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

August 24, 2018

Mr. Bryan C. Hanson
Senior Vice President
Exelon Generation Company, LLC
President and Chief Nuclear Officer
Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: JAMES A. FITZPATRICK NUCLEAR POWER PLANT - ISSUANCE OF AMENDMENT NO. 321 RE: REVISION TO TECHNICAL SPECIFICATIONS TO ADOPT TECHNICAL SPECIFICATIONS TASK FORCE (TSTF) TRAVELER TSTF-542, REVISION 2, "REACTOR PRESSURE VESSEL WATER INVENTORY CONTROL" (EPID L-2017-LLA-0311)

Dear Mr. Hanson:

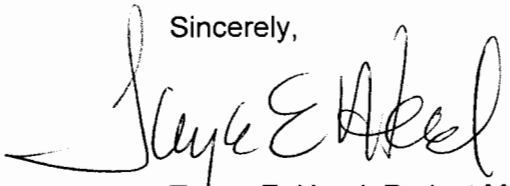
The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 321 to Renewed Facility Operating License No. DPR-59 for the James A. FitzPatrick Nuclear Power Plant (JAFNPP). The amendment is in response to your application dated October 2, 2017,[1] as supplemented by letters dated January 22 and April 19, 2018.[2]

The amendment revises existing JAFNPP technical specification (TS) requirements related to "operations with a potential for draining the reactor vessel," with new requirements on reactor pressure vessel water inventory control to protect the JAFNPP TS Safety Limit 2.1.1.3, which states, "Reactor vessel water level shall be greater than the top of active irradiated fuel."

[1] Agencywide Documents Access and Management System (ADAMS) Accession No. ML17275A520.
[2] ADAMS Accession Nos. ML18022A829 and ML18109A371, respectively.

A copy of the related Safety Evaluation is enclosed. The Notice of Issuance will be included in the Commission's 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 No. 50-333

Enclosures:
1. Amendment No. 321 to DPR-59
2. Safety Evaluation

cc: Listserv

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

EXELON FITZPATRICK, LLC

AND

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-333

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 321
Renewed License No. DPR-59

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

   A. The application for amendment by Exelon Generation Company, LLC, and its wholly owned subsidiary, Exelon FitzPatrick, LLC (collectively, the Applicants), dated October 2, 2017, as supplemented by letters dated January 22 and April 19, 2018, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

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

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

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

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

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. DPR-59 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 321, are hereby incorporated in the renewed operating license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 180 days of issuance.

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 Renewed Facility
Operating License No. DPR-59
and Technical Specifications

Date of Issuance: August 24, 2018

ATTACHMENT TO LICENSE AMENDMENT NO. 321

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

RENEWED FACILITY OPERATING LICENSE NO. DPR-59

DOCKET NO. 50-333

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.

Renewed Facility Operating License No. DPR-59

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.

Technical Specifications

Remove	Insert	Remove	Insert	Remove	Insert
i	i	---	3.3.5.3-3	3.6.4.1-2	3.6.4.1-2
ii	ii	---	3.3.5.3-4	3.6.4.2-1	3.6.4.2-1
---	1.1-2a	3.3.6.1-3	3.3.6.1-3	3.6.4.2-3	3.6.4.2-3
3.3.5.1-1	3.3.5.1-1	3.3.6.1-10	3.3.6.1-10	3.6.4.3-1	3.6.4.3-1
3.3.5.1-2	3.3.5.1-2	3.3.6.2-4	3.3.6.2-4	3.6.4.3-2	3.6.4.3-2
3.3.5.1-4	3.3.5.1-4	3.3.7.1-1	3.3.7.1-1	3.7.3-1	3.7.3-1
3.3.5.1-8	3.3.5.1-8	3.5.1-1	3.5.1-1	3.7.3-2	3.7.3-2
3.3.5.1-9	3.3.5.1-9	3.5.1-4	3.5.1-4	3.7.3-3	3.7.3-3
3.3.5.1-10	3.3.5.1-10	3.5.2-1	3.5.2-1	3.7.4-1	3.7.4-1
3.3.5.1-11	3.3.5.1-11	3.5.2-2	3.5.2-2	3.7.4-2	3.7.4-2
3.3.5.1-12	3.3.5.1-12	3.5.2-3	3.5.2-3	3.8.2-2	3.8.2-2
3.3.5.2-1	3.3.5.2-1	3.5.2-4	3.5.2-4	3.8.2-3	3.8.2-3
3.3.5.2-2	3.3.5.2-2	---	3.5.2-5	3.8.2-4	3.8.2-4
3.3.5.2-3	3.3.5.2-3	---	3.5.2-6	3.8.5-2	3.8.5-2
3.3.5.2-4	---	3.5.3-1	3.5.3-1	3.8.8-2	3.8.8-2
---	3.3.5.3-1	3.6.1.3-6	3.6.1.3-6		
---	3.3.5.3-2	3.6.4.1-1	3.6.4.1-1		

(4) Exelon Generation Company 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 without restriction to chemical or physical form, for sample analysis or instrument calibration; or associated with radioactive apparatus, components or tools.

(5) Pursuant to the Act and 10 CFR Parts 30 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 renewed operating license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; 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

Exelon Generation Company is authorized to operate the facility at steady state reactor core power levels not in excess of 2536 megawatts (thermal).

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 321, are hereby incorporated in the renewed operating license. The licensee shall operate the facility in accordance with the Technical Specifications.

(3) Fire Protection

Exelon Generation Company shall implement and maintain in effect all provisions of the approved fire protections program as described in the Final Safety Analysis Report for the facility and as approved in the SER dated November 20, 1972; the SER Supplement No. 1 dated February 1, 1973; the SER Supplement No. 2 dated October 4, 1974; the SER dated August 1, 1979; the SER Supplement dated October 3, 1980; the SER Supplement dated February 13, 1981; the NRC Letter dated February 24, 1981; Technical Specification Amendments 34 (dated January 31, 1978), 80 (dated May 22, 1984), 134 (dated July 19, 1989), 135 (dated September 5, 1989), 142 (dated October 23, 1989), 164 (dated August 10, 1990), 176 (dated January 16, 1992), 177 (dated February 10, 1992), 186 (dated February 19, 1993), 190 (dated June 29, 1993), 191 (dated July 7, 1993), 206 (dated February 28, 1994), and 214 (dated June 27, 1994); and NRC Exemptions and associated safety evaluations dated April 26, 1983, July 1, 1983, January 11, 1985,

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(continued)

(continued)

DRAIN TIME	The DRAIN TIME is the time it would take for the water inventory in and above the Reactor Pressure Vessel (RPV) to drain to the top of the active fuel (TAF) seated in the RPV assuming: a) The water inventory above the TAF is divided by the limiting drain rate: b) The limiting drain rate is the larger of the drain rate through a single penetration flow path with the highest flow rate, or the sum of the drain rates through multiple penetration flow paths susceptible to a common mode failure (e.g., seismic event, loss of normal power, single human error), for all penetration flow paths below the TAF except: 1. Penetration flow paths connected to an intact closed system, or isolated by manual or automatic valves that are locked, sealed or otherwise secured in the closed position, blank flanges, or other devices that prevent flow of reactor coolant through the penetration flow paths; 2. Penetration flow paths capable of being isolated by valves that will close automatically without offsite power prior to the RPV water level being equal to the TAF when actuated by RPV water level isolation instrumentation; or 3. Penetration flow paths with isolation devices that can be closed prior to the RPV water level being equal to the TAF by a dedicated operator trained in the task, who 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.

(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, 2.a, and 2.b. ---------- 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 (continued)

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. AND	1 hour from discovery of loss of HPCI initiation capability
	B.3 Place channel in trip.	24 hours
C. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	C.1 ------NOTE------ Only applicable for Functions 1.c, 1.d, 2.c, 2.d, and 2.f. ---------- 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.
	C.2 Restore channel to OPERABLE status.	24 hours

(continued)

ACTIONS (continued)

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

(continued)

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

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. 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 SR 3.3.5.1.6	≥ 18 inches
b. Drywell Pressure - High	1, 2, 3	4[(a)]	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 2.7 psig
c. Reactor Pressure – Low (Injection Permissive)	1, 2, 3	4	C	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 410 psig and ≤ 490 psig
d. Core Spray Pump Start – Time Delay Relay	1, 2, 3	1 per pump	C	SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 12.34 seconds
e. Core Spray Pump Discharge Flow – Low (Bypass)	1, 2, 3	1 per pump	E	SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 510 gpm and ≤ 980 gpm
f. Core Spray Pump Discharge Pressure – High (Bypass)	1, 2, 3	1 per pump	E	SR 3.3.5.1.3 SR 3.3.5.1.6	≥ 90 psig and ≤ 110 psig
2. Low Pressure Coolant Injection (LPCI) 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 SR 3.3.5.1.6	≥ 18 inches

(continued)

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

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

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
2. LPCI System (continued)					
b. Drywell Pressure - High	1, 2, 3	4[a]	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 2.7 psig
c. Reactor Pressure – Low (Injection Permissive)	1, 2, 3	4	C	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 410 psig and ≤ 490 psig
d. Reactor Pressure – Low (Recirculation Discharge Valve Permissive)	1[b], 2[b], 3[b]	4	C	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 295 psig
e. Reactor Vessel Shroud Level (Level 0)	1, 2, 3	2	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 SR 3.3.5.1.6	≥ 1.0 inches
f. Low Pressure Coolant Injection Pump Start – Time Delay Relay	1, 2, 3	1 per pump	C	SR 3.3.5.1.5 SR 3.3.5.1.6	
Pumps A, D					≤ 1.51 seconds
Pumps B, C					≤ 6.73 seconds

(continued)

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

(b) With associated recirculation pump discharge valve 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
2. LPCI System (continued)					
g. Low Pressure Coolant Injection Pump Discharge Flow – Low (Bypass)	1, 2, 3	1 per subsystem	E	SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 1040 gpm and ≤ 1665 gpm
h. Containment Pressure - High	1, 2, 3	4	B	SR 3.3.5.1.3 SR 3.3.5.1.6	≥ 1 psig and ≤ 2.7 psig
3. High Pressure Coolant Injection (HPCI) System					
a. Reactor Vessel Water Level – Low Low (Level 2)	1, 2[c], 3[c]	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 SR 3.3.5.1.6	≥ 126.5 inches
b. Drywell Pressure - High	1, 2[c], 3[c]	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 SR 3.3.5.1.6	≤ 2.7 psig
c. Reactor Vessel Water Level – High (Level 8)	1, 2[c], 3[c]	2	C	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 222.5 inches
d. Condensate Storage Tank Level - Low	1, 2[c], 3[c]	4	D	SR 3.3.5.1.3 SR 3.3.5.1.6	≥ 59.5 inches
e. Suppression Pool Water Level – High	1, 2[c], 3[c]	2	D	SR 3.3.5.1.3 SR 3.3.5.1.6	≤ 14.5 ft
f. High Pressure Coolant Injection Pump Discharge Flow - Low (Bypass)	1, 2[c], 3[c]	1	E	SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 475 gpm and ≤ 800 gpm
g. High Pressure Coolant Injection Pump Discharge Pressure – High (Bypass)	1, 2[c], 3[c]	1	E	SR 3.3.5.1.3 SR 3.3.5.1.6	≥ 25 psig and ≤ 80 psig

