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

December 12, 2018

Mr. David B. Hamilton
Site Vice President
FirstEnergy Nuclear Operating Company
Mail Stop A-PY-A290
P.O. Box 97, 10 Center Road
Perry, OH 44081-0097

SUBJECT: PERRY NUCLEAR POWER PLANT, UNIT NO. 1 - ISSUANCE OF AMENDMENT NO. 184 CONCERNING ADOPTION OF TECHNICAL SPECIFICATION TASK FORCE TRAVELER-542, REVISION 2, "REACTOR PRESSURE VESSEL WATER INVENTORY CONTROL" (EPID L-2017-LLA-0405)

Dear Mr. Hamilton:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 184 to Facility Operating License No. NPF-58 for Perry Nuclear Power Plant, Unit No. 1. The amendment consists of changes to the technical specifications (TSs) in response to your application dated December 6, 2017, as supplemented by letter dated July 24, 2018.

The amendment replaces TSs related to operations with a potential for draining the reactor vessel with new requirements for reactor pressure vessel water inventory control to protect TS Safety Limit 2.1.1.3, which requires the reactor vessel water level to be greater than the top of active irradiated fuel.

A copy of our safety evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

for

Kimberly J. Green, Senior Project Manager
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-440

Enclosures:
1. Amendment No. 184 to NPF-58
2. Safety Evaluation

cc: ListServ

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

FIRSTENERGY NUCLEAR OPERATING COMPANY

DOCKET NO. 50-440

PERRY NUCLEAR POWER PLANT, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 184
License No. NPF-58

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

   A. The application for amendment filed by FirstEnergy Nuclear Operating Company, et al. (the licensee, FENOC), dated December 6, 2017, as supplemented by letter dated July 24, 2018, 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 Facility Operating License No. NPF-58 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. 184, are hereby incorporated into the license. FENOC 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 its issuance and shall be implemented within 90 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

David J. Wrona, Chief
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Facility Operating
License No. NPF-58 and
Technical Specifications

Date of Issuance: December 12, 2018

ATTACHMENT TO LICENSE AMENDMENT NO. 184

PERRY NUCLEAR POWER PLANT, UNIT NO. 1

FACILITY OPERATING LICENSE NO. NPF-58

DOCKET NO. 50-440

Replace the following pages of the Facility Operating License and 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.

REMOVE	INSERT
License NPF-58	License NPF-58
- 4 -	- 4 -

Technical Specifications

REMOVE	INSERT	REMOVE	INSERT
i	i	--	3.5-7a
ii	ii	3.5-8	3.5-8
--	1.0-2a	3.5-9	3.5-9
--	1.0-2b	3.5-10	3.5-10
3.3-33	3.3-33	3.6-3	3.6-3
3.3-34	3.3-34	3.6-6	3.6-6
3.3-36	3.3-36	3.6-13	3.6-13
3.3-39	3.3-39	3.6-14	3.6-14
3.3-40	3.3-40	3.6-29	3.6-29
3.3-41	3.3-41	3.6-31	3.6-31
3.3-42	3.3-42	3.6-32	3.6-32
--	3.3-43a	3.6-34	3.6-34
--	3.3-43b	3.6-35	3.6-35
--	3.3-43c	3.6-51	3.6-51
--	3.3-43d	3.6-52	3.6-52
--	3.3-43e	3.6-53	3.6-53
3.3-44	3.3-44	3.6-55	3.6-55
3.3-45	3.3-45	3.6-56	3.6-56
3.3-46	3.3-46	3.6-57	3.6-57
3.3-47	3.3-47	3.7-4	3.7-4
3.3-51	3.3-51	3.7-5	3.7-5
3.3-52	3.3-52	3.7-6	3.7-6
3.3-55	3.3-55	3.7-8	3.7-8
3.3-56	3.3-56	3.7-9	3.7-9
3.3-59	3.3-59	3.7-10	3.7-10
3.3-73	3.3-73	3.8-18	3.8-18
3.5-1	3.5-1	3.8-19	3.8-19
3.5-6	3.5-6	3.8-20	3.8-20
--	3.5-6a	3.8-29	3.8-29
3.5-7	3.5-7	3.8-39	3.8-39

C. This 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

FENOC is authorized to operate the facility at reactor core power levels not in excess of 3758 megawatts thermal (100% 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. 184, are hereby incorporated into the license. FENOC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) Antitrust Conditions

a. FirstEnergy Nuclear Generation, LLC

TABLE OF CONTENTS

1.0 USE AND APPLICATION
1.1 Definitions....1.0-1
1.2 Logical Connectors....1.0-8
1.3 Completion Times....1.0-11
1.4 Frequency....1.0-24

2.0 SAFETY LIMITS (SLs)
2.1 SLs....2.0-1
2.2 SL Violations....2.0-1

3.0 LIMITING CONDITION FOR OPERATION (LCO) APPLICABILITY....3.0-1
3.0 SURVEILLANCE REQUIREMENT (SR) APPLICABILITY....3.0-4

3.1 REACTIVITY CONTROL SYSTEMS
3.1.1 SHUTDOWN MARGIN (SDM)....3.1-1
3.1.2 Reactivity Anomalies....3.1-5
3.1.3 Control Rod OPERABILITY....3.1-7
3.1.4 Control Rod Scram Times....3.1-12
3.1.5 Control Rod Scram Accumulators....3.1-15
3.1.6 Control Rod Pattern....3.1-18
3.1.7 Standby Liquid Control (SLC) System....3.1-20
3.1.8 Scram Discharge Volume (SDV) Vent and Drain Valves....3.1-24

3.2 POWER DISTRIBUTION LIMITS
3.2.1 AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR)....3.2-1
3.2.2 MINIMUM CRITICAL POWER RATIO (MCPR)....3.2-2
3.2.3 LINEAR HEAT GENERATION RATE (LHGR)....3.2-3

3.3 INSTRUMENTATION
3.3.1.1 Reactor Protection System (RPS) Instrumentation....3.3-1
3.3.1.2 Source Range Monitor (SRM) Instrumentation....3.3-10
3.3.2.1 Control Rod Block Instrumentation....3.3-15
3.3.3.1 Post Accident Monitoring (PAM) Instrumentation....3.3-20
3.3.3.2 Remote Shutdown System....3.3-24
3.3.4.1 End of Cycle Recirculation Pump Trip (EOC-RPT) Instrumentation....3.3-26
3.3.4.2 Anticipated Transient Without Scram Recirculation Pump Trip (ATWS-RPT) Instrumentation....3.3-29
3.3.5.1 Emergency Core Cooling System (ECCS) Instrumentation....3.3-32
3.3.5.2 Reactor Pressure Vessel (RPV) Water Inventory Control Instrumentation....3.3.43a
3.3.5.3 Reactor Core Isolation Cooling (RCIC) System Instrumentation....3.3-44
3.3.6.1 Primary Containment and Drywell Isolation Instrumentation....3.3-48
3.3.6.2 Residual Heat Removal (RHR) Containment Spray System Instrumentation....3.3-60

(continued)

3.3 INSTRUMENTATION (continued)
3.3.6.3 Suppression Pool Makeup (SPMU) System Instrumentation 3.3-64
3.3.6.4 Relief and Low-Low Set (LLS) Instrumentation 3.3-68
3.3.7.1 Control Room Emergency Recirculation (CRER) System Instrumentation 3.3-70
3.3.8.1 Loss of Power (LOP) Instrumentation 3.3-74
3.3.8.2 Reactor Protection System (RPS) Electric Power Monitoring 3.3-77

3.4 REACTOR COOLANT SYSTEM (RCS)
3.4.1 Recirculation Loops Operating 3.4-1
3.4.2 Flow Control Valves (FCVs) 3.4-6
3.4.3 Jet Pumps 3.4-8
3.4.4 Safety/Relief Valves (S/RVs) 3.4-10
3.4.5 RCS Operational LEAKAGE 3.4-12
3.4.6 RCS Pressure Isolation Valve (PIV) Leakage 3.4-14
3.4.7 RCS Leakage Detection Instrumentation 3.4-16
3.4.8 RCS Specific Activity 3.4-19
3.4.9 Residual Heat Removal (RHR) Shutdown Cooling System – Hot Shutdown 3.4-21
3.4.10 Residual Heat Removal (RHR) Shutdown Cooling System – Cold Shutdown 3.4-24
3.4.11 RCS Pressure and Temperature (P/T) Limits 3.4-26
3.4.12 Reactor Steam Dome Pressure 3.4-32

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS), RPV WATER INVENTORY CONTROL, AND REACTOR CORE ISOLATION COOLING (RCIC) SYSTEM
3.5.1 ECCS – Operating 3.5-1
3.5.2 Reactor Pressure Vessel (RPV) Water Inventory Control 3.5-6
3.5.3 RCIC System 3.5-10

3.6 CONTAINMENT SYSTEMS
3.6.1.1 Primary Containment – Operating 3.6-1
3.6.1.2 Primary Containment Air Locks 3.6-3
3.6.1.3 Primary Containment Isolation Valves (PCIVs) 3.6-9
3.6.1.4 Primary Containment Pressure 3.6-20
3.6.1.5 Primary Containment Air Temperature 3.6-21
3.6.1.6 Low-Low Set (LLS) Valves 3.6-22
3.6.1.7 Residual Heat Removal (RHR) Containment Spray System 3.6-24
3.6.1.8 Feedwater Leakage Control System (FWLCS) 3.6-26
3.6.1.9 Main Steam Shutoff Valves 3.6-27
3.6.1.10 Primary Containment – Shutdown 3.6-29
3.6.1.11 Containment Vacuum Breakers 3.6-31
3.6.1.12 Containment Humidity Control 3.6-34
3.6.2.1 Suppression Pool Average Temperature 3.6-36

(continued)

1.1 Definitions (continued)

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;

(continued)

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.

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
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		
	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

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
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, 1.e, 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	
	C.2 Restore channel to OPERABLE status.	24 hours

(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.f, 1.g, 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		
	F.2	Place channel in trip.	96 hours from discovery of inoperable channel concurrent with HPCS or reactor core isolation cooling (RCIC) inoperable AND 8 days

(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[(b)]	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	≥ 14.3 inches
b. Drywell Pressure – High	1, 2, 3	2[(b)]	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	≤ 1.88 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 (LPCS Injection Valve Permissive)	1, 2, 3	1	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	≥ 482.7 psig and ≤ 607.7 psig
e. Reactor Vessel Pressure – Low (LPCI Injection Valve Permissive)	1, 2, 3	1	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	≥ 490.0 psig and ≤ 537.1 psig
f. 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	≥ 1200 gpm

(continued)

(b) Also required to initiate the associated diesel generator and AEGT subsystem.

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
1. Low Pressure Coolant Injection-A (LPCI) and Low Pressure Core Spray (LPCS) Subsystems (continued)					
g. 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	≥ 1450 gpm
h. Manual Initiation	1, 2, 3	1	C	SR 3.3.5.1.6	NA
2. LPCI B and LPCI C Subsystems					
a. Reactor Vessel Water Level – Low Low Low, Level 1	1, 2, 3	2(b)	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	≥ 14.3 inches
b. Drywell Pressure - High	1, 2, 3	2(b)	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	≤ 1.88 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 (LPCI Injection Valve Permissive)	1, 2, 3	1 per subsystem	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	≥ 490.0 psig and ≤ 537.1 psig for LPCI B; and ≥ 490.0 psig and ≤ 537.1 psig for LPCI C

(continued)

(b) Also required to initiate the associated diesel generator and AEGT subsystem.

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
2. LPCI B and LPCI C Subsystems (continued)					
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	≥ 1450 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[(e)]	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	≥ 127.6 inches
b. Drywell Pressure - High	1, 2, 3	4[(e)]	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	≤ 1.88 psig
c. Reactor Vessel Water Level – High, Level 8	1, 2, 3	4	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	≤ 221.7 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 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 90,300 gallons
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 3.3.5.1.7 SR 3.3.5.1.6	≤ 18 ft 6 inches

(continued)

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

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. High Pressure Core Spray (HPCS) System (continued)					
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	≥ 120 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	≥ 600 gpm
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	≥ 14.3 inches
b. 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	≥ 100.5 seconds and ≤ 109.5 seconds
c. 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	≥ 177.1 inches
d. 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
e. 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
f. Manual Initiation	1, 2(d), 3(d)	2	G	SR 3.3.5.1.6	NA

(continued)

(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. 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

(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. 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
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.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.2.2	Perform CHANNEL FUNCTIONAL TEST.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.2.3	Perform LOGIC SYSTEM FUNCTIONAL TEST.	In accordance with the Surveillance Frequency Control Program

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 (LPCS Injection Valve Permissive)	4, 5	1 [(a)]	C	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 482.7 psig and ≤ 607.7 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	≥ 1200 gpm
c. Reactor Vessel Pressure – Low (LPCI Injection Valve Permissive)	4, 5	1 [(a)]	C	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 490.0 psig and ≤ 537.1 psig
d. LPCI Pump A Discharge Flow – Low (Bypass)	4, 5	1 [(a)]	E	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 1450 gpm
e. 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 (LPCI Injection Valve Permissive)	4, 5	1 per subsystem (a)	C	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 490.0 psig and ≤ 537.1 psig for LPCI B; and ≥ 490.0 psig and ≤ 537.1 psig for LPCI C
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	≥ 1450 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]	2[a]	D	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 90,300 gallons
b. HPCS Pump Discharge Pressure – High (Bypass)	4, 5	1[a]	E	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 120 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	≥ 600 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	≥ 177.1 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	≥ 127.6 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. AND B.2 Place channel in trip.	1 hour from discovery of loss of RCIC initiation capability 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 Function 5; and (b) for up to 6 hours for Functions 1, 2, 3, and 4 provided the associated Function maintains RCIC initiation capability.

