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

January 8, 2018

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

SUBJECT: DRESDEN NUCLEAR POWER STATION, UNIT NOS. 2 AND 3 - ISSUANCE OF AMENDMENTS TO RENEWED FACILITY OPERATING LICENSE NOS. DPR-19 AND DPR-25 TO REVISE TECHNICAL SPECIFICATIONS TO ADOPT TECHNICAL SPECIFICATION TRAVELER FORCE 542, REVISION 2, "REACTOR PRESSURE VESSEL WATER INVENTORY CONTROL" (CAC NOS. MF9295 AND MF9296; EPID L-2017-LLA-0176)

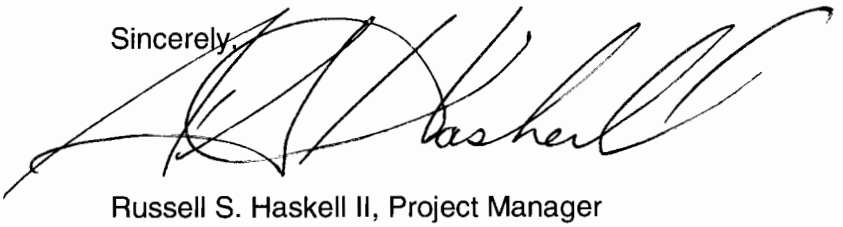
Dear Mr. Hanson:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 256 to Renewed Facility Operating License No. DPR-19 and Amendment No. 249 to Renewed Facility Operating License No. DPR-25 for Dresden Nuclear Power Station (DNPS), Unit Nos. 2 and 3, respectively. The amendments are in response to your application dated February 10, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17045A006), as supplemented by letters dated July 13, 2017, December 20, 2017, and December 21, 2017 (ADAMS Accession Nos. ML17194B069, ML17354B196, and ML17356A134, respectively).

The amendments revise existing DNPS 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 Safety Limit 2.1.1.3 which requires reactor vessel water level to be greater than the top of active irradiated fuel.

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

Sincerely,



Russell S. Haskell II, Project Manager
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-237 and 50-249

Enclosures:
1. Amendment No. 256 to DPR-19
2. Amendment No. 249 to DPR-25
3. Safety Evaluation

cc: Listserv

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

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-237

DRESDEN NUCLEAR POWER STATION, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 256
Renewed License No. DPR-19

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

   A. The application for amendment by the Exelon Generation Company, LLC (the licensee) dated February 10, 2017, as supplemented by letters dated July 13, December 20, and December 21, 2017, 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-19 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 256, are hereby incorporated into this renewed operating license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented prior to the beginning of refueling outage D3R25 currently planned for October 2018.

FOR THE NUCLEAR REGULATORY COMMISSION

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

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

Date of Issuance: January 8, 2018

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

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-249

DRESDEN NUCLEAR POWER STATION, UNIT 3

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 249
Renewed License No. DPR-25

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

   A. The application for amendment by the Exelon Generation Company, LLC (the licensee) dated February 10, 2017, as supplemented by letters dated July 13, December 20, and December 21, 2017, 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 3.B. of Renewed Facility Operating License No. DPR-25 is hereby amended to read as follows:

   B. Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 249, are hereby incorporated into this renewed operating license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented prior to the beginning of refueling outage D3R25 currently planned for October 2018.

FOR THE NUCLEAR REGULATORY COMMISSION

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

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

Date of Issuance: January 8, 2018

ATTACHMENT TO LICENSE AMENDMENT NOS. 256 AND 249

DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3

RENEWED FACILITY OPERATING LICENSE NOS. DPR-19 AND DPR-25

DOCKET NOS. 50-237 AND 50-249

Replace the following pages of the Renewed Facility Operating License with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove	Insert
Page 3 (DPR-19)	Page 3 (DPR-19)
Page 4 (DPR-25)	Page 4 (DPR-25)