(continued)

(c) With reactor steam dose 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[c], 3[c]	2	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 18 inches
b. Automatic Depressurization System Initiation Timer	1, 2[c], 3[c]	1	G	SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 134 seconds
c. Reactor Vessel Water Level – Low (Level 3)	1, 2[c], 3[c]	1	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 177 inches
d. Core Spray Pump Discharge Pressure - High	1, 2[c], 3[c]	2	G	SR 3.3.5.1.3 SR 3.3.5.1.6	≥ 90 psig and ≤ 110 psig
e. Low Pressure Coolant Injection Pump Discharge Pressure - High	1, 2[c], 3[c]	4	G	SR 3.3.5.1.3 SR 3.3.5.1.6	≥ 105 psig and ≤ 145 psig
5. ADS Trip System B					
a. Reactor Vessel Water Level – Low Low Low (Level 1)	1, 2[c], 3[c]	2	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 18 inches
b. Automatic Depressurization System Initiation Timer	1, 2[c], 3[c]	1	G	SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 134 seconds

(continued)

(c) 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 (continued)					
c. Reactor Vessel Water Level – Low (Level 3)	1, 2[c], 3[c]	1	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 177 inches
d. Core Spray Pump Discharge Pressure - High	1, 2[c], 3[c]	2	G	SR 3.3.5.1.3 SR 3.3.5.1.6	≥ 90 psig and ≤ 110 psig
e. Low Pressure Coolant Injection Pump Discharge Pressure - High	1, 2[c], 3[c]	4	G	SR 3.3.5.1.3 SR 3.3.5.1.6	≥ 105 psig and ≤ 145 psig

(c) With reactor steam dose pressure > 150 psig.

3.3 INSTRUMENTATION

3.3.5.2 Reactor Pressure Vessel (RPV) Water Inventory Control Instrumentation

LCO 3.3.5.2 The Reactor Pressure Vessel (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	Perform CHANNEL FUNCTIONAL TEST.	In accordance with the Surveillance Frequency Control Program

Table 3.3.5.2-1 (page 1 of 1)
Reactor Pressure Vessel (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 Pressure – Low (Injection Permissive)	4, 5	4(a)	C	SR 3.3.5.2.1 SR 3.3.5.2.2	≤ 490 psig
b. Core Spray Pump Discharge Flow – Low (Bypass)	4, 5	1 per pump (a)	D	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 510 gpm and ≤ 980 gpm
c. Core Spray Pump Discharge Pressure – High (Bypass)	4, 5	1 per pump (a)	D	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 90 psig and ≤ 110 psig
2. Low Pressure Coolant Injection (LPCI) System					
a. Reactor Pressure – Low (Injection Permissive)	4, 5	4(a)	C	SR 3.3.5.2.1 SR 3.3.5.2.2	≤ 490 psig
b. Low Pressure Coolant Injection Pump Discharge Flow – Low (Bypass)	4, 5	1 per pump (a)	D	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 1040 gpm and ≤ 1665 gpm
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	≥ 177 inches
4. Reactor Water Cleanup (RWCU) 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	≥ 177 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 automatic 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 1 and 3 provided the associated Function maintains RCIC initiation capability.

SURVELLANCE		FREQUENCY
SR 3.3.5.3.1	Perform CHANNEL CHECK.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.3.2	Perform CHANNEL FUNCTIONAL TEST.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.3.3	Perform CHANNEL CALIBRATION.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.3.4	Calibrate the trip units.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.3.5	Perform CHANNEL CALIBRATION.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.3.6	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 SR 3.3.5.3.6	≥ 126.5 inches
2.	Reactor Vessel Water Level – High (Level 8)	2	C	SR 3.3.5.3.1 SR 3.3.5.3.2 SR 3.3.5.3.4 SR 3.3.5.3.5 SR 3.3.5.3.6	≤ 222.5 inches
3.	Condensate Storage Tank Level - Low	4	D	SR 3.3.5.3.3 SR 3.3.5.3.6	≥ 59.5 inches
4.	Manual Initiation	1	C	SR 3.3.5.3.6	NA

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
H. Required Action and associated Completion Time of Condition F or G not met. OR As required by Required Action C.1 and referenced in Table 3.3.6.1-1.	H.1 Be in MODE 3. AND H.2 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 Declare associated standby liquid control subsystem (SLC) inoperable. OR I.2 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 5 of 6)
Primary Containment Isolation Instrumentation

	{PRIVATE }FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
5.	Reactor Water Cleanup (RWCU) System Isolation					
a.	RWCU Suction Line Penetration Area Temperature — High	1,2,3	1	F	SR 3.3.6.1.3 SR 3.3.6.1.7	≤ 144°F
b.	RWCU Pump Area Temperature — High	1,2,3	1 per room	F	SR 3.3.6.1.3 SR 3.3.6.1.7	≤ 165°F for Pump Room A and ≤ 175°F for Pump Room B
c.	RWCU Heat Exchanger Room Area Temperature — High	1,2,3	1	F	SR 3.3.6.1.3 SR 3.3.6.1.7	≤ 155°F
d.	SLC System Initiation	1,2	2(d)	I	SR 3.3.6.1.7	NA
e.	Reactor Vessel Water Level — Low (Level 3)	1,2,3	2	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.5 SR 3.3.6.1.7	≥ 177 inches
f.	Drywell Pressure — High	1,2,3	2	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.5 SR 3.3.6.1.7	≤ 2.7 psig
6.	Shutdown Cooling System Isolation					
a.	Reactor Pressure — High	1,2,3	1	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.5 SR 3.3.6.1.7	≤ 74 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 3.3.6.1.4 SR 3.3.6.1.5 SR 3.3.6.1.7	≥ 177 inches

(continued)

(d) SLC System Initiation only inputs into one of the two trip systems and only isolates one valve in the RWCU suction and return line.

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 (Level 3)	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 SR 3.3.6.2.6	≥ 177 inches
2.	Drywell Pressure - High	1, 2, 3	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.5 SR 3.3.6.2.6	≤ 2.7 psig
3.	Reactor Building Exhaust Radiation - High	1, 2, 3, (a)	1	SR 3.3.6.2.1 SR 3.3.6.2.3 SR 3.3.6.2.6	≤ 24,800 cpm
4.	Refueling Floor Exhaust Radiation - High	1, 2, 3, (a)	1	SR 3.3.6.2.1 SR 3.3.6.2.3 SR 3.3.6.2.6	≤ 24,800 cpm

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

3.3 INSTRUMENTATION

3.3.7.1 Control Room Emergency Ventilation Air Supply (CREVAS) System Instrumentation

LCO 3.3.7.1 The Control Room Air Inlet Radiation — High channel shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Channel inoperable.	A.1	Place the CREVAS System in the isolate mode of operation.	1 hour
	OR		
	A.2	Declare both CREVAS subsystems inoperable.	1 hour

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.

---NOTE---

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

APPLICABILITY: MODE 1,
MODES 2 and 3, except 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. OR One low pressure coolant injection (LPCI) pump in both LPCI subsystems inoperable.	A.1 Restore low pressure ECCS injection/spray subsystem(s) to OPERABLE status.	7 days
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)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.1.2	Verify each ECCS injection/spray subsystem 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 3.5.1.3	Verify ADS pneumatic supply header pressure is $\geq$ 95 psig.	In accordance with the Surveillance Frequency Control Program
SR 3.5.1.4	Verify the RHR System cross tie valves are closed and power is removed from the electrical valve operator.	In accordance with the Surveillance Frequency Control Program
SR 3.5.1.5	Cycle open and closed each LPCI motor operated valve independent power supply battery charger AC input breaker and verify each LPCI inverter output voltage is $\geq$ 576 V and $\leq$ 624 V while supplying the respective bus.	In accordance with the Surveillance Frequency Control Program

(continued)

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

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	C.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
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

	SURVELLANCE	FREQUENCY
SR 3.5.2.1	Verify DRAIN TIME $\geq$ 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 $\geq$ 10.33 ft.	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 ≥ 10.33 ft; or b. The water level in each condensate storage tank is ≥ 324 inches	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)

	SURVELLANCE	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 can be manually operated.	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.	Immediately
	AND		
	A.2	Restore RCIC System to OPERABLE status.	14 days
B. Required Action and associated Completion Time not met.	B.1	Be in MODE 3.	12 hours
	AND		
	B.2	Reduce reactor steam dome pressure to ≤ 150 psig.	36 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Required Action and associated Completion Time of Condition A, B, C, D, or E not met in MODE 1, 2, or 3.	F.1 Be in MODE 3. AND F.2 Be in MODE 4.	12 hours 36 hours
G. Required Action and associated Completion Time of Condition A or B not met for PCIV(s) required to be OPERABLE during Mode 4 or 5.	G.1 Initiate action to restore valve(s) to OPERABLE status.	Immediately

3.6 CONTAINMENT SYSTEMS

3.6.4.1 Secondary Containment

LCO 3.6.4.1 The secondary containment shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Secondary containment inoperable in MODE 1, 2, or 3.	A.1 Restore secondary containment to OPERABLE status.	4 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	12 hours 36 hours
C. Secondary containment inoperable during movement of recently irradiated fuel assemblies in the secondary containment.	C.1 ----------NOTE---------- LCO 3.0.3 is not applicable. ---------- Suspend movement of recently irradiated fuel assemblies in the secondary containment.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.4.1.1	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 secondary containment equipment hatches are closed and sealed.	In accordance with the Surveillance Frequency Control Program
SR 3.6.4.1.3	Verify one secondary containment access door in each access opening is closed, except when the access opening is being used for entry and exit.	In accordance with the Surveillance Frequency Control Program
SR 3.6.4.1.4	Verify the secondary containment can be maintained ≥ 0.25 inch of vacuum water gauge for 1 hour using one SGT subsystem at a flow rate ≤ 6000 cfm.	In accordance with the Surveillance Frequency Control Program

3.6 CONTAINMENT SYSTEMS

3.6.4.2 Secondary Containment Isolation Valves (SCIVs)

LCO 3.6.4.2 Each SCIV shall be OPERABLE.

