCS injection/spray subsystems to one ECCS injection/spray subsystem is acceptable because, as stated previously in Section 3.3 of this SE, this level of redundancy is not required, even during application of LCO 3.10.1. When the licensee applies LCO 3.10.1 at the end of a refueling outage, an exceptionally large volume of water is present in the reactor vessel since the vessel is nearly water solid (full of water). There is much more water in the reactor vessel than is present during power operation and more than is present during most of an outage. Small leaks from the reactor coolant system would be detected by inspections before a significant loss of inventory occurred. In the event of a large reactor coolant system leak, the RPV would rapidly depressurize and allow operation of the low pressure ECCS. At low decay heat values, and near Mode 4 conditions, the stored energy in the reactor core will be very low. Therefore, the reasoning that operators would have time to respond with manual actions to start any ECCS pumps and properly align valves for injection from the control room remains valid.

As stated previously in Section 3.3 of this SE, with one ECCS injection/spray subsystem and nonsafety-related injection sources, defense-in-depth will be maintained. The defense-in-depth measure is consistent with other events considered during shutdown with no additional single failure assumed. The DRAIN TIME controls, in addition to the required ECCS injection/spray subsystem, provide reasonable assurance that an unexpected draining event can be prevented or mitigated before the RPV water level would be lowered to the TAF.

Based on the evaluation in Sections 3.2 and 3.3 of this SE, including a review of the SE for Amendment No. 172, the NRC staff determined that proposed LCO 3.3.5.2 and LCO 3.5.2, continue to represent either the lowest functional capability or performance level of equipment required for safe operation of the facility. Therefore, the staff finds that the licensee's proposed changes to TS 3.3.5.2 and TS 3.5.2 are acceptable.

3.8 Technical Conclusion

The Grand Gulf TS Safety Limit 2.1.1.3 requires that "[r]eactor vessel water level shall be greater than the top of active irradiated fuel." Maintaining water level above the TAF ensures that the fuel cladding fission product barrier is protected during shutdown conditions. The proposed TS changes evaluated within this SE establish new TS requirements that address the preventive and mitigative equipment and associated instrumentation that provide an alternative means to support TS Safety Limit 2.1.1.3 during Modes 4 and 5 operations.

During Modes 4 and 5 conditions, the reactor coolant system is at a low operating temperature (< 200 °F) and is depressurized. An event involving a loss of inventory while in the shutdown Condition does not exceed the capacity of one ECCS subsystem. The accidents that are postulated to occur during shutdown conditions, the fuel handling accident (UFSAR 15.7.4) and postulated radioactive releases due to liquid radwaste tank failure (UFSAR 15.7.3), do not involve a loss of inventory. Therefore, the equipment and instrumentation associated with the RPV WIC TS do not provide detection or mitigation related to these design basis accidents.

The proposed TS LCO 3.5.2 contains a requirement for operability of one ECCS subsystem along with requirements to maintain a sufficiently long DRAIN TIME so that plant operators would have time to diagnose and mitigate an unplanned draining event. The NRC staff concludes that LCO 3.5.2 and LCO 3.3.5.2 provide for the lowest functional capability or performance levels of equipment required for safe operation of the facility, and therefore, meet the requirements of 10 CFR 50.36(c)(2)(i).

Additionally, the revised TSs 3.5.2 and 3.3.5.2 provide remedial actions to be taken in the event the LCO is not satisfied and, therefore, meet the requirements of 10 CFR 50.36(c)(2)(i).

The NRC staff finds that the proposed Action statements provide reasonable assurance that an unexpected draining event can be prevented or mitigated before the RPV water level would be lowered to the TAF.

The NRC staff evaluated the proposed DRAIN TIME definition, TS 3.5.2, which contains the requirements for RPV WIC, and TS 3.3.5.2, which contains the requirements for instrumentation necessary to support TS 3.5.2. Based on the considerations discussed above, the NRC staff concludes that the proposed revisions are acceptable because they consolidate and clarify the RPV WIC requirements.