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

Remove	Insert	Remove	Insert	Remove	Insert
i	i	3.3.5.2-1	3.3.5.2-1	3.6.4.2-1	3.6.4.2-1
ii	ii	3.3.5.2-2	3.3.5.2-2	3.6.4.2-3	3.6.4.2-3
1.1-2	1.1-2	---	3.3.5.2-3	3.6.4.3-1	3.6.4.3-1
1.1-3	1.1-3	---	3.3.5.3-1	3.6.4.3-2	3.6.4.3-2
1.1-4	1.1-4	---	3.3.5.3-2	3.7.4-1	3.7.4-1
1.1-5	1.1-5	3.3.6.1-8	3.3.6.1-8	3.7.4-2	3.7.4-2
1.1-6	1.1-6	3.3.6.2-5	3.3.6.2-5	3.7.5-1	3.7.5-1
---	1.1-7	3.3.7.1-1	3.3.7.1-1	3.8.2-2	3.8.2-2
3.3.5.1-2	3.3.5.1-2	3.5.1-1	3.5.1-1	3.8.2-3	3.8.2-3
3.3.5.1-3	3.3.5.1-3	3.5.2-1	3.5.2-1	3.8.2-4	---
3.3.5.1-4	3.3.5.1-4	3.5.2-2	3.5.2-2	3.8.2-5	---
3.3.5.1-5	3.3.5.1-5	3.5.2-3	3.5.2-3	3.8.5-1	3.8.5-1
3.3.5.1-6	3.3.5.1-6	3.5.2-4	3.5.2-4	3.8.5-2	3.8.5-2
3.3.5.1-7	3.3.5.1-7	---	3.5.2-5	3.8.8-2	3.8.8-2
3.3.5.1-8	3.3.5.1-8	3.5.3-1	3.5.3-1		
3.3.5.1-9	3.3.5.1-9	3.6.1.3-5	3.6.1.3-5		
3.3.5.1-10	3.3.5.1-10	3.6.1.3-6	3.6.1.3-6		
3.3.5.1-11	3.3.5.1-11	3.6.1.3-7	3.6.1.3-7		
3.3.5.1-12	3.3.5.1-12	3.6.1.3-8	3.6.1.3-8		
3.3.5.1-13	---	3.6.1.3-9	---		
3.3.5.1-14	---	3.6.4.1-1	3.6.4.1-1		

(2) Exelon Generation Company, LLC, pursuant to the Act and 10 CFR Part 70, to receive, possess and use at any time special nuclear materials as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the Updated Final Safety Analysis Report, as supplemented and amended;

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

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

(5) Exelon Generation Company, LLC, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct 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 Commission's regulations set forth in 10 CFR Chapter I; 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

The licensee is authorized to operate the facility at steady state reactor core power levels not in excess of 2957 megawatts thermal (100 percent rated power) in accordance with the conditions specified herein.

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 256, are hereby incorporated into this renewed operating license. The licensee shall operate the facility in accordance with the Technical Specifications.

(3) Operation in the coastdown mode is permitted to 40% power.

f. Surveillance Requirement 4.9.A.10 - Diesel Storage Tank Cleaning (Unit 3 and Unit 2/3 only)

Each of the above Surveillance Requirements shall be successfully demonstrated prior to entering into MODE 2 on the first plant startup following the fourteenth refueling outage (D3R14).

3. This renewed operating license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations: 10 CFR Part 20, Section 30.34 of 10 CFR Part 30, Section 40.41 of 10 CFR Part 40, Sections 50.54 and 50.59 of 10 CFR Part 50, and Section 70.32 of 10 CFR Part 70; 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:

A. Maximum Power Level

The licensee is authorized to operate the facility at steady state power levels not in excess of 2957 megawatts (thermal), except that the licensee shall not operate the facility at power levels in excess of five (5) megawatts (thermal), until satisfactory completion of modifications and final testing of the station output transformer, the auto-depressurization interlock, and the feedwater system, as described in the licensee's telegrams; dated February 26, 1971, have been verified in writing by the Commission.

B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 249, are hereby incorporated into this renewed operating license. The licensee shall operate the facility in accordance with the Technical Specifications.

C. Reports

The licensee shall make certain reports in accordance with the requirements of the Technical Specifications.

D. Records

The licensee shall keep facility operating records in accordance with the requirements of the Technical Specifications.

E. Restrictions

Operation in the coastdown mode is permitted to 40% power.

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1.1 Definitions (continued)

CHANNEL FUNCTIONAL TEST	A CHANNEL FUNCTIONAL TEST shall be 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. The CHANNEL FUNCTIONAL TEST may be performed by means of any series of sequential, overlapping, or total channel steps.
CORE ALTERATION	CORE ALTERATION shall be the movement of any fuel, sources, or reactivity control components, within the reactor vessel with the vessel head removed and fuel in the vessel. The following exceptions are not considered to be CORE ALTERATIONS: a. Movement of source range monitors, local power range monitors, intermediate range monitors, traversing incore probes, or special movable detectors (including undervessel replacement); and b. Control rod movement, provided there are no fuel assemblies in the associated core cell. Suspension of CORE ALTERATIONS shall not preclude completion of movement of a component to a safe position.
CORE OPERATING LIMITS REPORT (COLR)	The COLR is the unit specific document that provides cycle specific parameter limits for the current reload cycle. These cycle specific limits shall be determined for each reload cycle in accordance with Specification 5.6.5. Plant operation within these limits is addressed in individual Specifications.
DOSE EQUIVALENT I-131	DOSE EQUIVALENT I-131 shall be that concentration of I-131 (microcuries/gram) that alone would produce the same dose as the quantity and isotopic mixture of I-131, I-132, I-133, I-134, and I-135 actually present. The dose conversion factors used for this calculation shall be the inhalation committed dose conversion factors in Federal Guidance Report 11, "Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion," 1989.