SURVEILLANCE		FREQUENCY
SR 3.3.5.3.1	Perform CHANNEL CHECK.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.3.2	Perform CHANNEL FUNCTIONAL TEST.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.3.3	Calibrate the trip unit.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.3.4	Perform CHANNEL CALIBRATION.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.3.5	Perform LOGIC SYSTEM FUNCTIONAL TEST.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.3.6	Perform CHANNEL CALIBRATION.	In accordance with the Surveillance Frequency Control Program

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	≥ 127.6 inches
2. Reactor Vessel Water Level – High, Level 8	4	C	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	≤ 221.7 inches
3. Condensate Storage Tank Level – Low	2	D	SR 3.3.5.3.1 SR 3.3.5.3.2 SR 3.3.5.3.3 SR 3.3.5.3.4 SR 3.3.5.3.5	≥ 90,300 gallons
4. Suppression Pool Water Level - High	2	D	SR 3.3.5.3.1 SR 3.3.5.3.2 SR 3.3.5.3.3 SR 3.3.5.3.6 SR 3.3.5.3.5	≤ 18 ft 6 inches
5. Manual Initiation	1	C	SR 3.3.5.3.5	NA

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
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

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
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). OR	Immediately
	K.2 Suspend movement of recently irradiated fuel assemblies in the primary containment.	Immediately

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 (continued)					
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 3.3.6.1.4 SR 3.3.6.1.5	≤ 1.88 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 3.3.6.1.4 SR 3.3.6.1.5	≥ 14.3 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 3.3.6.1.4 SR 3.3.6.1.5	≤ 1.88 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 3.3.6.1.4 SR 3.3.6.1.5	≥ 127.6 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 3.3.6.1.4 SR 3.3.6.1.5	≤ 1.88 psig
g. Containment and Drywell Purge Exhaust Plenum Radiation – High	1, 2, 3	2[(b)]	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.5	≤ 4.0 mR/hr above background

(continued)

(b) Required to initiate the 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 Purge Exhaust Plenum Radiation – High (continued)	(d)	2	K	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.5	≤ 4.0 mR/hr above background
h. Manual Initiation	1, 2, 3	2[(b)]	G	SR 3.3.6.1.5	NA
	(d)	2	K	SR 3.3.6.1.5	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 3.3.6.1.4 SR 3.3.6.1.5	≤ 298.5 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 3.3.6.1.5	≥ 3 seconds and ≤ 13 seconds
c. RCIC Steam Supply Line Pressure – Low	1, 2, 3	1	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.4 SR 3.3.6.1.5	≥ 55 psig
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 3.3.6.1.4 SR 3.3.6.1.5	≤ 20 psig
e. RCIC Equipment Area Ambient Temperature – High	1, 2, 3	1	F	SR 3.3.6.1.1 SR 3.3.6.1.4 SR 3.3.6.1.5 SR 3.3.6.1.7	≤ 145.9°F
f. Main Steam Line Pipe Tunnel Temperature – High	1, 2, 3	1	F	SR 3.3.6.1.1 SR 3.3.6.1.4 SR 3.3.6.1.5 SR 3.3.6.1.7	≤ 158.9°F

(continued)

(b) Required to initiate the drywell isolation function.

(d) During movement of recently irradiated fuel assemblies in primary containment.

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 Area Ambient Temperature – High	2[e], 3[e]	1 per area	F	SR 3.3.6.1.1 SR 3.3.6.1.4 SR 3.3.6.1.5 SR 3.3.6.1.7	≤ 159.9°F
b. Reactor Vessel Water Level – Low, Level 3	1, 2[g], 3[g]	2	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.4 SR 3.3.6.1.5	≥ 177.1 inches
	2[e], 3[e]	2	J	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.4 SR 3.3.6.1.5	≥ 177.1 inches
c. Reactor Vessel 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 3.3.6.1.4 SR 3.3.6.1.5	≤ 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 3.3.6.1.4 SR 3.3.6.1.5	≤ 1.88 psig
e. Manual Initiation	1, 2, 3	2	G	SR 3.3.6.1.5	NA

(e) With reactor vessel steam dome pressure less than the RHR cut in permissive pressure.

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

Table 3.3.7.1-1 (page 1 of 1)
Control Room Emergency Recirculation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Reactor Vessel Water Level – Low Low Low, Level 1	1, 2, 3	2	B	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.3 SR 3.3.7.1.4 SR 3.3.7.1.5	≥ 14.3 inches
2. Drywell Pressure – High	1, 2, 3	2	B	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.3 SR 3.3.7.1.4 SR 3.3.7.1.5	≤ 1.88 psig
3. Control Room Ventilation Radiation Monitor	1, 2, 3, (b)	1	C	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.4 SR 3.3.7.1.5	≤ 800 cpm

(b) During movement of recently irradiated fuel assemblies in the primary containment or fuel handling building.

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.

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
B. High Pressure Core Spray (HPCS) System inoperable.	B.1 Verify by administrative means RCIC System is OPERABLE when RCIC is required to be OPERABLE. AND B.2 Restore HPCS System to OPERABLE status.	1 hour 14 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 AND	Verify primary containment boundary is capable of being established in less than the DRAIN TIME.	4 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	C.2 Verify each primary containment penetration flow path is capable of being isolated in less than the DRAIN TIME.	4 hours

(continued)

ACTIONS (continued)

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 primary containment boundary.	Immediately
	AND		
	D.3	Initiate action to isolate each primary containment penetration flow path or verify it can be manually isolated from the control room.	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.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.2	Verify, for a required low pressure ECCS injection/spray subsystem, the suppression pool water level is ≥ 16 ft 6 in.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.2.3	Verify, for a required High Pressure Core Spray (HPCS) System, the: a. Suppression pool water level is ≥ 16 ft 6 in; or b. Condensate storage tank water volume is ≥ 249,700 gal.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.4	Verify, for the required ECCS injection/spray subsystem, the piping is filled with water from the pump discharge valve to the injection valve.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.5	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.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.5.2.6	Operate the required ECCS injection/spray subsystem through the recirculation line for ≥ 10 minutes.	In accordance with the Surveillance Frequency Control Program
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.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.8	----------NOTE---------- Vessel injection/spray may be excluded. ----------	
	Verify the required LPCI or LPCS subsystem actuates on a manual injection signal, or the required HPCS subsystem can be manually operated.	In accordance with the Surveillance Frequency Control Program

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 ACTION		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

3.6.1.2 Primary Containment Air Locks

LCO 3.6.1.2 Two primary containment air locks shall be OPERABLE.

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

ACTIONS

----------NOTES----------

1. Entry and exit is permissible to perform repairs of the affected air lock components.

2. Separate Condition entry is allowed for each air lock.

3. Enter applicable Conditions and Required Actions of LCO 3.6.1.1, "Primary Containment-Operating," when air lock leakage results in exceeding overall containment leakage rate acceptance criteria in MODES 1, 2, and 3.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more primary containment air locks with one primary containment air lock door inoperable.	----------NOTES---------- 1. Required Actions A.1, A.2, and A.3 are not applicable if both doors in the same air lock are inoperable and Condition C is entered. 2. Entry and exit is permissible for 7 days under administrative controls if both air locks are inoperable. ----------	(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. (continued)	C.3	Restore air lock to OPERABLE status.	24 hours
D. Required Action and associated Completion Time of Condition A, B, or C not met in MODE 1, 2, or 3.	D.1	Be in MODE 3.	12 hours
	AND		
	D.2	Be in MODE 4.	36 hours
E. Required Action and associated Completion Time of Condition A, B, or C not met during movement of recently irradiated fuel assemblies in the primary containment.	E.1	Suspend movement of recently irradiated fuel assemblies in the primary containment.	Immediately

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. (continued)	D.3 Perform SR 3.6.1.3.6 for the resilient seal purge valves closed to comply with Required Action D.1.	Once per 92 days
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. AND E.2 Be in MODE 4.	12 hours 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 containment.	F.1 Suspend movement of recently irradiated fuel assemblies in primary containment.	Immediately

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3.6 CONTAINMENT SYSTEMS

3.6.1.10 Primary Containment-Shutdown

LCO 3.6.1.10 Primary containment shall be OPERABLE.

APPLICABILITY: During movement of recently irradiated fuel assemblies in the primary containment.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Primary containment inoperable.	A.1 Suspend movement of recently irradiated fuel assemblies in the primary containment.	Immediately

3.6 CONTAINMENT SYSTEMS

3.6.1.11 Containment Vacuum Breakers

LCO 3.6.1.11 Three containment vacuum breakers shall be OPERABLE and four containment vacuum breakers shall be closed.

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

ACTIONS

----------NOTE----------
Enter applicable Conditions and Required Actions of LCO 3.6.1.1, "Primary Containment-Operating" when the containment vacuum relief subsystem leakage results in exceeding overall containment leakage acceptance criteria.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- Separate Condition entry is allowed for each containment vacuum breaker. ---------- One or two containment vacuum breakers not closed. OR One required containment vacuum breaker inoperable for other reasons.	A.1 Close the associated motor operated isolation valve. AND A.2 Restore required containment vacuum breaker to OPERABLE status.	4 hours 72 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met. OR Three or more containment vacuum breakers not closed. OR Two or more required containment vacuum breakers inoperable for other reasons.	----------NOTE---------- Only applicable in MODE 1, 2 or 3. ---------- B.1.1 Be in MODE 3. AND B.1.2 Be in MODE 4. AND ----------NOTE---------- Only applicable during movement of recently irradiated fuel assemblies in the primary containment. ---------- B.2 Suspend movement of recently irradiated fuel assemblies in the primary containment.	 12 hours 36 hours Immediately

3.6 CONTAINMENT SYSTEMS

3.6.1.12 Containment Humidity Control

LCO 3.6.1.12 Containment average temperature-to-relative humidity shall be maintained within limits.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Requirements of LCO not met.	A.1 Restore containment average temperature-to-relative humidity to within limits.	8 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, or 3.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	12 hours 36 hours
C. Required Action and associated Completion Time of Condition A not met during movement of recently irradiated fuel assemblies in the primary containment.	C.1 Suspend movement of recently irradiated fuel assemblies in the primary containment.	Immediately

SURVEILLANCE REQUIREMENT

SURVEILLANCE		FREQUENCY
SR 3.6.1.12.1	Verify containment average temperature-to-relative humidity to be within limits.	In accordance with the Surveillance Frequency Control Program

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 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 Be in MODE 3. AND B.2 Be in MODE 4.	12 hours 36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Secondary containment inoperable during movement of recently irradiated fuel assemblies in the primary containment.	C.1 Suspend movement of recently irradiated fuel assemblies in the primary containment.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.4.1.1	Verify secondary containment vacuum is ≥ 0.66 inch of vacuum water gauge.	In accordance with the Surveillance Frequency Control Program
SR 3.6.4.1.2	Verify the primary containment equipment hatch is closed and sealed and the shield blocks are installed adjacent to the shield building.	In accordance with the Surveillance Frequency Control Program
SR 3.6.4.1.3	Verify each secondary containment access door is closed, except when the access opening is being used for entry and exit.	In accordance with the Surveillance Frequency Control Program

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 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 manual valve 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 containment.	D.1 Suspend movement of recently irradiated fuel assemblies in the primary containment.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.4.2.1	----------NOTES---------- 1. Valves and blind flanges in high radiation areas may be verified by use of administrative means. 2. Not required to be met for SCIVs that are open under administrative controls. ---------- Verify each secondary containment isolation manual valve and blind flange that is not locked, sealed, or otherwise secured and is required to be closed during accident conditions is closed.	In accordance with the Surveillance Frequency Control Program

3.6 CONTAINMENT SYSTEMS

3.6.4.3 Annulus Exhaust Gas Treatment (AEGT) System

LCO 3.6.4.3 Two AEGT subsystems shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One AEGT subsystem inoperable.	A.1 Restore AEGT 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 Be in MODE 3. AND B.2 Be in MODE 4.	12 hours 36 hours
C. Required Action and associated Completion Time of Condition A not met during movement of recently irradiated fuel assemblies in the primary containment.	C.1 Place OPERABLE AEGT 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 containment.	Immediately
D. Two AEGT subsystems inoperable in MODE 1, 2, or 3.	D.1 Enter LCO 3.0.3.	Immediately
E. Two AEGT subsystems inoperable during movement of recently irradiated fuel assemblies in the primary containment.	E.1 Suspend movement of recently irradiated fuel assembles in the primary containment.	Immediately

3.7 PLANT SYSTEMS

3.7.3 Control Room Emergency Recirculation (CRER) System

LCO 3.7.3 Two CRER subsystems shall be OPERABLE.