The licensee proposed to delete OPDRV references from the TS applicability descriptions, Conditions, Required Actions, and Footnotes. The NRC staff has reviewed the proposed changes and determined that the deletion of OPDRVs references, along with the corresponding editorial changes, are appropriate because the proposed TSs governing RPV WIC and the associated instrumentation, TSs 3.5.2 and 3.3.5.2, respectively, are a clarified and simplified alternative set of controls for ensuring that water level is maintained above the TAF.

The NRC staff reviewed the SRs associated with the new LCOs 3.5.2 and 3.3.5.2. The NRC staff finds that the proposed TS SRs in TS 3.5.2 are acceptable since they support TS 3.5.2 DRAIN TIME requirements, assure that water inventory is available for ECCS injection/spray subsystem RPV injection and pump performance, ECCS injection/spray subsystems are adequately filled (mitigates effects of gas accumulation or voiding), the subsystems have verified valve positions to support RPV injection, verify pumps provide adequate flow to support DRAIN TIME and RPV injection, verify automatic isolation, and that ECCS injection/spray subsystems can be manually operated to inject via main control room push buttons (LPCS/LPCI subsystems) or pump and valve hand switches (HPCS). The NRC staff finds that the three SRs proposed for TS 3.3.5.2 are sufficient and adequate, because they ensure that the Functions are capable of performing their specified safety functions in support of TS 3.5.2, DRAIN TIME, and the protection from a potential drain down of the RPV in Modes 4 and 5. Therefore, the NRC staff concludes that the proposed SRs satisfy 10 CFR 50.36(c)(3).

The NRC staff evaluated the proposed Grand Gulf changes against each of the unit's applicable design requirements listed in Section 2.3.1 of this SE. The NRC staff finds that the proposed changes for Mode 4 and 5 operations, as they relate to the proposed TS changes for the new DRAIN TIME definition and the removal of OPDRV references, remain consistent with the Grand Gulf GDCs in that the Grand Gulf design requirements for instrumentation, reactor coolant leakage detection, the reactor coolant pressure boundary, and reactor coolant makeup are unaffected.

The regulation at 10 CFR 50.36(a)(1) states that 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 TSs. In accordance with this requirement, the licensee provided TS Bases changes in the proposed LAR. The NRC staff notes that the TS Bases changes provided describe the basis for the affected TS and follow the Final Policy Statement on TS Improvements for Nuclear Power Reactors (58 FR 39132, dated July 22, 1993).

Additionally, the proposed TS changes were reviewed for technical clarity and consistency with the existing Grand Gulf requirements for customary terminology and formatting. The NRC staff found that the proposed changes were consistent with TSTF-542, Revision 2 and Chapter 16 of NUREG-0800.

In summary, the NRC staff finds that the revised TSs to adopt TSTF-542 will provide reasonable assurance the health and safety of the public will not be endangered.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Mississippi State official was notified of the proposed issuance of the amendment on March 25, 2019. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of facility components located within the restricted area as defined in 10 CFR Part 20 and changes SRs. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The

Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, published in the *Federal Register* on June 5, 2018 (83 FR 26103), and there has been no public comment on such finding. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

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 will not be inimical to the common defense and security or to the health and safety of the public.

7.0 REFERENCES

1. Larson, E. A., Entergy Operations, Inc., letter to U.S. Nuclear Regulatory Commission, "Application to Revise Technical Specifications to Adopt Technical Specifications Task Force Traveler TSTF-542, 'Reactor Pressure Vessel Water Inventory Control,' Grand Gulf Nuclear Station, Unit 1, Docket No. 50-416, License No. NPF-29," dated April 10, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18100B304).

