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

September 26, 2018

Mr. Kevin Cimorelli
Site Vice President
Susquehanna Nuclear, LLC
769 Salem Boulevard
NUCSB3
Berwick, PA 18603-0467

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2 - ISSUANCE OF AMENDMENT NOS. 271 AND 253 REVISING TECHNICAL SPECIFICATIONS TO ADOPT TSTF-542, REVISION 2 (CAC NOS. MG0269 AND MG0270; EPID L-2017-LLA-0306)

Dear Mr. Cimorelli:

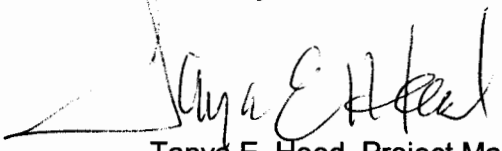
The U.S. Nuclear Regulatory Commission (NRC or the Commission) has issued the enclosed Amendment No. 271 to Renewed Facility Operating License No. NPF-14 and Amendment No. 253 to Renewed Facility Operating License No. NPF-22 for the Susquehanna Steam Electric Station, Units 1 and 2, respectively. These amendments consist of changes to the technical specifications in response to your application dated September 20, 2017, as supplemented by letters dated February 16, 2018, and May 15, 2018.

The amendments replace existing technical specification requirements related to "operations with a potential for draining the reactor vessel" with new requirements on reactor pressure vessel water inventory control to protect Safety Limit 2.1.1.3. Safety Limit 2.1.1.3 requires reactor pressure vessel water level to be greater than the top of active irradiated fuel. The changes are based on Technical Specifications Task Force (TSTF) Traveler TSTF-542, Revision 2, "Reactor Pressure Vessel Water Inventory Control."

The licensee has proposed several variations from the technical specification changes described in applicable parts of TSTF-542, or the NRC-approved TSTF-542 safety evaluation. These are described in the enclosed safety evaluation in Section 2.2.5 and evaluated in Section 3.5 of the safety evaluation.

A copy of our related safety evaluation is also enclosed. Notice of Issuance will be included in the Commission's next Biweekly *Federal Register* Notice.

Sincerely,



Tanya E. Hood, Project Manager
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-387 and 50-388

Enclosures:
1. Amendment No. 271 to License No. NPF-14
2. Amendment No. 253 to License No. NPF-22
3. Safety Evaluation

cc: Listserv

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

SUSQUEHANNA NUCLEAR, LLC

ALLEGHENY ELECTRIC COOPERATIVE, INC.

DOCKET NO. 50-387

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 271
Renewed License No. NPF-14

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

   A. The application for the amendment filed by Susquehanna Nuclear, LLC, dated September 20, 2017, as supplemented by letters dated February 16, 2018, and May 15, 2018, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's 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 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 set forth in 10 CFR Chapter I;

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

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

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-14 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 271 and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. Susquehanna Nuclear, LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance and shall be implemented on both units no later than initial entry into Mode 4 for Unit 2 during the Spring 2019 Unit 2 refueling outage.

FOR THE NUCLEAR REGULATORY COMMISSION

James G. Danna, Chief
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Renewed Facility
Operating License and
Technical Specifications

Date of Issuance: September 26, 2018

ATTACHMENT TO LICENSE AMENDMENT NO. 271

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 1

RENEWED FACILITY OPERATING LICENSE NO. NPF-14

DOCKET NO. 50-387

Replace the following page of the Renewed Facility Operating License with the attached revised page. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

Remove	Insert
Page 3	Page 3

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove	Insert	Remove	Insert
TS/TOC-1	TOC-1	---	3.5-9a
TS/TOC-2	TOC-2	3.5-10	3.5-10
1.1-3	1.1-3	3.5-11	3.5-11
---	1.1-3a	3.5-12	3.5-12
3.3-36	3.3-36	3.6-8	3.6-8
3.3-37	3.3-37	3.6-11	3.6-11
3.3-42	3.3-42	3.6-12	3.6-12
3.3-43	3.3-43	3.6-14	3.6-14
3.3-44	3.3-44	3.6-15	3.6-15
3.3-45	3.3-45	3.6-16	3.6-16
3.3-46	3.3-46	3.6-35	3.6-35
3.3-47	3.3-47	3.6-36	3.6-36
---	3.3-47a	3.6-38	3.6-38
---	3.3-47b	3.6-40	3.6-40
---	3.3-47c	3.6-42	3.6-42
3.3-48	3.3-48	3.6-43	3.6-43
3.3-49	3.3-49	3.6-44	3.6-44
3.3-50	3.3-50	3.7-6	3.7-6
3.3-51	3.3-51	3.7-7	3.7-7
3.3-54	3.3-54	3.7-8	3.7-8
3.3-62	3.3-62	3.7-10	3.7-10
3.3-66	3.3-66	3.7-11	3.7-11
3.3-71	3.3-71	3.7-12	3.7-12
3.5-1	3.5-1	3.8-18	3.8-18
3.5-8	3.5-8	3.8-30	3.8-30
---	3.5-8a	3.8-42	3.8-42
3.5-9	3.5-9		

(3) Susquehanna Nuclear, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed neutron sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;

(4) Susquehanna Nuclear, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70 to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and

(5) Susquehanna Nuclear, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70 to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

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

Susquehanna Nuclear, LLC is authorized to operate the facility at reactor core power levels not in excess of 3952 megawatts thermal in accordance with the conditions specified herein. The preoperational tests, startup tests and other items identified in License Conditions 2.C.(36), 2.C.(37), 2.C.(38), and 2.C.(39) to this license shall be completed as specified.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 271, and the Environmental Protection Plan contained in Appendix B are hereby incorporated in the license. Susquehanna Nuclear, LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

For Surveillance Requirements (SRs) that are new in Amendment 178 to Facility Operating License No. NPF-14, the first performance is due at the end of the first surveillance interval that begins at implementation of Amendment 178. For SRs that existed prior to Amendment 178, including SRs with modified acceptance criteria and SRs whose frequency of performance is being extended, the first performance is due at the end of the first surveillance interval that begins on the date the Surveillance was last performed prior to implementation of Amendment 178.

(continued)

(continued)

DOSE EQUIVALENT I-131 (continued)	Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion," EPA, 1988, as described in Regulatory Guide 1.183. The factors in the column headed "effective" yield doses corresponding to the CEDE. The conversion factors that are used for the calculation of EDE (or DDE) from external exposure (submersion) shall be those listed in Table III.1 of Federal Guidance Report 12, "External Exposure to Radionuclides in Air, Water, and Soil," EPA, 1993, as described in Regulatory Guide 1.183. The factors in the column headed "effective" yield doses corresponding to the EDE.
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 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.
EMERGENCY CORE COOLING SYSTEM (ECCS) RESPONSE TIME	The ECCS RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its ECCS initiation setpoint at the channel sensor until the ECCS equipment is capable of performing its safety function (i.e., the valves travel to their required positions, pump discharge pressures reach their required values, etc.). Times shall include diesel generator starting and sequence loading delays, where applicable. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured.
END OF CYCLE RECIRCULATION PUMP TRIP (EOC RPT) SYSTEM RESPONSE TIME	The EOC RPT SYSTEM RESPONSE TIME shall be that time interval from initial signal generation by the associated turbine stop valve limit switch or from when the turbine control valve hydraulic oil control oil pressure drops below the pressure switch setpoint to complete suppression of the electric arc between the fully open contacts of the recirculation pump circuit breaker. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured.
ISOLATION SYSTEM RESPONSE TIME	The ISOLATION SYSTEM RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its isolation initiation setpoint at the channel sensor until the isolation valves travel to their required positions. Times shall include diesel generator starting and sequence loading delays, where applicable. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured.

3.3 INSTRUMENTATION

3.3.5.1 Emergency Core Cooling System (ECCS) Instrumentation

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

APPLICABILITY: According to Table 3.3.5.1-1.

ACTIONS

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

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

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.2 ----------NOTE---------- Only applicable for Functions 3.a and 3.b. ---------- Declare High Pressure Coolant Injection (HPCI) System inoperable.	1 hour from discovery of loss of HPCI initiation capability
	AND	
	B.3 Place channel in trip.	24 hours
C. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	C.1 ----------NOTE---------- Only applicable for Functions 1.d, 2.d, 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	
	C.2 Restore channel to OPERABLE status.	24 hours

(continued)

Table 3.3.5.1-1 (page 1 of 6)
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. Core Spray System					
a. Reactor Vessel Water Level—Low Low Low, Level 1	1,2,3	4[a]	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ -136 inches
b. Drywell Pressure—High	1,2,3	4[a]	B	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≤ 1.88 psig
c. Reactor Steam Dome Pressure—Low (initiation)	1,2,3	4	B	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≥ 407 psig (lower) ≤ 433 psig (upper)
d. Reactor Steam Dome Pressure—Low (injection permissive)	1,2,3	4	C	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≥ 407 psig (lower) ≤ 433 psig (upper)
e. Manual Initiation	1,2,3	2 1 per Subsystem	C	SR 3.3.5.1.5	NA
2. Low Pressure Coolant Injection (LPCI) System					
a. Reactor Vessel Water Level—Low Low Low, Level 1	1,2,3	4[b]	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ -136 inches

(continued)

(a) Also required to initiate the associated diesel generator (DG), initiate Drywell Cooling Equipment Trip, and Emergency Service Water (ESW) Pump timer reset.

(b) Also required to initiate the associated DGs, ESW Pump timer reset and Turbine Building and Reactor Building Chillers trip.

Table 3.3.5.1-1 (page 2 of 6)
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 System (continued)					
b. Drywell Pressure—High	1,2,3	4[b]	B	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≤ 1.88 psig
c. Reactor Steam Dome Pressure—Low (initiation)	1,2,3	4	B	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≥ 407 psig (lower) ≤ 433 psig (upper)
d. Reactor Steam Dome Pressure—Low (injection permissive)	1,2,3	4	C	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≥ 407 psig (lower) ≤ 433 psig (upper)
e. Reactor Steam Dome Pressure—Low (Recirculation Discharge Valve Permissive)	1[c], 2[c], 3[c]	4	C	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≥ 216 psig

(continued)

(b) Also required to initiate the associated DGs, ESW pump timer reset and Turbine Building and Reactor Building Chiller trip.

(c) With either associated recirculation pump discharge or bypass valves open.

Table 3.3.5.1-1 (page 3 of 6)
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 System (continued)					
f. Manual Initiation	1,2,3	2 1 per subsystem	C	SR 3.3.5.1.5	NA
3. High Pressure Coolant Injection (HPCI) System					
a. Reactor Vessel Water Level-Low, Level 2	1, 2[d], 3[d]	4	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ -45 inches
b. Drywell Pressure-High	1, 2[d],3[d]	4	B	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≤ 1.88 psig
c. Reactor Vessel Water Level-High, Level 8	1, 2[d], 3[d]	2	C	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≤ 55.5 inches
d. Condensate Storage Tank Level-Low	1, 2[d], 3[d]	2	D	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≥ 40.5 inches above tank bottom

(continued)

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

Table 3.3.5.1-1 (page 4 of 6)
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. HPCI System (continued)					
e. Manual Initiation	1, 2[d], 3[d]	1	C	SR 3.3.5.1.5	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	E	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ -136 inches
b. Drywell Pressure—High	1, 2[d], 3[d]	2	E	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≤ 1.88 psig
c. Automatic Depressurization System Initiation Timer	1, 2[d], 3[d]	1	F	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≤ 114 seconds
d. Reactor Vessel Water Level—Low, Level 3 (Confirmatory)	1, 2[d], 3[d]	1	E	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ 11.5 inches
e. Core Spray Pump Discharge Pressure—High	1, 2[d], 3[d]	2	F	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≥ 125 psig and ≤ 165 psig

(continued)

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

Table 3.3.5.1-1 (page 5 of 6)
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
4. ADS Trip System A (continued)					
f. Low Pressure Coolant Injection Pump Discharge Pressure—High	1, 2[d], 3[d]	4	F	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≥ 115 psig and ≤ 135 psig
g. Automatic Depressurization System Drywell Pressure Bypass Actuation Timer	1, 2[d], 3[d]	2	F	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≤ 450 sec
h. Manual Initiation	1, 2[d], 3[d]	2	F	SR 3.3.5.1.5	NA
5. ADS Trip System B					
a. Reactor Vessel Water Level—Low Low Low, Level 1	1, 2[d], 3[d]	2	E	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ -136 inches
b. Drywell Pressure—High	1, 2[d], 3[d]	2	E	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≤ 1.88 psig
c. Automatic Depressurization System Initiation Timer	1, 2[d], 3[d]	1	F	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≤ 114 sec
d. Reactor Vessel Water Level—Low, Level 3 (Confirmatory)	1, 2[d], 3[d]	1	E	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ 11.5 inches
e. Core Spray Pump Discharge Pressure—High	1, 2[d], 3[d]	2	F	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≥ 125 psig and ≤ 165 psig

(continued)

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

Table 3.3.5.1-1 (page 6 of 6)
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
5. ADS Trip System B (continued)					
f. Low Pressure Coolant Injection Pump Discharge Pressure—High	1, 2[d], 3[d]	4	F	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≥ 115 psig and ≤ 135 psig
g. Automatic Depressurization System Drywell Pressure Bypass Actuation Timer	1, 2[d], 3[d]	2	F	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≤ 450 sec
h. Manual Initiation	1, 2[d], 3[d]	2	F	SR 3.3.5.1.5	NA

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

3.3 INSTRUMENTATION

3.3.5.2 Reactor Pressure Vessel (RPV) Water Inventory Control Instrumentation

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

APPLICABILITY: According to Table 3.3.5.2-1.

ACTIONS

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

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

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Required Action and associated Completion Time of Condition C or D not met.	E.1 Declare associated low pressure 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	----------NOTE---------- A test of all required contacts does not have to be performed. --- 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 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. Core Spray System					
a. Reactor Steam Dome Pressure - Low (Injection Permissive)	4, 5	4 (a)	C	SR 3.3.5.2.2 SR 3.3.5.2.3	≤ 433 psig (upper)
b. Manual Initiation	4, 5	1 per subsystem (a)	D	SR 3.3.5.2.3	NA
2. Low Pressure Coolant Injection (LPCI) System					
a. Reactor Steam Dome Pressure - Low (Injection Permissive)	4, 5	4 (a)	C	SR 3.3.5.2.2 SR 3.3.5.2.3	≤ 433 psig (upper)
b. Manual Initiation	4, 5	1 per subsystem (a)	D	SR 3.3.5.2.3	NA
3. RHR System Isolation					
a. Reactor Vessel Water Level - Low, Level 3	(b)	2 in one trip system	B	SR 3.3.5.2.1 SR 3.3.5.2.2 SR 3.3.5.2.3	≥ 11.5 inches
4. Reactor Water Cleanup (RWCU) System Isolation					
a. Reactor Vessel Water Level - Low Low, Level 2	(b)	2 in one trip system	B	SR 3.3.5.2.1 SR 3.3.5.2.2 SR 3.3.5.2.3	≥ -45 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 automatic isolation of the associated penetration flow path(s) is credited in calculating DRAIN TIME.