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

ACTIONS

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

1. Penetration flow paths may be unisolated intermittently under administrative controls.

2. Separate Condition entry is allowed for each penetration flow path.

2. Enter applicable Conditions and Required Actions for systems made inoperable by SCIVs.

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

ACTIONS (continued)

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

3.6 CONTAINMENT SYSTEMS

3.6.4.3 Standby Gas Treatment (SGT) System

LCO 3.6.4.3 Two SGT subsystems shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One SGT subsystem inoperable.	A.1 Restore SGT subsystem to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, or 3.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	12 hours 36 hours
C. Required Action and associated Completion Time of Condition A not met during movement of recently irradiated fuel assemblies in the secondary containment.	----------NOTE---------- LCO 3.0.3 is not applicable. ---------- C.1 Place OPERABLE SGT subsystem in operation. OR	Immediately

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. (continued)	C.2 Suspend movement of recently irradiated fuel assemblies in secondary containment.	Immediately
D. Two SGT subsystems inoperable in MODE 1, 2, or 3.	D.1 Enter LCO 3.0.3.	Immediately
E. Two SGT subsystems inoperable during movement of recently irradiated fuel assemblies in the secondary containment	E.1 --------NOTE-------- LCO 3.0.3 is not applicable. ---------- Suspend movement of recently irradiated fuel assemblies in secondary containment.	Immediately

3.7 PLANT SYSTEMS

3.7.3 Control Room Emergency Ventilation Air Supply (CREVAS) System

LCO 3.7.3 Two CREVAS subsystems shall be OPERABLE.

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

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

ACTIONS

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

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of Condition A or B not met in MODE 1, 2, or 3.	C.1 Be in MODE 3. AND C.2 Be in MODE 4.	12 hours 36 hours
D. Required Action and associated Completion Time of Condition A not met during movement of recently irradiated fuel assemblies in the secondary containment	---------- NOTE ---------- LCO 3.0.3 is not applicable. ---------- D.1 Place OPERABLE CREVAS subsystem in isolate mode. OR D.2 Suspend movement of recently irradiated fuel assemblies in the secondary containment.	 Immediately Immediately
E. Two CREVAS 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 CREVAS subsystems inoperable during movement of recently irradiated fuel assemblies in the secondary containment OR One or more CREVAS subsystems inoperable due to an inoperable CRE boundary during movement of recently irradiated fuel in the secondary containment	---------- NOTE ---------- LCO 3.0.3 is not applicable. ---------- F.1 Suspend movement of recently irradiated fuel assemblies in the secondary containment.	Immediately

SURVEILLANCE REQUIREMENTS

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

(continued)

3.7 PLANT SYSTEMS

3.7.4 Control Room Air Conditioning (AC) System

LCO 3.7.4 Two control room AC subsystems shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One control room AC subsystem inoperable.	A.1 Restore control room AC subsystem to OPERABLE status.	30 days
B. Two control room AC subsystems inoperable.	B.1 Verify control room area temperature < 90 °F. AND B.2 Restore one control room AC subsystem to OPERABLE status.	Once per 4 hours 72 hours
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

(continued)

ACTIONS (continued)

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

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or both required offsite circuits inoperable.	----------NOTE---------- Enter applicable Condition and Required Actions of LCO 3.8.8, when any required division is de-energized as a result of Condition A. --- A.1 Declare affected required feature(s), with no offsite power available, inoperable. OR A.2.1 Suspend CORE ALTERATIONS. AND A.2.2 Suspend movement of recently irradiated fuel assemblies in the secondary containment. AND	Immediately Immediately Immediately

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.3 Initiate action to restore required offsite power circuit(s) to OPERABLE status.	Immediately
B. One required EDG subsystem inoperable.	B.1 Suspend CORE ALTERATIONS. AND	Immediately
	B.2 Suspend movement of recently irradiated fuel assemblies in secondary containment. AND	Immediately
	B.3 Initiate action to restore required EDG subsystem to OPERABLE status.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.2.1	----------NOTES---------- 1. The following SRs are not required to be performed: SR 3.8.1.3, SR 3.8.1.8, SR 3.8.1.9, SR 3.8.1.11, SR 3.8.1.12, and SR 3.8.1.13. 2. SR 3.8.1.10 and SR 3.8.1.12 are not required to be met when associated ECCS subsystem(s) are not required to be OPERABLE per LCO 3.5.2, "Reactor Pressure Vessel (RPV) Water Inventory Control." --- For AC sources required to be OPERABLE the SRs of Specification 3.8.1, except SR 3.8.1.7, are applicable.	In accordance with applicable SRs

ACTIONS

CONDITIONS	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.3 Initiate action to restore required DC electrical power subsystem to OPERABLE status.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.5.1	----------NOTE---------- The following SRs are not required to be performed: SR 3.8.4.2, SR 3.8.4.3, and SR 3.8.4.4. ----------	
	For DC electrical power subsystem required to be OPERABLE the following SRs are applicable: SR 3.8.4.1, SR 3.8.4.2, SR 3.8.4.3, and SR 3.8.4.4.	In accordance with applicable SRs

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.3 Initiate actions to restore required AC and 125 VDC electrical power distribution subsystems to OPERABLE status. AND A.2.4 Declare associated required shutdown cooling subsystem(s) inoperable.	Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.8.1	Verify correct breaker alignments and voltage to required AC and 125 VDC electrical power distribution subsystems.	In accordance with the Surveillance Frequency Control Program

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 321 TO RENEWED

FACILITY OPERATING LICENSE NO. DPR-59

EXELON FITZPATRICK, LLC

AND

EXELON GENERATION COMPANY, LLC

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

DOCKET NO. 50-333

1.0 INTRODUCTION

By letter dated October 2, 2017 (Reference 1), and as supplemented by letters dated January 22 and April 19, 2018 (References 2 and 3, respectively), Exelon Fitzpatrick, LLC and Exelon Generation Company, LLC (the licensee) requested to adopt Technical Specifications Task Force (TSTF) Traveler TSTF-542, Revision 2, "Reactor Pressure Vessel Water Inventory Control," (Reference 4) for the James A. FitzPatrick Nuclear Power Plant (JAFNPP). The final safety evaluation (SE) for TSTF-542, Revision 2, was approved by the U.S. Nuclear Regulatory Commission (NRC, the Commission) on December 20, 2016 (Reference 5).

The proposed changes would replace existing technical specification (TS) requirements 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 the JAFNPP TS Safety Limit 2.1.1.3, which states, "Reactor vessel water level shall be greater than the top of active irradiated fuel."

Additionally, a new definition "DRAIN TIME" would be added to the JAFNPP 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 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 would require a properly calculated DRAIN TIME.

The licensee proposed several JAFNPP plant-specific variations from the TS changes described in the applicable parts of TSTF-542, Revision 2, or the NRC-approved TSTF-542 SE. These are explained and evaluated, respectively, in Sections 2.2.5 and 3.5 of this SE.

The supplemental letters dated January 22 and April 19, 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 55405).

2.0 REGULATORY EVALUATION

2.1 System Description

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

During operation in Mode 1 (Power Operation - Reactor Mode Switch in Run), Mode 2 (Startup - Reactor Mode Switch in Refuel (with all reactor vessel head closure bolts fully tensioned) or Startup/Hot Standby), and Mode 3 (Hot Shutdown - Reactor Mode Switch in Shutdown and average reactor coolant temperature greater than (>) 212 degrees Fahrenheit (°F), the TS for instrumentation and ECCS require operability of sufficient equipment to ensure large quantities of water can be injected into the reactor 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 operation in Mode 4 (Cold Shutdown - Reactor Mode Switch in Shutdown with all reactor vessel head closure bolts fully tensioned and average reactor coolant temperature less than or equal to (≤) 212 °F), and Mode 5 (Refueling - One or more reactor vessel head closure bolts less than fully tensioned and Reactor Mode Switch in Shutdown or Refuel), the pressures and temperatures that could cause a LOCA are not present. During certain phases of refueling (Mode 5), a large volume of water is available above the RPV (i.e., the RPV head is removed, the water level is greater than or equal to (≥) 22 feet 2 inches above the top of the RPV flange), and the spent fuel storage pool gates are removed (existing TS limiting condition for operation (LCO) 3.5.2).

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, at other times during a refueling outage (i.e., Mode 4 or 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.

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 potential significant or even unexpected drainage paths. These potential drainage paths in Modes 4 and 5 generally would require less

water replacement capability to maintain water above TAF. To address the drain down potential during Modes 4 and 5, the current JAFNPP 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 new RPV WIC TSs with attendant equipment operability requirements, required actions and surveillance requirements (SRs), and deleting references to OPDRVs throughout the JAFNPP TSs.

2.2 Proposed TS Changes

Section 2.2.1 of this SE discusses the proposed addition of a new definition, "DRAIN TIME" (evaluated below in SE Section 3.1). Section 2.2.2 of this SE discusses the proposed revisions to TS 3.3, "INSTRUMENTATION," including the proposed revisions to TS 3.3.5.1, "Emergency Core Cooling System (ECCS) Instrumentation," the proposed addition of a new TS 3.3.5.2, "Reactor Pressure Vessel Water (RPV) Inventory Control Instrumentation," and the proposed renumbering of existing TS 3.3.5.2, "Reactor Core Isolation Cooling (RCIC) System Instrumentation," to TS 3.3.5.3. Section 2.2.3 of this SE discusses the proposed revisions to TS 3.5, "Emergency Core Cooling System (ECCS) and Reactor Core Isolation Cooling (RCIC) System," including the proposed revisions to TS 3.5.2, "ECCS – Shutdown" (evaluated below in SE Section 3.3). Section 2.2.4 of this SE discusses the proposed deletion of existing TS references to OPDRVs (evaluated below in SE Section 3.6). Section 2.2.5 of this SE discusses JAFNPP plant-specific variations to TSTF-542, Revision 2 (evaluated below in SE Section 3.5).

In addition, the licensee proposes administrative changes to the table of contents (TOC) to reflect the above TS changes.

2.2.1 Addition of DRAIN TIME Definition

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 is in continuous communication with the control room, is stationed at the controls, and is capable of closing the penetration flow path isolation device without offsite power.

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

d) No additional draining events occur; and

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

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

2.2.2 TS 3.3, Instrumentation

The following subsections describe the existing and proposed changes to the JAFNPP TS, Section 3.3, "Instrumentation."