(continued)

1.1 Definitions (continued)

DRAIN TIME

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

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

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

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

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

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

(continued)

1.1 Definitions

DRAIN TIME (continued)	c. The penetration flow paths required to be evaluated per paragraph b) are assumed to open instantaneously and are not subsequently isolated, and no water is assumed to be subsequently added to the RPV water inventory; d. No additional draining events occur; and e. Realistic cross-sectional areas and drain rates are used. A bounding DRAIN TIME may be used in lieu of a calculated value.
INSERVICE TESTING PROGRAM	The INSERVICE TESTING PROGRAM is the licensee program that fulfills the requirements of 10 CFR 50.55a(f).
LEAKAGE	LEAKAGE shall be: a. Identified LEAKAGE 1. LEAKAGE into the drywell, such as that from pump seals or valve packing, that is captured and conducted to a sump or collecting tank; or 2. LEAKAGE into the drywell atmosphere from sources that are both specifically located and known either not to interfere with the operation of leakage detection systems or not to be pressure boundary LEAKAGE; b. Unidentified LEAKAGE All LEAKAGE into the drywell that is not identified LEAKAGE;

(continued)

1.1 Definitions

LEAKAGE (continued)	c. Total LEAKAGE Sum of the identified and unidentified LEAKAGE; and d. Pressure Boundary LEAKAGE LEAKAGE through a nonisolable fault in a Reactor Coolant System (RCS) component body, pipe wall, or vessel wall.
LINEAR HEAT GENERATION RATE (LHGR)	The LHGR shall be the heat generation rate per unit length of fuel rod. It is the integral of the heat flux over the heat transfer area associated with the unit length.
LOGIC SYSTEM FUNCTIONAL TEST	A LOGIC SYSTEM FUNCTIONAL TEST shall be a test of all logic components required for OPERABILITY of a logic circuit, from as close to the sensor as practicable up to, but not including, the actuated device, to verify OPERABILITY. The LOGIC SYSTEM FUNCTIONAL TEST may be performed by means of any series of sequential, overlapping, or total system steps so that the entire logic system is tested.
MINIMUM CRITICAL POWER RATIO (MCPR)	The MCPR shall be the smallest critical power ratio (CPR) that exists in the core for each class of fuel. The CPR is that power in the assembly that is calculated by application of the appropriate correlation(s) to cause some point in the assembly to experience boiling transition, divided by the actual assembly operating power.
MODE	A MODE shall correspond to any one inclusive combination of mode switch position, average reactor coolant temperature, and reactor vessel head closure bolt tensioning specified in Table 1.1-1 with fuel in the reactor vessel.
OPERABLE—OPERABILITY	A system, subsystem, division, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water,

(continued)

1.1 Definitions

OPERABLE—OPERABILITY (continued)	lubrication, and other auxiliary equipment that are required for the system, subsystem, division, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).
RATED THERMAL POWER (RTP)	RTP shall be a total reactor core heat transfer rate to the reactor coolant of 2957 MWt.
REACTOR PROTECTION SYSTEM (RPS) RESPONSE TIME	The RPS RESPONSE TIME shall be that time interval from the opening of the sensor contact until the opening of the trip actuator. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured.
SHUTDOWN MARGIN (SDM)	SDM shall be the amount of reactivity by which the reactor is subcritical or would be subcritical throughout the operating cycle assuming that: a. The reactor is xenon free; b. The moderator temperature is $\geq$ 68°F, corresponding to the most reactive state; and c. All control rods are fully inserted except for the single control rod of highest reactivity worth, which is assumed to be fully withdrawn. With control rods not capable of being fully inserted, the reactivity worth of these control rods must be accounted for in the determination of SDM.
THERMAL POWER	THERMAL POWER shall be the total reactor core heat transfer rate to the reactor coolant.
TURBINE BYPASS SYSTEM RESPONSE TIME	The TURBINE BYPASS SYSTEM RESPONSE TIME shall be that time interval from when the turbine bypass control unit generates a turbine bypass valve flow signal until the turbine bypass valves travel to their required positions. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured.