3.3 INSTRUMENTATION

3.3.5.3 Reactor Core Isolation Cooling (RCIC) System Instrumentation

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

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

ACTIONS

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

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

(continued)

ACTIONS (continued)

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

SURVEILLANCE REQUIREMENTS

NOTES

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

2. When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed as follows: (a) for up to 6 hours for Functions 2 and 4 and (b) for up to 6 hours for Functions other than Functions 2 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	A test of all required contacts does not have to be performed. Perform CHANNEL FUNCTIONAL TEST.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.3.3	Perform CHANNEL CALIBRATION.	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

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 3.3.5.3.4 SR 3.3.5.3.5	≥ -45 inches
2.	Reactor Vessel Water Level—High, Level 8	2	C	SR 3.3.5.3.1 SR 3.3.5.3.2 SR 3.3.5.3.3 SR 3.3.5.3.5	≤ 55.5 inches
3.	Condensate Storage Tank Level—Low	2	D	SR 3.3.5.3.2 SR 3.3.5.3.3 SR 3.3.5.3.5	≥ 36.0 inches above the tank bottom
4.	Manual Initiation	1	C	SR 3.3.5.3.5	NA

ACTIONS (continued)

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

Table 3.3.6.1-1 (page 6 of 6)
Primary Containment 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
6.	Shutdown Cooling System Isolation					
	a. Reactor Steam Dome Pressure - High	1,2,3	1	F	SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5	≤ 108 psig
	b. Reactor Vessel Water Level - Low, Level 3	3	2	J	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5	≥ 11.5 inches
	c. Manual Initiation	3	1	G	SR 3.3.6.1.5	NA
7.	Traversing Incore Probe Isolation					
	a. Reactor Vessel Water Level - Low, Level 3	1,2,3	2	G	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5	≥ 11.5 inches
	b. Drywell Pressure - High	1,2,3	2	G	SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.5	≤ 1.88 psig

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

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1.	Reactor Vessel Water Level—Low Low, Level 2	1,2,3	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.5	≥ -45 inches
2.	Drywell Pressure—High	1,2,3	2	SR 3.3.6.2.2 SR 3.3.6.2.3 SR 3.3.6.2.5	≤ 1.88 psig
3.	Unit 1 Refuel Floor High Exhaust Duct Radiation—High	(a)	1	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.5	≤ 25 mR/hr
4.	Unit 2 Refuel Floor High Exhaust Duct Radiation—High	(a)	1	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.5	≤ 25 mR/hr
5.	Unit 1 Refuel Floor Wall Exhaust Duct Radiation—High	(a)	1	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.5	≤ 28 mR/hr
6.	Unit 2 Refuel Floor Wall Exhaust Duct Radiation—High	(a)	1	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.5	≤ 28 mR/hr
7.	Railroad Access Shaft Exhaust Duct Radiation—High	(b)	1	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.5	≤ 7 mR/hr
8.	Manual Initiation	1,2,3, (a)	1	SR 3.3.6.2.5	NA

(a) During CORE ALTERATIONS and during movement of irradiated fuel assemblies in secondary containment.

(b) During movement of irradiated fuel assemblies within the Railroad Access Shaft, and above the Railroad Access Shaft with the Railroad Access Shaft Equipment Hatch open.

Table 3.3.7.1-1 (page 1 of 1)
Control Room Emergency Outside Air Supply 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, Level 2	1,2,3	2	B	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.4 SR 3.3.7.1.5	≥ -45 inches
2. Drywell Pressure—High	1,2,3	2	B	SR 3.3.7.1.2 SR 3.3.7.1.3 SR 3.3.7.1.5	≤ 1.88 psig
3. Unit 1 Refuel Floor Radiation—High	(a)	1	B	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.4 SR 3.3.7.1.5	≤ 25 mR/hr
4. Unit 2 Refuel Floor High Exhaust Duct Radiation—High	(a)	1	B	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.4 SR 3.3.7.1.5	≤ 25 mR/hr
5. Unit 1 Refuel Floor Wall Exhaust Duct Radiation —High	(a)	1	B	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.4 SR 3.3.7.1.5	≤ 28 mR/hr
6. Unit 2 Refuel Floor Wall Exhaust Duct Radiation —High	(a)	1	B	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.4 SR 3.3.7.1.5	≤ 28 mR/hr
7. Railroad Access Shaft Exhaust Duct Radiation—High	(b)	1	B	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.4 SR 3.3.7.1.5	≤ 7 mR/hr
8. Main Control Room Outside Air Intake Radiation – High	1,2,3, (a)	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	≤ 5 mR/hr
9. Manual Initiation	1,2,3 (a)	1	B	SR 3.3.7.1.5	n/a

(a) During CORE ALTERATIONS and during movement of irradiated fuel assemblies in the secondary containment.

(b) During movement of irradiated fuel assemblies within the Railroad Access Shaft, and above the Railroad Access Shaft with the Railroad Access Shaft Equipment Hatch open.

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS), REACTOR PRESSURE VESSEL (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 six safety/relief valves shall be OPERABLE.

APPLICABILITY: MODE 1,
MODES 2 and 3, except high pressure coolant injection (HPCI) and 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 HPCI.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One low pressure ECCS injection/spray subsystem inoperable for reasons other than Condition B.	A.1 Restore low pressure ECCS injection/spray subsystem to OPERABLE status.	7 days
B. One LPCI pump in one or both LPCI subsystems inoperable.	B.1 Restore LPCI pump(s) to OPERABLE status.	7 days
C. Required Action and associated Completion Time of Condition A or Condition B not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 4.	12 hours 36 hours

(continued)

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS), REACTOR PRESSURE VESSEL (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 low pressure 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

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. DRAIN TIME < 36 hours and ≥ 8 hours.	C.1 Verify secondary containment boundary is capable of being established in less than the DRAIN TIME. AND C.2 Verify each secondary containment penetration flow path is capable of being isolated in less than the DRAIN TIME. AND C.3 Verify one standby gas treatment subsystem is capable of being placed in operation in less than the DRAIN TIME.	4 hours 4 hours 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 secondary containment boundary.	Immediately
	AND	
	D.3 Initiate action to isolate each secondary containment penetration flow path or verify it can be manually isolated from the control room.	Immediately
	AND	
	D.4 Initiate action to verify one standby gas treatment subsystem is capable of being placed in operation	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
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 coolant injection (LPCI) subsystem, the suppression pool water level is ≥ 20 ft 0 inches.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.2.3	Verify, for a required Core Spray (CS) subsystem, the: a. Suppression pool water level is ≥ 20 ft 0 inches; or b. Condensate storage tank water level is ≥ 49% of capacity.	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 ECCS injection/spray subsystem actuates on a manual initiation signal.	In accordance with the Surveillance Frequency Control Program

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS), REACTOR PRESSURE VESSEL (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 Coolant Injection System is OPERABLE. AND A.2 Restore RCIC System to OPERABLE status	Immediately 14 days
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Reduce reactor steam dome pressure to ≤ 150 psig.	12 hours 36 hours

3.6 CONTAINMENT SYSTEMS

3.6.1.3 Primary Containment Isolation Valves (PCIVs)

LCO 3.6.1.3 Each PCIV shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3

ACTIONS

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

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- Only applicable to penetration flow paths with two PCIVs except for the H_2O_2 Analyzer penetrations. ---------- One or more penetration flow paths with one PCIV inoperable except for purge valve leakage not within limit.	A.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured. AND	4 hours except for main steam line AND 8 hours for main steam line (continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. ----------NOTE---------- Only applicable to the H_2O_2 Analyzer penetrations. ---------- One or more H_2O_2 Analyzer penetrations with one or two PCIVs inoperable.	D.1	Isolate the affected penetration flow path by the use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange.	72 hours
	AND		
	D.2	Verify the affected penetration flow path is isolated.	Once per 31 days
E. Secondary containment bypass leakage rate not within limit.	E.1	Restore leakage rate to within limit.	4 hours
F. One or more penetration flow paths with one or more containment purge valves not within purge valve leakage limit.	F.1	Restore the valve leakage to within valve leakage limit.	24 hours
G. Required Action and associated Completion Time of Condition A, B, C, D, E, or F not met.	G.1	Be in MODE 3.	12 hours
	AND		
	G.2	Be in MODE 4.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.1.3.1	----------NOTE---------- Not required to be met when the 18 and 24 inch primary containment purge valves are open for inerting, de-inerting, pressure control, ALARA or air quality considerations for personnel entry, or Surveillances that require the valves to be open. ---------- Verify each 18 and 24 inch primary containment purge valve is closed.	In accordance with the Surveillance Frequency Control Program
SR 3.6.1.3.2	----------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 PCIVs that are open under administrative controls. ---------- Verify each primary containment isolation manual valve and blind flange that is located outside primary containment and 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

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.1.3.6	Perform leakage rate testing for each primary containment purge valve with resilient seals.	In accordance with the Surveillance Frequency Control Program
SR 3.6.1.3.7	Verify the isolation time of each MSIV is $\geq$ 3 seconds and $\leq$ 5 seconds.	In accordance with the Inservice Testing Program
SR 3.6.1.3.8	Verify each automatic PCIV actuates to the isolation position on an actual or simulated isolation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.6.1.3.9	Verify a representative sample of reactor instrumentation line EFCVs actuate to check flow on a simulated instrument line break.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.1.3.10	Remove and test the explosive squib from each shear isolation valve of the TIP System.	In accordance with the Surveillance Frequency Control Program
SR 3.6.1.3.11	Verify the combined leakage rate for all secondary containment bypass leakage paths is ≤ 15 scfh when pressurized to ≥ P_a.	In accordance with the Primary Containment Leakage Rate Testing Program.
SR 3.6.1.3.12	Verify leakage rate through each MSIV is ≤ 100 scfh and ≤300 scfh for the combined leakage including the leakage from the MS Line Drains, when the MSIVs are tested at ≥ 24.3 psig or P_a and the MS Line Drains are tested at P_a.	In accordance with the Primary Containment Leakage Rate Testing Program.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.1.3.13	Verify combined leakage rate through hydrostatically tested lines that penetrate the primary containment is within limits.	In accordance with the Primary Containment Leakage Rate Testing 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 irradiated fuel assemblies in the secondary containment,
During CORE ALTERATIONS.

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 irradiated fuel assemblies in the secondary containment or during CORE ALTERATIONS.	C.1 ----------NOTE---------- LCO 3.0.3 is not applicable. ---------- Suspend movement of irradiated fuel assemblies in the secondary containment.	Immediately
	AND	
	C.2 Suspend CORE ALTERATIONS.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.4.1.1	----------NOTE---------- Not required to be met for 4 hours if analysis demonstrates one standby gas treatment (SGT) subsystem is capable of establishing the required secondary containment vacuum. ---------- Verify secondary containment vacuum is ≥ 0.25 inch of vacuum water gauge.	In accordance with the Surveillance Frequency Control Program
SR 3.6.4.1.2	Verify all required secondary containment removable walls and equipment hatches required to be closed are closed and sealed.	In accordance with the Surveillance Frequency Control Program

(continued)

3.6 CONTAINMENT SYSTEMS

3.6.4.2 Secondary Containment Isolation Valves (SCIVs)

LCO 3.6.4.2 Each required SCIV shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
During movement of irradiated fuel assemblies in the secondary containment,
During CORE ALTERATIONS.

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. ----------NOTE---------- Only applicable to penetration flow paths with two SCIVs. ---------- One or more penetration flow paths with one required SCIV inoperable.	A.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange. AND	8 hours (continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. (continued)	C.2 ----------NOTE---------- Isolation devices in high radiation areas may be verified by use of administrative means. --- Verify the affected penetration flow path is isolated.	Once per 31 days
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. AND D.2 Be in MODE 4.	12 hours 36 hours
E. Required Action and associated Completion Time of Condition A, B or C not met during movement of irradiated fuel assemblies in the secondary containment or during CORE ALTERATIONS.	E.1 ----------NOTE---------- LCO 3.0.3 is not applicable. --- Suspend movement of irradiated fuel assemblies in the secondary containment. AND E.2 Suspend CORE ALTERATIONS.	Immediately Immediately

3.6 CONTAINMENT SYSTEMS

3.6.4.3 Standby Gas Treatment (SGT) System

LCO 3.6.4.3 Two SGT subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
During movement of irradiated fuel assemblies in the secondary containment,
During CORE ALTERATIONS.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One SGT subsystem inoperable.	A.1 Restore SGT subsystem to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, or 3.	B.1 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 irradiated fuel assemblies in the secondary containment or during CORE ALTERATIONS.	----------NOTE---------- LCO 3.0.3 is not applicable. ---------- C.1 Place OPERABLE SGT filter train in operation. OR	 Immediately (continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. (continued)	C.2.1 Suspend movement of irradiated fuel assemblies in secondary containment. AND C.2.2 Suspend CORE ALTERATIONS.	Immediately Immediately
D. Two SGT subsystems inoperable in MODE 1, 2, or 3.	D.1 Restore one SGT subsystem to OPERABLE status.	4 hours
E. Required Action and associated Completion Time of Condition 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

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Two SGT subsystems inoperable during movement of irradiated fuel assemblies in the secondary containment or during CORE ALTERATIONS.	F.1 ----------NOTE---------- LCO 3.0.3 is not applicable. ---------- Suspend movement of irradiated fuel assemblies in secondary containment.	Immediately
	AND	
	F.2 Suspend CORE ALTERATIONS.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.4.3.1	Operate each SGT filter train for ≥ 15 continuous minutes with heaters operating.	In accordance with the Surveillance Frequency Control Program
SR 3.6.4.3.2	Perform required SGT filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP
SR 3.6.4.3.3	Verify each SGT subsystem actuates on an actual or simulated initiation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.6.4.3.4	Verify each SGT filter cooling bypass and outside air damper opens and the fan starts on high charcoal temperature.	In accordance with the Surveillance Frequency Control Program

3.7 PLANT SYSTEMS

3.7.3 Control Room Emergency Outside Air Supply (CREOAS) System

LCO 3.7.3 Two CREOAS 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 irradiated fuel assemblies in the secondary containment,
During CORE ALTERATIONS.