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

Proposed changes to TS 3.3.5.1 include the deletion of Note 1 in Required Actions B.1, C.1, and E.1, which states:

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

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, "Reactor Pressure Vessel (RPV) Water Inventory Control Instrumentation." Modes 4 and 5 applicability and associated requirements would be deleted for the following functions:

1. Core Spray (CS) System
   - a. Reactor Vessel Water Level – Low Low Low (Level 1)
   - c. Reactor Pressure – Low (Injection Permissive)
   - d. Core Spray Pump Start – Time Delay Relay
   - e. Core Spray Pump Discharge Flow – Low (Bypass)
   - f. Core Spray Pump Discharge Pressure – High (Bypass)

2. Low Pressure Coolant Injection (LPCI) System

   a. Reactor Vessel Water Level – Low Low Low (Level 1)
   c. Reactor Pressure – Low (Injection Permissive)
   f. Low Pressure Coolant Injection Pump Start – Time Delay Relay
   g. Low Pressure Coolant Injection Pump Discharge Flow – Low (Bypass)

TS Table 3.3.5.1-1 Footnote (a), which states, "When associated ECCS subsystem(s) are required to be OPERABLE per LCO 3.5.2," would be deleted. As a result, existing Footnotes (b), (c), and (d) would be renumbered (a), (b), and (c), respectively.

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

The proposed new TS 3.3.5.2 would contain functions that are comprised of requirements moved 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 Reactor Pressure Vessel (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

CONDITION	REQUIRED ACTION	COMPLETION TIME
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	Perform CHANNEL FUNCTIONAL TEST.	In accordance with the Surveillance Frequency Control Program

Table 3.3.5.2-1 (page 1 of 1)
Reactor Pressure Vessel (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 Pressure – Low (Injection Permissive)	4, 5	4(a)	C	SR 3.3.5.2.1 SR 3.3.5.2.2	≤ 490 psig
b. Core Spray Pump Discharge Flow - Low (Bypass)	4, 5	1 per pump (a)	D	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 510 gpm and ≤ 980 gpm
c. Core Spray Pump Discharge Pressure - High (Bypass)	4, 5	1 per pump (a)	D	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 90 psig and ≤ 110 psig
2. Low Pressure Coolant Injection (LPCI) System					
a. Reactor Pressure – Low (Injection Permissive)	4, 5	4(a)	C	SR 3.3.5.2.1 SR 3.3.5.2.2	≤ 490 psig
b. Low Pressure Coolant Injection Pump Discharge Flow - Low (Bypass)	4, 5	1 per pump (a)	D	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 1040 gpm and ≤ 1665 gpm
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	≥ 177 inches

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
4. Reactor Water Cleanup (RWCU) 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	$\geq$ 177 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 Isolation," and its subsections would be renumbered to TS 3.3.5.3 in order to maintain the TS numbering conventions.

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

The title of JAFNPP TS Section 3.5 would be revised from "Emergency Core Cooling System (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." This also would affect TSs 3.5.1 and 3.5.3 with modification of the title at the top of the page.

The title of JAFNPP 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:

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

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

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. ----------	Immediately
	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.	

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

The proposed TS 3.5.2 SRs would be added as shown below:

SURVEILLANCE		FREQUENCY
SR 3.5.2.1	Verify DRAIN TIME ≥ 36 hours.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.2	Verify, for a required low pressure coolant injection (LPCI) subsystem, the suppression pool water level is ≥ 10.33 ft.	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 ≥ 10.33 ft; or b. The water level in each condensate storage tank is ≥ 324 inches	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

	SURVEILLANCE	FREQUENCY
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 can be manually operated.	In accordance with the Surveillance Frequency Control Program

2.2.4 Deletion of OPDRV References and Other Changes

In its license amendment request (LAR) dated October 2, 2017 (Reference 1), the licensee proposed to revise existing TS requirements related to OPDRVs or "Initiate action to suspend OPDRVs" with new requirements on RPV WIC that would protect the JAFNPP TS Safety Limit 2.1.1.3. To remain consistent with TSTF-542, Revision 2, all references to the term OPDRVs in the JAFNPP TSs would be deleted. The existing TS locations of these references are summarized below:

JAFNPP LCO	Location of OPDRV Reference
3.3.6.1, Primary Containment Isolation Instrumentation	Required Action J.2, Table 3.3.6.1-1, Function 6.b. and Footnote (e) (See Below)
3.3.6.2, Secondary Containment Isolation Instrumentation	Table 3.3.6.2-1 Footnote (a)
3.3.7.1, Control Room Emergency Ventilation Air Supply (CREVAS) System Instrumentation	Applicability
3.6.1.3, Primary Containment Isolation Valves (PCIVs)	Required Action G.1
3.6.4.1, Secondary Containment	Applicability, Condition C, Required Action C.2
3.6.4.2, Secondary Containment Isolation Valves (SCIVs)	Applicability, Condition D, Required Action D.2
3.6.4.3, Standby Gas Treatment (SGT) System	Applicability, Condition C, Required Action C.2.2, Condition E, Required Action E.2
3.7.3, Control Room Emergency Ventilation Air Supply (CREVAS) System	Applicability, Condition D, Required Action D.2.2, Condition F, Required Action F.2
3.7.4, Control Room Air Conditioning (AC) System	Applicability, Condition D, Required Action D.2.2, Condition E, Required Action E.2

JAFNPP LCO	Location of OPDRV Reference
3.8.2, AC Sources Shutdown	Required Actions A.2.3, B.3, and SR 3.8.2.1
3.8.5, DC Sources – Shutdown	Required Action A.2.3
3.8.8, Distribution Systems-Shutdown	Required Action A.2.3

For each of these TS, the applicability and/or Actions table sections would be revised to delete references to OPDRVs and delete required actions for OPDRVs. Additionally, conforming changes would be made by renumbering remaining required actions or in the case of SR 3.8.2.1, to revise the title of a reference to LCO 3.5.2 to the newly proposed title, "Reactor Pressure Vessel (RPV) Water Inventory Control."

2.2.5 JAFNPP Plant-Specific TSTF-542 TS Variations

In Section 2.2 of the LAR dated October 2, 2017 (Reference 1), the licensee identified several JAFNPP plant-specific TS variations from the TS changes described in TSTF-542, Revision 2, or the applicable parts of the NRC staff's SE. The licensee stated in the LAR that these variations do not affect the applicability of the TSTF-542, Revision 2, or the NRC staff's SE to the proposed license amendment. Specific details of these variations are described in the LAR.

2.2.5.1 Variation 1, Relocation of LPCI Injection Mode Notes from SRs to TS LCO

The licensee proposed to relocate JAFNPP TS notes in SRs 3.5.1.2 and 3.5.2.4 to notes in LCOs 3.5.1 and 3.5.2. The notes permit the LPCI subsystem to be considered operable during alignment and operation for decay heat removal (DHR) if capable of being manually realigned and not otherwise inoperable.

2.2.5.2 Variation 2, CS and LPCI Manual Initiation Logic

There are Standard Technical Specifications (STS) SRs proposed in TSTF-542 related to "manual initiation," that do not appear in the current JAFNPP TSs. The "manual initiation" logic does not exist in the JAFNPP design. These functions, as well as related TSTF-542, Revision 2, SRs 3.3.5.2.3 and 3.5.2.8, do not apply to JAFNPP.

As an alternative, the licensee proposed that TS 3.5.2 include SR 3.5.2.8 to verify that the JAFNPP-required ECCS injection/spray subsystem can be manually operated through the manipulation of subsystem components from the Main Control Room (MCR).

2.2.5.3 Variation 3, RWCU System Isolation Occurs at Reactor Vessel Water Level – Low Level 3

The licensee stated in the LAR that the JAFNPP design for RWCU isolation is on Reactor Vessel Water Level - Low (Level 3), not Reactor Vessel Water Level – Low, Low (Level 2) in the JAFNPP design. Therefore, the licensee proposed to revise JAFNPP TS Table 3.3.5.2-1 to reflect this plant-specific design difference.

2.2.5.4 Variation 4, CS Time Delay Relay Function Deleted in Modes 4 and 5

The licensee stated in the LAR that the JAFNPP TS for the CS time delay relay function does not appear in the STS table and this function is proposed to be deleted in Modes 4 and 5 using the same justification provided in TSTF-542 for deletion of the LPCI time delay relay.

2.2.5.5 Variation 5, CS Pump Discharge Pressure – High (Bypass) Function

The JAFNPP CS pump discharge pressure high bypass function does not appear in the STS table. Therefore, the licensee proposed to carry this function into TS Table 3.3.5.2-1 consistent with the justification for CS and LPCI pump discharge flow low bypass functions.

2.2.5.6 Variation 6, JAFNPP TSs Contain the Surveillance Frequency Control Program

The JAFNPP TSs contain a TS 5.5.15, Surveillance Frequency Control Program. Therefore, the SR frequencies for Specification 3.3.5.2 and 3.5.2 are "In accordance with the Surveillance Frequency Control Program."

2.3 Applicable Regulatory Requirements

2.3.1 Rules

The regulation under Title 10 of the *Code of Federal Regulations* (10 CFR), Paragraph 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."

The categories of items required to be in the TSs are provided in 10 CFR 50.36(c). As required by 10 CFR 50.36(c)(1)(i)(A), safety limits for nuclear 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.

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

The regulation under 10 CFR 50.36(c)(2)(ii) requires licensees to 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 via operating experience.

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

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

As described in 10 CFR 50.92(a), in determining whether an amendment to a license will be issued to the applicant, the Commission will be guided by the considerations which govern the issuance of initial licenses 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.

2.3.2 Guidance

The NRC staff's guidance for review of TSs is in Chapter 16, "Technical Specifications," of NUREG-0800, Revision 3, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants" (SRP), March 2010 (Reference 6). As described therein, as part of the regulatory standardization effort, the NRC staff prepared STS for each of the light-water reactor nuclear designs.

NUREG-1433, Revision 4, "Standard Technical Specifications, General Electric BWR/4," April 2012 (Reference 7), contains the STS for BWR/4 plants and therefore is applicable to JAFNPP.

2.3.3 Conformance to Applicable Design Requirements

The construction permit for JAFNPP was issued by the Atomic Energy Commission (AEC) on May 20, 1970. On February 20, 1971, the AEC published in the *Federal Register* (36 FR 3255) a final rule that added Appendix A to 10 CFR Part 50, "General Design Criteria for Nuclear Power Plants" (hereinafter referred to as the "final GDC"). As discussed in Chapter 16, Appendices, Section 16.6 to the JAFNPP Final Safety Analysis Report (FSAR), JAFNPP was evaluated against the 10 CFR 50, Appendix A, GDC for Nuclear Power Plants, effective May 21, 1971. It was concluded that JAFNPP conformed with the intent of the AEC GDC for Nuclear Power Plants to the maximum extent possible consistent with the state of design and construction at the time of issuance of the criteria.