Table 1.1-1 (page 1 of 1)
MODES

MODE	TITLE	REACTOR MODE SWITCH POSITION	AVERAGE REACTOR COOLANT TEMPERATURE (°F)
1	Power Operation	Run	NA
2	Startup	Refuel[a] or Startup/Hot Standby	NA
3	Hot Shutdown[a]	Shutdown	> 212
4	Cold Shutdown[a]	Shutdown	≤ 212
5	Refueling[b]	Shutdown or Refuel	NA

(a) All reactor vessel head closure bolts fully tensioned.

(b) One or more reactor vessel head closure bolts less than fully tensioned.

ACTIONS

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

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	C.1	--------NOTE-------- Only applicable for Functions 1.c, 1.e, 2.c, 2.e, 2.g, 2.h, 2.i, and 2.k. ----------	
		Declare supported feature(s) inoperable when its redundant feature ECCS initiation capability is inoperable.	1 hour from discovery of loss of initiation capability for feature(s) in both divisions
	AND		
	C.2	Restore channel to OPERABLE status.	24 hours
D. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	D.1	--------NOTE--------- Only applicable if HPCI pump suction is not aligned to the suppression pool. ----------	
		Declare HPCI System inoperable.	1 hour from discovery of loss of HPCI initiation capability
	AND		
	D.2.1	Place channel in trip.	24 hours
	OR		
	D.2.2	Align the HPCI pump suction to the suppression pool.	24 hours

(continued)

ACTIONS

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.d and 2.f. ----------	
		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
F. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	F.1	Declare Automatic Depressurization System (ADS) valves inoperable.	1 hour from discovery of loss of ADS initiation capability in both trip systems
	AND		
	F.2	Place channel in trip.	96 hours from discovery of inoperable channel concurrent with HPCI or isolation condenser (IC) inoperable AND 8 days

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	G.1 Declare ADS valves inoperable. AND G.2 Restore channel to OPERABLE status.	1 hour from discovery of loss of ADS initiation capability in both trip systems 96 hours from discovery of inoperable channel concurrent with HPCI or IC inoperable AND 8 days
H. Required Action and associated Completion Time of Condition B, C, D, E, F, or G not met.	H.1 Declare associated supported feature(s) inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

---------- NOTES----------
1. Refer to Table 3.3.5.1-1 to determine which SRs apply for each ECCS 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 3.c, 3.f, and 3.g; and (b) for up to 6 hours for Functions other than 3.c, 3.f, and 3.g provided the associated Function or the redundant Function maintains ECCS initiation capability.

SURVEILLANCE		FREQUENCY
SR 3.3.5.1.1	Perform CHANNEL CHECK.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.1.2	Perform CHANNEL FUNCTIONAL TEST.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.1.3	Calibrate the trip unit.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.1.4	Perform CHANNEL CALIBRATION.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.5.1.5	Perform CHANNEL CALIBRATION.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.1.6	Perform LOGIC SYSTEM FUNCTIONAL TEST.	In accordance with the Surveillance Frequency Control Program

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	1,2,3	4[a]	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ -54.15 inches
b. Drywell Pressure–High	1,2,3	4[a]	B	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≤ 1.81 psig
c. Reactor Steam Dome Pressure–Low (Permissive)	1,2,3	2	C	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≥ 308.5 psig and ≤ 341.7 psig
d. Core Spray Pump Discharge Flow–Low (Bypass)	1,2,3	1 per pump	E	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 802 gpm and ≤ 992 gpm
e. 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	≤ 11.0 seconds
2. Low Pressure Coolant Injection (LPCI) System					
a. Reactor Vessel Water Level–Low Low	1,2,3	4	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ -54.15 Inches
b. Drywell Pressure–High	1,2,3	4	B	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≤ 1.81 psig
c. Reactor Steam Dome Pressure–Low (Permissive)	1,2,3	2	C	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≥ 308.5 psig and ≤ 341.7 psig

(continued)