ACTIONS

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

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of Condition A or B not met in MODE 1, 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 irradiated fuel assemblies in the secondary containment or during CORE ALTERATIONS.	----------NOTE---------- LCO 3.0.3 is not applicable. ---------- D.1 Place OPERABLE CREOAS subsystem in pressurization/ filtration mode. OR D.2.1 Suspend movement of irradiated fuel assemblies in the secondary containment. AND D.2.2 Suspend CORE ALTERATIONS.	 Immediately Immediately Immediately
E. Two CREOAS 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 CREOAS subsystems inoperable during movement of irradiated fuel assemblies in the secondary containment or during CORE ALTERATIONS. OR One or more CREOAS subsystems inoperable due to an inoperable CRE boundary during movement of irradiated fuel assemblies in the secondary containment or during CORE ALTERATIONS.	----------NOTE---------- LCO 3.0.3 is not applicable. ---------- F.1 Suspend movement of irradiated fuel assemblies in the secondary containment. AND F.2 Suspend CORE ALTERATIONS.	Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.3.1	Operate each CREOAS filter train for ≥ 15 continuous minutes with the heaters operating.	In accordance with the Surveillance Frequency Control Program
SR 3.7.3.2	Perform required CREOAS filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP
SR 3.7.3.3	Verify each CREOAS subsystem actuates on an actual or simulated initiation signal.	In accordance with the Surveillance Frequency Control Program

(continued)

3.7 PLANT SYSTEMS

3.7.4 Control Room Floor Cooling System

LCO 3.7.4 Two control room floor cooling subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
During movement of irradiated fuel assemblies in the secondary containment,
During CORE ALTERATIONS.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One control room floor cooling subsystem inoperable.	A.1 Restore control room floor cooling subsystem to OPERABLE status.	30 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

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of Condition A not met during movement of irradiated fuel assemblies in the secondary containment or during CORE ALTERATIONS.	----------NOTE---------- LCO 3.0.3 is not applicable. ---------- C.1 Place OPERABLE control room floor cooling subsystem in operation. OR C.2.1 Suspend movement of irradiated fuel assemblies in the secondary containment. AND C.2.2 Suspend CORE ALTERATIONS.	Immediately Immediately Immediately
D. Two control room floor cooling subsystems inoperable in MODE 1, 2, or 3.	D.1 Enter LCO 3.0.3.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Two control room floor cooling subsystems inoperable during movement of irradiated fuel assemblies in the secondary containment or during CORE ALTERATIONS.	----------NOTE---------- LCO 3.0.3 is not applicable. ---------- E.1 Suspend movement of irradiated fuel assemblies in the secondary containment. AND E.2 Suspend CORE ALTERATIONS.	 Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.4.1	Verify each control room floor cooling 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. One or more required AC Sources inoperable.	---NOTE--- Enter applicable Condition and Required Actions of LCO 3.8.8, with one required subsystem de-energized as a result of Condition A. ---	
	A.1 Declare affected required feature(s), inoperable. OR	Immediately
	A.2.1 Suspend CORE ALTERATIONS. AND	Immediately
	A.2.2 Suspend movement of irradiated fuel assemblies in the secondary containment. AND	Immediately
	A.2.3 Initiate action to restore required AC Source to OPERABLE status.	Immediately

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.2 Suspend movement of irradiated fuel assemblies in the secondary containment. AND	Immediately
	A.2.3 Initiate action to restore required Unit 1 DC electrical power subsystems to OPERABLE status.	Immediately
B. Diesel Generator E DC electrical power subsystem inoperable, while not aligned to the Class 1E distribution system.	B.1 Verify that all ESW valves associated with Diesel Generator E are closed.	2 hours
C. Diesel Generator E DC electrical power subsystem inoperable, while aligned to the Class 1E distribution system.	C.1 Declare Diesel Generator E inoperable.	2 hours

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	----------NOTE---------- Enter applicable Conditions and Required Actions of LCO 3.5.2 "Reactor Pressure Vessel (RPV) Water Inventory Control" when Condition A renders an ECCS subsystem Inoperable. ----------	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2.2 Suspend handling of irradiated fuel assemblies in the secondary containment.	Immediately
	AND	
	A.2.3 Initiate actions to restore required AC and DC electrical power distribution subsystems to OPERABLE status.	Immediately
	AND	
	A.2.4 Declare associated required shutdown cooling subsystem(s) inoperable and not in operation.	Immediately

(continued)

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

SUSQUEHANNA NUCLEAR, LLC

ALLEGHENY ELECTRIC COOPERATIVE, INC.

DOCKET NO. 50-388

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 253
Renewed License No. NPF-22

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

   A. The application for the amendment filed by Susquehanna Nuclear, LLC, dated September 20, 2017, as supplemented by letters dated February 16, 2018, and May 15, 2018, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's 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 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 set forth in 10 CFR Chapter I;

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

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

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-22 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 253 and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. Susquehanna Nuclear, LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance and shall be implemented on both units no later than initial entry into Mode 4 for Unit 2 during the Spring 2019 Unit 2 refueling outage.

FOR THE NUCLEAR REGULATORY COMMISSION

James G. Danna, Chief
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Renewed Facility
Operating License and
Technical Specifications

Date of Issuance: September 26, 2018

ATTACHMENT TO LICENSE AMENDMENT NO. 253

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 2

RENEWED FACILITY OPERATING LICENSE NO. NPF-22

DOCKET NO. 50-388

Replace the following page of the Renewed Facility Operating License with the attached revised page. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

Remove	Insert
Page 3	Page 3

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove	Insert	Remove	Insert
TS/TOC-1	TOC-1	3.5-10	3.5-10
TS/TOC-2	TOC-2	3.5-11	3.5-11
1.1-3	1.1-3	3.5-12	3.5-12
---	1.1-3a	3.6-8	3.6-8
3.3-37	3.3-37	3.6-11	3.6-11
3.3-38	3.3-38	3.6-12	3.6-12
3.3-43	3.3-43	3.6-14	3.6-14
3.3-44	3.3-44	3.6-15	3.6-15
3.3-45	3.3-45	3.6-16	3.6-16
3.3-46	3.3-46	3.6-35	3.6-35
3.3-47	3.3-47	3.6-36	3.6-36
---	3.3-47a	3.6-38	3.6-38
---	3.3-47b	3.6-40	3.6-40
---	3.3-47c	3.6-42	3.6-42
3.3-48	3.3-48	3.6-43	3.6-43
3.3-49	3.3-49	3.6-44	3.6-44
3.3-50	3.3-50	3.7-6	3.7-6
3.3-51	3.3-51	3.7-7	3.7-7
3.3-54	3.3-54	3.7-8	3.7-8
3.3-62	3.3-62	3.7-10	3.7-10
3.3-66	3.3-66	3.7-11	3.7-11
3.3-71	3.3-71	3.7-12	3.7-12
3.5-1	3.5-1	3.8-20	3.8-20
3.5-8	3.5-8	3.8-35	3.8-35
---	3.5-8a	3.8-36	3.8-36
3.5-9	3.5-9	3.8-51	3.8-51
---	3.5-9a		

(3) Susquehanna Nuclear, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed neutron sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;

(4) Susquehanna Nuclear, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70 to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and

(5) Susquehanna Nuclear, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70 to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

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

Susquehanna Nuclear, LLC is authorized to operate the facility at reactor core power levels not in excess of 3952 megawatts thermal in accordance with the conditions specified herein. The preoperational tests, startup tests and other items identified in License Conditions 2.C.(20), 2.C.(21), 2.C.(22), and 2.C.(23) to this license shall be completed as specified.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 253, and the Environmental Protection Plan contained in Appendix B are hereby incorporated in the license. Susquehanna Nuclear, LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

For Surveillance Requirements (SRs) that are new in Amendment 151 to Facility Operating License No. NPF-22, the first performance is due at the end of the first surveillance interval that begins at implementation of Amendment 151. For SRs that existed prior to Amendment 151, including SRs with modified acceptance criteria and SRs whose frequency of performance is being extended, the first performance is due at the end of the first surveillance interval that begins on the date the Surveillance was last performed prior to implementation of Amendment 151.

(continued)

(continued)

1.1 Definitions

DOSE EQUIVALENT I-131 (continued)	actually present. The conversion factors that are used for this calculation of committed effective dose equivalent (CEDE) from inhalation shall be those listed in Table 2.1 of Federal Guidelines Report 11, "Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion," EPA, 1988, as described in Regulatory Guide 1.183. The factors in the column headed "effective" yield doses corresponding to the CEDE. The conversion factors that are used for the calculation of EDE (or DDE) from external exposure (submersion) shall be those listed in Table III.1 of Federal Guidance Report 12, "External Exposure to Radionuclides in Air, Water, and Soil," EPA, 1993, as described in Regulatory Guide 1.183. The factors in the column headed "effective" yield doses corresponding to the EDE.
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 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.

(continued)

1.1 Definitions (continued)

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.

EMERGENCY CORE COOLING SYSTEM (ECCS) RESPONSE TIME	The ECCS RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its ECCS initiation setpoint at the channel sensor until the ECCS equipment is capable of performing its safety function (i.e., the valves travel to their required positions, pump discharge pressures reach their required values, etc.). Times shall include diesel generator starting and sequence loading delays, where applicable. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured.
END OF CYCLE RECIRCULATION PUMP TRIP (EOC RPT) SYSTEM RESPONSE TIME	The EOC RPT SYSTEM RESPONSE TIME shall be that time interval from initial signal generation by the associated turbine stop valve limit switch or from when the turbine control valve hydraulic oil control oil pressure drops below the pressure switch setpoint to complete suppression of the electric arc between the fully open contacts of the recirculation pump circuit breaker. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured.
ISOLATION SYSTEM RESPONSE TIME	The ISOLATION SYSTEM RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its isolation initiation setpoint at the channel sensor until the isolation valves travel to their required positions. Times shall include diesel generator starting and sequence loading delays, where applicable. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured.

(continued)

3.3 INSTRUMENTATION

3.3.5.1 Emergency Core Cooling System (ECCS) Instrumentation

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

APPLICABILITY: According to Table 3.3.5.1-1.

ACTIONS

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

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

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.2 ----------NOTE---------- Only applicable for Functions 3.a and 3.b. ---------- Declare High Pressure Coolant Injection (HPCI) System inoperable.	1 hour from discovery of loss of HPCI initiation capability
	AND	
	B.3 Place channel in trip.	24 hours
C. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	C.1 ----------NOTE---------- Only applicable for Functions 1.d, 2.d, 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	
	C.2 Restore channel to OPERABLE status.	24 hours

(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. Core Spray System					
a. Reactor Vessel Water Level—Low Low Low, Level 1	1,2,3	4[(a)]	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ -136 inches
b. Drywell Pressure—High	1,2,3	4[(a)]	B	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≤ 1.88 psig
c. Reactor Steam Dome Pressure—Low (initiation)	1,2,3	4	B	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≥ 407 psig (lower) ≤ 433 psig (upper)
d. Reactor Steam Dome Pressure—Low (injection permissive)	1,2,3	4	C	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≥ 407 psig (lower) ≤ 433 psig (upper)
e. Manual Initiation	1,2,3	2 1 per subsystem	C	SR 3.3.5.1.5	NA
2. Low Pressure Coolant Injection (LPCI) System					
a. Reactor Vessel Water Level—Low Low Low, Level 1	1,2,3	4[(b)]	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ -136 inches

(continued)

(a) Also required to initiate the associated diesel generator (DG), initiate Drywell Cooling Equipment Trip, and Emergency Service Water (ESW) Pump timer reset.

(b) Also required to initiate the associated DGs, ESW Pump timer reset and Turbine Building and Reactor Building Chillers trip.

Table 3.3.5.1-1 (page 2 of 5)

Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
2. LPCI System (continued)					
b. Drywell Pressure-High	1,2,3	4[b]	B	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≤ 1.88 psig
c. Reactor Steam Dome Pressure-Low (initiation)	1,2,3	4	B	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≥ 407 psig (lower) ≤ 433 psig (upper)
d. Reactor Steam Dome Pressure-Low (injection permissive)	1,2,3	4	C	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≥ 407 psig (lower) ≤ 433 psig (upper)
e. Reactor Steam Dome Pressure-Low (Recirculation Discharge Valve Permissive)	1[c],2[c], 3[c]	4	C	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≥ 216 psig
f. Manual Initiation	1,2,3	2 1 per subsystem	C	SR 3.3.5.1.5	NA

(continued)

(b) Also required to initiate the associated DGs, ESW pump timer reset and Turbine Building and Reactor Building Chiller trip.

(c) With either associated recirculation pump discharge or bypass valves open.

Table 3.3.5.1-1 (page 3 of 5)

Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
3. High Pressure Coolant Injection (HPCI) System					
a. Reactor Vessel Water Level-Low Low, Level 2	1, 2[d], 3[d]	4	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ -45 inches
b. Drywell Pressure-High	1, 2[d],3[d]	4	B	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≤ 1.88 psig
c. Reactor Vessel Water Level-High, Level 8	1 2[d], 3[d]	2	C	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≤ 55.5 inches
d. Condensate Storage Tank Level-Low	1, 2[d], 3[d]	2	D	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≥ 40.5 inches above tank bottom
e. Manual Initiation	1, 2[d], 3[d]	1	C	SR 3.3.5.1.5	NA

(continued)

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

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
4. Automatic Depressurization System (ADS) Trip System A					
a. Reactor Vessel Water Level—Low Low Low, Level 1	1, 2[d], 3[d]	2	E	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ -136 inches
b. Drywell Pressure—High	1, 2[d], 3[d]	2	E	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≤ 1.88 psig
c. Automatic Depressurization System Initiation Timer	1, 2[d], 3[d]	1	F	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≤ 114 seconds
d. Reactor Vessel Water Level—Low, Level 3 (Confirmatory)	1, 2[d], 3[d]	1	E	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ 11.5 inches
e. Core Spray Pump Discharge Pressure—High	1, 2[d], 3[d]	2	F	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≥ 125 psig and ≤ 165 psig
f. Low Pressure Coolant Injection Pump Discharge Pressure – High	1, 2[d], 3[d]	4	F	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≥ 115 psig and ≤ 135 psig
g. Automatic Depressurization System Drywell Pressure Bypass Actuation Timer	1, 2[d], 3[d]	2	F	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≤ 450 seconds
h. Manual Initiation	1, 2[d], 3[d]	2	F	SR 3.3.5.1.5	NA

(continued)

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

Table 3.3.5.1-1 (page 5 of 5)

Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
5. ADS Trip System B					
a. Reactor Vessel Water Level - Low Low Low, Level 1	1, 2[d], 3[d]	2	E	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ -136 inches
b. Drywell Pressure—High	1, 2[d], 3[d]	2	E	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≤ 1.88 psig
c. Automatic Depressurization System Initiation Timer	1, 2[d], 3[d]	1	F	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≤ 114 sec
d. Reactor Vessel Water Level—Low, Level 3 (Confirmatory)	1, 2[d], 3[d]	1	E	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ 11.5 inches
e. Core Spray Pump Discharge Pressure—High	1, 2[d], 3[d]	2	F	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≥ 125 psig and ≤ 165 psig
f. Low Pressure Coolant Injection Pump Discharge Pressure—High	1, 2[d], 3[d]	4	F	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≥ 115 psig and ≤ 135 psig
g. Automatic Depressurization System Drywell Pressure Bypass Actuation Timer	1, 2[d], 3[d]	2	F	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5	≤ 450 seconds
h. Manual Initiation	1, 2[d], 3[d]	2	F	SR 3.3.5.1.5	NA

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

3.3 INSTRUMENTATION

3.3.5.2 Reactor Pressure Vessel (RPV) Water Inventory Control Instrumentation

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

APPLICABILITY: According to Table 3.3.5.2-1.

ACTIONS

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

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

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Required Action and associated Completion Time of Condition C or D not met.	E.1 Declare associated low pressure 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	----------NOTE---------- A test of all required contacts does not have to be performed. --- 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 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. Core Spray System					
a. Reactor Steam Dome Pressure - Low (Injection Permissive)	4, 5	4 (a)	C	SR 3.3.5.2.2 SR 3.3.5.2.3	≤ 433 psig (upper)
b. Manual Initiation	4, 5	1 per subsystem (a)	D	SR 3.3.5.2.3	NA
2. Low Pressure Coolant Injection (LPCI) System					
a. Reactor Steam Dome Pressure - Low (Injection Permissive)	4, 5	4 (a)	C	SR 3.3.5.2.2 SR 3.3.5.2.3	≤ 433 psig (upper)
b. Manual Initiation	4, 5	1 per subsystem (a)	D	SR 3.3.5.2.3	NA
3. RHR System Isolation					
a. Reactor Vessel Water Level - Low, Level 3	(b)	2 in one trip system	B	SR 3.3.5.2.1 SR 3.3.5.2.2 SR 3.3.5.2.3	≥ 11.5 inches
4. Reactor Water Cleanup (RWCU) System Isolation					
a. Reactor Vessel Water Level - Low Low, Level 2	(b)	2 in one trip system	B	SR 3.3.5.2.1 SR 3.3.5.2.2 SR 3.3.5.2.3	≥ -45 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 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 Functions 2 and 4 and (b) for up to 6 hours for Functions other than Functions 2 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	A test of all required contacts does not have to be performed. Perform CHANNEL FUNCTIONAL TEST.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.3.3	Perform CHANNEL CALIBRATION.	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

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 3.3.5.3.4 SR 3.3.5.3.5	≥ -45 inches
2. Reactor Vessel Water Level—High, Level 8	2	C	SR 3.3.5.3.1 SR 3.3.5.3.2 SR 3.3.5.3.3 SR 3.3.5.3.5	≤ 55.5 inches
3. Condensate Storage Tank Level—Low	2	D	SR 3.3.5.3.2 SR 3.3.5.3.3 SR 3.3.5.3.5	≥ 36.0 inches above the tank bottom
4. Manual Initiation	1	C	SR 3.3.5.3.5	NA

ACTIONS (continued)

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

Table 3.3.6.1-1 (page 6 of 6)
Primary Containment 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
6. Shutdown Cooling System Isolation					
a. Reactor Steam Dome Pressure - High	1,2,3	1	F	SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5	≤ 108 psig
b. Reactor Vessel Water Level - Low, Level 3	3	2	J	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5	≥ 11.5 inches
c. Manual Initiation	3	1	G	SR 3.3.6.1.5	NA
7. Traversing Incore Probe Isolation					
a. Reactor Vessel Water Level - Low, Level 3	1,2,3	2	G	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5	≥ 11.5 inches
b. Drywell Pressure - High	1,2,3	2	G	SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.5	≤ 1.88 psig

Table 3.3.6.2-1 (page 1 of 1)

Secondary Containment Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Reactor Vessel Water Level—Low Low, Level 2	1,2,3	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.5	≥ -45 inches
2. Drywell Pressure—High	1,2,3	2	SR 3.3.6.2.2 SR 3.3.6.2.3 SR 3.3.6.2.5	≤ 1.88 psig
3. Unit 1 Refuel Floor High Exhaust Duct Radiation—High	(a)	1	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.5	≤ 25 mR/hr
4. Unit 2 Refuel Floor High Exhaust Duct Radiation—High	(a)	1	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.5	≤ 25 mR/hr
5. Unit 1 Refuel Floor Wall Exhaust Duct Radiation—High	(a)	1	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.5	≤ 28 mR/hr
6. Unit 2 Refuel Floor Wall Exhaust Duct Radiation—High	(a)	1	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.5	≤ 28 mR/hr
7. Railroad Access Shaft Exhaust Duct Radiation—High	(b)	1	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.5	≤ 7 mR/hr
8. Manual Initiation	1,2,3, (a)	1	SR 3.3.6.2.5	NA

(a) During CORE ALTERATIONS and during movement of irradiated fuel assemblies in secondary containment.