The following criteria for JAFNPP are related to the evaluation of this LAR:

- Criterion 13 – Instrumentation and control. Instrumentation shall be provided to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions as appropriate to assure adequate safety, including those variables and systems that can affect the fission process, the integrity of the reactor core, the reactor coolant pressure boundary, and the containment

and its associated systems. Appropriate controls shall be provided to maintain these variables and systems within prescribed operating ranges.

- Criterion 14 – Reactor coolant pressure boundary. The reactor coolant pressure boundary shall be designed, fabricated, erected, and tested so as to have an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture.

- Criterion 30 – Quality of reactor coolant pressure boundary. Components which are part of the reactor coolant pressure boundary shall be designed, fabricated, erected, and tested to the highest quality standards practical. Means shall be provided for detecting and, to the extent practical, identifying the location of the reactor coolant leakage source.

- Criterion 33 – Reactor coolant makeup. A system to supply reactor coolant makeup for protection against small breaks in the reactor coolant pressure boundary shall be provided. The system safety function shall be to assure that specified acceptable fuel design limits are not exceeded as a result of reactor coolant loss due to leakage from the reactor coolant pressure boundary and rupture of small piping or other small components which are part of the boundary. The system shall be designed to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) the system safety function can be accomplished using the piping, pumps, and valves used to maintain coolant inventory during normal reactor operation.

- Criterion 35 – Emergency core cooling. A system to provide abundant emergency core cooling shall be provided. The system safety function shall be to transfer heat from the reactor core following any loss of reactor coolant at a rate such that (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.

3.0 TECHNICAL EVALUATION

Section 2.2 of this SE lists the proposed TS changes, as included in the licensee's letters dated October 2, 2017, and January 22 and April 19, 2018 (References 1, 2, and 3, respectively), for the licensee to adopt TSTF-542, Revision 2. The licensee states in the LAR dated October 2, 2017, that it performed a review of the information provided in approved TSTF-542, Revision 2 (Reference 4), as well as the SE provided to the TSTF group on December 20, 2016 (Reference 5). The licensee concluded that the justifications presented in TSTF-542, Revision 2, and the SE prepared by the NRC staff are applicable to JAFNPP and justify this amendment for the incorporation of the changes into the JAFNPP TSs. The following sections include the NRC staff's evaluation of each of these proposed changes.

3.1 Staff Evaluation of Proposed DRAIN TIME Definition

As discussed in Section 2.2.1 of this SE, 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.

The NRC staff reviewed the proposed DRAIN TIME definition from TSTF-542, Revision 2. For the purpose of NRC staff considerations, the term "break" describes a pathway for water to

drain from the RPV that has not been prescribed in the "DRAIN TIME" definition in TSTF-542, Revision 2. Based on the 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, Revision 2.

The NRC staff has reasonable assurance that the licensee will include all RPV penetrations below the TAF in the determination of DRAIN TIME as potential pathways. As part of this evaluation, the staff reviewed requests for additional information used during the development of TSTF-542, Revision 2, which provided examples of bounding DRAIN TIME calculations for three examples: (1) water level at or below the RPV flange; (2) water level above 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 drain down event. The discharge point will depend on the lowest potential drain point for each RPV penetration flow path on a plant-specific basis. This calculation provides a conservative approach to determining the DRAIN TIME of the RPV.

The NRC staff concluded that the licensee will use methods resulting in conservative calculations to determine RPV DRAIN TIME, thereby, protecting the JAFNPP TS 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 DRAIN TIME definition to the JAFNPP TSs is acceptable.

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

The existing JAFNPP TS 3.3.5.2, "Reactor Core Isolation Cooling (RCIC) System Instrumentation," would be renumbered as TS 3.3.5.3. This achieves consistency within the 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 new TS LCO 3.5.2, and the proposed new definition of DRAIN TIME. There are instrumentation and controls that are required for manual pump starts or required as a permissive or operational controls on the equipment of the systems that provide water injection capability, certain start commands, pump protection, and isolation functions. These instruments are required to be operable if the systems that provide water injection and isolation functions are to be considered operable as described in Section 3.3 this SE for new TS 3.5.2. In the JAFNPP design, 'manual initiation logic' does not exist; however, reactor operators can manually manipulate subsystem components from the control room for injecting water. This is more complex than the preferred simple push button switch start but can still be accomplished within the time frames assumed in development of TSTF-542, Revision 2. This variation is evaluated in Section 3.5.2 of this SE.

Specifically, the proposed new TS 3.3.5.2 regarding RPV WIC Instrumentation is to support the operation of the CS and LPCI manual starts when needed as well as the system isolation of the residual heat removal (RHR) system and the RWCU system. The equipment involved with each of these systems is described in the evaluation of TS 3.5.2 and the Bases for LCO 3.5.2.

3.2.1 Staff Evaluation of Proposed TS 3.3.5.2 LCO and Applicability

In the LAR dated October 2, 2017 (Reference 1), the licensee proposed new TS 3.3.5.2 to provide alternative instrumentation requirements to support manual initiation of the low pressure ECCS injection/spray subsystem required in new TS 3.5.2 and automatic isolation of penetration flow paths that may be credited in the determination of DRAIN TIME. The current TSs contain instrumentation requirements related to OPDRVs in TS Tables 3.3.5.1-1, 3.3.6.1-1, and 3.3.6.2-1, and TS 3.3.7.1. These requirements from TS Tables 3.3.5.1-1 and 3.3.6.1-1 would be consolidated into new TS 3.3.5.2.

The proposed LCO 3.3.5.2 would state:

> The Reactor Pressure Vessel (RPV) Water Inventory Control Instrumentation for each Function in Table 3.3.5.2-1 shall be OPERABLE.

The proposed applicability would state:

> According to Table 3.3.5.2-1.

Revision 2 of TSTF-542 selected TS Table 3.3.5.2-1 to contain those instrumentation functions needed to support manual initiation of the low pressure ECCS injection/spray subsystem required by LCO 3.5.2 and automatic isolation of penetration flow paths that may be credited in a calculation of DRAIN TIME. The functions in TS Table 3.3.5.2-1 are moved from existing TS 3.3.5.1, "Emergency Core Cooling System (ECCS) Instrumentation," and TS 3.3.6.1, "Primary Containment Isolation Instrumentation," functions that are required in Modes 4 or 5 or during OPDRVs. 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. As identified in Section 2.2.5.2 of this SE, the JAFNPP design does not include a manual initiation logic for the CS or LPCI systems. Therefore as an alternative, the licensee proposed to include an SR 3.5.2.8 to TS 3.5.2 to verify that the required ECCS injection/spray subsystems can be manually operated from the MCR.

The NRC staff concluded that the licensee's proposed alternative is acceptable for JAFNPP since either CS or LPCI (or both) subsystems would be available to perform the intended function to inject water into the RPV which meets the intent of the NRC-approved TSTF-542, Revision 2.

3.2.2 Staff Evaluation of Proposed TS 3.3.5.2 Actions

As discussed in Section 2.2.2.2 above, the NRC staff has determined that the licensee's proposed new TS 3.3.5.2 Actions are sufficient and necessary because when one or more instrument channels are inoperable, the equipment and function controlled by these instruments cannot complete the required function in the normal manner. The Actions are evaluated as follows:

> Action A would be applicable when one or more instrument channels are inoperable from TS Table 3.3.5.2-1 and directs the licensee to immediately enter the Condition referenced in TS Table 3.3.5.2-1 for that channel.
>
> Action B (concerning the RHR System Isolation and RWCU System Isolation functions) would be applicable when automatic isolation of the associated penetration flow path is

credited as a path for potential drainage in calculating DRAIN TIME. If the instrumentation is inoperable, Required Action B.1 directs an immediate declaration that the associated penetration flow path(s) are incapable of automatic isolation. Required Action B.2 requires an immediate re-calculation of DRAIN TIME, but automatic isolation of the affected penetration flow paths cannot be credited.

Action C (concerning low reactor pressure 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 initiation valve opening may now be performed using the control board hand-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 pump discharge flow bypass functions) would address actions when the bypass is inoperable and then there is a risk that the associated ECCS pump could overheat when the pump is operating and the associated injection valve is not fully open. In this condition, the operator can take manual control of the pump and the injection valves. Similar to the justification for Action C, while this is not the preferred method, if a manual initiation function is inoperable, 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 becomes necessary if the required actions and associated completion times of Conditions C or D are not met. In this condition, the associated low pressure ECCS injection/spray subsystem may be incapable of performing the intended function, and the ECCS subsystem must be declared inoperable immediately.

These Actions direct the licensee to take appropriate actions as necessary and enter immediately into the Conditions referenced in TS Table 3.3.5.2-1. The NRC staff 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 staff concludes that there is reasonable assurance that the licensee will take appropriate actions during an unexpected draining event to either prevent or mitigate RPV water level being lowered to the JAFNPP TS Safety Limit 2.1.1.3 and, therefore, the proposed actions are acceptable.

3.2.3 Staff Evaluation of Proposed TS 3.3.5.2 Surveillance Requirements

The proposed new TS 3.3.5.2 SRs include Channel Checks and Channel Functional Tests numbered SR 3.3.5.2.1 and SR 3.3.5.2.2, respectively. The NRC staff determined that these tests are sufficient and adequate, because they are essential to ensure that the functions of TS 3.3.5.2 are operable (i.e., capable of performing the specified safety function in support of TS 3.5.2, DRAIN TIME, and the protection from a potential drain down of the RPV in Modes 4 and 5). The NRC staff determined that the proposed SRs of LCO 3.3.5.2, as described in Section 3.3.3 of the TSTF-542 justification, 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.

Surveillance requirement 3.3.5.2.1 would require a Channel Check and applies to all functions in the TS Table 3.3.5.2-1. Performance of the Channel Check ensures 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.

Surveillance requirement 3.3.5.2.2 would require a Channel Functional Test and applies to all functions in the TS Table 3.3.5.2-1. 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. The NRC staff has determined that this is acceptable because it is consistent with the existing requirements for these functions and is based upon operating experience that demonstrates channel failure is rare. In addition, 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.

In the LAR dated October 2, 2017 (Reference 1), the licensee originally proposed a SR 3.3.5.2.3 to perform a logic system functional test even though Section 2.2.6 of Attachment 1 of the LAR stated that no manual initiation logic existed at JAFNPP. See Variation 2 of Section 3.5 of this SE for a full discussion. Additionally, no TS functions included in the proposed TS Table 3.3.5.2-1 referenced SR 3.3.5.2.3. Because of the apparent discrepancy, the NRC staff requested clarification via use of a request for additional information dated March 26, 2018 (Reference 8). In its response letter dated April 19, 2018 (Reference 3), the licensee identified the inclusion of SR 3.3.5.2.3 as an error and proposed removal of the logic system functional test. The NRC staff accepts removal of formerly proposed SR 3.3.5.2.3 because of the reasoning in Variation 2 of Section 3.5 of this SE and the clarification provided in Reference 3.