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

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CRER subsystem inoperable for reasons other than Condition B.	A.1 Restore CRER subsystem to OPERABLE status.	7 days
B. One or more CRER subsystems inoperable due to inoperable CRE boundary in Mode 1, 2, or 3.	B.1 Initiate action to implement mitigating actions. AND B.2 Verify mitigating actions ensure CRE occupant radiological exposures will not exceed limits, and CRE occupants are protected from chemical and smoke hazards. AND B.3 Restore CRE boundary to OPERABLE status.	Immediately 24 hours 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, 2, or 3.	C.1 Be in MODE 3. AND C.2 Be in MODE 4.	12 hours 36 hours
D. Required Action and associated Completion Time of Condition A not met during movement of recently irradiated fuel assemblies in the primary containment or fuel handling building.	----------NOTE---------- LCO 3.0.3 is not applicable. ---------- D.1 Place OPERABLE CRER subsystem in emergency recirculation mode. OR D.2 Suspend movement of recently irradiated fuel assemblies in the primary containment and fuel handling building.	 Immediately Immediately
E. Two CRER subsystems inoperable in MODE 1, 2, or 3 for reasons other than Condition B.	E.1 Enter LCO 3.0.3.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Two CRER subsystems inoperable during movement of recently irradiated fuel assemblies in the primary containment or fuel handling building. OR One or more CRER subsystems inoperable due to inoperable CRE boundary during movement of recently irradiated fuel assemblies in the primary containment or fuel handling building.	F.1 Suspend movement of recently irradiated fuel assemblies in the primary containment and fuel handling building	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.3.1	Operate each CRER subsystem for ≥ 15 continuous minutes.	In accordance with the Surveillance Frequency Control Program
SR 3.7.3.2	Perform required CRER filter testing in accordance with the Ventilation Filter Testing Program (VTFP).	In accordance with the VFTP

(continued)

3.7 PLANT SYSTEMS

3.7.4 Control Room Heating, Ventilating, and Air Conditioning (HVAC) System

LCO 3.7.4 Two control room HVAC subsystems shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One control room HVAC subsystem inoperable.	A.1	Restore control room HVAC subsystem to OPERABLE status.	30 days
B. Two control room HVAC subsystems inoperable.	B.1	Verify control room air temperature is ≤ 90°F.	Once per 4 hours
	AND		
	B.2	Restore one control room HVAC subsystem to OPERABLE status.	7 days
C. Required Action and associated Completion Time of Condition A or B not met in MODE 1, 2, or 3.	C.1	Be in MODE 3.	12 hours
	AND		
	C.2	Be in MODE 4.	36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition A not met during movement of recently irradiated fuel assemblies in the primary containment or fuel handling building.	----------NOTE---------- LCO 3.0.3 is not applicable. ---------- D.1 Place OPERABLE control room HVAC subsystem in operation. OR D.2 Suspend movement of recently irradiated fuel assemblies in the primary containment and fuel handling building.	Immediately Immediately

(continued)

ACTIONS (continued)

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

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.4.1	Verify each control room HVAC subsystem has the capability to remove the assumed heat load.	In accordance with the Surveillance Frequency Control Program

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 required feature(s) with no offsite power available from a required circuit inoperable. OR A.2.1 Suspend CORE ALTERATIONS. AND A.2.2 Suspend movement of recently irradiated fuel assemblies in the primary containment and fuel handling building. AND	Immediately Immediately Immediately

(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 containment and fuel handling building.	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

SURVEILLANCE REQUIREMENTS

SURVEILLANCE				FREQUENCY
SR 3.8.2.1	----------NOTES---------- 1. The following SRs are not required to be performed: SR 3.8.1.3, SR 3.8.1.8 through SR 3.8.1.16, SR 3.8.1.18, and SR 3.8.1.19. 2. SR 3.8.1.12 and SR 3.8.1.19 are not required to be met when the associated ECCS subsystem(s) are not required to be OPERABLE per LCO 3.5.2, "Reactor Pressure Vessel (RPV) Water Inventory Control." ---------- For AC sources required to be OPERABLE, the following SRs are applicable:			In accordance with applicable SRs
	SR 3.8.1.1	SR 3.8.1.7	SR 3.8.1.14	
	SR 3.8.1.2	SR 3.8.1.9	SR 3.8.1.15	
	SR 3.8.1.3	SR 3.8.1.10	SR 3.8.1.16	
	SR 3.8.1.4	SR 3.8.1.11	SR 3.8.1.18	
	SR 3.8.1.5	SR 3.8.1.12	SR 3.8.1.19	
	SR 3.8.1.6	SR 3.8.1.13		

ACTIONS

----------NOTE----------
LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required DC electrical power subsystems inoperable.	A.1 Declare affected required feature(s) inoperable.	Immediately
	OR	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2.2 Suspend movement of recently irradiated fuel assemblies in the primary containment and fuel handling building.	Immediately
	AND	
	A.2.3 Initiate action to restore required DC electrical power subsystems to OPERABLE status.	Immediately

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. AND	Immediately
	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.	In accordance with the Surveillance Frequency Control Program

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 184 TO FACILITY OPERATING LICENSE NO. NPF-58

FIRSTENERGY NUCLEAR OPERATING COMPANY

PERRY NUCLEAR POWER PLANT, UNIT NO. 1

DOCKET NO. 50-440

1.0 INTRODUCTION

By application dated December 6, 2017, as supplemented by letter dated July 24, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML17347A788 and ML18207A268, respectively), FirstEnergy Nuclear Operating Company (FENOC, the licensee), requested to adopt Technical Specifications Task Force (TSTF) Traveler-542, Revision 2, "Reactor Pressure Vessel Water Inventory Control" (ADAMS Accession No. ML16074A448), for Perry Nuclear Power Plant, Unit No. 1 (PNPP). Traveler TSTF-542, Revision 2, was approved by the U.S. Nuclear Regulatory Commission (NRC, the Commission) on December 20, 2016 (ADAMS Accession No. ML16343B008).

The proposed changes would replace existing technical specification (TS) requirements associated with "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 "DRAIN TIME," would be added to the PNPP TS 1.1, "Definitions." 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 primary 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 the TS changes described in the applicable parts of 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 letter dated July 24, 2018, provided additional information that clarified the application, but 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 January 30, 2018 (83 FR 4293).

2.0 REGULATORY EVALUATION

2.1 System Description

The PNPP is a boiling-water reactor (BWR) consisting of an RPV designed with numerous penetrations located below the top of active fuel (TAF). These penetrations provide entry for control rods, recirculation flow, reactor water cleanup (RWCU), and shutdown cooling. Since these penetrations are below the TAF, this creates a potential drain path for reactor vessel water inventory and loss of 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 > 200 °F (degrees Fahrenheit), the TSs for instrumentation and ECCS require operability of sufficient equipment to ensure large quantities of water will be injected into the vessel should level decrease below the preselected value. These requirements are designed to mitigate the effects of a loss-of-coolant accident (LOCA), but also provide protection for other accidents and transients that involve a loss of RPV water inventory.

During BWR operation in Mode 4 (Cold Shutdown[1] – Reactor Mode Switch in Shutdown and average reactor coolant temperature ≤ 200 °F), and Mode 5 (Refueling[2] - Reactor Mode Switch in Shutdown or Refuel), the pressures and temperatures that could cause a LOCA are not present. During certain phases of refueling (Mode 5) a large volume of water is available above the RPV (i.e., the RPV head is removed), the water level is ≥ 23 feet over the top of the RPV flange with the reactor cavity to steam dryer gate 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 or Refueling, 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 be less time for operator action as compared to periods when there are large volumes of water above the RPV.

In comparison to Modes 1, 2, and 3, with typical high temperatures and pressures (especially in Modes 1 and 2), 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 existing PNPP TSs contain specifications that are applicable during OPDRVs, or require suspension of OPDRVs if certain equipment is inoperable. The term OPDRVs is not specifically defined in the TSs and historically has been subject to inconsistent application by licensees. The changes discussed in

---

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

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

Section 2.2.2 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 Table 3.3.5.2-1); (3) renumbering of existing TS 3.3.5.2, "Reactor Core Isolation Cooling (RCIC) System Instrumentation" to 3.3.5.3; and (4) the proposed revisions to TS 3.3.6.1, "Primary Containment and Drywell Isolation Instrumentation" (including Table 3.3.6.1-1) (evaluated in Sections 3.2 and 3.4 of this SE).

Section 2.2.3 describes the proposed revisions to TS 3.5, "Emergency Core Cooling System (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 describes the proposed deletion of existing TS references to OPDRVs (evaluated in Section 3.6 of this SE).

Section 2.2.5 describes PNPP 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 license amendment request (LAR) includes the following definition of "DRAIN TIME" that would be added to PNPP 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 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 device 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 TS 3.3, "Instrumentation"

The following subsections describe the proposed changes to the PNPP 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:

"Only applicable in MODES 1, 2, and 3."

As a result, the numbering for Note 2 would be removed with no change in the note.

For TS Table 3.3.5.1-1, "Emergency Core Cooling System (ECCS) Instrumentation," the proposed changes delete the applicability in Modes 4 and 5 for the following Functions 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."

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 (LPCS Injection Valve Permissive)
e. Reactor Vessel Pressure - Low (LPCI Injection Valve Permissive)
f. LPCS Pump Discharge Flow - Low (Bypass)
g. LPCI Pump A Discharge Flow - Low (Bypass)
h. Manual Initiation

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 (LPCI Injection Valve Permissive)
e. LPCI Pump B and LPCI Pump C Discharge Flow - Low (Bypass)
f. Manual Initiation

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 limits of SR 3.5.2.2.

Footnote (f), which states,

> When associated AEGT subsystems are required to be OPERABLE per LCO 3.6.4.3, Annulus Exhaust Gas Treatment (AEGT) System.

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 and Drywell 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 described below:

3.3.5.2 Reactor Pressure Vessel (RPV) Water Inventory Control (WIC) 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
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.	In accordance with the Surveillance Frequency Control program

SR 3.3.5.2.2 Perform CHANNEL FUNCTIONAL TEST.	In accordance with the Surveillance Frequency Control program
SR 3.3.5.2.3 Perform LOGIC SYSTEM FUNCTIONAL TEST.	In accordance with the Surveillance Frequency Control program

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 (LPCS Injection Valve Permissive)	4, 5	1 [(a)]	C	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 482.7 psig and ≤ 607.7 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	≥ 1200 gpm
c. Reactor Vessel Pressure - Low (LPCI Injection Valve Permissive)	4, 5	1[(a)]	C	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 490.0 psig and ≤ 537.1 psig
d. LPCI Pump A Discharge Flow - Low (Bypass)	4, 5	1[(a)]	E	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 1450 gpm
e. 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	4, 5		C	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 490.0 psig and ≤ 537.1

(LPCI Injection Valve Permissive)		1 per subsystem (a)			psig for LPCI B and ≥ 490.0 psig and ≤ 537.1 psig for LPCI C
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	≥ 1450 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)]	2 [(a)]	D	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 90,300 gallons
b. HPCS Pump Discharge Pressure - High (Bypass)	4, 5	1 [(a)]	E	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 120 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	≥ 600 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	≥ 177.1 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	≥ 127.6 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 condensate storage tank.
(c) When automatic isolation of the associated penetration flow path(s) is credited in calculating DRAIN TIME.

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

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

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

In TS 3.3.6.1, Condition L (including Required Action L.1) and Required Actions J.2, J.3.1, J.3.2, J.3.3, and K.2, were proposed to be deleted. This is further addressed in Sections 2.2.5.7 and 2.2.5.8 (Variations 7 and 8) for Required Actions J.2, J.3.1 - J.3.3. Condition L and associated five Required Actions are related to OPDRV.