(b) During movement of irradiated fuel assemblies within the Railroad Access Shaft, and above the Railroad Access Shaft with the Railroad Access Shaft Equipment Hatch open.

Table 3.3.7.1-1 (page 1 of 1)

Control Room Emergency Outside Air Supply 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, Level 2	1,2,3	2	B	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.4 SR 3.3.7.1.5	≥ -45 inches
2. Drywell Pressure—High	1,2,3	2	B	SR 3.3.7.1.2 SR 3.3.7.1.3 SR 3.3.7.1.5	≤ 1.88 psig
3. Unit 1 Refuel Floor High Exhaust Duct Radiation—High	(a)	1	B	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.4 SR 3.3.7.1.5	≤ 25 mR/hr
4. Unit 2 Refuel Floor High Exhaust Duct Radiation—High	(a)	1	B	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.4 SR 3.3.7.1.5	≤ 25 mR/hr
5. Unit 1 Refuel Floor Wall Exhaust Duct Radiation —High	(a)	1	B	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.4 SR 3.3.7.1.5	≤ 28 mR/hr
6. Unit 2 Refuel Floor Wall Exhaust Duct Radiation —High	(a)	1	B	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.4 SR 3.3.7.1.5	≤ 28 mR/hr
7. Railroad Access Shaft Exhaust Duct Radiation—High	(b)	1	B	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.4 SR 3.3.7.1.5	≤ 7 mR/hr
8. Main Control Room Outside Air Intake Radiation – High	1,2,3, (a)	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	≤ 5 mR/hr
9. Manual Initiation	1,2,3 (a)	1	B	SR 3.3.7.1.5	n/a

(a) During CORE ALTERATIONS and during movement of irradiated fuel assemblies in the secondary containment.

(b) During movement of irradiated fuel assemblies within the Railroad Access Shaft, and above the Railroad Access Shaft with the Railroad Access Shaft Equipment Hatch open.

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS), REACTOR PRESSURE VESSEL (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 six safety/relief valves shall be OPERABLE.

APPLICABILITY: MODE 1,
MODES 2 and 3, except high pressure coolant injection (HPCI) and 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 HPCI.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One low pressure ECCS injection/spray subsystem inoperable for reasons other than Condition B.	A.1 Restore low pressure ECCS injection/spray subsystem to OPERABLE status.	7 days
B. One LPCI pump in one or both LPCI subsystems inoperable.	B.1 Restore LPCI pump(s) to OPERABLE status.	7 days
C. Required Action and associated Completion Time of Condition A or Condition B not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 4.	12 hours 36 hours

(continued)

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS), REACTOR PRESSURE VESSEL (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 low pressure 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

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. DRAIN TIME < 36 hours and ≥ 8 hours.	C.1 Verify secondary containment boundary is capable of being established in less than the DRAIN TIME. AND	4 hours
	C.2 Verify each secondary containment penetration flow path is capable of being isolated in less than the DRAIN TIME. AND	4 hours
	C.3 Verify one standby gas treatment subsystem is capable of being placed in operation 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 secondary containment boundary.	Immediately
	AND	
	D.3 Initiate action to isolate each secondary containment penetration flow path or verify it can be manually isolated from the control room.	Immediately
	AND	
	D.4 Initiate action to verify one standby gas treatment subsystem is capable of being placed in operation.	Immediately

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
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 coolant injection (LPCI) subsystem, the suppression pool water level is ≥ 20 ft 0 inches.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.2.3	Verify, for a required Core Spray (CS) subsystem, the: a. Suppression pool water level is ≥ 20 ft 0 inches; or b. Condensate storage tank water level is ≥ 49% of capacity.	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 ECCS injection/spray subsystem actuates on a manual initiation signal.	In accordance with the Surveillance Frequency Control Program

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS), REACTOR PRESSURE VESSEL (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 Coolant Injection System is OPERABLE. AND A.2 Restore RCIC System to OPERABLE status	Immediately 14 days
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Reduce reactor steam dome pressure to ≤ 150 psig.	12 hours 36 hours

3.6 CONTAINMENT SYSTEMS

3.6.1.3 Primary Containment Isolation Valves (PCIVs)

LCO 3.6.1.3 Each PCIV shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3

ACTIONS

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

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- Only applicable to penetration flow paths with two PCIVs except for the H_2 O_2 Analyzer penetrations. ---------- One or more penetration flow paths with one PCIV inoperable except for purge valve leakage not within limit.	A.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured. AND	4 hours except for main steam line AND 8 hours for main steam line (continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. ----------NOTE---------- Only applicable to the H_2O_2 Analyzer penetrations. ---------- One or more H_2 O_2 Analyzer penetrations with one or two PCIVs inoperable.	D.1 Isolate the affected penetration flow path by the use of at least one closed and de-activated automatic valve, closed manual valve or blind flange.	72 hours
	AND	
	D.2 Verify the affected penetration flow path is isolated.	Once per 31 days
E. Secondary containment bypass leakage rate not within limit.	E.1 Restore leakage rate to within limit.	4 hours
F. One or more penetration flow paths with one or more containment purge valves not within purge valve leakage limit.	F.1 Restore the valve leakage to within valve leakage limit.	24 hours
G. Required Action and associated Completion Time of Condition A, B, C, D, E, or F not met.	G.1 Be in MODE 3.	12 hours
	AND	
	G.2 Be in MODE 4.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.1.3.1	----------NOTE---------- Not required to be met when the 18 and 24 inch primary containment purge valves are open for inerting, de-inerting, pressure control, ALARA or air quality considerations for personnel entry, or Surveillances that require the valves to be open. ---------- Verify each 18 and 24 inch primary containment purge valve is closed.	In accordance with the Surveillance Frequency Control Program
SR 3.6.1.3.2	----------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 PCIVs that are open under administrative controls. ---------- Verify each primary containment isolation manual valve and blind flange that is located outside primary containment and 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

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.1.3.6	Perform leakage rate testing for each primary containment purge valve with resilient seals.	In accordance with the Surveillance Frequency Control Program
SR 3.6.1.3.7	Verify the isolation time of each MSIV is ≥3 seconds and ≤ 5 seconds.	In accordance with the Inservice Testing Program
SR 3.6.1.3.8	Verify each automatic PCIV actuates to the isolation position on an actual or simulated isolation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.6.1.3.9	Verify a representative sample of reactor instrumentation line EFCVs actuate to check flow on a simulated instrument line break.	In accordance with the Surveillance Frequency Control Program
SR 3.6.1.3.10	Remove and test the explosive squib from each shear isolation valve of the TIP System.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.1.3.11	Verify the combined leakage rate for all secondary containment bypass leakage paths is ≤ 15 scfh when pressurized to ≥ P_a.	In accordance with the Primary Containment Leakage Rate Testing Program.
SR 3.6.1.3.12	Verify leakage rate through each MSIV is ≤100 scfh and ≤ 300 scfh for the combined leakage including the leakage from the MS Line Drains when the MSIVs are tested at ≥ 24.3 psig or P_a and the MS Line Drains are tested at P_a.	In accordance with the Primary Containment Leakage Rate Testing Program.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.1.3.13	Verify combined leakage rate through hydrostatically tested lines that penetrate the primary containment is within limits.	In accordance with the Primary Containment Leakage Rate Testing 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 irradiated fuel assemblies in the secondary containment,
During CORE ALTERATIONS.

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Secondary containment inoperable during movement of irradiated fuel assemblies in the secondary containment or during CORE ALTERATIONS.	C.1 ----------NOTE---------- LCO 3.0.3 is not applicable. ---------- Suspend movement of irradiated fuel assemblies in the secondary containment.	Immediately
	AND	
	C.2 Suspend CORE ALTERATIONS.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.4.1.1	----------NOTE---------- Not required to be met for 4 hours if analysis demonstrates one standby gas treatment (SGT) subsystem is capable of establishing the required secondary containment vacuum. ---------- Verify secondary containment vacuum is ≥ 0.25 inch of vacuum water gauge.	In accordance with the Surveillance Frequency Control Program
SR 3.6.4.1.2	Verify all required secondary containment removable walls and equipment hatches required to be closed are closed and sealed.	In accordance with the Surveillance Frequency Control Program

(continued)

3.6 CONTAINMENT SYSTEMS

3.6.4.2 Secondary Containment Isolation Valves (SCIVs)

LCO 3.6.4.2 Each required SCIV shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
During movement of irradiated fuel assemblies in the secondary containment,
During CORE ALTERATIONS.

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. ----------NOTE---------- Only applicable to penetration flow paths with two SCIVs. ---------- One or more penetration flow paths with one required SCIV inoperable.	A.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange. AND	8 hours (continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. (continued)	C.2 ----------NOTE---------- Isolation devices in high radiation areas may be verified by use of administrative means. ---------- Verify the affected penetration flow path is isolated.	Once per 31 days
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. AND D.2 Be in MODE 4.	12 hours 36 hours
E. Required Action and associated Completion Time of Condition A, B or C not met during movement of irradiated fuel assemblies in the secondary containment or during CORE ALTERATIONS.	E.1 ----------NOTE---------- LCO 3.0.3 is not applicable. ---------- Suspend movement of irradiated fuel assemblies in the secondary containment. AND E.2 Suspend CORE ALTERATIONS.	Immediately Immediately

3.6 CONTAINMENT SYSTEMS

3.6.4.3 Standby Gas Treatment (SGT) System

LCO 3.6.4.3 Two SGT subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
During movement of irradiated fuel assemblies in the secondary containment,
During CORE ALTERATIONS.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One SGT subsystem inoperable.	A.1 Restore SGT subsystem to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, or 3.	B.1 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 irradiated fuel assemblies in the secondary containment or during CORE ALTERATIONS.	----------NOTE---------- LCO 3.0.3 is not applicable. ---------- C.1 Place OPERABLE SGT filter train in operation. OR	 Immediately

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. (continued)	C.2.1 Suspend movement of irradiated fuel assemblies in secondary containment. AND C.2.2 Suspend CORE ALTERATIONS.	Immediately Immediately
D. Two SGT subsystems inoperable in MODE 1, 2, or 3.	D.1 Restore one SGT subsystem to OPERABLE status.	4 hours
E. Required Action and associated Completion Time of Condition 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

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Two SGT subsystems inoperable during movement of irradiated fuel assemblies in the secondary containment or during CORE ALTERATIONS.	F.1 ----------NOTE---------- LCO 3.0.3 is not applicable. ---------- Suspend movement of irradiated fuel assemblies in secondary containment.	Immediately
	AND	
	F.2 Suspend CORE ALTERATIONS.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.4.3.1	Operate each SGT filter train for ≥ 15 continuous minutes with heaters operating.	In accordance with the Surveillance Frequency Control Program
SR 3.6.4.3.2	Perform required SGT filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP
SR 3.6.4.3.3	Verify each SGT subsystem actuates on an actual or simulated initiation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.6.4.3.4	Verify each SGT filter cooling bypass and outside air damper opens and the fan starts on high charcoal temperature.	In accordance with the Surveillance Frequency Control Program

3.7 PLANT SYSTEMS

3.7.3 Control Room Emergency Outside Air Supply (CREOAS) System

LCO 3.7.3 Two CREOAS subsystems shall be OPERABLE.

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

The control room envelope (CRE) boundary may be opened intermittently under administrative control.

APPLICABILITY: MODES 1, 2, and 3,
During movement of irradiated fuel assemblies in the secondary containment,
During CORE ALTERATIONS.