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

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)					
d. Reactor Steam Dome Pressure–Low (Break Detection)	1,2,3	4	B	SR 3.3.5.1.2 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 802 psig and ≤ 898 psig
e. Low Pressure Coolant Injection Pump Start–Time Delay Relay Pumps B and D	1,2,3	1 per pump	C	SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 5.5 seconds
f. Low Pressure Coolant Injection Pump Discharge Flow–Low (Bypass)	1,2,3	1 per loop	E	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 1107 gpm
g. Recirculation Pump Differential Pressure–High (Break Detection)	1,2,3	4 per pump	C	SR 3.3.5.1.2 SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 5.9 psid
h. Recirculation Riser Differential Pressure–High (Break Detection)	1,2,3	4	C	SR 3.3.5.1.2 SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 2.0 psid
i. Recirculation Pump Differential Pressure Time Delay–Relay (Break Detection)	1,2,3	2	C	SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 0.53 seconds
j. Reactor Steam Dome Pressure Time Delay–Relay (Break Detection)	1,2,3	2	B	SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 2.12 seconds
k. Recirculation Riser Differential Pressure Time Delay–Relay (Break Detection)	1,2,3	2	C	SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 0.53 seconds

(continued)

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

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
3. High Pressure Coolant Injection (HPCI) System					
a. Reactor Vessel Water Level—Low Low	1, 2(b), 3(b)	4	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ -54.15 Inches
b. Drywell Pressure—High	1, 2(b), 3(b)	4	B	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≤ 1.81 psig
c. Reactor Vessel Water Level—High	1, 2(b), 3(b)	2	C	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 46.2 inches
d. Contaminated Condensate Storage Tank (CCST) Level—Low	1, 2(b), 3(b)	2 per CCST	D	SR 3.3.5.1.2 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ 11.1158 ft for CCST 2/3 A and ≥ 7.5637 ft for CCST 2/3 B
e. Suppression Pool Water Level—High	1, 2(b), 3(b)	2	D	SR 3.3.5.1.2 SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 15 ft 5.625 inches
f. High Pressure Coolant Injection Pump Discharge Flow—Low (Bypass)	1, 2(b), 3(b)	1	E	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≥ 616 gpm
g. Manual Initiation	1, 2(b), 3(b)	1	C	SR 3.3.5.1.6	NA

(continued)

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

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

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
4. Automatic Depressurization System (ADS) Trip System A					
a. Reactor Vessel Water Level–Low Low	1, 2[b], 3[b]	2	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ -54.15 Inches
b. Drywell Pressure–High	1, 2[b], 3[b]	2	F	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≤ 1.81 psig
c. Automatic Depressurization System Initiation Timer	1, 2[b], 3[b]	1	G	SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 113 seconds
d. Core Spray Pump Discharge Pressure-High	1, 2[b], 3[b]	2	G	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≥ 101.5 psig and ≤ 148.5 psig
e. Low Pressure Coolant Injection Pump Discharge Pressure-High	1, 2[b], 3[b]	4	G	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≥ 101.5 psig and ≤ 148.5 psig
f. Automatic Depressurization System Low Low Water Level Actuation Timer	1, 2[b], 3[b]	1	G	SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 580 seconds

(continued)

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

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

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
5. ADS Trip System B					
a. Reactor Vessel Water Level—Low Low	1, 2(b), 3(b)	2	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6	≥ -54.15 inches
b. Drywell Pressure—High	1, 2(b), 3(b)	2	F	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≤ 1.81 psig
c. Automatic Depressurization System Initiation Timer	1, 2(b), 3(b)	1	G	SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 113 seconds
d. Core Spray Pump Discharge Pressure—High	1, 2(b), 3(b)	2	G	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≥ 101.5 psig and ≤ 148.5 psig
e. Low Pressure Coolant Injection Pump Discharge Pressure—High	1, 2(b), 3(b)	4	G	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.6	≥ 101.5 psig and ≤ 148.5 psig
f. Automatic Depressurization System Low Low Water Level Actuation Timer	1, 2(b), 3(b)	1	G	SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 580 seconds

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

3.3 INSTRUMENTATION

3.3.5.2 Reactor Pressure Vessel (RPV) Water Inventory Control Instrumentation

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

APPLICABILITY: According to Table 3.3.5.2-1.