In Table 3.3.6.1-1, "Primary Containment and Drywell Isolation Instrumentation," the following instrumentation functions were proposed to be deleted or revised because they are associated to OPDRVs:

2. Primary Containment and Drywell Isolation

   a. Reactor Vessel Water Level - Low Low, Level 2
   c. Reactor Vessel Water Level - Low Low Low, Level 1 (ECCS Divisions 1 and 2)
   e. Reactor Vessel Water Level - Low Low, Level 2 (HPCS)
   g. Containment and Drywell Purge Exhaust Plenum Radiation - High
   h. Manual Initiation

5. Residual Heat Removal (RHR) System Isolation

   b. Reactor Vessel Water Level - Low, Level 3 (Applicable Mode 3 is maintained in this Table)

Footnote (c) for Table 3.3.6.1-1, "During operations with the potential for draining the reactor vessel" and Footnote (f), "Only one trip system required in MODES 4 and 5 with RHR Shutdown Cooling System Integrity maintained," are proposed to be deleted due to the reference to OPDRV. Footnote (d) is modified to remove the reference to OPDRV and is revised to state: "During movement of recent irradiated fuel assemblies in primary containment."

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

The title of PNPP 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 PNPP 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
C. DRAIN TIME < 36 hours and ≥ 8 hours.	C.1 Verify primary containment boundary is capable of being established in less than the DRAIN TIME. AND C.2 Verify each primary containment penetration flow path is capable of being isolated in less than the DRAIN TIME.	4 hours 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 primary containment boundary.	Immediately
	AND	
	D.3 Initiate action to isolate each primary containment penetration flow path or verify it can be manually isolated from the control room.	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		FREQUENCY
SR 3.5.2.1	Verify DRAIN TIME ≥ 36 hours.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.2	Verify, for a required low pressure ECCS injection/spray subsystem, the suppression pool water level is ≥ 16 ft 6 in.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.3	Verify, for a required High Pressure Core Spray (HPCS) System, the: a. Suppression pool water level is ≥ 16 ft 6 inches; or b. Condensate storage tank available water volume is ≥ 249,700 gal.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.4	Verify, for the required ECCS injection/spray subsystem, the piping is filled with water from the pump discharge valve to the injection valve.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.5	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.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.6	Operate the required ECCS injection/spray subsystem through the recirculation line for ≥ 10 minutes.	In accordance with the Surveillance Frequency Control Program
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.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.8	----------NOTE---------- Vessel injection/spray may be excluded. ---------- Verify the required LPCI or LPCS subsystem actuates on a manual injection signal, or the required HPCS subsystem can be manually operated.	In accordance with the Surveillance Frequency Control Program

2.2.4 Deletion of References to OPDRVs Term and Other Miscellaneous Changes

2.2.4.1 Deletion of References to OPDRVs Term

In the LAR, the licensee proposed to delete references to OPDRVs (or terms related to OPDRVs) throughout the PNPP TSs because they: (1) 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 (OPDRV)." The following table lists these TSs and their affected sections:

PNPP LCO	Location of OPDRVs References
3.3.6.1, Primary Containment and Drywell Isolation	Table 3.3.6.1-1, "Primary Containment and Drywell Isolation Instrumentation," Footnotes (c) and (f) – completely deleted; Footnote (d) revised to remove OPDRV reference. (see Section 2.2.2.4)
3.3.7.1, Control Room Emergency Recirculation (CRER) System Instrumentation	Table 3.3.7.1-1, "Control Room Emergency Recirculation System Instrumentation" Footnote (a) deleted. Footnote (b) was revised to: "During movement of recently irradiated fuel assemblies in the primary containment or fuel handling building." This affects Function 3, Control Room Ventilation Radiation Monitor (no longer required for OPDRVs).
3.6.1.2, Primary Containment Air Locks	Applicability, Condition E, Required Action E.2
3.6.1.3, Primary Containment Isolation Valves (PCIVs)	Condition G
3.6.1.10, Primary Containment - Shutdown	Applicability, Required Action A.2
3.6.1.11, Containment Vacuum Breakers	Applicability, Required Action B.2 Note, Required Action B.2.2
3.6.1.12, Containment Humidity Control	Applicability, Condition C, Required Action C.2
3.6.4.1, Secondary Containment	Applicability, Condition C, Required Action C.2
3.6.4.2, Secondary Containment Isolation Valves (SCIVs)	Applicability, Condition D, Required Action D.2
3.6.4.3, Annulus Exhaust Gas Treatment (AEGT) System	Applicability, Condition C, Required Action C.2.2, Condition E, Required Action E.2
3.7.3, Control Room Emergency Recirculation (CRER) System	Applicability, Condition D, Condition F, Required Actions D.2.2 and F.2
3.7.4, Control Room Heating, Ventilating, and Air Conditioning (HVAC) System	Applicability, Condition D, Condition E, Required Actions D.2.2 and E.2
3.8.2, AC Sources - Shutdown	Required Action A.2.3, Required Action B.3
3.8.5, DC Sources - Shutdown	Required Action A.2.3
3.8.10, Distribution Systems - Shutdown	Required Action A.2.3

2.2.4.2 Other Miscellaneous Changes

The licensee updated the title for TS 3.5.2 in TS 3.8.2, "AC Sources – Shutdown," to align with TSTF-542, Revision 2. The proposed change is shown below.

SR 3.8.2.1, Note 2:

> SR 3.8.1.12 and SR 3.8.1.19 are not required to be met when the associated ECCS subsystem(s) are not required to be OPERABLE per LCO 3.5.2, "Reactor Pressure Vessel (RPV) Water Inventory Control."

2.2.5 PNPP Plant-Specific TSTF-542, Revision 2, TS Variations

In Attachment 1, Section 2.2 (ADAMS Accession Nos. ML17347A788 and ML18207A268), the licensee identified several PNPP plant-specific TS variations from TSTF-542, Revision 2, or the NRC-approved TSTF-542 SE. The licensee stated in the submittal these variations do not affect the applicability of TSTF-542, Revision 2, or the NRC staff's SE to the proposed license amendment. Section 3.5 of this SE includes the staff's evaluation for each proposed licensee variation, as stated below.

2.2.5.1 Variation 1, TS Table 3.3.5.1-1, Functions 1.d, 1.e, and 2.d, reactor pressure versus dome pressure

> PNPP TS Table 3.3.5.1-1, Functions 1.d, 1.e, and 2.d are identified as low pressure coolant injection (LPCI) and low pressure core spray (LPCS) subsystem injection valve permissives for reactor vessel pressure low versus STS [Standard Technical Specifications] identified LPCI and LPCS functions for reactor steam dome pressure low as permissives.

2.2.5.2 Variation 2, TS Table 3.3.5.1-1, Functions 1.d and 1.e, injection valve permissive versus pressure permissive

> PNPP TS Table 3.3.5.1-1, Functions 1.d and 1.e address reactor vessel pressure low (injection valve permissives) for LPCS and LPCI, respectively, versus STS, Function 1.d that addresses both LPCS and LPCI injection (pressure) permissives as one function.

2.2.5.3 Variation 3, TS Table 3.3.5.1-1, Function 2.d, injection valve permissive versus modes

> PNPP TS Table 3.3.5.1-1, Function 2.d, addresses reactor vessel pressure low (LPCI injection valve permissive), which is applicable in Modes 1 through 5, versus STS Function 2.d that, as written, is only applicable in Modes 1 through 3. With the proposed changes, PNPP TS Table 3.3.5.1-1, Function 2.d, will only be applicable in Modes 1 through 3.

2.2.5.4 Variation 4, TS Table 3.3.5.1-1, Annulus Exhaust Gas Treatment (AEGT) System

> PNPP TS Table 3.3.5.1-1, Functions 1.a and 2.a currently reference Note (f), which is associated with PNPP TS 3.6.4.3, "Annulus Exhaust Gas Treatment (AEGT) System." Due to the PNPP design as a primary containment plant, the

AEGT system is not required to be operable during Modes 4 and 5 and will no longer be applicable during OPDRVS. As such, Note (f) will be deleted consistent with other TSTF-542 OPDRV-related changes.

2.2.5.5 Variation 5, TS 3.3.5.2, HPCS Level 8 and Manual Initiation

TS 3.3.5.2, "Reactor Pressure Vessel (RPV) Water Inventory Control Instrumentation," Table 3.3.5.2-1, is revised to reflect the PNPP 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 are not included in the proposed Technical Specifications. This variation corrects an error in TSTF-542 that affects the BWR/5 and BWR/6 ECCS instrumentation requirements.

2.2.5.6 Variation 6, TS 3.3.6.1, Primary Containment and Drywell Isolation Instrumentation, Required Action J.2

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

2.2.5.7 Variation 7, TS 3.3.6.1, Primary Containment, and Drywell Isolation Instrumentation, Required Action J.3

PNPP TS 3.3.6.1, "Primary Containment and Drywell Isolation Instrumentation," Required Action J.3.1 through J.3.3 will be deleted.

2.2.5.8 Variation 8, LCO 3.5.2 Note

The PNPP TSs do not contain a Note[3] on LCO 3.5.2 regarding realignment to the LPCI mode. The Note that is provided on LCO 3.5.2 in STS is limited to SR 3.5.2.4 in the PNPP TS. The proposed PNPP LCO 3.5.2 will include this Note, which is relocated from SR 3.5.2.4 to align with the STS. This is a minor variation, as the purpose of the Note is the same as the one described in the STS and the Note is applicable to the PNPP.

2.2.5.9 Variation 9, TSTF-542, Revision 2, TS 3.5.2, Required Actions C.3 and D.4

Optional Required Actions C.3 and D.4 from the TSTF-542 proposed changes to TS 3.5.2, will not be included. By design, the PNPP is a primary containment plant. As such, the action to "verify one standby gas treatment subsystem is capable of being placed in operation," which would be required to support secondary containment operability, is not required.

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[3] 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.

2.2.5.10 Variation 10, TS 3.6.1.2, Primary Containment Air Locks

PNPP TS 3.6.1.2, "Primary Containment Air Locks," currently includes in its Applicability, "During operations with a potential for draining the reactor vessel (OPDRVS)," which will be deleted consistent with other TSTF-542 changes. This PNPP TS also includes Required Action E.2, "Initiate action to suspend OPDRVs," which will also be deleted consistent with other TSTF-542 OPDRV-related changes.

2.2.5.11 Variation 11, TS 3.6.1.3, Primary Containment Isolation Valves (PCIVs)

The Applicability to TS 3.6.1.3, "Primary Containment Isolation Valves (PCIVs)," currently states:

> MODES 1, 2, and 3, when associated instrumentation is required to be OPERABLE per LCO 3.3.6.1, "Primary Containment and Drywell Isolation Instrumentation."

Though TSTF-542 relocated most of the non-Mode 1, 2, or 3 instrumentation requirements to LCO 3.3.5.2 [Note (d), "During movement of recently irradiated fuel assemblies in primary containment," remains in Table 3.3.6.1-1], the Applicability statement remains applicable for Condition F when PCIVs are required to be OPERABLE during movement of recently irradiated fuel assemblies in primary containment. Condition G, which only applies to conditions in Mode 4 and 5 or during OPDRVS, is deleted in its entirety. This is considered an administrative variation and is consistent with other TSTF-542 OPDRV-related changes.

2.2.5.12 Variation 12, TS 3.6.10, Primary Containment - Shutdown

STS and TSTF-542 do not have a corresponding TS 3.6.1.10, "Primary Containment - Shutdown." PNPP TS 3.6.1.10 currently includes in its Applicability, "During operations with a potential for draining the reactor vessel (OPDRVs)," which will be deleted consistent with other TSTF-542 changes. This PNPP TS also includes Required Action A.2, "Initiate action to suspend OPDRVs," which will also be deleted consistent with other TSTF-542 OPDRV-related changes. By design, the PNPP is a primary containment plant. During shutdown, the primary containment performs a similar function to the secondary containment in other boiling water reactor designs.

2.2.5.13 Variation 13, TS 3.6.1.11, Containment Vacuum Breakers

STS and TSTF-542 do not have a corresponding TS 3.6.1.11, "Containment Vacuum Breakers." PNPP TS 3.6.1.11 currently includes in its Applicability, "During operations with a potential for draining the reactor vessel (OPDRVs)," which will be deleted consistent with other TSTF-542 changes. This PNPP TS also includes Required Action B.2.2, "Initiate action to suspend OPDRVs," which will also be deleted consistent with other TSTF-542 OPDRV-related changes.

2.2.5.14 Variation 14, TS 3.6.1.12, Containment Humidity Control

> STS and TSTF-542 do not have a corresponding TS 3.6.1.12, "Containment Humidity Control." PNPP TS 3.6.1.12 currently includes in its Applicability, "During operations with a potential for draining the reactor vessel (OPDRVS)," which will be deleted consistent with other TSTF-542 changes. This PNPP TS also includes Required Action C.2, "Initiate action to suspend OPDRVs," which will also be deleted consistent with other TSTF-542 OPDRV-related changes.