ACTIONS

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

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 irradiated fuel assemblies in the secondary containment or during CORE ALTERATIONS.	----------NOTE---------- LCO 3.0.3 is not applicable. ---------- D.1 Place OPERABLE CREOAS subsystem in pressurization/ filtration mode. OR D.2.1 Suspend movement of irradiated fuel assemblies in the secondary containment. AND D.2.2 Suspend CORE ALTERATIONS.	 Immediately Immediately Immediately
E. Two CREOAS 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 CREOAS subsystems inoperable during movement of irradiated fuel assemblies in the secondary containment or during CORE ALTERATIONS. OR One or more CREOAS subsystems inoperable due to an inoperable CRE boundary during movement of irradiated fuel assemblies in the secondary containment or during CORE ALTERATIONS.	----------NOTE---------- LCO 3.0.3 is not applicable. ---------- F.1 Suspend movement of irradiated fuel assemblies in the secondary containment. AND F.2 Suspend CORE ALTERATIONS.	Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.3.1	Operate each CREOAS filter train for ≥ 15 continuous minutes with the heaters operating.	In accordance with the Surveillance Frequency Control Program
SR 3.7.3.2	Perform required CREOAS filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP
SR 3.7.3.3	Verify each CREOAS subsystem actuates on an actual or simulated initiation signal.	In accordance with the Surveillance Frequency Control Program

(continued)

3.7 PLANT SYSTEMS

3.7.4 Control Room Floor Cooling System

LCO 3.7.4 Two control room floor cooling subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
During movement of irradiated fuel assemblies in the secondary containment,
During CORE ALTERATIONS.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One control room floor cooling subsystem inoperable.	A.1 Restore control room floor cooling subsystem to OPERABLE status.	30 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. <u>AND</u> B.2 Be in MODE 4.	12 hours 36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of Condition A not met during movement of irradiated fuel assemblies in the secondary containment or during CORE ALTERATIONS.	----------NOTE---------- LCO 3.0.3 is not applicable. ---------- C.1 Place OPERABLE control room floor cooling subsystem in operation. OR C.2.1 Suspend movement of irradiated fuel assemblies in the secondary containment. AND C.2.2 Suspend CORE ALTERATIONS.	 Immediately Immediately Immediately
D. Two control room floor cooling subsystems inoperable in MODE 1, 2, or 3.	D.1 Enter LCO 3.0.3.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Two control room floor cooling subsystems inoperable during movement of irradiated fuel assemblies in the secondary containment or during CORE ALTERATIONS.	----------NOTE---------- LCO 3.0.3 is not applicable. ---------- E.1 Suspend movement of irradiated fuel assemblies in the secondary containment. AND E.2 Suspend CORE ALTERATIONS.	 Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.4.1	Verify each control room floor cooling 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. One or more required AC Sources inoperable.	---NOTE--- Enter applicable Condition and Required Actions of LCO 3.8.8, with one required subsystem de-energized as a result of Condition A.	
	A.1 Declare affected required feature(s), inoperable.	Immediately
	OR	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2.2 Suspend movement of irradiated fuel assemblies in the secondary containment.	Immediately
	AND	
	A.2.3 Initiate action to restore required AC Source to OPERABLE status.	Immediately

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.2 Suspend movement of irradiated fuel assemblies in the secondary containment. AND	Immediately
	A.2.3 Initiate action to restore required Unit 2 DC electrical power subsystems to OPERABLE status.	Immediately
B. Diesel Generator E DC electrical power subsystem inoperable, while not aligned to the Class 1E distribution system.	B.1 Verify that all ESW valves associated with Diesel Generator E are closed.	2 hours
C. Diesel Generator E DC electrical power subsystem inoperable, while aligned to the Class 1E distribution system.	C.1 Declare Diesel Generator E inoperable.	2 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. ----------NOTE---------- Not applicable to DG E DC electrical power subsystem. ---------- One or more inoperable required Unit 1 DC electrical power subsystem.	D.1 Declare affected required feature(s) inoperable	Immediately
	OR	
	D.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	D.2.2 Suspend movement of irradiated fuel assemblies in the secondary containment.	Immediately
	AND	
	D.2.3 Initiate action to restore required DC electrical power subsystems to OPERABLE status.	Immediately
	OR	

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	----------NOTE---------- Enter applicable Conditions and Required Actions of LCO 3.5.2 "Reactor Pressure Vessel (RPV) Water Inventory Control" when Condition A renders an ECCS subsystem Inoperable. ----------	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2.2 Suspend handling of irradiated fuel assemblies in the secondary containment.	Immediately
	AND	
	A.2.3 Initiate actions to restore required AC and DC electrical power distribution subsystems to OPERABLE status.	Immediately
	AND	
	A.2.4 Declare associated required shutdown cooling subsystem(s) inoperable and not in operation.	Immediately
	OR	

(continued)

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 271 TO

RENEWED FACILITY OPERATING LICENSE NO. NPF-14

AND AMENDMENT NO. 253 TO

RENEWED FACILITY OPERATING LICENSE NO. NPF-22

SUSQUEHANNA NUCLEAR, LLC

ALLEGHENY ELECTRIC COOPERATIVE, INC.

SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2

DOCKET NOS. 50-387 AND 50-388

1.0 INTRODUCTION

By application dated September 20, 2017,[1] as supplemented by letters dated February 16, 2018,[2] and May 15, 2018,[3] Susquehanna Nuclear, LLC (the licensee), requested to adopt Technical Specifications Task Force (TSTF) Traveler TSTF-542, Revision 2, "Reactor Pressure Vessel Water Inventory Control," [4] which changes the Technical Specifications (TSs) for Susquehanna Steam Electric Station Units 1 and 2 (Susquehanna). Traveler TSTF-542, Revision 2, was approved by the U.S. Nuclear Regulatory Commission (NRC or the Commission) on December 20, 2016.[5]

The proposed changes would replace existing TS requirements associated with "operations with a potential for draining the reactor vessel [OPDRVs]," with revised TSs providing alternative requirements for reactor pressure vessel (RPV) water inventory control (WIC). These alternative requirements would protect Safety Limit TS 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 Susquehanna TSs, Section 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

[1] Agencywide Documents Access and Management System (ADAMS) Package Accession No. ML17265A434
[2] ADAMS Accession No. ML18052A579
[3] ADAMS Accession No. ML18136A525
[4] ADAMS Accession No. ML16074A448
[5] ADAMS Accession No. ML16343B008

Modes 4 and 5 outage-related activities. Adequate licensee management of secondary containment requirements or mitigation of certain emergency core cooling system (ECCS) safety injection/spray systems during Modes 4 and 5 requires a properly calculated drain time.

The licensee has proposed several variations from the TS changes described in applicable parts of TSTF-542, or the NRC-approved TSTF-542 safety evaluation. These are described in this safety evaluation (SE) in Section 2.2.5 and evaluated in Section 3.5.

The supplements dated February 16, 2018, and May 15, 2018, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the NRC staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on November 21, 2017 (82 FR 55414).

2.0 REGULATORY EVALUATION

2.1 System Description

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

During operation in Mode 1 (Power Operation – Reactor Mode Switch in Run), Mode 2 (Startup – Reactor Mode Switch in Refuel [6] or Startup/Hot Standby), and Mode 3 (Hot Shutdown [6] - Reactor Mode Switch in Shutdown and average reactor coolant temperature > 200 degrees Fahrenheit (°F)), the TSs for instrumentation and emergency core cooling systems 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 water inventory loss.

During BWR operation in Mode 4 (Cold Shutdown [6] – Reactor Mode Switch in Shutdown and average reactor coolant temperature ≤ 200 °F) and Mode 5 (Refueling [7] - 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), and the water level is ≥ 22 feet over the top of the RPV flange with the spent fuel storage pool gates removed.

The large volume of water available in and above the RPV (during much of the time when in Mode 5) provides time for operator detection and manual operator action to stop and mitigate an RPV draining event. However, typically at other times during a refueling outage during Cold Shutdown (Mode 4) or Refueling (Mode 5), there may be a potential for significant drainage paths from certain outage activities, human error, and other events when it is more likely to have some normally available equipment, instrumentation, and systems inoperable due to maintenance and outage activities. There may not be as much time for operator action as compared to times when there are large volumes of water above the RPV.

---

[6] All reactor vessel head closure bolts fully tensioned

[7] One or more reactor vessel head closure bolts less than fully tensioned

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

2.2 Changes to the TSs

Section 2.2.1 describes the proposed addition of a new definition, "DRAIN TIME."

Section 2.2.2 describes the proposed revision to TS 3.3, "Instrumentation," including the proposed revision to: (1) 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 existing TS 3.3.5.2, "Reactor Core Isolation Cooling (RCIC) System Instrumentation," to 3.3.5.3, and (4) revisions to existing TS 3.3.6.1, "Primary Containment Isolation Instrumentation" (including Table 3.3.6.1-1).

Section 2.2.3 describes the proposed revision to TS 3.5, "Emergency Core Cooling System (ECCS) and Reactor Core Isolation Cooling (RCIC) System," including a proposed revision to TS 3.5.2, "ECCS – Shutdown."

Section 2.2.4 describes the proposed deletion of existing TS references to OPDRVs.

Section 2.2.5 describes Susquehanna plant-specific variations to TSTF-542, Revision 2.

The descriptions of the proposed changes are provided in this section. A summary statement of the bases or reasons for such specifications, other than those covering administrative controls, were also included in the application, but these bases will not become part of the TSs.

2.2.1 *Insertion of New Definition of Drain Time*

The following definition of "DRAIN TIME" would be added to Section 1.1, "Definitions":

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

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

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

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

3. Penetration flow paths with isolation devices that can be closed prior to the RPV water level being equal to the TAF by a dedicated operator trained in the task, who 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 *Changes to TS Section 3.3, Instrumentation*

The following subsections describe the existing and proposed changes to the Susquehanna TSs, 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 and C.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, the applicability in Modes 4 and 5 was proposed for deletion because the instrumentation requirements during shutdown would be consolidated into the new TS 3.3.5.2, "RPV Water Inventory Control Instrumentation." Modes 4 and 5 applicability and associated requirements would be deleted for the following functions:

1. Core Spray System:
   (a) Reactor Vessel Water Level - Low Low Low, Level 1
   (c) Reactor Steam Dome Pressure - Low (initiation)
   (d) Reactor Steam Dome Pressure - Low (injection permissive)
   (e) Manual Initiation

2. Low Pressure Coolant Injection (LPCI) System:
   (a) Reactor Vessel Water Level - Low Low Low, Level 1
   (c) Reactor Steam Dome Pressure - Low (initiation)
   (d) Reactor Steam Dome Pressure - Low (injection permissive)
   (f) Manual Initiation

Table 3.3.5.1-1 Footnote (a), which states, "When the associated subsystem(s) are required to be OPERABLE," would be deleted. As a result, existing Footnotes (b), (c), (d), and (e) would be renumbered (a), (b), (c), and (d), respectively.

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

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

3.3.5.2 Reactor Pressure Vessel (RPV) Water Inventory Control Instrumentation

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

APPLICABILITY: According to Table 3.3.5.2-1.

ACTIONS

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

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

C. As required by Required Action A.1 and referenced in Table 3.3.5.2-1.	C.1 Place channel in trip.	1 hour
D. As required by Required Action A.1 and referenced in Table 3.3.5.2-1.	D.1 Restore channel to OPERABLE status.	24 hours
E. Required Action and associated Completion Time of Condition C or D not met.	E.1 Declare associated low pressure 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 ----------NOTE---------- A test of all required contacts does not have to be performed. ---------- 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 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. Core Spray System					
a. Reactor Steam Dome Pressure – Low (Injection Permissive)	4,5	4 (a)	C	SR 3.3.5.2.2 SR 3.3.5.2.3	≤ 433 psig (upper)
b. Manual Initiation	4,5	1 per subsystem (a)	D	SR 3.3.5.2.3	NA

2. Low Pressure Coolant Injection (LPCI) System					
a. Reactor Steam Dome Pressure – Low (Injection Permissive)	4,5	4 (a)	C	SR 3.3.5.2.2 SR 3.3.5.2.3	≤ 433 psig (upper)
b. Manual Initiation	4,5	1 per subsystem (a)	D	SR 3.3.5.2.3	NA
3. RHR System Isolation					
a. Reactor Vessel Water Level – Low, Level 3	(b)	2 in one trip system	B	SR 3.3.5.2.1 SR 3.3.5.2.2 SR 3.3.5.2.3	≥ 11.5 inches
4. Reactor Water Cleanup (RWCU) System Isolation					
a. Reactor Vessel Water Level – Low Low, Level 2	(b)	2 in one trip system	B	SR 3.3.5.2.1 SR 3.3.5.2.2 SR 3.3.5.2.3	≥ - 45 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 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 Isolation Instrumentation"*

In Limiting Conditions for Operation (LCO) 3.3.6.1, Required Action J.2 was proposed to be deleted since it was associated with the isolation of residual heat removal (RHR) SDC during Modes 4 and 5. In addition, TS Table 3.3.6.1-1, Function 6.b, Shutdown Cooling System Isolation, Reactor Vessel Water Level – Low, Level 3, and Function 6.c, Shutdown Cooling System Isolation, Manual Initiation, the applicability in Modes 4 and 5 was proposed for deletion. Also, Table 3.3.6.1-1, Footnote (c), "Only one trip system required in MODES 4 and 5 when RHR Shutdown Cooling System integrity maintained," was proposed to be deleted, as it is applicable only to Functions 6.b and 6.c during Modes 4 and 5. Function 6.b would move to the new TS Table 3.3.5.2-1, Function 3.a, as shown in Section 2.2.2.2 of this SE. Function 6.c is further described in Section 2.2.5.7 (Variation 7) of this SE.

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

The title of Susquehanna 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), Reactor Pressure Vessel (RPV) Water Inventory Control, and Reactor Core Isolation Cooling (RCIC) System."

The title of Susquehanna TS Section 3.5.2 would be revised from "ECCS - Shutdown" to "Reactor Pressure Vessel (RPV) Water Inventory Control," and 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 low pressure ECCS injection/spray subsystem shall be OPERABLE.

---NOTE---

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	A.1 Restore required ECCS injection/spray subsystem to OPERABLE status.	4 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action to establish a method of water injection capable of operating without offsite electrical power.	Immediately
C. DRAIN TIME < 36 hours and ≥ 8 hours.	C.1 Verify secondary containment boundary is capable of being established in less than the DRAIN TIME. AND C.2 Verify each secondary containment penetration flow path is capable of being isolated in less than the DRAIN TIME. AND C.3 Verify one standby gas treatment subsystem is capable of being placed in operation in less than the DRAIN TIME.	4 hours 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 secondary containment boundary.	Immediately
	AND	
	D.3 Initiate action to isolate each secondary containment penetration flow path or verify it can be manually isolated from the control room.	Immediately
	AND	
	D.4 Initiate action to verify one standby gas treatment subsystem is capable of being placed in operation.	Immediately
E. Required Action and associated Completion Time of Condition C or D not met. OR DRAIN TIME < 1 hour.	E.1 Initiate action to restore DRAIN TIME to ≥ 36 hours.	Immediately

The proposed SRs for TS 3.5.2 are shown below.

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.2.1	Verify DRAIN TIME ≥ 36 hours.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.2	Verify, for a required low pressure coolant injection (LPCI) subsystem, the suppression pool water level is ≥ 20 ft 0 inches.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.3	Verify, for a required Core Spray (CS) subsystem, the: a. Suppression pool water level is ≥ 20 ft 0 inches; or b. Condensate storage tank water level is ≥ 49% of capacity.	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 ECCS injection/spray subsystem actuated on a manual initiation signal.	In accordance with the Surveillance Frequency Control Program

2.2.4 *Deletion of References to OPDRVs and Other Miscellaneous Changes*

2.2.4.1 *Deletion of References to OPDRVs*

The licensee proposed to revise existing TS requirements related to "operations with a potential for draining the reactor vessel" or "OPDRVs," or if certain conditions are not met, the required actions direct the licensee to "initiate action to suspend operations with a potential for draining the reactor vessel (OPDRVs)" with new requirements on RPV WIC that will protect Safety Limit 2.1.1.3. To remain consistent with TSTF-542, all references to the term OPDRVs in the Susquehanna TSs would be deleted. The TS locations of these references are summarized as follows:

Susquehanna LCO	Location of OPDRVs References
3.3.6.1 Primary Containment Isolation Instrumentation	Required Action J.2 Table 3.3.6.1-1 Footnote (c) (Previously described in Section 2.2.2.4 of this SE)
3.3.6.2 Secondary Containment Isolation Instrumentation	Table 3.3.6.2-1 Footnote (a)
3.3.7.1 Control Room Emergency Outside Air Supply System Instrumentation	Table 3.3.7.1-1 Footnote (a)
3.6.1.3 Primary Containment Isolation Valves (PCIVs)	.Applicability, Conditions G and H
3.6.4.1 Secondary Containment	Applicability, Condition C
3.6.4.2 Secondary Containment Isolation Valves (SCIVs)	Applicability, Condition E
3.6.4.3 Standby Gas Treatment (SGT) System	Applicability, Conditions C and F
3.7.3 Control Room Emergency Outside Air Supply (CREOAS) System	Applicability, Conditions D and F
3.7.4 Control Room Floor Cooling System	Applicability, Conditions C and E
3.8.2 AC Sources - Shutdown	Condition A (Required Action A.2.3 is deleted)
3.8.5 DC Sources - Shutdown	Condition A (Required Action A.2.3 is deleted) (Required Action D.2.3 is deleted for Unit 2 only)
3.8.8 Distribution Systems - Shutdown	Condition A (Required Action A.2.3 is deleted)

2.2.4.2 *Other Miscellaneous Changes*

The licensee corrected the existing TS LCO 3.8.8, Required Action 'A', note, which states:

----------NOTE----------
Enter applicable Conditions and Required Actions of LCO 3.5.2 "ECCS Shutdown" when Condition A renders an ECCS subsystem Inoperable.