ACTIONS

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

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

(continued)

ACTIONS

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)
RPV Water Inventory Control Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Core Spray System					
a. Reactor Steam Dome Pressure–Low (Permissive)	4, 5	2 (a)	C	SR 3.3.5.2.2	≤ 341.7 psig
b. Core Spray Pump Discharge Flow–Low (Bypass)	4, 5	1 per pump (a)	D	SR 3.3.5.2.2	≥ 802 gpm and ≤ 992 gpm
2. Low Pressure Coolant Injection (LPCI) System					
a. Reactor Steam Dome Pressure–Low (Permissive)	4, 5	2 (a)	C	SR 3.3.5.2.2	≤ 341.7 psig
b. Low Pressure Coolant Injection Pump Discharge Flow–Low (Bypass)	4, 5	1 per loop (a)	D	SR 3.3.5.2.2	≥ 1107 gpm
3. Shutdown Cooling System (SDC) Isolation					
a. Reactor Vessel Water Level–Low	(b)	1 per trip system	B	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 2.65 inches
4. Reactor Water Cleanup System Isolation					
a. Reactor Vessel Water Level–Low	(b)	1 per trip system	B	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 2.65 inches

(a) Associated with an ECCS subsystem required to be OPERABLE by LCO 3.5.2, "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 Isolation Condenser (IC) System Instrumentation

LCO 3.3.5.3 Four channels of Reactor Vessel Pressure–High instrumentation 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 Reactor Vessel Pressure–High channels inoperable.	A.1 Declare IC System inoperable.	1 hour from discovery of loss of IC initiation capability
	AND	
	A.2 Place channel(s) in trip.	24 hours
B. Required Action and associated Completion Time not met.	B.1 Declare IC System inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

----------NOTE----------
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 for up to 6 hours provided the Reactor Vessel Pressure–High Function maintains IC initiation capability.

SURVEILLANCE		FREQUENCY
SR 3.3.5.3.1	Perform CHANNEL FUNCTIONAL TEST.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.3.2	----------NOTE---------- Not required for the time delay portion of the channel. ---------- Perform CHANNEL CALIBRATION. The Allowable Value shall be ≤ 1068 psig.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.3.3	Perform CHANNEL CALIBRATION for the time delay portion of the channel. The Allowable Value shall be ≤ 15 seconds.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.3.4	Perform LOGIC SYSTEM FUNCTIONAL TEST.	In accordance with the Surveillance Frequency Control Program

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

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
5. Reactor Water Cleanup System Isolation					
a. SLC System Initiation	1,2,3	1	H	SR 3.3.6.1.7	NA
b. Reactor Vessel Water Level–Low	1,2,3	2	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.6 SR 3.3.6.1.7	≥ 2.65 inches
6. Shutdown Cooling System Isolation					
a. Reactor Vessel Pressure - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.6 SR 3.3.6.1.7	≤ 114.1 psig (Loop 1, Reactor Wide Range Pressure) ≤ 110.4 psig (Loop 2, Reactor Pressure Feedwater Control)
b. Reactor Vessel Water Level–Low	3	2	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.6 SR 3.3.6.1.7	≥ 2.65 inches

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	1,2,3	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.3 SR 3.3.6.2.5 SR 3.3.6.2.6	≥ 2.65 inches
2. Drywell–Pressure–High	1,2,3	2	SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.6	≤ 1.94 psig
3. Reactor Building Exhaust Radiation–High	1,2,3, (a)	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.6	≤ 14.9 mR/hr
4. Refueling Floor Radiation–High	1,2,3, (a)	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.6	≤ 100 mR/hr

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

3.3 INSTRUMENTATION

3.3.7.1 Control Room Emergency Ventilation (CREV) System Instrumentation

LCO 3.3.7.1 Two channels of the Reactor Building Ventilation System—High High Radiation Alarm Function shall be OPERABLE.

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

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more channels inoperable.	A.1 Declare CREV System inoperable.	1 hour from discovery of loss of CREV System Instrumentation alarm capability in both trip systems
	AND	
	A.2 Restore channel to OPERABLE status.	6 hours

(continued)

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS), REACTOR PRESSURE VESSEL (RPV) WATER INVENTORY CONTROL, AND ISOLATION CONDENSER (IC) SYSTEM

3.5.1 ECCS–Operating

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

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

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One Low Pressure Coolant Injection (LPCI) pump inoperable.	A.1 Restore LPCI pump to OPERABLE status.	30 days
B. One LPCI subsystem inoperable for reasons other than Condition A. OR One Core Spray subsystem inoperable.	B.1 Restore low pressure ECCS injection/spray subsystem to OPERABLE status.	7 days
C. One LPCI pump in each subsystem inoperable.	C.1 Restore one LPCI pump to OPERABLE status.	7 days

(continued)

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS), REACTOR PRESSURE VESSEL (RPV) WATER INVENTORY CONTROL, AND ISOLATION CONDENSER (IC) SYSTEM

3.5.2 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.

APPLICABILITY: MODES 4 and 5.