2.2.5.15 Variation 15, Required Channels per Function, TSTF-542, Revision 2, Table 3.3.5.2-1

In the supplemental letter dated July 24, 2018, the licensee clarified variations for the proposed PNPP TS Table 3.3.5.2-1, LPCI-A/LPCS Function 1.e – Manual Initiation and LPCI-B/LPCI-C and Function 2.c – Manual Initiation, regarding the Required Channels per Function nomenclature specified in TSTF-542, which is "[1 per subsystem]," as opposed to "1" in PNPP TSs.

Also, for the proposed PNPP TS Table 3.3.5.2-1, LPCI-B/LPCI-C Function 2.a - Reactor Pressure Vessel – Low (LPCI Injection Valve Permissive), the Required Channels per Function nomenclature specified in TSTF-542, is "[3]" as opposed to "1 per subsystem" in PNPP TSs.

2.3 Applicable Regulatory Requirements and Guidance

The regulation at Title 10 of the *Code of Federal Regulations* (10 CFR), Section 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)(1)(i)(a), TSs will include items in the following categories:

> (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 limiting conditions for operation (LCOs), which are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When a limiting condition for operation of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the TSs until the condition can be met.

The regulation at 10 CFR 50.36(c)(2)(ii) requires licensees to establish TS LCOs for items meeting one or more of the listed criteria. For example, Criterion 4, "A structure, system, or component which operating experience or probabilistic risk assessment has shown to be

significant to public health and safety." This criterion supports the establishment of LCOs for RPV WIC due to insights gained via operating experience.

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.

Pursuant to 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 governed in particular 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 applicable and appropriate. The general considerations that guide the Commission include, as stated in 10 CFR 50.40(a), how the TSs provide reasonable assurance 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 finding 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.

NUREG-1434, Revision 4 (ADAMS Accession Nos. ML12104A195 and ML12104A196), contains the STS for BWR/6 plants; and is part of the regulatory standardization effort. The NRC staff has prepared STS for each of the light-water reactor nuclear designs. The TSTF changes would be incorporated into future revisions of NUREG-1434, Volumes 1 and 2.

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" (SRP), dated March 2010 (ADAMS Accession No. ML100351425).

2.3.1 PNPP Applicable Design Requirements

PNPP Updated Safety Analysis Report (USAR), Section 3.1. "Compliance with NRC General Design Criteria," describes an evaluation of the design basis of PNPP as measured against the NRC General Design Criteria [GDC] for Nuclear Power Plants, Appendix A of 10 CFR, Part 50, effective May 21, 1971, and subsequently amended July 7, 1971. The following criteria from the PNPP USAR 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 (RCPB) shall be designed, fabricated, erected, and tested so as to have an extremely low probability of abnormal leakage, rapidly propagating failure, and gross rupture.

Criterion 30 – "Quality of Reactor Coolant Pressure Boundary"

Components which are part of the RCPB 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 RCPB 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: (1) fuel and clad damage that could interfere with continued effective core cooling is prevented, and (2) 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 above lists the proposed TS changes, as included in the LAR, 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 in Section 2.2.1 above, 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 the TSTF-542, Revision 2. For the purpose of 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, Revision 2. Based on information furnished by the licensee, the staff has determined that the licensee is appropriately adopting the principles of DRAIN TIME as specified in TSTF-542, Revision 2.

With the adoption of the DRAIN TIME definition in accordance with TSTF-542, it is expected that all RPV penetrations below TAF will be included in the determination of drain time as potential pathways. As part of this evaluation, the NRC 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 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. Therefore, the NRC staff has determined that the licensee's proposed addition of the DRAIN TIME definition to the PNPP 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 PNPP TSs and the NRC staff finds this to be acceptable.

The purpose of the proposed new TS 3.3.5.2 regarding RPV WIC instrumentation, is to support the requirements of revised TS 3.5.2, and the proposed new definition of DRAIN TIME. There are instrumentation and controls functions that are required for manual pump starts or required as a permissive or operational controls on the equipment of the systems that provide water injection capability, certain start commands, pump protection, and isolation functions. These instruments 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 PNPP, 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 time frames assumed in the development of TSTF-542, Revision 2. For PNPP, operators have manual push buttons that automatically align reactor injection for Modes 1, 2, and 3 (LPCS, LPCI, and HPCS subsystem). PNPP proposed to maintain manual push buttons that automatically align reactor injection for Modes 4 and 5 for LPCS and LPCI, and 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, and LPCI C, LPCS, and HPCS, including manual alignment for HPCS when needed. Also, TS 3.3.5.2 supports the system isolation of the RHR system and the RWCU system. The equipment involved with each of these systems is described in the evaluation of TS 3.5.2 and the Bases for TS 3.5.2 (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, the licensee proposed a new TS 3.3.5.2 to provide alternative instrumentation requirements to support manual initiation of the LPCI and LPCS subsystems and manual alignment of the HPCS injection/spray subsystem and 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 Table 3.3.5.1-1, TS Table 3.3.6.1-1, and TS Table 3.3.7.1-1. The requirements from Tables 3.3.5.1-1 and Table 3.3.6.1-1 would be consolidated into the new TS 3.3.5.2. The references to OPDRVs requirements in Tables 3.3.6.1-1, and 3.3.7.1-1 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."

The TSTF-542, Revision 2, selected Table 3.3.5.2-1 to contain those instrumentation Functions needed to support manual initiation or 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. If plant-specific design and TSs require different functions to support manual initiation or manual alignment of an ECCS subsystem, those functions should be included in TS 3.3.5.2.

The NRC staff concludes that the licensee's proposed alternative is acceptable for PNPP because either HPCS, LPCS, or LPCI (or all three) subsystems would be available to perform the intended function to inject water into the RPV; therefore, this meets the intent of the NRC-approved TSTF-542, Revision 2.

3.2.2 Staff Evaluation of Proposed TS 3.3.5.2 Actions

Section 2.2.2.2 of this safety evaluation identifies 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 evaluated are:

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 re-calculation of DRAIN TIME, but automatic isolation of the affected penetration flow paths cannot be credited.

Action C (concerning LPCS and LPCI reactor pressure low permissive functions necessary for ECCS subsystem manual initiation or alignment) addresses an event in which the permissive is inoperable and manual start of ECCS using the control board switches is prevented. The function must be placed in the trip condition within 1 hour. With the permissive function instrument in trip condition, and manual pump injection may now be performed using the preferred control board switches. The 1 hour completion time is acceptable since the reactor operator can take manual control of the pump and the injection valve to inject water into the RPV and achieve the safety function. The time of 1 hour also provides reasonable time for the operator to evaluate and 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 have the ability to detect low-water setpoint in the condensate storage tank and actuate valves to realign HPCS suction water source to the suppression pool. The Condensate Storage Tank Level [CST] - Low Function indicates multiple, inoperable channels within the same function resulting in a loss of the automatic ability to swap suction 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 provides sufficient time to take the action in order to minimize the possible risk of HPCS being needed without an adequate water source by allowing time for restoration or alignment of the HPCS pump suction to the suppression pool.

Action E (concerning LPCS/LPCI/HPCS pump discharge flow bypass functions, HPCS discharge pressure high 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.

Also, Action E (concerning LPCS/LPCI manual initiation function) 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 is acceptable because the functions can be performed manually and it allows time for the operator to evaluate the situation and have necessary repairs completed.

Action F would apply if the Required Action and associated Completion Time of Conditions C, D, or E are not met. If they are not met, then the associated ECCS injection/spray subsystem may be incapable of performing the 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 remedial actions permitted by the TS until the LCO can be met. The NRC concludes 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. Because this satisfies a requirement of 10 CFR 50.57(a)(3)(i), 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.

SR 3.3.5.2.1 would require a Channel Check and applies to all functions, expect LPCI/LPCS manual initiation logic. Performance of the Channel Check would ensure that a failure of the instrumentation has not occurred. A Channel Check is normally a comparison of the parameter indicated on one channel to a similar parameter on other related channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviation between the instrument channels could be an indication of excessive instrument drift in one of the channels or something even more serious. The frequency is in accordance with the Surveillance Frequency Control Program (SFCP), which is consistent with the existing requirements and supports operating shift situational awareness.

SR 3.3.5.2.2 would require a Channel Functional Test and applies to all functions, expect LPCI/LPCS manual initiation logic. A Channel Functional Test is performed on each required channel to ensure that the entire channel with perform the intended function. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contract of the relay. The frequency is in accordance with the SFCP.

SR 3.3.5.2.3 requires a Logic System Functional Test and is only applied to the manual initiation logic for LPCI/LPCS to demonstrate the operability of the required initiation logic for a specific channel. The frequency is in accordance with the SFCP. Note that the LPCI/LPCS subsystem functional manual initiation signal testing performed in proposed SR 3.5.2.8 overlaps with this surveillance. This will complete testing of the safety function.

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 finds that the proposed SRs of TS 3.3.5.2 are acceptable and concludes that these SRs satisfy 10 CFR 50.36(c)(3) by providing the specific SRs relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained.

The TSTF-542, Revision 2, 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 there is no accident analysis on which to base the calculation of a setpoint. The purpose of the TS 3.3.5.2 functions 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 has determined that the Mode 3 allowable value and established calibration intervals are adequate to ensure that the channel responds with the required pumping systems to inject water when needed and isolation equipment to perform when commanded.

The ECCS response time (PNPP TS 3.5.1, "ECCS - Operating," SR 3.5.1.8) and Isolation System Response Time (PNPP TS 3.3.6.1, "Primary Containment and Drywell Isolation

Instrumentation," SR 3.3.6.1.6) 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 are to ensure that the individual channel response times are less than or equal to the maximum values assumed in the accident analysis, but a draining event in Modes 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.

Based on the above, the NRC staff concludes that the proposed SRs of TS 3.3.5.2 satisfy 10 CFR 50.36(c)(3) by providing the specific SRs relating to test, calibration, or inspection to assure that the necessary operability of systems and components is maintained and are, therefore, acceptable.

3.2.4 Staff Evaluation of Proposed Table 3.3.5.2-1, "Reactor Pressure Vessel (RPV) Water Inventory Control Instrumentation"

Table 3.3.5.2-1 includes the instrumentation requirements to support TS 3.5.2. These instruments would be required to be operable if the systems that provide water injection and isolation functions were to be 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 to be 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., Conditions 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 NRC staff finds this RPV WIC instrumentation set is acceptable, because the instrument channels will respond with the required accuracy 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 LPCI and LPCS ECCS subsystems in Modes 4 and 5 can be started by manual pushbutton. Each of the ECCS subsystems (including HPCS) in Modes 4 and 5 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 (gpm). Thus, manual actuation is preferable and there is adequate time to take 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 DRAIN TIME is less than 1 hour), there is sufficient time for the reactor operators to perform 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 is acceptable because a draining event is a slow evolution when compared to a design basis 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, 1.c, and 2.a in proposed TS Table 3.3.5.2-1, are low RPV pressure instrumentation for LPCS, LPCI A, and LPCI B/C, respectively. They are used as injection 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 RPV pressure will be below the ECCS maximum design pressure, the RPV low signal are assumed to be operable and capable of permitting initiation of the ECCS. The RPV pressure low injection valve permissive signals are initiated from one pressure transmitter for each low pressure ECCS system that sensed the reactor pressure. The allowable value is low enough to prevent the over-pressurization of a low pressure ECCS subsystem.

The proposed allowable values (previously found in TS Table 3.3.5.1-1) are as follows:

LPCS	≥ 482.7 psig [pounds per square inch gauge] and ≤ 607.7 psig	Table 3.3.5.2-1, Function 1.a
LPCI A	≥ 490.0 psig and ≤ 537.1 psig	Table 3.3.5.2-1, Function 1.c
LPCI B/C	≥ 490.0 psig and ≤ 537.1 psig	Table 3.3.5.2-1, Function 2.a

The instruments for Table 3.3.5.2-1, Functions 1.b, 1.d, and 2.b, 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 subsystem's flow rates. The logic is arranged such that each transmitter will cause its associated minimum flow valve to open. The logic will close the minimum flow valve once the setpoint for closure is exceeded. The LPCI minimum flow valves are time delayed, such that the valves will not open for 8 seconds after the transmitter and its associated trip unit detect low flow.