The proposed changes state:

> ----------NOTE----------
> Enter applicable Conditions and Required Actions of LCO 3.5.2 "Reactor Pressure Vessel (RPV) Water Inventory Control" when Condition A renders an ECCS subsystem Inoperable.
> ----------

2.2.5 *Susquehanna Plant-Specific TSTF-542 TS Variations*

In Section 2.2 of Enclosure 1 to the license amendment request for Susquehanna, the licensee identified several plant-specific TS variations from TSTF-542, Revision 2, or the NRC-approved TSTF-542 SE. The licensee states these variations do not affect the applicability of TSTF-542 or the NRC staff's SE to the proposed license amendment.

2.2.5.1 *Variation 1, TS LCO 3.5.2 Note, LPCI Alignment*

The note on TS LCO 3.5.2 regarding realignment to the low pressure Injection mode is currently located in TS SR 3.5.2.4 but is proposed to be relocated to the LCO. The intent of the note was to allow LPCI subsystems to be considered operable during this condition.

2.2.5.2 *Variation 2, TS Table 3.3.5.1-1, CS and LPCI Pumps Discharge Flow Low (Bypass)*

Standard TS Table 3.3.5.1-1, Function 1.d, "Core Spray Pump Discharge Flow - Low (Bypass)," and Function 2.g, "Low Pressure Coolant Injection Pump- Discharge Flow - Low (Bypass)," are not included in the Susquehanna TSs. The minimum flow instruments are provided to protect the associated low pressure ECCS pump from overheating when the pump is operating and the associated injection valve is not fully open. The minimum flow line valve is opened when low flow is sensed, and the valve is automatically closed when the flow rate is adequate to protect the pump.

2.2.5.3 *Variation 3, TS Table 3.3.5.1-1, Reactor Steam Dome Pressure – Low (Initiation)*

Susquehanna TS Table 3.3.5.1-1 includes Functions 1.c and 2.c, "Reactor Steam Dome Pressure - Low (initiation)," that are not included in the standard TS. Low reactor steam dome pressure signals (Functions 1.c, 1.d, 2.c, and 2.d) are used as permissives for the low pressure ECCS subsystems. The low reactor pressure permissive is provided to prevent a high drywell pressure condition that is not accompanied by low reactor pressure (i.e., a false LOCA signal) from disabling two RHR pumps on the other unit. Functions 1.c and 2.c are not required to ensure manual initiation of CS and LPCI and are, therefore, not included in the new Table 3.3.5.2-1.

2.2.5.4 *Variation 4, Standard TS SR 3.3.5.1.7, ECCS Response Time*

The Susquehanna TSs do not include standard TS SR 3.3.5.1.7 (verify the ECCS response time is within limits); however, similar requirements are included in Susquehanna SRs 3.5.1.13 and 3.5.2.7 (verify the ECCS response time for each ECCS injection/spray subsystem is within limit). As described in the discussion in Section 3.3.3 of the TSTF-542 justification, since a draining event is not an analyzed accident, there are no accident analysis assumptions with respect to response time. In addition, response times are insignificant compared to draindown times (seconds vs. hours). On this basis, the existing SR 3.5.2.7 is being deleted.

2.2.5.5 *Variation 5, TS SR 3.3.5.2.2 Note, Test of All Required Contacts*

A note was added to TS SR 3.3.5.2.2 to state, "A test of all required contacts does not have to be performed." This note is included in the existing channel functional test surveillance in TS 3.3.5.1 (SR 3.3.5.1.2) and TS 3.3.6.1 (SR 3.3.6.1.2) for the affected functions included in TS 3.3.5.2. The Bases for these SRs state that the exception is necessary because the design of instrumentation does not facilitate functional testing of all required contacts of the relay that input into the combinational logic, and that performance of such a test could result in a plant transient or place the plant in an undue risk situation. Therefore, for this SR, the channel functional test verifies acceptable response by verifying the change of state of the relay that inputs into the combinational logic. The required contacts not tested during the channel functional test are tested under the logic system functional test, SR 3.3.5.1.5 (or SR 3.3.6.1.5).

2.2.5.6 *Variation 6, TS Table 3.3.5.1-1, Channel Checks*

The current Susquehanna TSs do not include Channel Checks for Table 3.3.5.1-1, Functions 1.d and 2.d (Reactor Steam Dome Pressure – Low (Injection Permissive)); therefore, no Channel Checks SR was added for these functions in the new Table 3.3.5.2-1 (Functions 1.a and 2.a).

2.2.5.7 *Variation 7, TS Table 3.3.6.1-1, Manual Initiation, Function 6.c*

Susquehanna Table 3.3.6.1-1, "Primary Containment Isolation Instrumentation," includes Function 6.c, "Manual Initiation," which is not included in the standard TS. Modes 4 and 5 applicability is being removed from this function, and the footnote is correspondingly being removed from the required channels per trip system column. The SDC system can be isolated without the primary containment isolation instrumentation function; this is consistent with the basis for eliminating the applicability during OPDRVs from the Manual Initiation function associated with secondary containment isolation as described in Section 3.4.1.3 of the TSTF-542 justification.

2.2.5.8 *Variation 8, TS Table 3.3.7.1-1, Manual Initiation, Function 9*

Susquehanna Table 3.3.7.1-1, "Control Room Emergency Outside Air Supply System Instrumentation," includes Function 9, "Manual Initiation," which is not included in the standard TS. Function 9 is applicable during OPDRVs. The applicability during OPDRVs is eliminated. The CREOAS system can be initiated without the associated instrumentation function; this is consistent with the basis for eliminating the applicability during OPDRVs from the Manual Initiation function associated with secondary containment isolation as described in Section 3.4.1.3 of the TSTF-542 justification.

2.2.5.9 *Variation 9, TS 3.6.1.3, Applicability and SRs Deletions*

Susquehanna TS 3.6.1.3, "Primary Containment Isolation Valves," is currently applicable in Modes 1, 2, and 3, and when associated instrumentation is required to be operable per LCO 3.3.6.1, "Primary Containment Isolation Instrumentation." However, TSTF-542 deletes from Table 3.3.6.1-1 the Mode 4 and 5 requirement for SDC system isolation. As a result, TS 3.6.1.3 will no longer require any PCIVs to be operable in Modes 4 or 5. Therefore, Susquehanna proposes to revise the applicability to Modes 1, 2, and 3 and delete Condition H, which is applicable in Modes 4 and 5. In addition, the unnecessary reference to Modes 1, 2, or 3 in Condition G and SRs 3.6.1.3.1, 3.6.1.3.6, 3.6.1.3.11, 3.6.1.3.12, and 3.6.1.3.13 is

deleted since LCO 3.6.1.3 is applicable only in Modes 1, 2, and 3. These changes are administrative in nature and are justified on the basis that TSTF-542 removed the Mode 4 and 5 applicability from LCO 3.6.1.3.

2.2.5.10 *Variation 10, TS 3.6.4.1 and TS 3.6.4.3, Removal of One-Time Completion Time*

TS 3.6.4.1, Condition A, and TS 3.6.4.3, Condition D, for both Units 1 and 2, include a one-time completion time that expired on December 31, 2005. The note states, "48 hours for a one-time outage for replacement of the Reactor Building Recirculating Fan Damper Motors, to be completed by December 31, 2005." The licensee proposes to delete these notes that no longer apply.

2.3 Applicable Regulatory Requirements

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 LCOs, which are the lowest functional capability or performance levels of equipment required for safe operation of the facility. Per 10 CFR 50.36(c)(2)(i), when an LCO of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the TSs until the condition can be met.

As required by 10 CFR 50.36(c)(2)(ii), licensees establish TS LCOs for items meeting one or more of the listed criteria. Specifically, Criterion 4, "A structure, system, or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety," supports the establishment of LCOs for RPV WIC due to insights gained by operating experience.

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

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

NUREG-1433, "Standard Technical Specifications, General Electric BWR/4 Plants," Volume 1,[8] "Specifications," and Volume 2, "Bases,"[9] Revision 4, dated April 2012, contains the standard TS for BWR/4 plants and is part of the regulatory standardization effort. The NRC staff prepared standard TS for each of the light-water reactor nuclear designs.

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" (Standard Review Plan), dated March 2010.[10]

The regulations in Appendix A to 10 CFR Part 50, "General Design Criteria for Nuclear Power Plants" (hereinafter referred to as GDC), establish the minimum requirements for the principal design criteria for water-cooled nuclear power plants. The principal design criteria establish the necessary design, fabrication, construction, testing, and performance requirements for structures, systems, and components important to safety.

GDC 13, "Instrumentation and Control," requires that 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.

GDC 14, "Reactor Coolant Pressure Boundary," requires that the reactor coolant pressure boundary shall be designed, fabricated, erected, and tested so as to have an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture.

GDC 30, "Quality of Reactor Coolant Pressure Boundary," requires that components that are part of the reactor coolant pressure boundary shall be designed, fabricated, erected, and tested to the highest quality standards practical. Means shall be provided for detecting and, to the extent practical, identifying the location of the source of reactor coolant leakage.

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[8] ADAMS Accession No. ML12104A192
[9] ADAMS Accession No. ML12104A193
[10] ADAMS Accession No. ML100351425

GDC 33, "Reactor Coolant Makeup," requires that a system to supply reactor coolant makeup for protection against small breaks in the reactor coolant pressure boundary shall be provided. The system safety function shall be to assure that specified acceptable fuel design limits are not exceeded as a result of reactor coolant loss due to leakage from the reactor coolant pressure boundary and rupture of small piping or other small components that 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.

GDC 35, "Emergency Core Cooling," requires a system to provide abundant emergency core cooling. 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

3.1 Staff Evaluation of Proposed "DRAIN TIME" Definition

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

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

The NRC finds there is reasonable assurance that the licensee will include all RPV penetrations below the TAF in the determination of drain time as potential pathways. As part of this evaluation, the 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 reactor flange, (2) water level above the RPV flange with fuel pool gates installed, and (3) water level above the 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 draindown event. The discharge point will depend on the lowest potential drain point for each RPV penetration flow path on a plant-specific basis. This calculation provides a conservative approach to determining the drain time of the RPV.

The NRC staff concluded that the licensee's calculational methods result in conservative calculations to determine RPV drain time, thereby protecting Safety Limit 2.1.1.3, which meets the requirements of 10 CFR 50.36(c)(3). Based on these considerations, the NRC staff has determined that the licensee's proposed addition of the drain time definition to the Susquehanna 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 achieves consistency within the Susquehanna TSs and is acceptable.

The purpose of the proposed new TS 3.3.5.2 regarding RPV WIC instrumentation is to support the requirements of revised TS LCO 3.5.2 and the proposed new definition of drain time. There are instrumentation and control functions required for manual pump starts that serve as permissives, operational controls for the systems that provide water injection capability, certain start commands, pump protection, and system isolations. 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 Susquehanna, reactor operators have a manual initiation push button start for CS and LPCI.

Specifically, the proposed new TS 3.3.5.2 supports operation of the CS and LPCI, including manual initiation when needed, as well as the system isolation of the RHR SDC 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 LCO 3.5.2.

3.2.1 Staff Evaluation of Proposed TS 3.3.5.2 LCO and Applicability

The licensee proposed a new TS 3.3.5.2 to provide alternative instrumentation requirements to support manual initiation of the ECCS injection/spray subsystem. This subsystem is required in the revised TS 3.5.2 and automatic isolation of penetration flow paths that may be credited in the determination of drain time. The existing TSs contain instrumentation requirements related to OPDRVs in TS Tables 3.3.5.1-1, 3.3.6.1-1, 3.3.6.2-1, and 3.3.7.1-1. The requirements from Tables 3.3.5.1-1 and 3.3.6.1-1 would be consolidated into new TS 3.3.5.2. The OPDRVs requirements in Tables 3.3.6.2-1 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.

TSTF-542 selected Table 3.3.5.2-1 to contain those instrumentation functions needed to support manual initiation 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.

The functions that are required in Modes 4 or 5, or during OPDRVs, are relocated to Table 3.3.5.2-1 from existing TS 3.3.5.1, "ECCS Instrumentation," and TS 3.3.6.1, "Primary Containment Isolation Instrumentation." Creation of TS 3.3.5.2 places these functions in a single location with requirements appropriate to support the safety function for TS 3.5.2.

The NRC staff concluded that the licensee's proposed alternative is acceptable for Susquehanna since either CS or LPCI (or both) subsystems would be available to perform the intended function to inject water into the RPV; this meets the intent of the NRC-approved TSTF-542.

3.2.2 Staff Evaluation of Proposed TS 3.3.5.2 Actions

The NRC staff has reviewed the licensee's proposed TS 3.3.5.2 Actions to determine whether they provide effective remedial measures when one or more instrument channels are inoperable and cannot complete the required function in a normal manner. The Actions are evaluated as follows:

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

Action B (concerning the RHR/SDC 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 an immediate recalculation of drain time, but automatic isolation of the affected penetration flow paths cannot be credited.

Action C (concerning low reactor steam dome pressure injection permissive functions necessary for ECCS subsystem manual injection valve opening) would address an event in which the permissive is inoperable. The function must be placed in the trip condition within 1 hour. With the permissive function instrument in the trip condition, manual injection valve opening may now be performed using the preferred control board switches. This 1-hour completion time is acceptable because despite the preferred start method being prevented, 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 in that time. The time of 1 hour also provides reasonable time for evaluation and placing the channel in trip.

Action D (concerning manual initiation) would address actions when the manual initiation logic with the push button is inoperable. In this condition, the operator can take manual control of the pump and the injection. Similar to the justification for Action C, while this is not the preferred method, the CS and LPCI 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 and have necessary repairs completed.

Action E would apply if the required actions and associated completion times of Conditions C or D were not met. If they were not met, then the associated low pressure ECCS injection/spray subsystem might be incapable of performing the intended function, and the CS/LPCI subsystem would be declared inoperable immediately.

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

3.2.3 *Staff Evaluation of Proposed TS 3.3.5.2 SRs*

The NRC staff finds that these tests are sufficient and adequate because they will ensure 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 draindown of the RPV in Modes 4 and 5). The NRC staff finds that the proposed SRs of LCO 3.3.5.2, as described in Section 3.3.3 of TSTF-542, 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.

SR 3.3.5.2.1 would require a Channel Check and applies to RHR/SDC and RWCU system isolation. Performance of the Channel Check would ensure that a gross failure of instrumentation has not occurred. A Channel Check is normally a comparison of the parameter indicated on one channel to a similar parameter on other related channels. A Channel Check is significant in assuring that there is a low probability of an undetected complete channel failure and is a key safety practice to verifying the instrumentation continues to operate properly between each Channel Functional Test. 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, except manual initiation. A Channel Functional Test is the injection of a simulated or actual signal into the channel, as close to the sensor as practicable, to verify operability of all devices in the channel required for channel operability. It would be performed on each required channel to ensure that the entire channel will perform the intended function. The frequency would be in accordance with the SFCP. This is acceptable because it is consistent with the existing requirements for these functions. In addition, if licensees so desire, this SR could be included as part of a refueling activity, since during refueling outages, periods in Modes 4 and 5 are often 30 days or less.

Variation 5, Section 2.2.5.5, of this SE, describes a note related to testing of contacts that was proposed by the licensee in SR 3.3.5.2.2. The NRC staff evaluated this note in Section 3.5.5 of this SE.

SR 3.3.5.2.3 requires a logic system functional test and applies to all functions. The logic system functional test is a test of all logic components required for operability of a logic circuit from as close to the sensor as practicable up to, but not including, the actuated device, and

demonstrates the operability of the required manual initiation logic for a specific channel. The frequency is in accordance with the SFCP. The ECCS injection/spray subsystem functional manual initiation signal testing performed in proposed SR 3.5.2.8 overlaps this surveillance to complete testing of the assumed safety function.