ACTIONS

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

(continued)

ACTIONS

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

(continued)

ACTIONS

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

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Required Action and associated Completion Time of Condition C or D not met. OR DRAIN TIME < 1 hour.	E.1 Initiate action to restore DRAIN TIME to ≥ 36 hours.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.2.1	Verify DRAIN TIME ≥ 36 hours.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.2	Verify, for the required ECCS injection/spray subsystem, the: a. Suppression pool water level is ≥ 10 ft 4 inches; or b. Contaminated condensate storage tanks water volume is ≥ 140,000 available gallons.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.3	Verify, for the required ECCS injection/spray subsystem, locations susceptible to gas accumulation are sufficiently filled with water.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.5.2.4	----------NOTE---------- Not required to be met for system vent flow paths opened under administrative control. ---------- Verify for the required ECCS injection/spray subsystem each manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.5	Operate the required ECCS injection/spray subsystem through the recirculation line for ≥ 10 minutes.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.6	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 3.5.2.7	----------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 ISOLATION CONDENSER (IC) SYSTEM

3.5.3 IC System

LCO 3.5.3 The IC 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 IC.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. IC System inoperable.	A.1 Verify by administrative means High Pressure Coolant Injection System is OPERABLE. AND A.2 Restore IC System to OPERABLE status.	Immediately 14 days
B. Required Action and associated Completion Time not met.	----------NOTE---------- LCO 3.0.4.a is not applicable when entering MODE 3. ---------- B.1 Be in MODE 3.	 12 hours

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. (continued)	C.2	--------NOTES-------- 1. Isolation devices in high radiation areas may be verified by use of administrative means. 2. Isolation devices that are a locked, sealed, or otherwise secured may be verified by use of administrative means. ---------- Verify the affected penetration flow path is isolated.	Once per 31 days
D. MSIV leakage rate not within limit.	D.1	Restore leakage rate to within limit.	8 hours
E. Required Action and associated Completion Time of Condition A, B, C, or D not met in MODE 1, 2, or 3.	E.1 AND E.2	Be in MODE 3. Be in MODE 4.	12 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.1.3.1	----------NOTE---------- Not required to be met when the 18 inch primary containment vent and purge valves are open for inerting, de-inerting, pressure control, ALARA or air quality considerations for personnel entry, or Surveillances that require the valves to be open, provided the drywell vent and purge valves and their associated suppression chamber vent and purge valves are not open simultaneously. ---------- Verify each 18 inch primary containment vent and purge valve, except the torus purge valve, is closed.	In accordance with the Surveillance Frequency Control Program
SR 3.6.1.3.2	----------NOTES---------- 1. Valves and blind flanges in high radiation areas may be verified by use of administrative means. 2. Not required to be met for PCIVs that are open under administrative controls. ---------- Verify each primary containment isolation manual valve and blind flange that is located outside primary containment and not locked, sealed, or otherwise secured and is required to be closed during accident conditions is closed.	In accordance with the Surveillance Frequency Control Program

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.1.3.3	----------NOTES---------- 1. Valves and blind flanges in high radiation areas may be verified by use of administrative means. 2. Not required to be met for PCIVs that are open under administrative controls. ---------- Verify each primary containment manual isolation valve and blind flange that is located inside primary containment and not locked sealed, or otherwise secured and is required to be closed during accident conditions is closed.	Prior to entering MODE 2 or 3 from MODE 4 if primary containment was de-inerted while in MODE 4, if not performed within the previous 92 days
SR 3.6.1.3.4	Verify continuity of the traversing incore probe (TIP) shear isolation valve explosive charge.	In accordance with the Surveillance Frequency Control Program
SR 3.6.1.3.5	Verify the isolation time of each power operated, automatic PCIV, except for MSIVs, is within limits.	In accordance with the INSERVICE TESTING PROGRAM
SR 3.6.1.3.6	Verify the isolation time of each MSIV is $\geq$ 3 seconds and $\leq$ 5 seconds.	In accordance with the INSERVICE TESTING PROGRAM

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.1.3.7	Verify each automatic PCIV actuates to the isolation position on an actual or simulated isolation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.6.1.3.8	Verify a representative sample of reactor instrumentation line EFCVs actuate to the isolation position on an actual or simulated instrument line break signal.	In accordance with the Surveillance Frequency Control Program
SR 3.6.1.3.9	Remove and test the explosive squib from each shear isolation valve of the TIP System.	In accordance with the Surveillance Frequency Control Program
SR 3.6.1.3.10	Verify the leakage rate through each MSIV leakage path is ≤ 34 scfh when tested at ≥ 25 psig, and the combined leakage rate for all MSIV leakage paths is ≤ 86 scfh when tested at ≥ 25 psig.	In accordance with the Primary Containment Leakage Rate Testing Program

3.6 CONTAINMENT SYSTEMS

3.6.4.1 Secondary Containment

LCO 3.6.4.1 The secondary containment shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
During movement of 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.	----------NOTE---------- LCO 3.0.4.a is not applicable when entering MODE 3. ---------- B.1 Be in MODE 3.	 12 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

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.