The proposed allowable values (previously found in TS Table 3.3.5.1-1) are as follows:

LPCS	≥1200 gpm	Table 3.3.5.2-1, Function 1.b
LPCI A	≥ 1450 gpm	Table 3.3.5.2-1, Function 1.d
LPCI B/C	≥ 1450 gpm	Table 3.3.5.2-1, Function 2.b

For Table 3.3.5.2-1, Functions, 1.e and 2.c, LPCS and LPCI systems manual initiation, respectively, the manual initiation pushbutton 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 manual initiation function is not assumed in any accident or transient analyses described in the USAR. However, the function is retained for overall redundancy and diversity of the low pressure ECCS function as required by the NRC in the plant licensing basis. There is no Allowable Value for this function since the channels are mechanically actuated based solely on the position of the push buttons. Each channel of the manual initiation function (one channel per division) is required to be Operable when the associated ECCS is required to be Operable.

For Table 3.3.5.2-1, Function 3.a, HPCS System, Condensate Storage Tank Level – Low, the low level signal in the CST indicates the unavailability of an adequate supply of makeup water from the normal source. Normally, the suction valve between the HPCS and the CST is open and, upon receiving a HPCS initiation signal, water for HPCS injection initiation would be taken from the CST. However, if 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. CST level low signals are initiated from two level transmitters.

For Table 3.3.5.2-1, Function 3.a, the proposed allowable value is 90,300 gallons which is high enough to ensure adequate pump suction head while water is being taken from the CST. Two channel of the CST level low function are required to be operable when HPCS is required to be operable to ensure that no single instrument failure can preclude HPCS swap to the suppression pool.

For Table 3.3.5.2-1, Functions 3.b and 3.c, HPCS system, HPCS Pump Discharge Pressure - High (Bypass) and HPCS System Flow Rate - Low (Bypass), the minimum flow instruments are provided to protect the HPCS pump from overheating when the pump is operating and the associated injection valve is not fully open. The minimum flow line valve is opened when low flow and high pump discharge pressure are sensed, and the valve is automatically closed when the flow rate is adequate to protect the pump or the discharge pressure is low (indicating the HPCS pump is not operating).

The Table 3.3.5.2-1, Function 3.b, HPCS high pressure function, allowable value is 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 allowable value is ≥ 120 psig and the existing required channels per function is one, as described in PNPP TS Table 3.3.5.1-1. The proposed allowable value remains at ≥ 120 psig and the proposed required channels per function remains at one.

The Table 3.3.5.2-1, Function 3.c, HPCS low flow function allowable value is 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 allowable value is ≥ 600 gpm and the existing required channels per function is one, as described in PNPP TS Table 3.3.5.1-1. The proposed allowable value remains at ≥ 600 gpm and the proposed required channels per function remains at one.

Table 3.3.5.2-1, Function 4.a, RHR system isolation, Reactor Vessel Water Level - Low, Level 3, is 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 dropping below the TAF, but if the instrument function is inoperable, a closed path cannot be credited and a DRAIN TIME calculation must be re-performed. The existing allowable value is ≥ 177.1 inches and the existing required channels per function is two, as described in PNPP TS Table 3.3.6.1-1. The proposed allowable value remains at ≥ 177.1 inches and the proposed required channels per function changes to two in a one-trip system.

Table 3.3.5.2-1, Function 5.a, RWCU system isolation, Reactor Vessel Water Level - Low Low, Level 2, is 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 dropping below the TAF, but if the instrument function is inoperable, a closed path cannot be credited and a DRAIN TIME calculation must be reperformed. This function is not applicable in Modes 4 or 5 in TS 3.3.6.1 but is being added to TS 3.3.5.2 to support crediting the automatic isolation of the RWCU system in calculating DRAIN TIME. The existing allowable value is ≥ 127.6 inches and the existing required channels per function is two, as described in PNPP TS Table 3.3.6.1-1. The proposed allowable value remains at ≥ 127.6 inches and the proposed required channels per function is changed to two in a one-trip system.

3.2.5 Staff Conclusion for Proposed TS 3.3.5.2

The NRC staff reviewed the proposed changes to TS 3.3.5.2 and finds them acceptable based on the actions that will be taken to ensure that the RPV WIC instrumentation will be operable. TS 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 can be conducted without endangering the health and safety of the public. Therefore, the LCO meets the requirements of 10 CFR 50.36(c)(2)(i) and 50.57(a)(3)(i).

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 TS 3.5.2.

The 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 subsystem 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/start of an ECCS pump would provide the necessary water source to counter these expected drain rates. The LPCI subsystem (LPCI A or LPCI B subsystems) are considered to be operable to perform its safety function while it is aligned and operating for decay heat removal if it is capable of being manually realigned. Decay heat removal in Modes 4 and 5 is not affected by the proposed PNPP TS change as the requirements on the number of RHR shutdown cooling subsystems that must be operable to ensure adequate decay heat removal (DHR) from the core are unchanged. These requirements can be found in the PNPP 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," TS 3.9.8, "Residual Heat Removal (RHR) - High Water Level," and TS 3.9.9, "Residual Heat Removal (RHR) - Low Water Level." These PNPP DHR 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," TS 3.9.8, "Residual Heat Removal (RHR) - High Water Level," and TS 3.9.10, "Residual Heat Removal (RHR) - Low Water Level." 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 which meet previously stated regulatory requirements.

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 TAF shall be ≥ 36 hours, and the second part states that one 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 addition of this note and removal of a similar note from existing SR 3.5.2.4 is evaluated in Section 3.5.2 of this SE (Variation 8).

The NRC staff reviewed the proposed TS 3.5.2, focusing on ensuring that the fuel remains covered with water and on the changes made compared 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 two ECCS injection/spray subsystems shall be operable, whereas, the proposed LCO 3.5.2 states that one 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 that redundancy is not required. With one ECCS injection/spray subsystem and nonsafety-related injection sources, defense-in-depth (DID) will be maintained. The DID 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 because the TS requirements on ECCS in Modes 1, 2, and 3 are unaffected.

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. 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 (C.1) verify the primary containment boundary is capable of being established in less than the DRAIN TIME with a completion time of 4 hours, and (C.2) verify each primary containment penetration flow path is capable of being isolated 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 primary containment, isolate additional flow paths, and have the annuals exhaust gas treatment subsystem capable of being placed in operations.

The proposed Condition D states that when DRAIN TIME < 8 hours to (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 (D.2) immediately initiate action to establish primary containment boundary, and (D.3) immediately initiate action to isolate each primary containment penetration flow path or verify it can be manually isolated from the control room. 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 PNPP Condition D is similar to the proposed for when Required Action C.2 is not met. The proposed Condition D provides adequate protection should the DRAIN TIME be < 8 hours because of the ability to establish an additional method of water injection (without offsite electrical power), establish primary containment, and isolate additional flow paths.

The proposed Condition E states that when the required action and associated completion time of Conditions 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 and is not present in the current PNPP TS. The proposed Condition E is acceptable.

The NRC staff reviewed the proposed changes to TS 3.5.2 and finds them acceptable based on the actions that will be taken to mitigate the water level reaching the TAF with the water sources available and maintaining DRAIN TIME ≥ 36 hours. LCO 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 can be conducted without endangering the health and safety of the public.

3.3.1 Staff Evaluation of Proposed TS 3.5.2 SRs

The proposed TS 3.5.2 SRs includes verifications of DRAIN TIME, of water levels/volumes that support LPCS system and LPCI injection subsystems, water levels/volumes that support HPCS system, water filled pipes to preclude water hammer events, correct valves positions for the required ECCS injection/spray subsystem, operations of ECCS injection/spray systems through the recirculation line, valves credited for automatic isolation actuated to the isolation position, and required ECCS injection/spray subsystem can be manually initiated or operated. Each of the eight SRs are described below.

SR 3.5.2.1: The DRAIN TIME would be determined or calculated, and required to be verified to be ≥ 36 hours in accordance with the SFCP. 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.

SR 3.5.2.2: The suppression pool water level (≥ 16 feet, 6 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 is available for the LPCI subsystem and LPCS system required to be operable by the LCO. Indications are available either locally or in the control room regarding suppression pool water level. This surveillance would be required to be performed in accordance with the SFCP.

SR 3.5.2.3: The suppression pool water level (≥ 16 feet, 6 inches) or CST level (≥ 249,700 gallons) for a required HPCS system is to be verified to ensure pump net positive suction head and vortex prevention is available for the HPCS subsystem required to be operable by the LCO. Indications are available either locally or in the control room regarding suppression pool water level and CST water level. This surveillance is required to be performed in accordance with the SFCP.

SR 3.5.2.4: 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 "Verify, for each required ECCS..." to "Verify, for the required ECCS..." This change clarifies the requirement to maintain consistency with the proposed LCO. Maintaining the pump discharge lines of the required ECCS injection/spray subsystem sufficiently full of water ensures that the ECCS subsystem will perform properly. One acceptable method of ensuring that the lines are full is to vent at the high points. This surveillance would be required to be performed in accordance with the SFCP.

SR 3.5.2.5: 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, "Verify, for the required ECCS injection/spray subsystem, each manual,..." would replace "Verify each required ECCS injection/spray subsystem manual, . . . " SR 3.5.2.5 would provide assurance that the proper flow path will be available for ECCS operation to support TS 3.5.2. This SR would not apply to valves that are locked, sealed, or otherwise secured in position since these valves would be verified to be in the correct position prior to locking, sealing, or securing. This surveillance would be required to be performed in accordance with the SFCP.

SR 3.5.2.6: The required ECCS injection/spray subsystem would be required to be operated through its recirculation line for ≥ 10 minutes in accordance with the SFCP. This would demonstrate that the subsystem is capable of operation to support TS 3.5.2, RPV water inventory control. Testing the ECCS injection/spray subsystem through the recirculation line is necessary to avoid overfilling the refueling cavity. The minimum operating time of 10 minutes is based on engineering judgment.

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. This surveillance is required to be performed in accordance with the SFCP.

SR 3.5.2.8: This SR would state, "Verify the required LPCI or LPCS subsystem actuated on a manual injection signal, or the required HPCS subsystem can be manually operated." It would demonstrate that the required ECCS subsystem could be manually initiated (LPCI/LPCS) or manually aligned (HPCS) to provide additional RPV water inventory, if needed. For HPCS, the RPV high water level (Level 8), can be overridden by plant operators, if required (see Variation 5). By operating the associated pump and valve switches which operates all active components, water flow can be demonstrated by recirculation through the test line. Vessel injection/spray may be excluded from the SR, per the existing Note. The manual initiation push button for the HPCS system is not used to satisfy this SR (see Variation 5, Sections 2.2.5.5 and

3.5.5 of this SE). This surveillance would be required to be performed in accordance with the SFCP.

The NRC staff evaluated each of these proposed SRs associated with the proposed 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 staff concluded that each of the proposed SRs are acceptable since they meet the requirements of 10 CFR 50.36(c)(2)(ii) regarding insights gained via operating experience and 10 CFR 50.36(c)(3) for SRs by ensuring that the necessary quality of systems and components are maintained.

3.4 Staff Evaluation of TS Table 3.3.5.1-1, "ECCS Instrumentation"

The TS LCO 3.3.5.1, currently states, "The ECCS instrumentation for each Function in Table 3.3.5.1-1, shall be OPERABLE," with the applicability as stated in the table. Table 3.3.5.1-1, "Emergency Core Cooling System Instrumentation," currently contains requirements for function operability during Modes 4 and 5 when the associated ECCS subsystem(s) are required to be operable per LCO 3.5.2, "ECCS - Shutdown."

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

FUNCTION	FUNCTIONS 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 (LPCS Injection Valve Permissive)	No	Function 1.a
e. Reactor Vessel Pressure - Low (LPCI Injection Valve Permissive)	No	Function 1.c
f. LPCS Pump Discharge Flow - Low (Bypass)	No	Function 1.b
g. LPCI Pump A Discharge Flow - Low (Bypass)	No	Function 1.d
h. Manual Initiation	No	Function 1.e
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 (LPCI Injection Valve 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, 7 TS functions above would be deleted to support the consolidation of RPV WIC instrumentation requirements into proposed new TS 3.3.5.2. The remaining 11 TS 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 PNPP 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 adversely overfilling the refueling cavity or water flowing into the main steam lines, potentially damaging plant equipment. The NRC staff finds the proposed TS function deletions to be acceptable because manual ECCS initiation is preferred to automatic initiation during Modes 4 and 5 plant conditions.

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."
>
> Footnote (f), which states, "When associated AEGT subsystems are required to be OPERABLE per LCO 3.6.4.3, Annulus Exhaust Gas Treatment (AEGT) System."

The NRC staff finds the deletion of TS Table 3.3.5.1-1, Functions 1.a, 2.a, and 3.a, and associated Footnote (a) to be acceptable 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. The NRC staff finds the deletion of TS Table 3.3.5.1-1 Footnote (c) acceptable because this is no longer needed in this Table (in accordance with TSTF-542, Revision 2, 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, for the LPCI A and B pump start time delay relays to be acceptable. 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 manual initiations Function 3.h and HPCS vessel water high Level 8 interlock (Function 3.c) are evaluated in Variation 5, Section 3.5.5, of this SE.