TSTF-542 did not include SRs to verify or adjust the instrument setpoint derived from the allowable value using a channel calibration or a surveillance to calibrate the trip unit. A draining event in Modes 4 or 5 is not an analyzed accident and, therefore, there is no accident analysis on which to base the calculation of a setpoint. The functions requiring this SR allow ECCS manual initiation or automatic isolation of 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 TSs 3.3.5.1 and 3.3.6.1 continue to require the functions to be calibrated on an established interval. Also, a draining event in Modes 4 or 5 is not an analyzed accident and, therefore, there are no accident analysis assumptions on response time.

The NRC staff has determined that the Mode 3 allowable value and established calibration intervals are adequate to ensure that the channel will respond with the required accuracy to allow manual initiation of the pumping systems to inject water and automatic isolation of penetration flow paths.

The NRC staff concludes that the proposed SRs of LCO 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, "RPV Water Inventory Control Instrumentation"*

In order to support the requirements of proposed TS 3.5.2, the associated instrumentation requirements would be designated in Table 3.3.5.2-1. 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.

Proposed Table 3.3.5.2-1 specifies the instrumentation that shall be operable for each function in the table for Modes 4 and 5 (or other specified conditions), the required number of channels per function, conditions referenced from Required Action A.1, SR for the functions, the allowable value, and footnotes concerning items of the table.

The NRC staff finds this table acceptable because it sufficiently discusses the purpose of the functions, the applicability, the number of required channels, the references to the condition to be entered by letter (e.g., A, B, C) if the function is inoperable, the applicable SRs, the selection of the allowable value, and justification of differences between the existing and proposed TS functions. This RPV WIC instrumentation set is acceptable because it is adequate so that the instrument channels 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.

Each of the ECCS subsystems in Modes 4 and 5 can be started by manual alignment of a small number of components or by manual pushbutton. Automatic initiation of an ECCS injection/spray subsystem may be undesirable because it could lead to overflowing the RPV cavity due to injection rates of thousands of gallons per minute. Thus, there is adequate time to

take manual actions (e.g., hours vs. 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 times less than 1 hour), there is sufficient time for the reactor operators to take manual action to stop the draining event and to manually start an ECCS injection/spray subsystem or additional method of water injection, as needed. Consequently, there is no need for automatic initiation of ECCS to respond to an unexpected draining event. The NRC staff finds this acceptable because a draining event is a slow evolution when compared to a design-basis LOCA assumed to occur at a significant power level.

3.2.4.1 *Staff Evaluation of Proposed Table 3.3.5.2-1 Functions*

For Table 3.3.5.2-1, Functions 1.a (CS) and 2.a (LPCI), Reactor Steam Dome Pressure - Low (Injection Permissive), the signals would be used as permissives for the low pressure ECCS injection/spray subsystem Manual Initiation Functions. This function would ensure that the reactor pressure has fallen to a value below these subsystems' maximum design pressure before permitting the operator to open the injection valves of the low pressure ECCS subsystems. Even though the reactor steam dome pressure is expected to be below the ECCS maximum design pumping pressure during Modes 4 and 5, the reactor steam dome pressure - low (injection permissive) signals would be required to be operable and capable of permitting initiation of the ECCS. The proposed allowable value would be ≤ 433 pounds per square inch gauge (psig), with four required channels per function, as it is currently in Susquehanna TS Table 3.3.5.1-1.

For Table 3.3.5.2-1, Functions 1.b (CS) and 2.b (LPCI), Manual Initiation, the pushbutton channels introduce signals into the appropriate ECCS logic to provide subsystem initiation capability. There is one push button for each of the CS and LPCI subsystems (i.e., two for CS and two for LPCI). The Manual Initiation Function is not assumed in any accident or transient analyses in the Final Safety Analysis Report (FSAR). However, the Function is retained for overall redundancy and diversity of the low pressure ECCS function as required 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 subsystem) is required to be operable only when the associated ECCS is required to be operable. However, the CS/LPCI pumps can be started manually, and valves can be opened manually by the reactor operator, if required.

For Table 3.3.5.2-1, Function 3.a, RHR/SDC System Isolation, Reactor Vessel Water Level - Low, Level 3, the function would only be required to be operable when automatic isolation of the associated penetration flow path is credited in the drain time calculation. The proposed number of required instrument channels is two in one trip system. The condition that the RHR/SDC system integrity be maintained is a concept related to OPDRVs, so it would not be carried over into TS 3.3.5.2 for RPV WIC instrumentation.

Reactor Vessel Water Level - Low, Level 3 signals are initiated from four level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. While four channels (two channels per trip system) of the Reactor Vessel Water Level - Low, Level 3 function are available, only two channels (all in the same trip system) are required to be operable. The Allowable Value was chosen to be the same as the primary containment isolation instrumentation Reactor Vessel Water Level - Low, allowable value from LCO 3.3.6.1, Function 6.b (≥ 11.5 inches).

For Table 3.3.5.2-1, Function 4.a, RWCU System Isolation, Reactor Vessel Water Level - Low Low Level 2, the function is only required to be operable when automatic isolation of the associated penetration flow path is credited in the drain time calculation. The proposed number of required channels is two in one trip system. The Reactor Vessel Water Level - Low Low Level 2 isolation function signals are initiated from four level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. While four channels (two channels per trip system) of the Reactor Vessel Water Level - Low Low, Level 2 function are available, only two channels (all in the same trip system) are required to be operable. The allowable value was chosen to be the same as the primary containment isolation instrumentation Reactor Vessel Water Level - Low, Allowable Value from LCO 3.3.6.1, Function 5.f (≥ - 45 inches).

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

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

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

The proposed LCO 3.5.2 would state, in part:

> One low pressure ECCS injection/spray subsystem shall be OPERABLE.

'One' low pressure ECCS injection/spray subsystem would consist of either one CS subsystem or one LPCI subsystem. A CS subsystem consists of one motor-driven pump, piping, and valves to transfer water from the suppression pool or condensate storage tank to the RPV. An LPCI subsystem consists of one motor-driven pump, piping, and valves to transfer water from the suppression pool to the RPV.

The ECCS pumps are high-capacity pumps, with flow rates of thousands of gallon per minute. Most RPV penetration flow paths would have a drain rate on the order of tens or hundreds of gallons per minute. The manual initiation/start of an ECCS pump would provide the necessary water source to counter these expected drain rates. Decay heat removal in Modes 4 and 5 is not affected by the proposed Susquehanna TS changes, as these requirements on the number of SDC subsystems that must be operable and in operation to ensure adequate decay heat removal from the core are unchanged. These requirements can be found in Susquehanna TS 3.4.9, "Residual Heat Removal (RHR) Shutdown Cooling System - Cold Shutdown"; TS 3.9.7, "Residual Heat Removal (RHR) - High Water Level"; and TS 3.9.8, "Residual Heat Removal (RHR) - Low Water Level." These Susquehanna decay heat removal requirements are similar to the standard TS and can be found in NUREG-1433 TS 3.4.9, "Residual Heat Removal (RHR) Shutdown Cooling System - Cold Shutdown"; 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.

The proposed TS LCO 3.5.2 contains two parts. The first part states that drain time of RPV WIC to the TAF shall be ≥ 36 hours, and the second part states that one low pressure ECCS injection/spray subsystem shall be operable. The proposed applicability for TS 3.5.2 is Modes 4 and 5.

The NRC staff reviewed proposed TS 3.5.2 to assure that the fuel remains covered with water, and to compare the revised TS with 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 low pressure ECCS injection/spray subsystems shall be operable, whereas proposed LCO 3.5.2 states that only one low pressure 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 because this redundancy is not required. With one ECCS injection/spray subsystem and nonsafety-related injection sources, defense-in-depth will be maintained. The defense-in-depth measure is consistent with other events considered during shutdown with no additional single failure assumed. The drain time controls, in addition to the required ECCS injection/spray subsystem, provide reasonable assurance that an unexpected draining event can be prevented or mitigated before the RPV water level would be lowered to the TAF.

The proposed TS LCO 3.5.2 'note' for Modes 4 and 5 state that the RHR system may operate in the SDC mode to remove decay heat and sensible heat from the reactor, and the RHR valves that are required for LPCI subsystem operation may be aligned for decay heat removal. This note allows a required LPCI subsystem of the RHR system to be considered operable for the ECCS function if all the required valves in the LPCI flow path can be manually realigned (remote or local) to allow injection into the RPV, and the system is not otherwise inoperable. This will ensure adequate core cooling if an inadvertent RPV draindown should occur. This is further evaluated in Section 3.5.1 (Variation 1) of this SE.

The proposed Modes 4 and 5 applicability of TS 3.5.2 is appropriate, given that the TS requirements on ECCS in Modes 1, 2, and 3 will be 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.

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

The proposed Condition C states that for a drain time < 36 hours and ≥ 8 hours, to (C.1) verify the secondary containment boundary is capable of being established in less than the drain time with a completion time of 4 hours, and (C.2) verify each secondary containment penetration flow path is capable of being isolated less than the drain time with a completion time of 4 hours, and (C.3) verify required one SGT subsystem is capable of being placed in operation in less than the drain time with a completion time of 4 hours. The proposed Condition C provides adequate protection, should the drain time be < 36 hours and ≥ 8 hours because of the ability to establish secondary containment, isolate additional flow paths, and have the SGT subsystem capable of being placed in operation.

The proposed Condition D states that when drain time is < 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 secondary containment boundary, and (D.3) immediately initiate action to isolate each secondary containment penetration flow path or verify it can be manually isolated from the control room, and (D.4) immediately initiate action to verify one SGT system is capable of being placed in operation. Additionally, there is a note stating that required ECCS injection/spray subsystem or additional method of water injection shall be capable of operating without offsite electrical power, which is similar to proposed Condition B. The existing Susquehanna TS for Condition D (Required Action C.2 and associated completion time not met) is similar to proposed Condition D. The proposed Condition D provides adequate protection, should the drain time be < 8 hours, because of the requirement for the ability to establish an additional method of water injection (without offsite electrical power), establish secondary containment, isolate additional flow paths, and have the SGT subsystem capable of being placed in operation.

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

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

3.3.1 *Staff Evaluation of Proposed TS 3.5.2 SRs*

The proposed TS 3.5.2 SRs includes verification of drain time, verification of water levels/volumes that support ECCS injection/spray subsystems, verification of water-filled pipes to preclude water hammer events, verification of correct valves positions for the required ECCS injection/spray subsystem, operation of the ECCS injection/spray systems through the recirculation line, verification of valves credited for automatic isolation actuated to the isolation position, and verification that the required ECCS injection/spray subsystem actuated on a manual initiation signal. 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. The NRC staff has determined the option to place this frequency in the licensee's SFCP is appropriate and consistent with similar LCOs and surveillances. 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 three operator shifts). Changes in RPV level would necessitate recalculation of the drain time. As plant conditions change, the drain time must be confirmed to be ≥ 36 hours or the LCO must be declared not met and the appropriate TS actions followed.

SR 3.5.2.2: The suppression pool water level (≥ 20 feet 0 inches) for a required low pressure LPCI subsystem would be required to be verified to ensure pump net positive suction head and vortex prevention is available for the ECCS injection/spray subsystem 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 (≥ 20 feet 0 inches) or condensate storage tank level (≥ 49 percent of capacity) for a required ECCS injection/spray subsystem would be required to be verified to ensure pump net positive suction head and vortex prevention is available for the CS subsystem required to be operable by the LCO. Indications are available either locally or in the control room regarding suppression pool water level and condensate storage tank level. This surveillance would be 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 low pressure ECCS injection/spray subsystem to be operable instead of two. SR 3.5.2.3 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 subsystems full of water ensures that the ECCS subsystem will perform properly. This may also prevent a water hammer following an ECCS initiation signal. 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. 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 judgement.

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 would be required to prevent RPV water inventory from dropping below the TAF, should an unexpected draining event occur. This surveillance would be required to be performed in accordance with the SFCP.

SR 3.5.2.8: The required ECCS injection/spray subsystem shall actuate on an initiation signal. This surveillance verifies that a manual initiation signal will cause the required CS or LPCI subsystem to start and operate as designed, including pump startup and actuation of all automatic valves to their required positions. A note states that vessel injection/spray may be excluded. This surveillance is required to be performed in accordance with the SFCP.

The NRC staff evaluated each of these proposed SRs associated with the new LCO 3.5.2 and concluded they are appropriate for ensuring the operability of the equipment and instrumentation specified in LCO 3.5.2. The NRC staff concluded that each of the proposed SRs are acceptable since they meet the requirements of 10 CFR 50.36(c)(2)(ii) regarding insights gained by 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, "Emergency Core Cooling System Instrumentation"

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," 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." Conforming changes were proposed for the actions table of LCO 3.3.5.1 as well.

As discussed in Section 2.2.2.1 of this SE, the licensee proposed to delete the following Modes 4 and 5, Table 3.3.5.1-1 function requirements:

1. Core Spray System
   (a) Reactor Vessel Water Level - Low Low Low, Level 1
   (c) Reactor Steam Dome Pressure - Low (Initiation)
   (d) Reactor Steam Dome Pressure - Low (Injection Permissive)
   (e) Manual Initiation

2. Low Pressure Coolant Injection System
   (a) Reactor Vessel Water Level - Low Low Low, Level 1
   (c) Reactor Steam Dome Pressure - Low (Initiation)
   (d) Reactor Steam Dome Pressure - Low (Injection Permissive)
   (f) Manual Initiation

These functions would be deleted to support the consolidation of RPV WIC instrumentation requirements into proposed new TS 3.3.5.2. The requirements for Functions 1.d, 1.e, 2.d, and 2.f would be moved to proposed TS Table 3.3.5.2-1 as discussed in Section 3.2.4.1 of this SE.

For the other TS Table 3.3.5.1-1, Functions 1.a, 1.c, 2.a, and 2.c, the Mode 4 and 5 requirements would not be retained. The existing Susquehanna TSs require automatic initiation of ECCS pumps on low reactor vessel water level. However, in Modes 4 and 5, automatic initiation of ECCS pumps (high capacity pumps) could result in overfilling the refueling cavity or water flowing into the main steam lines, potentially damaging plant equipment.

The NRC staff has determined it is acceptable to delete TS Table 3.3.5.1-1, Functions 1.a, 1.c, 2.a, and 2.c on the bases that manual ECCS initiation is preferred over automatic initiation during Modes 4 and 5, and the operator would be able to use the most appropriately sized

pumps if needed to mitigate a draining event. Functions 1.c and 2.c are further described in Section 3.5.3 (Variation 3) of this SE.

3.5 Staff Evaluation of Proposed Technical Variations

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

3.5.1 *Variation 1, TS LCO 3.5.2 Note, LPCI Alignment*

The note in LCO 3.5.2 regarding realignment to the Low Pressure Injection mode is currently located in SR 3.5.2.4 but is proposed to be relocated to the LCO. The intent of the note was to allow LPCI subsystems to be considered operable during this condition.

The NRC staff finds that the added footnote to LCO 3.5.2 associated with the LPCI subsystem is appropriate and is consistent with TSTF-542, 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, which allows the LPCI subsystem to be operable when aligned for decay heat removal; therefore, this variation is acceptable.

3.5.2 *Variation 2, TS Table 3.3.5.1-1, CS and LPCI Pumps Discharge Flow Low (Bypass)*

Standard TS Table 3.3.5.1-1, Function 1.d, "Core Spray Pump Discharge Flow - Low (Bypass)," and Function 2.g, "Low Pressure Coolant Injection Pump - Discharge Flow - Low (Bypass)," are not included in the Susquehanna TSs. The minimum flow instruments are provided to protect the associated low pressure ECCS pump from overheating when the pump is operating and the associated injection valve is not fully open. The minimum flow line valve is opened when low flow is sensed, and the valve is automatically closed when the flow rate is adequate to protect the pump.