Revision 2 of TSTF-542 did not include SRs to verify or adjust the instrument setpoint derived from the allowable value using a channel calibration or a surveillance to calibrate the trip unit. Since a draining event in Mode 4 or 5 is not an analyzed accident, there is no accident analysis on which to base the calculation of a setpoint. The purpose of the function is to allow ECCS manual initiation or to automatically isolate a penetration flow path, but no specific RPV water level is assumed for those actions. Therefore, the Mode 3 allowable value was chosen for use in Modes 4 and 5 as it will perform the desired function. Calibrating the functions in Modes 4 and 5 is not necessary, as TS 3.3.5.1 and TS 3.3.6.1 continue to require the functions to be calibrated on an established interval. 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 concluded this is adequate to ensure the channel responds with the required pumping systems to inject water when needed and isolation equipment to perform when commanded.

Based on the above, 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 quality of systems and components is maintained and, are, therefore, acceptable.

3.2.4 Staff Evaluation of Proposed TS Table 3.3.5.2-1, "Reactor Pressure Vessel (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 TS Table 3.3.5.2-1. These instruments are required to be operable if the systems that provide water injection and isolation functions are to be considered operable as described in the NRC staff's evaluation of TS 3.5.2 (Section 3.3 of this SE).

Proposed TS 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.

Proposed TS Table 3.3.5.2-1, "Reactor Pressure Vessel (RPV) Water Inventory Control Instrumentation," presents details on the functions required to support the equipment and functions of TS 3.5.2. The NRC staff finds the presentation in this table to be acceptable, because this section 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, and 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 to ensure the channels of instrumentation respond with the required accuracy permitting pumps and associated systems to operate to inject water when needed and isolating equipment when commanded to support the prevention of or mitigate 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. Automatic initiation of an ECCS injection/spray subsystem may be undesirable because it could lead to overflowing the RPV cavity, due to injection rates of thousands of gallons per minute (gpm). Thus, there is adequate time to take manual actions (e.g., hours versus minutes). Considering the action statements as the DRAIN TIME decreases (the proposed TS 3.5.2, Action E, prohibits plant conditions that could result in a DRAIN TIME less than (<) 1 hour), there is sufficient time for the reactor operators to take manual action to stop the draining event and to manually start an ECCS injection/spray subsystem or the additional method of water injection as needed. Consequently, there is no need for automatic initiation of ECCS to respond to an unexpected draining event. This is acceptable, because a draining event is a slow evolution when compared to a design basis LOCA assumed to occur at a significant power level.

3.2.4.1 Staff Evaluation of Proposed TS Table 3.3.5.2-1, Functions

For the TS Table 3.3.5.2-1, Functions 1.a. and 2.a., CS and LPCI Systems, Reactor Pressure - Low (Injection Permissive), these signals are used as permissives and protection for these 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 pressure is expected to virtually always be below the ECCS maximum design pumping pressure during Modes 4 and 5, the Reactor Pressure - Low signals are required to be operable to permit manual initiation of the ECCS equipment to inject water into the vessel, if needed. The proposed allowable value would be ≤ 490 pounds per square inch gauge (psig) with four required channels per function.

For the TS Table 3.3.5.2-1, Functions 1.b., 2.b., and 1.c., CS and LPCI Pump Discharge Flow - Low (Bypass), and CS Pump Discharge Pressure – High (Bypass), these minimum flow instruments are provided to protect the associated low pressure ECCS pumps from overheating when the pump is operating and the associated injection valve is not fully open.

Each CS pump and LPCI subsystem has one differential pressure indicating switch used to detect the associated subsystems' flow rates. In addition, for CS, one pressure indicating switch per pump is used to detect the associated pump's discharge pressure. The logic is arranged such that each differential pressure indicating switch causes its associated minimum flow valve to open. For CS both the differential pressure indicating switch and the pressure switch must actuate to cause the valve to open. The logic will close the minimum flow valve once the closure setpoint of the associated pressure indicating switch is exceeded.

The proposed allowable values for each of these instruments will be unchanged and moved from TS Table 3.3.5.1-1 to the proposed TS Table 3.3.5.2-1.

For the TS Table 3.3.5.2-1, Function 3.a., RHR System Isolation, Reactor Vessel Water Level - Low, Level 3, 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 number of required instrument channels is "2 in one trip system" which retains the requirement that the two instrument channels must be associated with the same trip system. Each trip system isolates one of two redundant isolation valves, and only one trip system is required to be operable to ensure that automatic isolation of one of the two isolation valves will occur on low reactor vessel water level indication. The allowable value was chosen to be the same as the Primary Containment Isolation Instrumentation Reactor Vessel Water Level - Low, Level 3 Allowable Value from LCO 3.3.6.1.

In current TS Table 3.3.6.1-1, there is a footnote referenced by this function that states:

> Only one trip system required in MODES 4 and 5 when RHR Shutdown Cooling System integrity maintained.

As stated above, it is understood that only one trip system is required to be operable to ensure automatic isolation and the concept that shutdown cooling system integrity be maintained; therefore, this footnote is not needed and not carried forward for this function into proposed TS Table 3.3.5.2-1.

For TS Table 3.3.5.2-1, Function 4.a., RWCU System Isolation, Reactor Vessel Water Level - Low, Level 3, 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 number of required channels is "2 in one trip system" which retains the requirement that the two instrument channels must be part of the same trip system. Only one trip system is required to be operable to ensure that automatic isolation of one of the two isolation valves will occur on low reactor vessel water level. The Allowable Value was chosen to be the same as the RPS Reactor Vessel Water Level - Low, Level 3 Allowable Value.

The NRC staff determined 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 can be conducted without endangering the health and safety of the public. This meets

the requirements of 10 CFR 50.36(c)(2)(i) and, therefore, the staff concluded 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 the proposed new TS 3.5.2.

The licensee's proposed TS 3.5.2, "Reactor Pressure Vessel (RPV) Water Inventory Control," LCO contains two parts. The first part states that:

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

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. Both of these conditions must be met during operational Modes 4 and 5 to meet the proposed LCO. "One low pressure ECCS injection/spray subsystem" would consist of either one CS subsystem or one LPCI subsystem. At JAFNPP, a CS subsystem consists of two motor-driven pumps, piping, and valves to transfer water from the suppression pool or condensate storage tanks to the RPV. At JAFNPP, LPCI is one mode of operation of the RHR system and the LPCI subsystems share four common pumps. An LPCI subsystem consists of two motor-driven pumps, 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 gallons 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. The LPCI subsystem is to be considered operable during alignment and operation for DHR if capable of being manually realigned and not otherwise inoperable. Decay heat removal in Modes 4 and 5 is not affected by the proposed change. The requirements on the number of RHR shutdown cooling subsystems that must be operable and in operation to ensure adequate DHR from the core are unchanged. These requirements can be found in JAFNPP TS 3.4.8, "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." Based on these considerations, the NRC staff finds that the water sources provide assurances that the lowest functional capability required for safe operation is maintained and supports the safety limit.

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

The existing TS LCO states that two ECCS injection/spray subsystems shall be operable, whereas the proposed LCO 3.5.2 states that only one ECCS injection/spray subsystem shall be operable. This change is reflected in Condition A. Changing from two ECCS injection/spray subsystems to one ECCS injection/spray subsystem is satisfactory because this level of

redundancy is not required given the low drain rates during Modes 4 and 5. With one ECCS injection/spray subsystem and non-safety 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 JAFNPP TS Safety Limit 2.1.1.3.

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 should be established immediately. The proposed Condition B provides adequate assurance of an available water source should Condition A not be met within the 4-hour completion time.

The proposed Condition C states that for a DRAIN TIME < 36 hours and ≥ 8 hours, to (Required Action C.1) verify secondary containment boundary is capable of being established in less than the DRAIN TIME, and (Required Action C.2) verify each secondary containment penetration flow path is capable of being isolated in less than DRAIN TIME, and (Required Action C.3) verify one SGT subsystem is capable of being placed in operation in less than the DRAIN TIME all 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 < 8 hours to (Required Action D.1) immediately initiate action to establish an additional method of water injection with water sources capable of maintaining RPV water level > TAF for ≥ 36 hours, (Required Action D.2) immediately initiate action to establish secondary containment boundary, (Required Action D.3) immediately initiate action to isolate each secondary containment penetration flow path or verify it can be manually isolated from the control room, and (Required Action D.4) immediately initiate action to verify one SGT subsystem 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 JAFNPP TS for Condition D (Required Action C.2 and associated Completion Time not met) is similar to the proposed Condition D. The proposed Condition D provides adequate protection should the DRAIN TIME be < 8 hours because of the ability to establish additional method of water injection (without electric power), establish secondary containment, isolate additional flow paths, and have the SGT subsystem capable of being placed in operation.

The proposed new 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 (Required Action E.1) initiate action to restore DRAIN TIME to ≥ 36 hours immediately. 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 RPV water level reaching the JAFNPP TS Safety Limit 2.1.1.3 with the water sources available and maintaining DRAIN TIME ≥ 36 hours. LCO 3.5.2 correctly specifies the lowest functional capability or performance levels of equipment required for safe operation of the facility. The NRC staff concludes there is reasonable assurance that the TS Required Actions to be taken when the LCO is not met can be conducted without endangering the health and safety of the public and, therefore, they are acceptable.

3.3.1 Staff Evaluation of Proposed TS 3.5.2 Surveillance Requirements

The proposed TS 3.5.2 SRs (Section 2.2.3 of this SE) 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 can be manually operated. Each of the eight SRs are described below.

- SR 3.5.2.1: The DRAIN TIME would be determined or calculated, and required to be verified to be ≥ 36 hours in accordance with the SFCP. This is a new surveillance and 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[3] is considered reasonable to identify and initiate action to mitigate draining of reactor coolant. Changes in RPV level would necessitate recalculation of the DRAIN TIME.

- SR 3.5.2.2: The suppression pool water level (≥ 10.33 ft.) for a required LPCI subsystem would be required to be verified to ensure pump net positive suction head and vortex prevention is available for the LPCI injection subsystem required to be operable by the LCO. This SR is retained from the existing SR 3.5.2.1 and would be required to be performed in accordance with the SFCP.

- SR 3.5.2.3: The suppression pool water level (≥ 10.33 ft.) or condensate storage tank level (≥ 324 inches) for a required CS 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. This SR is retained from the existing SR 3.5.2.2 and would be required to be performed in accordance with the SFCP. The note prior to part b is removed due to the removal of all OPDRV references.