2. Larson, E. A., Entergy Operations, Inc., letter to U.S. Nuclear Regulatory Commission, "Supplement to Revise Technical Specifications to Adopt Technical Specification Task Force Traveler TSTF-542, 'Reactor Pressure Vessel Water Inventory Control,' Grand Gulf Nuclear Station, Unit 1, Docket No. 50-416, License No. NPF-29," dated October 23, 2018 (ADAMS Accession No. ML18297A380).

3. Larson, E. A., Entergy Operations, Inc., letter to U.S. Nuclear Regulatory Commission, "Supplement 1 to Revise Technical Specifications to Adopt Technical Specification Task Force Traveler TSTF-542, 'Reactor Pressure Vessel Water Inventory Control,' Grand Gulf Nuclear Station, Unit 1, Docket No. 50-416, License No. NPF-29," dated March 13, 2019 (ADAMS Accession No. ML19072A281).

4. Technical Specifications Task Force, letter to U.S. Nuclear Regulatory Commission, "Response to NRC Request for Additional Information Regarding TSTF-542, Revision 1, "Reactor Pressure Vessel Water Inventory Control" and Submittal of Revision 2," dated March 14, 2016 (ADAMS Accession No. ML16074A448).

5. Klein, A. R., U.S. Nuclear Regulatory Commission, letter to Technical Specifications Task Force, "Final Safety Evaluation of Technical Specifications Task Force Traveler TSTF-542, Revision 2, 'Reactor Pressure Vessel Water Inventory Control' (TAC No. MF3487)," dated December 20, 2016 (ADAMS Accession No. ML16343B008).

6. U.S. Nuclear Regulatory Commission, Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," NUREG-0800, Chapter 16.0, "Technical Specifications," Revision 3, March 2010 (ADAMS Accession No. ML100351425).

7. U.S. Nuclear Regulatory Commission, "Standard Technical Specifications, General Electric BWR/6 Plants," NUREG-1434, Revision 4.0, Volume 1, Specifications, dated April 2012 (ADAMS Accession No. ML12104A195).

8. U.S. Nuclear Regulatory Commission, "Standard Technical Specifications, General Electric BWR/6 Plants," NUREG-1434, Revision 4.0, Volume 2, Bases, dated April 2012 (ADAMS Accession No. ML12104A196).

9. Vaidya, B., U.S. Nuclear Regulatory Commission, letter to Mr. George A. Williams, Entergy Operations, Inc., "Grand Gulf Nuclear Station, Unit 1 - Issuance of Amendment Re: Residual Heat Removal Shutdown Cooling System Isolation Instrumentation (TAC No. MB8939)," dated January 23, 2004 (ADAMS Package Accession No. ML040330706).

10. Sekerak, S. P., U.S. Nuclear Regulatory Commission, letter to Mr. William A. Eaton, Entergy Operations, Inc., "Grand Gulf Nuclear Station, Unit 1 - Issuance of Amendment Re: Full-Scope Implementation of an Alternative Accident Source Term (TAC No. MA8065)," March 14, 2001 (ADAMS Accession No. ML010780172).

11. Vaidya, B., U.S. Nuclear Regulatory Commission, letter to Mr. William R. Brian, Entergy Operations, Inc., "Grand Gulf Nuclear Station, Unit 1 - Issuance of Amendment Re: Technical Specification (TS) to Adopt Task Force (TSTF)-484, Revision 0, "Use of TS 3.10.1 for Scram Time Testing Activities," using the Consolidated Line Item Improvement Process (TAC No. MD3578)," dated February 21, 2007 (ADAMS Accession No. ML070250445).

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Date: May 23, 2019

SUBJECT: GRAND GULF NUCLEAR STATION, UNIT 1 – ISSUANCE OF AMENDMENT NO. 218 TO REVISE TECHNICAL SPECIFICATIONS TO ADOPT TSTF-542, REVISION 2, "REACTOR PRESSURE VESSEL WATER INVENTORY CONTROL" (EPID L-2018-LLA-0105) DATED MAY 23, 2019

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ADAMS Accession No: ML19084A218 *by memo (in concurrence with EICB and SRXB)

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