Therefore, in order for the NRC staff to complete its technical review of the licensee's proposed change, the NRC staff issued a request for additional information to the licensee by e-mail dated January 22, 2018,[11] requesting technical justification for omitting ECCS pump bypass functions as presented in TSTF-542, standard TS Table 3.3.5.2-1. In its request for additional information response letter dated February 16, 2018, the licensee maintained that even with loss of flow due to a failed minimum flow valve, the ECCS pumps would still have the capability to mitigate a draindown event. Regarding operability of the minimum flow valves, the licensee stated that:

> For the Residual Heat Removal (RHR) and CS systems, minimum flow valve opening is a function of the pump breaker being closed (pump running) and system flow less than the setpoint. Testing of the minimum flow function for RHR is performed separately for each pump every 24 months during RHR logic system functional testing. This test is performed using manual component by component logic. For the CS system, the minimum flow valve is verified to open on low flow during the quarterly flow verification.

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[11] ADAMS Accession No. ML18024A995

The NRC staff finds Variation 2 acceptable because although the "Pump Discharge Flow-Low (Bypass)" function is not a part of proposed Susquehanna TS Table 3.3.5.2-1, the existing SRs for RHR/LPCI and CS are sufficient to provide reasonable assurance that a required ECCS pump will operate as expected.

3.5.3 *Variation 3, TS Table 3.3.5.1-1, Reactor Steam Dome Pressure – Low (Initiation)*

Susquehanna Table 3.3.5.1-1 includes Functions 1.c and 2.c, "Reactor Steam Dome Pressure - Low (initiation)," which are not included in the standard TS. Low reactor steam dome pressure signals (Functions 1.c, 1.d, 2.c, and 2.d) are used as permissives for the low pressure ECCS subsystems. The low reactor pressure permissive is provided to prevent a high drywell pressure condition that is not accompanied by low reactor pressure (i.e., a false LOCA signal) from disabling two RHR pumps on the other unit. Functions 1.c and 2.c are not required to ensure manual initiation of CS and LPCI and are, therefore, not included in the new Table 3.3.5.2-1.

The NRC staff finds Variation 3 acceptable because all of the permissive functions necessary for Susquehanna ECCS injection were proposed for inclusion; also, Variation 3 clarifies the Susquehanna design differences when compared to TSTF-542.

3.5.4 *Variation 4, Standard TS SR 3.3.5.1.7, ECCS Response Time*

The Susquehanna TSs do not include standard TS SR 3.3.5.1.7 (verify the ECCS response time is within limits); however, similar requirements are included in Susquehanna SRs 3.5.1.13 and 3.5.2.7 (verify the ECCS response time for each ECCS injection/spray subsystem is within limits). As described in the discussion in Section 3.3.3 of the TSTF-542 justification, since a draining event is not an analyzed accident, there are no accident analysis assumptions with respect to response time. In addition, response times are insignificant compared to draindown times (seconds vs. hours). On this basis, the existing SR 3.5.2.7 is being deleted.

The NRC staff finds that this existing SR 3.5.2 7 related to ECCS response time is unnecessary, given the new requirements set forth in TSTF-542, drain time and WIC. Consequently, there is no need for the Modes 4 and 5 ECCS response time SR. 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.

3.5.5 *Variation 5, TS SR 3.3.5.2.2 Note, Test of All Required Contacts*

A note was added to TS SR 3.3.5.2.2 to state, "A test of all required contacts does not have to be performed." This note is included in the existing channel functional test surveillance in TS 3.3.5.1 (SR 3.3.5.1.2) and TS 3.3.6.1 (SR 3.3.6.1.2) for the affected functions included in TS 3.3.5.2. The bases for these SRs state that the exception is necessary because the design of instrumentation does not facilitate functional testing of all required contacts of the relay, which input into the combinational logic, and that performance of such a test could result in a plant transient or place the plant in an undue risk situation. Therefore, for this SR, the Channel Functional Test verifies acceptable response by verifying the change of state of the relay, which inputs into the combinational logic. The required contacts that are not tested during the Channel Functional Test are tested under the Logic System Functional Test, SR 3.3.5.1.5 (or SR 3.3.6.1.5).

The NRC staff finds that variation is acceptable since this is part of Susquehanna current licensing bases and is, therefore, carried forward to the new TS SR 3.3.5.2.2. As stated above, the design of instrumentation does not facilitate functional testing of all required contacts of the relay, which input into the combinational logic, and performance of such a test could result in a plant transient or place the plant in an undue risk situation. Therefore, the NRC staff finds Variation 5 acceptable.

3.5.6 *Variation 6, TS Table 3.3.5.1-1, Channel Checks*

The current Susquehanna TSs do not include channel checks for Table 3.3 .5.1-1, Functions 1.d and 2.d (Reactor Steam Dome Pressure – Low (Injection Permissive)); therefore, no Channel Checks SR was added for these functions in the new Table 3.3.5.2-1 (Functions 1.a and 2.a).

Since Channel Checks for these functions have no impact on manual ECCS injection/spray capabilities for CS or LPCI, and the licensee will retain its current licensing basis for these instruments, the NRC staff has determined the proposed variation to be acceptable.

3.5.7 *Variation 7, TS Table 3.3.6.1-1, Manual Initiation, Function 6.c*

Susquehanna Table 3.3.6.1-1, "Primary Containment Isolation Instrumentation," includes Function 6.c, "Manual Initiation," which is not included in the standard TS. Modes 4 and 5 applicability is being removed from this function, and the footnote is correspondingly being removed from the required channels per trip system column. The SDC system can be isolated without the primary containment isolation instrumentation function, and this is consistent with the basis for eliminating the applicability during OPDRVs from the Manual Initiation function associated with secondary containment isolation as described in Section 3.4.1.3 of the TSTF-542 justification.

The NRC staff finds that this existing Function 6.c manual initiation logic for SDC is unnecessary, given the new requirements set forth in TSTF-542, drain time and WIC. Consequently, there is no need for Mode 4 and 5 manual initiation for SDC isolation, primary containment isolation instrumentation function. 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.

3.5.8 *Variation 8, TS Table 3.3.7.1-1, Manual Initiation, Function 9*

Susquehanna Table 3.3.7.1-1, "Control Room Emergency Outside Air Supply System Instrumentation," includes Function 9, "Manual Initiation," which is not included in the standard TS. Function 9 is applicable during OPDRVs. The applicability during OPDRVs is eliminated. The CREOAS system can be initiated without the associated instrumentation function; this is consistent with the basis for eliminating the applicability during OPDRVs from the Manual Initiation function associated with secondary containment isolation as described in Section 3.4.1.3 of the TSTF-542 justification.

The NRC staff finds that this existing Function 9 manual initiation logic for CREOAS system is unnecessary, given the new requirements set forth in TSTF-542, drain time and WIC. Consequently, there is no need for Mode 4 and 5 manual initiation for CREOAS system and Mode 4 and 5 instrumentation logic. Therefore, the NRC staff finds Variation 8 acceptable.

3.5.9 *Variation 9, TS 3.6.1.3, Applicability and SR Deletions*

Susquehanna TS 3.6.1.3, "Primary Containment Isolation Valves (PCIVs)," is currently applicable in Modes 1, 2, and 3, and when associated instrumentation is required to be operable per LCO 3.3.6.1, "Primary Containment Isolation Instrumentation." However, TSTF-542 deletes from Table 3.3.6.1-1 the Modes 4 and 5 requirement for SDC system isolation. As a result, TS 3.6.1.3 will no longer require any PCIVs to be operable in Modes 4 or 5. Therefore, the licensee proposes to revise the applicability to Modes 1, 2, and 3, and delete Condition H, which is applicable in Modes 4 and 5. In addition, the unnecessary reference to Modes 1, 2, or 3 in Condition G and SRs 3.6.1.3.1, 3.6.1.3.6, 3.6.1.3.11, 3.6.1.3.12, and 3.6.1.3.13 is deleted since LCO 3.6.1.3 is applicable only in Modes 1, 2, and 3. These changes are justified on the basis that TSTF-542 removed the Mode 4 and 5 applicability from LCO 3.6.1.3.

This variation is consistent with the treatment of other primary containment isolation instruments as discussed in Section 3.4.1.2, "TS 3.3.6.1A and 3.3.6.1b, Primary Containment Isolation Instrumentation," and 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. The applicability for TS 3.6.1.3 is revised with the deletion of the statement, "When associated instrumentation is required to be OPERABLE per LCO 3.3.6.1, 'Primary Containment Isolation Instrumentation.'" Therefore, the NRC staff finds Variation 9 acceptable.

3.5.10 *Variation 10, TS 3.6.4.1 and TS 3.6.4.3, Removal of One-Time Completion Time*

TS 3.6.4.1, Condition A, and TS 3.6.4.3, Condition D, for both Units 1 and 2, include a one-time completion time that expired on December 31, 2005. The note states, "48 hours for a one-time outage for replacement of the Reactor Building Recirculating Fan Damper Motors, to be completed by December 31, 2005." The licensee proposes to delete these notes that no longer apply.

The NRC staff finds Variation 10 acceptable because, the condition is expired and its removal is administrative in nature.

3.6 Staff Evaluation of Proposed Deletion of Reference to OPDRVs Term

Section 2.2.4 of this SE lists the numerous OPDRVs references proposed for deletion. The proposed changes would replace the existing specifications related to OPDRVs with revised specifications for the RPV WIC. For example, the proposed changes would remove:

- During operations with a potential for draining the reactor vessel
- Only one trip system required in MODES 4 and 5 with RHR Shutdown Cooling System Integrity maintained
- OPDVRs
- Initiation action to suspend OPDRVs
- During OPDRV

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 TSs.

The existing Susquehanna TSs contain instrumentation requirements related to OPDRVs in four separate TSs. 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/secondary containment, primary/secondary containment isolation valves, SGT system, control room habitability, control room floor temperature control, and electrical sources. Each of these system's requirements during OPDRVs were proposed for consolidation into new 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, 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 simplified alternative set of controls for ensuring water level is maintained above the TAF and, therefore, these changes are acceptable.

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

The current Susquehanna 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 212 degrees Fahrenheit (°F(, while considering operational conditions to still be in Mode 4, provided certain secondary containment LCOs are met.

TSTF-484, "Use of TS 3.10.1 for Scram Time Testing Activities," Revision 0,[12] 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 Nos. 245 and 223 (Units 1 and 2, respectively), dated December 20, 2007,[13] the NRC approved changes to Susquehanna TS LCO 3.10.1 in accordance with TSTF-484. The NRC staff's SE for these amendments stated, in part, that, "Two low-pressure emergency core cooling systems (ECCS) injected/spray subsystems are required to be operable in Mode 4 by TS 3.5.2, ECCS-Shutdown." However, per the proposed new LCO 3.5.2, only one low pressure 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 because, as stated previously in Section 3.3 of this SE, this level of redundancy is not required, even during application of LCO 3.10.1. When the licensee applies LCO 3.10.1 at the end of a refueling outage, an exceptionally large volume of water is present in the reactor vessel since the vessel is nearly water solid. There is much more water in the reactor vessel than is present during power operation and more than is present during most of an outage. Small leaks from the reactor coolant system would be detected by inspections before a significant loss of inventory occurred. In the event of a large reactor coolant system leak, the RPV would rapidly depressurize and allow operation of the low pressure ECCS. At low decay heat values, and near Mode 4 conditions, the stored energy in the reactor core will be very low. Therefore, the reasoning that operators would have time to respond with manual actions to start any ECCS pumps and properly align valves for injection from the control room remains valid.

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[2] ADAMS Accession No. ML052930102

[3] ADAMS Accession No. ML073330471

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

After considering the reasoning presented in this SE and reviewing the letter dated December 20, 2007, issuing Amendment Nos. 245 and 223, the NRC staff determined that LCOs 3.3.5.2 and 3.5.2 adopted as part of TSTF-542 are satisfactory and will be acceptable even application of LCO 3.10.1.

3.8 Technical Conclusion

Susquehanna 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 TS changes evaluated within this SE 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 Mode 4 and 5 operations.

The reactor coolant system is at a low operating temperature (< 200 °F) and is depressurized during Mode 4 and 5 conditions. 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 and equipment handling accident (FSAR 15.7.4) and gaseous radwaste system leak or failure (FSAR 15.7.1), do not involve a loss of inventory. Therefore, the equipment and instrumentation associated with the reactor vessel WIC TSs do not provide detection or mitigation related to these design-basis accidents.

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.

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, which meet 10 CFR 50.36(c)(2)(ii), Criterion 4, to establish LCOs for structures, systems, or components significant to public health and safety as evidenced by operating experience.

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

The NRC staff reviewed the SRs associated with the new LCOs 3.5.2 and 3.3.5.2. The NRC staff finds that the proposed TS SRs in TS 3.5.2 are acceptable since they support TS 3.5.2 drain time requirements, assure that water inventory is available for ECCS injection/spray subsystem RPV injection and pump performance, ECCS injection/spray subsystems are adequately filled (mitigates effects of gas accumulation or voiding), the subsystems have verified valve positions to support RPV injection, 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 by main control room push buttons. The NRC staff finds that the three SRs proposed for TS 3.3.5.2 are sufficient and adequate, because they ensure that the Functions are capable of performing their specified safety functions in support of TS 3.5.2, Drain Time, and the protection from a potential draindown of the RPV in Modes 4 and 5. Therefore, the NRC staff concludes that the proposed SRs satisfy 10 CFR 50.36(c)(3).

The NRC staff evaluated the licensee's proposed changes against each of the unit applicable design requirements listed in Section 2.3 of this SE. The NRC staff finds that the proposed changes for Mode 4 and 5 operations, as they relate to the proposed TS changes for the new drain time definition and the removal of OPDRV references remain consistent with the GDCs in that the Susquehanna design requirements for instrumentation, reactor coolant leakage detection, reactor coolant pressure boundary, and reactor coolant makeup are unaffected.

The regulation at 10 CFR 50.36(a)(1) states that a summary statement of the bases or reasons for such specifications, other than those covering administrative controls, shall also be included in the application, but shall not become part of the TSs. In accordance with this requirement, the licensee provided TS Bases changes in the proposed license amendment request. The NRC staff concludes that the TS Bases changes provided describe the basis for the affected TSs and follow the Final Policy Statement on TSs Improvements for Nuclear Power Reactors (58 FR 39132).

Additionally, the proposed TS changes were reviewed for technical clarity and consistency with the existing Susquehanna requirements for customary terminology and formatting. The NRC staff found that the proposed changes were consistent with TSTF-542 and Standard Review Plan Chapter 16.

.0 STATE CONSULTATION

accordance with the Commission's regulations, the Pennsylvania State official was notified of proposed issuance of the amendments on June 12, 2018. The State official had no nments.

ENVIRONMENTAL CONSIDERATION

amendments change a requirement with respect to installation or use of a facility onent located within the restricted area as defined in 10 CFR Part 20 and change SRs.

The NRC staff has determined that the amendments involve 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 amendments involve no significant hazards consideration, and there has been no public comment on such finding published in the *Federal Register* on November 21, 2017 (82 FR 55414). Accordingly, the amendments meet 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 amendments.

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: September 26, 2018

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2 - ISSUANCE OF AMENDMENT NOS. 271 AND 253 REVISING TECHNICAL SPECIFICATIONS TO ADOPT TSTF-542, REVISION 2 (CAC NOS. MG0269 AND MG0270; EPID L-2017-LLA-0306) DATED SEPTEMBER 26, 2018

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