The deletion of Footnote (f) is described in Variation 4, Section 3.5.4, of this SE.

3.5 NRC Staff Evaluation of Licensee Proposed Technical Variations

The licensee proposed the following technical variations from the TS changes described in TSTF-542, Revision 2, 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, Revision 2, or the NRC staff's SE for TSTF-542 to the proposed LAR. The NRC staff evaluated each variation below.

3.5.1 Variation 1, TS Table 3.3.5.1-1, Functions 1.d, 1.e, and 2.d, reactor pressure versus dome pressure

The PNPP TS Table 3.3.5.1-1, Functions 1.d, 1.e, and 2.d, are identified as LPCI and LPCS subsystem injection valve permissives on RPV low, respectively, versus STS identified LPCI and LPCS functions for reactor steam dome pressure low.

The NRC staff finds that the differences in the name of these functions is acceptable because this is how they are identified in the existing license. This is an acceptable variation and does not change the conclusion that TSTF-542 is applicable to the PNPP TS. Therefore, the NRC staff finds proposed Variation 1 to be acceptable.

3.5.2 Variation 2, TS Table 3.3.5.1-1, Functions 1.d and 1.e, injection valve permissive versus pressure permissive

The PNPP TS Table 3.3.5.1-1, Functions 1.d and 1.e, address reactor vessel pressure low (injection valve permissives) for LPCS and LPCI, respectively, versus STS Function 1.d, that addresses both LPCS and LPCI injection (pressure) permissives as one function.

The NRC staff reviewed Variation 2 and finds it acceptable based upon the PNPP TS injection permissive functions for LPCS and LPCI, though separate, are equivalent to STS 3.3.5.1, Function 1.d. Therefore, the NRC staff finds proposed Variation 2 to be acceptable.

3.5.3 Variation 3, TS Table 3.3.5.1-1, Function 2.d, injection valve permissive versus modes

The PNPP TS Table 3.3.5.1-1 , Function 2.d, addresses RPV low (LPCI injection valve permissive), which is applicable in Modes 1 through 5, versus STS Function 2.d, that, as written, is applicable in Modes 1 through 3. With the proposed changes, PNPP TS Table 3.3.5.1-1, Function 2.d, will be applicable in Modes 1 through 3.

With the proposed changes, PNPP TS Table 3.3.5.1-1, Function 2.d, will be applicable in Modes 1 through 3. Further, PNPP will include this injection permissive function into the proposed TS Table 3.3.5.2-1 as Function 2.a, with applicable Modes 4 and 5 since this function is needed for support of manual operations of the LPCI B and C subsystems. The NRC staff finds that the differences in the applicability mode for Table 3.3.5.2-1, Function 2.d, is acceptable because this is consistent with the existing license. This variation does not change the conclusion that TSTF-542 is applicable to the PNPP TS. Therefore, the NRC staff finds Variation 3 acceptable.

3.5.4 Variation 4, TS Table 3.3.5.1-1, AEGT System

The PNPP TS Table 3.3.5.1-1, Functions 1.a and 2.a, currently reference Note (f), which is associated with PNPP TS 3.6.4.3, "Annulus Exhaust Gas Treatment (AEGT) System." Due to the PNPP design as a primary containment plant, the AEGT system is not required to be operable during Modes 4 and 5 and will no longer be applicable during OPDRVS. As such, Note (f) will be deleted consistent with other TSTF-542, Revision 2, OPDRV-related changes.

The NRC staff reviewed Variation 4 and finds that Note (f) to PNPP Table 3.3.5.1-1 applies to modes that would be deleted per TSTF-542. Therefore, the NRC staff finds the deletion of Note (f) acceptable as it would not apply to any other Functions in Table 3.3.5.1-1.

3.5.5 Variation 5, TS 3.3.5.2, HPCS Level 8 and Manual Initiation

The TS 3.3.5.2, "Reactor Pressure Vessel (RPV) Water Inventory Control Instrumentation," Table 3.3.5.2-1, is revised to reflect the PNPP design. Function 3, 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 variation corrects an error identified in TSTF-542, Revision 2, which 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 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 Table 3.3.5.2-1.

The PNPP 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 desired 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 limit specified in TS 3.5.2, Condition E. Consequently, Functions 3.a and 3.e, instrumentation functions are not needed to actuate the HPCS subsystem components to mitigate a draining event.

Based on the evaluation above, the NRC staff finds that the HPCS Manual Initiation Function (Function 3.e) and HPCS Vessel Water Level 8 Function (Function 3.a) can be deleted.

The ability to override the HPCS Level 8 isolation is part of the existing PNPP emergency operating procedures. In addition, SR 3.5.2.8 is revised to assure that the HPCS manual start capability is tested. The manual initiation functions for the other low pressure subsystems are maintained. Therefore, the NRC staff finds the deletion of these functions for HPCS to be acceptable. Table 3.3.5.2-1, Functions 3.a and 3.e, as described in TSTF-542, Revision 2, are not needed to actuate the HPCS subsystem components to mitigate a draining event and, therefore, are not included in the proposed Table 3.3.5.2-1 for PNPP. NRC staff finds that

TS 3.3.5.2, Condition E, and associated Required Actions E.1, and E.2, will be 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 proposed Variation 5 to be acceptable.

3.5.6 Variation 6, TS 3.3.6.1, Primary Containment and Drywell Isolation Instrumentation, Required Action J.2

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

The Required Action J.2 is an 'OR' action directly below Required Action J.1, states to immediately "initiate 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," 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 (Required Action A.1). Therefore, Required Action J.2 will be deleted.

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 vessel 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 uncovery would not result and radiological consequences are bounded by the LOCA and main steam line break accidents.

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 an Action to restore channel to operable status. In addition, based on the requirements of PNPP TS 3.3.6.1, Required Action J.2 being similar to credited actions for manual isolation of RHR/SDC in current PNPP TSs 3.5.1 and TS 3.3.6.1, Required Action J.2 not aligning with the RHR/SDC requirements in PNPP TS 3.4.9. NRC staff finds proposed Variation 6 (the deletion of Required Action J.2) to be acceptable.

3.5.7 Variation 7, TS 3.3.6.1, Primary Containment and Drywell Isolation Instrumentation, Required Action J.3

The PNPP TS 3.3.6.1, "Primary Containment and Drywell Isolation Instrumentation," Required Action J.3.1, "Initiate action to restore primary containment to OPERABLE status," Required Action J.3.2, "Initiate action to restore isolation capability in each required primary containment penetration flow path not isolated," and Required Action J.3.3, "Initiate action to close one door in each primary containment air lock," are no longer required and, therefore, will be deleted.

Currently, PNPP primary containment is required to be operable in Modes 1, 2, and 3 and during OPDRVS. For primary containment to be operable, the primary containment penetration flow paths are required to be isolated, and at least one primary containment airlock door is required closed. With the deletion of OPDRVs and the Modes 4 and 5 requirements from Table 3.3.6.1-1, Function 5.b, these required actions (J.3.1, J.3.2, and J.3.3) no longer apply. In addition, the proposed TS LCO 3.3.5.2 and Table 3.3.5.2-1 contain the necessary primary containment isolation requirements. Therefore, the NRC staff finds proposed Variation 7 to be acceptable.

3.5.8 Variation 8, LCO 3.5.2 Note

The PNPP TSs do not contain a Note on LCO 3.5.2 regarding realignment to the LPCI mode. The Note that is provided on LCO 3.5.2 in STS is limited to SR 3.5.2.4. The proposed PNPP LCO 3.5.2 will include this Note, which is relocated from SR 3.5.2.4 to align with the STS. This is a minor variation as the purpose of the Note is the same as the one described in the STS and the Note is applicable to the PNPP.

Proposed TS 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.

Existing Note for TS SR 3.5.2.4, states:

> One 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 finds that the added Note (directly below the DRAIN TIME and ECCS requirements) to LCO 3.5.2 associated with the LPCI subsystem is appropriate and is consistent with TSTF-542, Revision 2, which places this note within the LCO. Without the note, the associated RHR pump would be declared inoperable, which would be contrary to the intent of the existing note for SR 3.5.2.4 that allows the LPCI subsystem to be Operable when aligned for decay heat removal. Therefore, the NRC staff finds proposed Variation 8 to be acceptable.

3.5.9 Variation 9, TSTF-542, TS 3.5.2, Required Actions C.3 and D.4

Optional Required Actions C.3 and D.4 from the TSTF-542, Revision 2, proposed changes to TS 3.5.2, will not be included. By design, the PNPP is a primary containment plant and as such, the action to "verify one standby gas treatment subsystem is capable of being placed in operation," which would be required to support secondary containment operability is not required.

The PNPP primary containment consists of a free standing steel cylinder with an ellipsoidal dome (as previously described in Section 3.5.4 of this SE). The free standing containment does not have a standby gas treatment subsystem which is part of the existing licensing bases. In Modes 4 and 5, the probability and consequences of the LOCA are reduced due to the pressure and temperature limitations in these modes. Therefore, maintaining primary containment Operable is not required in Modes 4 or 5 to ensure a control volume except for other situations for which significant releases of radioactive material can be postulated, such as during

movement of recently irradiated fuel assemblies in the primary containment, or during operations with a potential for draining the reactor vessel (OPDRVs). TSTF-542, Revision 2, removes the requirements for a standard BWR/6 to required Secondary Containment to be Operable for OPDRVs. The NRC staff concludes this variation does not change the conclusion of TSTF-542, Revision 2; therefore, TS LCO 3.5.2, Required Actions C.3 and D.4 can be deleted. The NRC staff finds proposed Variation 9 to be acceptable.

3.5.10 Variation 10, TS 3.6.1.2, Primary Containment Air Locks

The PNPP TS 3.6.1.2, "Primary Containment Air Locks," currently includes in its Applicability, "During operations with a potential for draining the reactor vessel (OPDRVS)," which will be deleted consistent with other TSTF-542, Revision 2, changes. This PNPP TS also includes Required Action E.2, "Initiate action to suspend OPDRVs," which will also be deleted consistent with other TSTF-542, Revision 2, OPDRV-related changes.

The NRC finds this variation is equivalent to current TS requirements for the primary containment air locks and is consistent with the treatment of other secondary containment boundaries as discussed in Section 3.4.2, "Other Proposed Changes - Containment, Containment Isolation Valves, and Standby Gas Treatment Requirements," for TSTF-542, Revision 2. Proposed LCO 3.5.2, Conditions C and D, and associated Required Actions have requirements for primary containment and primary containment penetrations for DRAIN TIMES between 36 and 8 hours. The NRC staff finds that this difference does not alter the conclusion that the proposed change is applicable to PNPP. Therefore, the NRC staff finds proposed Variation 10 to be acceptable.

3.5.11 Variation 11, TS 3.6.1.3, Primary Containment Isolation Valves (PCIVs)

The Applicability to TS 3.6.1.3, "Primary Containment Isolation Valves (PCIVs)," currently states:

> MODES 1, 2, and 3, when associated instrumentation is required to be OPERABLE per LCO 3.3.6.1, "Primary Containment and Drywell Isolation Instrumentation."

Though TSTF-542, Revision 2, relocated most of the non-Modes 1, 2, or 3, instrumentation requirements to LCO 3.3.5.2 [Note (d), "During movement of recently irradiated fuel assemblies in primary containment," remains in Table 3.3.6.1-1], the Applicability statement remains applicable for Condition F when PCIVs are required to be Operable during movement of recently irradiated fuel assemblies in primary containment. Condition G, which applies to conditions in Mode 4 and 5 or during OPDRVS, is deleted in its entirety. This is consistent with other TSTF-542, Revision 2, OPDRV-related changes.

The PNPP TS 3.6.1.3, Condition G, states, in part, "Required Action and Associated Completion Time of Conditions 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)." The NRC staff determined that since the RPV WIC requirements would be consolidated into TSs 3.3.5.2 and 3.5.2, the Modes 4 and 5 requirements in TS 3.6.1.3 for OPDRVs would no longer be applicable. Therefore, the staff concluded that the proposed variation is consistent with the requirements of TSTF-542, Revision 2, and, therefore, the NRC staff finds proposed Variation 11 to be acceptable.

3.5.12 Variation 12, TS 3.6.10, Primary Containment - Shutdown

The STS and TSTF-542 do not have a corresponding TS 3.6.1.10, "Primary Containment - Shutdown." PNPP TS 3.6.1.10 currently includes in its Applicability, "During operations with a potential for draining the reactor vessel (OPDRVs)," which will be deleted consistent with other TSTF-542, Revision 2, changes. This PNPP TS also includes Required Action A.2, "Initiate action to suspend OPDRVs," which will also be deleted consistent with other TSTF-542, Revision 2, OPDRV-related changes. By design, the PNPP is a primary containment plant and during shutdown, performs a similar function to the secondary containment in other BWR designs.