- 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 SR 3.5.2.3. 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. The 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. This SR would 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

[3] Typically equivalent to three operator shifts.

existing SR 3.5.2.4. Again similar to proposed SR 3.5.2.4, 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. The note just prior to the SR allowing one LPCI subsystem to be considered operable during alignment and operation for DHR is relocated to the LCO. This is an administrative deviation further discussed in Section 3.5 of this SE (Variation 1). This SR would 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 for operation to support TS 3.5.2 and is retained from SR 3.5.2.5.

- 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 JAFNPP TS Safety Limit 2.1.1.3 should an unexpected draining event occur. This SR would be performed in accordance with the SFCP and is new for JAFNPP.

- SR 3.5.2.8: This SR would state, "Verify the required ECCS injection/spray subsystem can be manually operated." This SR is retained from existing JAFNPP SR 3.5.2.6. It demonstrates that the required CS or LPCI subsystem could be manually operated through the manipulation of subsystem components in the MCR to provide additional RPV water inventory, if needed. By operating the associated pump and valve switches which operates all active components, water flow can be demonstrated by recirculation through the test line. Vessel injection/spray may be excluded from the SR, per the accompanying note. Previously, JAFNPP relied only on automatic initiation of ECCS subsystems and manual actuation, while possible, this was not discussed in the TSs. Section 3.5 of this SE, evaluation of Variation 2, contains amplifying information. As further discussed in Section 3.3 of this SE, manual initiation is sufficient to counter expected drain rates within the DRAIN TIME. This SR would 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 determined that they are appropriate for ensuring the operability of the equipment and instrumentation specified in LCO 3.5.2. That traveler is TSTF-523, "Generic Letter 2008-01, Managing Gas Accumulation," which was approved by the NRC on January 14, 2014. The TSTF-523 traveler affected existing SR 3.5.2.3, which verifies that the ECCS piping is full of water, and existing SR 3.5.2.4, which verified that the valves are in correct position. Furthermore, 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 via operating experience and 10 CFR 50.36(c)(3) for SRs by ensuring that the necessary quality of systems and components is maintained.

3.4 Staff Evaluation of TS Table 3.3.5.1, Emergency Core Cooling System Instrumentation

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

For the following functions in TS Table 3.3.5.1-1, Mode 4 and 5 requirements would be deleted:

1. Core Spray System:

   (a) Reactor Vessel Water Level - Low Low Low (Level 1)
   (c) Reactor Pressure - Low (Injection Permissive)
   (d) Core Spray Pump Start – Time Delay Relay
   (e) Core Spray Pump Discharge Flow – Low (Bypass)
   (f) Core Spray Pump Discharge Pressure – High (Bypass)

2. Low Pressure Coolant Injection:

   (a) Reactor Vessel Water Level - Low Low Low (Level 1)
   (c) Reactor Pressure - Low (Injection Permissive)
   (f) Low Pressure Coolant Injection Pump Start - Time Delay Relay
   (g) Low Pressure Coolant Injection Pump Discharge Flow - Low (Bypass)

The Mode 4 and 5 requirements for the nine functions above would be deleted to support the consolidation of RPV WIC Instrumentation requirements into the proposed new TS 3.3.5.2. The requirements for Functions 1.c., 1.e., 1.f., 2.c., and 2.g., would be moved to proposed new 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.d., 2.a., and 2.f., the Mode 4 and 5 requirements would not be retained. The JAFNPP TSs currently requires automatic initiation of ECCS pumps on low Reactor Vessel water level. Functions 1.a. and 2.a., provide signals that automatically initiate the associated CS or LPCI pumps. Functions 1.d. and 2.f., are time delay relay functions that prevent overloading of the power source during an automatic initiation. However, as stated previously in this SE in Modes 4 and 5, automatic initiation of ECCS pumps could result in overfilling the refueling cavity or water flowing into the main steam lines, potentially damaging plant equipment. The NRC staff finds the deletion of TS Table 3.3.5.1-1, Functions 1.a. and 2.a., to be acceptable because 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.

The NRC staff finds the deletion of TS Table 3.3.5.1-1, Functions 1.d. and 2.f., to be acceptable for the CS and LPCI pump start time delay relays because the staggered starting of ECCS pumps is unnecessary for manual ECCS operation. Unlike automatic starts, which initiate all of the ECCS pumps to start requiring the delay logic, the operator will control which ECCS pumps to start, one at a time as needed for water inventory control.

3.5 Staff Evaluation of the Proposed Technical Variations

The licensee proposed the following variations from the TS changes described in TSTF-542 or the applicable parts of the NRC staff's SE for TSTF-542 (Reference 5). The licensee stated in the LAR that these variations do not affect the applicability of TSTF-542, Revision 2, or the NRC staff's SE for TSTF-542 to the proposed license amendment. The NRC staff evaluated each variation below.

3.5.1 Variation 1, Relocation of LPCI Injection Mode Notes From SRs to LCO

The licensee proposed to relocate JAFNPP TS notes in SRs 3.5.1.2 and 3.5.2.4 to TS notes in LCOs 3.5.1 and 3.5.2. In both cases, the notes permit the LPCI subsystem to be considered operable during alignment and operation if capable of being manually realigned and not otherwise inoperable.

The NRC staff finds that the added notes to LCOs 3.5.1 and 3.5.2 associated with the LPCI subsystem are appropriate and consistent with TSTF-542, Revision 2, which places this note within the LCO. Without the note, the associated RHR pump would be declared inoperable, which would be contrary to the intent of the existing notes for SRs 3.5.1.2 and 3.5.2.4 which allow the LPCI subsystem to be operable when aligned for DHR. Therefore, the NRC staff concludes that Variation 1 is acceptable.

3.5.2 Variation 2, CS and LPCI Manual Initiation Logic

There are STS SRs proposed in TSTF-542, Revision 2, related to "manual initiation," that do not appear in the current JAFNPP TSs. The licensee stated in the LAR that the "manual initiation" logic does not exist in the JAFNPP design. Since this is the case, these functions as well as related TSTF-542, Revision 2, SRs 3.3.5.2.3 and 3.5.2.8 do not apply to JAFNPP.

As an alternative, the licensee proposed that TS 3.5.2 include an SR 3.5.2.8 to verify that the JAFNPP-required ECCS injection/spray subsystem can be manually operated through the manipulation of subsystem components from the MCR.

Additionally, as stated by the licensee in the LAR dated October 2, 2017:

> The manual operation of the required ECCS injection/spray subsystem for the control of reactor cavity or RPV inventory is a relatively simple evolution and involves the manipulation of a small number of components. These subsystem alignments can be performed by licensed operators from the Main Control Room.
>
> This alternative is justified by the fact that a draining event is a slow evolution when compared to a design basis loss of coolant accident, which is assumed to occur at full power, and thus, there is adequate time to take manual actions (i.e., hours versus minutes). Adequate time to take action is assured since the proposed TS 3.5.2, Condition E, prohibits plant conditions that result in drain times that are less than one hour. Therefore, there is sufficient time for the licensed operators to take manual action to stop an unanticipated draining event, and to manually start an ECCS injection/spray subsystem or the additional method of water injection.

> Since the ECCS injection/spray subsystem can be placed in service using manual means in a short period of time (i.e., within the time frames assumed in the development of TSTF-542), using controls and indications that are readily available in the Main Control Room, manual operation of the required subsystem would be an equivalent alternative to system initiation via manual initiation logic.
>
> Current SR 3.5.1.6 and SR 3.5.2.4 manually operate the ECCS injection/spray pumps to verify each required ECCS injection/spray pump develops the specified flow rate against a system head corresponding to the specified reactor pressure at a frequency specified by the Inservice Testing (IST) Program. The IST Program requires the ECCS injection/spray subsystems motor operated injection valves, minimum flow valves and test flow path valves (with the exception of the CS test flow path valves) be cycled to demonstrate operability and compliance with IST stroke time requirements at a frequency specified by the IST Program. The CS test flow path valves are part of the IST Program but do not have stroke time requirements. The CS valves are cycled for position indication verification only.
>
> The manual operation of the ECCS injection/spray subsystem to demonstrate operability required by the proposed SR 3.5.2.7 is equivalent to the testing that is presently required to be performed on the ECCS injection/spray subsystems.

The NRC staff reviewed the licensee's proposed alternative and determined that although JAFNPP does not have the capability to start an ECCS subsystem with a single push button, the components that provide ECCS injection/spray into the RPV can be started from the MCR, as required, to support Modes 4 and 5 operations. The manipulation of low pressure ECCS subsystem components from the MCR would be verified in accordance with new SR 3.5.2.8. This SR verifies that the required CS or LPCI subsystem (including associated pump switches, and valves) can be manually operated to provide additional RPV water inventory, if needed. Therefore, the NRC staff concludes that Variation 2 is acceptable.

3.5.3 Variation 3, RWCU System Isolation Occurs at Reactor Vessel Water Level – Low Level 3

The licensee stated in the LAR that the JAFNPP design for RWCU isolation is on Reactor Vessel Water Level - Low (Level 3), not Reactor Vessel Water Level – Low, Low (Level 2) as in STS. The licensee states in the LAR:

> The intent of the TSTF is to change the applicability of this function, but does not change the setpoint or allowable value. This variation is technical however is consistent with the intent of TSTF 542.

This variation clarifies the JAFNPP design differences when compared to TSTF-542, Revision 2, concerning the requirements for RWCU isolation. The NRC staff concludes that Variation 3 is acceptable because the JAFNPP function proposed for RWCU system isolation is appropriate to meet the intent of TSTF-542, Revision 2.

3.5.4 Variation 4, CS Time Delay Relay Function Deleted in Modes 4 and 5

The licensee stated in the LAR that the JAFNPP TS for the CS time delay relay function (Function 1.d. of TS Table 3.3.5.1-1) does not appear in the STS table and this function is

proposed to be deleted in Modes 4 and 5 using the same justification provided in the TSTF for deletion of the LPCI time delay relay function (Function 2.f. of TS Table 3.3.5.1-1). The TSTF discussion in part mentions that the time delay relay is part of the automatic initiation system which will not be needed in Modes 4 and 5 because manual manipulation of the necessary components for CS subsystem initiation will be used from the control room to provide make-up water to the RPV in a drain down event.

The NRC staff finds that electrical emergency bus staggering is not necessary for manual operation. This function can be removed from the TS because the required ECCS subsystem is proposed to be started by manual operation. Therefore, NRC staff concludes that Variation 4 is acceptable.

3.5.5 Variation 5, CS Pump Discharge Pressure – High (Bypass) Function

The JAFNPP CS pump discharge pressure high bypass function (Function 1.f. of TS Table 3.3.5.1-1) does not appear in the STS table. The licensee proposed to carry this function into proposed TS Table 3.3.5.2-1 consistent with the justification for CS and LPCI pump discharge flow low bypass functions.