The NRC staff finds that this variation is equivalent to current TS requirements for the Primary Containment - Shutdown and is consistent with the treatment of other containment boundaries as discussed in Section 3.4.2, "Other Proposed Changes - Containment, Containment Isolation Valves, and Standby Gas Treatment Requirements," of the Justification for TSTF-542, Revision 2. Proposed LCO 3.5.2, Conditions C and D and associated Required Actions have requirements for primary containment and primary containment penetrations for DRAIN TIMES between 36 and 8 hours. The NRC staff finds that this difference does not alter the conclusion that the proposed change is applicable to PNPP. Therefore, the NRC staff finds proposed Variation 12 to be acceptable.

3.5.13 Variation 13, TS 3.6.1.11, Containment Vacuum Breakers

The STS and TSTF-542, Revision 2, do not have a corresponding TS 3.6.1.11, "Containment Vacuum Breakers." PNPP TS 3.6.1.11 currently includes in its Applicability, "During operations with a potential for draining the reactor vessel (OPDRVs)," which will be deleted consistent with other TSTF-542, Revision 2, changes. This PNPP TS also includes Required Action B.2.2, "Initiate action to suspend OPDRVs," which will also be deleted consistent with other TSTF-542, Revision 2, OPDRV-related changes.

The NRC staff finds that this variation is equivalent to current TS requirements for the Containment – Vacuum Breakers Shutdown and is consistent with the treatment of other containment boundaries as discussed in Section 3.4.2, "Other Proposed Changes - Containment, Containment Isolation Valves, and Standby Gas Treatment Requirements," of the Justification for TSTF-542, Revision 2. Proposed LCO 3.5.2, Conditions C and D and associated Required Actions have requirements for primary containment and primary containment penetrations for DRAIN TIMES between 36 and 8 hours. The NRC staff finds that this difference does not alter the conclusion that the proposed change is applicable to PNPP. Therefore, the NRC staff finds proposed Variation 13 to be acceptable.

3.5.14 Variation 14, TS 3.6.1.12, Containment Humidity Control

The STS and TSTF-542, Revision 2, do not have a corresponding TS 3.6.1.12, "Containment Humidity Control." PNPP TS 3.6.1.12 currently includes in its Applicability, "During operations with a potential for draining the reactor vessel (OPDRVS)," which will be deleted consistent with other TSTF-542, Revision 2, changes. This PNPP TS also includes Required Action C.2, "Initiate action to suspend OPDRVs," which will also be deleted consistent with other TSTF-542, Revision 2, OPDRV-related changes.

The NRC staff finds that this variation is equivalent to current TS requirements for the containment humidity control and is consistent with the treatment of other containment

boundaries as discussed in Section 3.4.2, "Other Proposed Changes - Containment, Containment Isolation Valves, and Standby Gas Treatment Requirements," as the justification for TSTF-542, Revision 2. Proposed LCO 3.5.2, Conditions C and D, and associated Required Actions have requirements for primary containment and primary containment penetrations for DRAIN TIMES between 36 and 8 hours. The NRC staff finds that this difference does not alter the conclusion that the proposed change is applicable to PNPP. Therefore, the NRC staff finds proposed Variation 14 to be acceptable.

3.5.15 Variation 15, Required Channels per Function, TSTF-542 Table 3.3.5.2-1

In the supplemental letter dated July 24, 2018, the licensee clarified variations for the proposed PNPP TS Table 3.3.5.2-1, LPCI-A/LPCS Function 1.e – Manual Initiation and LPCI-B/LPCI-C Function 2.c – Manual Initiation, regarding the nomenclature for Required Channels per Function. TSTF-542, Revision 2, identifies "[1 per subsystem]," as opposed to PNPP TSs which identifies "1." Also, for the proposed PNPP TS Table 3.3.5.2-1, LPCI-B/LPCI-C Function 2.a - Reactor Pressure Vessel – Low (LPCI Injection Valve Permissive), the Required Channels per Function nomenclature specified in TSTF-542, Revision 2, is "[3]" as opposed to PNPP TSs which identifies "1 per subsystem."

Function 1.e, "Manual Initiation," applies to the LPCI-A and LPCS subsystems. For PNPP Function 1.e, there is one manual initiation switch for both LPCI-A and LPCS subsystems (Division 1), and it is located in the main control room. The "Required Channels per Function" designation of "1 per subsystem" in TSTF-542, Revision 2, Table 3.3.5.2-1 is not applicable to the PNPP. Function 2.c, "Manual Initiation," applies to the LPCI-B and LPCI-C subsystems (Division 2). For PNPP, Function 2.c, there is one manual initiation switch for both LPCI-B and LPCI-C subsystems, and is located in the main control room. The "Required Channels per Function" designation of "1 per subsystem" in TSTF-542, Revision 2, Table 3.3.5.2-1, is not applicable to the PNPP.

Currently in PNPP TS Table 3.3.5.1-1, "Emergency Core Cooling System Instrumentation," Function 2.d, "Reactor Vessel Pressure - Low (LPCI Injection Valve Permissive)," which applies to the LPCI-B and LPCI-C subsystems in Modes 1, 2, 3, 4, and 5, specifies one required channel per subsystem. The proposed license amendment relocates the Modes 4 and 5 applicability for Function 2.d to Table 3.3.5.2-1 as Function 2.a and maintains the one required channel per subsystem applicability. This is appropriate since the designation of "3" required channels per function for Function 2.a in TSTF-542, Revision 2, Table 3.3.5.2-1, is not applicable to the PNPP. Function 2.a applies to two PNPP subsystems and thus it has two channels (one per subsystem).

For the manual initiation functions (Functions 1.e and 2.c), there is one manual initiation switch for Division 1 injection and one manual initiation switch for Division 2 injection. For the RPV-Low LPCI B/C Injection Value Permissive (Function 2.a) applies to two PNPP subsystems and thus it has two channels (one per subsystem).

The NRC staff finds that the instrumentation "Required Channels per Function" differences between TSTF-542, Revision 2, and the proposed Table 3.3.5.2-1, Functions 1.d, 2.c, and 2.a, is consistent with the existing license and do not change the conclusion that TSTF-542, Revision 2, is applicable to the PNPP TSs. Therefore, the NRC staff finds proposed Variation 15 to be acceptable.

3.6 Staff Evaluation of Proposed Deletion of Reference to OPDRVs and other miscellaneous changes

Sections 2.2.2.4 (TS 3.3.6.1, "Primary Containment Isolation Instrumentation"), and 2.2.4 (Deletion of References to OPDRVs) in this SE identify 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 changes remove:

- As required by Required Action C.1 and referenced in Table 3.3.6.1.1
- Initiation action to suspend operations with a potential for draining the reactor vessel (OPDRVs)
- During operations with a potential for draining the reactor vessel
- Operations with a potential for draining the vessel, and
- One trip system required in Modes 4 and 5 with RHR SDC system integrity maintained
- During operations with a potential for draining the reactor vessel (OPDRVs)
- Initiation action to suspend OPDRVs

The term OPDRVs 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 SRs, and deleting references to OPDRVs throughout the TS.

The current PNPP TSs contain instrumentation requirements related to OPDRVs in four separate 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 Primary Containment and Drywell Isolation Instrumentation, Primary Containment Air Locks, Primary Containment Isolation Valves (PCIVs), Primary Containment - Shutdown, Containment Vacuum Breakers, Containment Humidity Control, Secondary Containment, Secondary Containment Isolation Valves (SCIVs), Annulus Exhaust Gas Treatment (AEGT) System, Control Room Emergency Recirculation (CRER) System, Control Room Heating, Ventilating, and Air Conditioning (HVAC) System, AC Sources - Shutdown, DC Sources - Shutdown, and Distribution Systems - Shutdown. Each of these systems' requirements during OPDRVs were proposed for consolidation into revised the TS 3.5.2 for RPV WIC, based on the appropriate plant conditions and calculated DRAIN TIME.

The NRC staff determined that the deletion of OPDRVs references, TS Table 3.3.6.1-1, instrumentation functions 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 a simplified alternative set of controls for ensuring water level is maintained above the TAF and, therefore, these changes are acceptable.

Section 2.2.4.1 of this SE identifies a miscellaneous change proposed in the LAR. In particular, the licensee proposed revising SR 3.8.2.1 to change the TS LCO 3.5.2 title to "Reactor Pressure Vessel (RPV) Water Inventory Control," to be consistent with TSTF-542. The NRC staff determined that this change is administrative and finds it acceptable.

3.7 Staff Evaluation of TS 3.10, Special Operations and TSTF-484

The current PNPP TS LCO 3.10.1, "Inservice Leak and Hydrostatic Testing Operations," 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 containment LCOs were met.

The 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 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.

By Amendment No. 163, dated April 18, 2013, the NRC approved changes to PNPP TS LCO 3.10.1 in accordance with TSTF-484 (ADAMS Accession No. ML13017A431). The NRC staff's SE for this amendment stated, in part, that "two low-pressure emergency core cooling systems (ECCS) injection/spray subsystems are required to be operable in Mode 4 by TS 3.5.2, "ECCS Shutdown."" For PNPP, the ECCS injection/spray subsystems are defined as three LPCI subsystems, the LPCS system, and the HPCS system (four low pressure and one high pressure ECCS subsystems). However, per the proposed new LCO 3.5.2 for the TSTF-542, Revision 2, LAR, "one ECCS injection/spray subsystem" would be required to be operable in Mode 4.

The NRC staff has determined that changing from two ECCS injection/spray subsystems to one ECCS injection/spray subsystem is acceptable as stated previously in Section 3.3, of this SE, this level of redundancy is not required. 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. During this period of the outage, there is an abundance of RPV water inventory in contrast to periods during power operation. 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, DID will be maintained. The DID 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.

After consideration of the reasoning presented in this SE, the NRC staff determined that the TS LCOs for 3.3.5.2 and 3.5.2, introduced as part of the adoption of TSTF-542, Revision 2, do not conflict with the TS requirements for Inservice Leak and Hydrostatic Testing (TS 3.10.1), and are therefore acceptable.

3.8 Technical Conclusion

The PNPP Safety Limit 2.1.1.3 requires that reactor 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 changes to the PNPP TSs establish new LCO requirements that address the preventive and mitigative equipment and associated instrumentation that provide an alternative means to support Safety Limit 2.1.1.3 during Modes 4 and 5 operations.

The reactor coolant system is at a low operating temperature (< 200 °F) and is depressurized during Modes 4 and 5 conditions (except during Special Operations per TS 3.10.1, "Inservice Leak and Hydrostatic Testing Operation," when allowed to be > 200 °F). 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 outside containment (USAR 15.7.4) and Radioactive Gas Waste System Leak or Failure (USAR 15.7.1), 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 requirements 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 has determined that LCOs 3.5.2 and 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 LCO requirements of 10 CFR 50.36(c)(2)(i).

Additionally, the revised TS LCOs 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. This satisfies 10 CFR 50.57(a)(3)(i) and is, therefore, acceptable.

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 description, 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 RPV 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 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 subsystem are adequately filled (mitigates effects of gas accumulation or voiding), the subsystems have verified valve positions

to support RPV injection, verified pumps provide adequate flow to support DRAIN TIME and RPV injection, verification of automatic isolation, and 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 TS 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) and are, therefore, acceptable.

The NRC staff evaluated the proposed PNPP TS changes against each of the unit applicable design requirements listed in Section 2.3.1 of this SE. The NRC staff finds that the proposed changes for Modes 4 and 5 operations, as they relate to the proposed TS changes for the new DRAIN TIME definition and the removal of OPDRVs references, remain consistent with the GDCs in that the PNPP design requirements for instrumentation, reactor coolant leakage detection, the RCPB, 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 *Federal Register* 39132).

Additionally, the proposed TS changes were reviewed for technical clarity and consistency with the existing PNPP 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 the SRP.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Ohio State official was notified of the proposed issuance of the amendment on September 27, 2018. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or changes the surveillance requirements. 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 (83 FR 4293) 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.

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Date of issuance: December 12, 2018

SUBJECT: PERRY NUCLEAR POWER PLANT, UNIT NO. 1 - ISSUANCE OF AMENDMENT NO. 184 CONCERNING ADOPTION OF TECHNICAL SPECIFICATION TASK FORCE TRAVELER 542, REVISION 2, "REACTOR PRESSURE VESSEL WATER INVENTORY CONTROL" (EPID L-2017-LLA-0405) DATED DECEMBER 12, 2018

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