The licensee explains in Section 2.2.7 of the LAR dated October 2, 2017:

> JAFNPP TS Table 3.3.3.5.1-1 contains Function 1.f, "Core Spray Pump Discharge Pressure – High (Bypass)", that does not appear in the STS table. The Function is required to be operable in Modes 1, 2, 3, 4 and 5. The Function is required for protection of the low pressure ECCS pump from overheating when the associated injection valve is not fully open, similar to STS Function 1.d and 2.g, "Core Spray and Low Pressure Coolant Injection Pump Discharge Flow- Low (Bypass)". Modes 4 and 5 of JAFNPP TS Function 1.f are being moved to the new TS 3.3.5.2 as Function 1.c. Justification for this move is consistent with the justification provided in TSTF-542 Section 3.4.2 for STS Functions 1.d and 2.g from TS Table 3.3.5.1-1.

The NRC staff reviewed the proposed change and concludes that the inclusion of Function 1.c. in TS Table 3.3.5.2-1 in addition to Function 1.b. is consistent with the requirements described in TSTF-542 Section 3.3.4.2 regarding ECCS pump minimum flow instrumentation. Therefore, the NRC staff concludes that Variation 5 is acceptable.

3.6 Staff Evaluation of Proposed Deletion of Reference to OPDRVS (incl. Related Requirements

Section 2.2.4 of this SE lists the numerous OPDRVs references located in the JAFNPP TSs where the licensee proposed deletion of phrases used for controls during OPDRVs from the various TS elements.

The proposed changes remove the following from the current JAFNPP TS: the term "operations with a potential for draining the reactor vessel," the acronym "OPDRVs," and related concepts such as "RHR Shutdown Cooling System integrity maintained," and Required Actions to "suspend OPDRVs." The TS OPDRV requirements have existed for many years, but there is no clearly stated description of the event that is being prevented or mitigated. However, from the existing TS requirements, one can infer the postulated event that forms the basis of the existing TS.

The current JAFNPP TSs contain instrumentation requirements related to OPDRVs in four TSs; three of them, which have the OPDRVs phrases described above, and TS 3.3.5.1. The proposed TS 3.3.5.2 consolidates the instrumentation requirements into a single location to simplify the presentation and provide requirements consistent with TS 3.5.2. The remaining TSs with OPDRVs requirements are for containment, containment isolation valves, SGT system, control room habitability, temperature control, and electrical sources. Each of these systems' 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 has 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 RPV water level is maintained above the JAFNPP TS Safety Limit 2.1.1.3.

3.7 Staff Evaluation of TS 3.10, Special Operations and TSTF 484, "Use of TS 3.10.1 for Scram Time Testing activities"

The current JAFNPP TS LCO 3.10.1, "Inservice Leak and Hydrostatic Testing Operation," allows performance of an inservice leak or hydrostatic test with the average reactor coolant temperature greater than 212 °F, while considering operational conditions to still be in Mode 4, provided certain secondary containment and SGT system LCOs were met.

The licensee's adoption of TSTF-484 (Reference 9) revised this LCO to expand its scope to include operations where RCS temperature exceeds 212 °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.

When the NRC approved LCO 3.10.1 and TSTF-484 for JAFNPP, the staff stated, in part, that "two low-pressure emergency core cooling systems (ECCS) injection/spray [i.e., CS or LPCI] subsystems are required to be operable in Mode 4 by TS 3.5.2, ECCS-Shutdown"; however, per the new LCO 3.5.2 adopted as part of TSTF-542, Revision 2, only one low pressure ECCS injection/spray subsystem would be required to be operable in Mode 4.

The NRC staff determined that changing from two ECCS injection/spray subsystems to one ECCS injection/spray subsystem is acceptable because 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 that present during most of an outage. Small leaks from the RCS would be detected by inspections before a significant loss of inventory occurred. In the event of a large RCS leak, the RPV would rapidly depressurize and allow operation of the low pressure ECCS. At low decay heat values, and near Mode 4 conditions, the stored energy in the reactor core will be very low. Therefore, the reasoning that operators would have time to respond with manual actions to start any ECCS pumps and properly align valves for injection from the control room remains valid.

As previously stated in Section 3.3 of this SE, with one ECCS injection/spray subsystem and non-safety 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 levelwould be lowered to the TAF.

After considering the reasoning presented elsewhere in this SE for TSTF-542, Revision 2, and after additional review of the SE for JAFNPP TS 3.10.1 and TSTF-484, the NRC staff determined that LCOs 3.3.5.2 and 3.5.2 adopted as part of TSTF-542, Revision 2, are satisfactory and will therefore be acceptable even during application of LCO 3.10.1.

Proposed Changes to the TS Table of Contents

In the LAR, the licensee proposed administrative changes to the table of contents (TOC) to reflect the above TS changes. These changes are administrative and do not affect the applicability of TSTF 542, Revision 2, to the JAFNPP TSs. In addition, the proposed changes do not change any requirements in the JAFNPP TS. Therefore, the NRC staff concludes that these changes are acceptable.

3.8 Technical Conclusion

The JAFNPP TS Safety Limit 2.1.1.3 requires that the RPV water level shall be greater than the TAF. Maintaining RPV water level above the TAF ensures that the fuel cladding fission product barrier is protected during shutdown conditions. The proposed changes to the TS establish new LCO requirements that address the preventive and mitigative equipment and associated instrumentation that provide an alternative means to support the JAFNPP TS Safety Limit 2.1.1.3 during Mode 4 and 5 operations.

During operation in Modes 4 and 5, the reactor coolant system is at a low operating temperature (≤ 212 °F) and is depressurized. An event involving a loss of inventory while in the shutdown condition does not exceed the capacity of one ECCS subsystem. The accident that is postulated to occur during shutdown conditions, the fuel handling accident, does not involve a loss of inventory. Therefore, the equipment and instrumentation associated with the reactor vessel water inventory control TS do not provide detection or mitigation related to this design basis accident.

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

Additionally, the proposed 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, meeting the requirements of 10 CFR 50.36(c)(2)(i). The NRC staff has determined that the remedial actions 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 OPDRVs references from JAFNPP TS elements. The NRC staff reviewed the proposed changes and determined that the deletion of OPDRVs references, along with the corresponding editorial changes, are appropriate because the proposed TSs governing RPV WIC and the associated instrumentation, TSs 3.5.2 and 3.3.5.2, respectively, are a clarified and simplified alternative set of controls for ensuring that RPV water level is maintained above the JAFNPP TS Safety Limit 2.1.1.3.

The NRC staff reviewed the SRs associated with the new LCOs 3.5.2 and 3.3.5.2. The NRC staff has determined that the proposed TS 3.5.2 SRs are acceptable since they support DRAIN TIME requirements, assure that water inventory is available for ECCS injection/spray subsystem RPV injection and pump performance, ECCS injection/spray subsystem are adequately filled, 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. The NRC staff finds that the two SRs proposed for TS 3.3.5.2 are sufficient and adequate, because they are essential to ensure that the functions are capable of performing their specified safety functions in support of TS 3.5.2, DRAIN TIME, and the protection from a potential drain down of the RPV in Modes 4 and 5. Therefore, the NRC staff concludes that the proposed SRs satisfy 10 CFR 50.36(c)(3).

The NRC staff evaluated the proposed changes against JAFNPP's applicable design requirements listed in Section 2.3.3 of this SE. The NRC staff finds that the proposed changes for Mode 4 and 5 operations related to the new DRAIN TIME definition and the removal of OPDRVs references are consistent with the GDCs in that the JAFNPP design requirements are maintained for instrumentation, reactor coolant leakage detection, the reactor coolant pressure boundary, and reactor coolant makeup.

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 Attachment 3 of the LAR dated October 2, 2017. The NRC staff concluded that the TS Bases changes provided describe the basis for the affected TS and follow the Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors (58 FR 39132; July 22, 1993).

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

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the appropriate official for the State of New York was notified of the NRC's proposed issuance of the amendment on August 10, 2018. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes requirements with respect to the installation or use of facility components located within the restricted area as defined in 10 CFR Part 20 and changes SRs. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration (82 FR 55406; November 21, 2017), and there has been no public comment on such finding. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

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

7.0 REFERENCES

1. Barstow, James, Exelon Generation Company, LLC, letter to U.S. Nuclear Regulatory Commission, "Application to Revise Technical Specifications to Adopt [Technical Specifications Task Force] TSTF-542, 'Reactor Pressure Vessel Water Inventory Control,' Revision 2," dated October 2, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17275A520).

2. Gudger, David T., Exelon Generation Company, LLC, letter to U.S. Nuclear Regulatory Commission, "Supplemental Response Concerning License Amendment Request to Revise Technical Specifications to Adopt TSTF-542, 'Reactor Pressure Vessel Water Inventory Control,' Revision 2," dated January 22, 2018 (ADAMS Accession No. ML18022A829).

3. Gudger, David T., Exelon Generation Company, LLC, letter to U.S. Nuclear Regulatory Commission, "Response to Request for Additional Information Application to Revise Technical Specifications to Adopt TSTF-542, 'Reactor Pressure Vessel Water Inventory Control,' Revision 2," dated April 19, 2018 (ADAMS Accession No. ML18109A371).

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

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

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

7. Haskell II, Russell, U.S. Nuclear Regulatory Commission, electronic mail to Christian Williams, Exelon Generation Company, LLC, "James A. FitzPatrick Nuclear Power Plant, Unit 1 - Request for Information to Adopt Traveler TSTF-542, 'Reactor Pressure Vessel Water Inventory Control' (EPID: L-2017-LLA-0311)," dated March 26, 2018 (ADAMS Accession No. ML18085A692).

8. U.S. Nuclear Regulatory Commission, NUREG-1433, Revision 4.0, "Standard Technical Specifications, General Electric BWR/4," April 2012 (ADAMS Accession No. ML12104A192).

9. Boska, John P., U.S. Nuclear Regulatory Commission, letter to Michael Kansler, Entergy Nuclear Operations, Inc., "James A. FitzPatrick Nuclear Power Plant - Issuance of Amendment Re: Technical Specification 3.10.1, Inservice Leak and Hydrostatic Testing Operation, Consistent with Technical Specifications Task Force Traveler-484," dated June 21, 2007 (ADAMS Accession No. ML071550079).

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SUBJECT: JAMES A. FITZPATRICK NUCLEAR POWER PLANT - ISSUANCE OF AMENDMENT NO. 321 RE: REVISION TO TECHNICAL SPECIFICATIONS TO ADOPT TECHNICAL SPECIFICATIONS TASK FORCE (TSTF) TRAVELER TSTF-542, REVISION 2, "REACTOR PRESSURE VESSEL WATER INVENTORY CONTROL" (EPID L-2017-LLA-0311) DATED AUGUST 24, 2018

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