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

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

ACTIONS

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 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.	----------NOTE---------- LCO 3.0.4.a is not applicable when entering MODE 3. ---------- B.1 Be in MODE 3.	12 hours
C. Required Action and associated Completion Time of Condition A not met during movement of recently irradiated fuel assemblies in the secondary containment.	----------NOTE---------- LCO 3.0.3 is not applicable. ---------- C.1 Place OPERABLE SGT subsystem in operation. OR C.2 Suspend movement of recently irradiated fuel assemblies in secondary containment.	Immediately Immediately

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Two SGT subsystems inoperable in MODE 1, 2, or 3.	D.1 Restore one SGT subsystem to OPERABLE status.	1 hour
E. Required Action and associated Completion Time of Condition D not met.	----------NOTE---------- LCO 3.0.4.a is not applicable when entering MODE 3. ----------	
	E.1 Be in MODE 3.	12 hours
F. Two SGT subsystems inoperable during movement of recently irradiated fuel assemblies in the secondary containment.	F.1 --------NOTE-------- LCO 3.0.3 is not applicable. ---------- Suspend movement of recently irradiated fuel assemblies in secondary containment.	Immediately

3.7 PLANT SYSTEMS

3.7.4 Control Room Emergency Ventilation (CREV) System

LCO 3.7.4 The CREV System shall be OPERABLE.

----------NOTE----------
The main 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. CREV System inoperable in MODE 1, 2, or 3 for reasons other than Condition C.	A.1 Restore CREV System to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, or 3.	----------NOTE---------- LCO 3.0.4.a is not applicable when entering MODE 3. --- B.1 Be in MODE 3.	12 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. CREV system inoperable due to inoperable CRE boundary in MODE 1, 2, or 3.	C.1 Initiate action to implement mitigating actions. AND C.2 Verify mitigating actions ensure CRE occupant exposures to radiological, chemical, and smoke hazards will not exceed limits. AND C.3 Restore CRE boundary to OPERABLE status.	Immediately 24 hours 90 days
D. Required Action and associated Completion Time of Condition C not met in MODE 1, 2, or 3.	D.1 Be in MODE 3. AND D.2 Be in MODE 4.	12 hours 36 hours
E. CREV System inoperable during movement of recently irradiated fuel assemblies in the secondary containment. OR CREV System inoperable due to an inoperable CRE boundary 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

3.7 PLANT SYSTEMS

3.7.5 Control Room Emergency Ventilation Air Conditioning (AC) System

LCO 3.7.5 The Control Room Emergency Ventilation AC System 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. Control Room Emergency Ventilation AC System inoperable in MODE 1, 2, or 3.	A.1 Restore Control Room Emergency Ventilation AC System to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, or 3.	----------NOTE---------- LCO 3.0.4.a is not applicable when entering MODE 3. ---------- B.1 Be in MODE 3.	12 hours
C. Control Room Emergency Ventilation AC System inoperable during movement of recently irradiated fuel assemblies in the secondary containment.	----------NOTE---------- LCO 3.0.3 is not applicable. ---------- C.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 required offsite circuit 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 A.2.3 Initiate action to restore required offsite power circuit to OPERABLE status.	Immediately Immediately Immediately Immediately

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One required DG inoperable.	B.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	B.2 Suspend movement of recently irradiated fuel assemblies in secondary containment.	Immediately
	AND	
	B.3 Initiate action to restore required DG 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 3.8.1.10 through SR 3.8.1.12, and SR 3.8.1.14 through SR 3.8.1.19. 2. SR 3.8.1.13 and SR 3.8.1.19 are not required to be met when associated ECCS subsystem(s) are not required to be OPERABLE per LCO 3.5.2, "RPV Water Inventory Control." ----------	
	For AC sources required to be OPERABLE the SRs of Specification 3.8.1, except SR 3.8.1.9, SR 3.8.1.20, and SR 3.8.1.21 are applicable.	In accordance with applicable SRs

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources—Shutdown

LCO 3.8.5 One 250 VDC and one 125 VDC electrical power subsystem shall be OPERABLE to support the 250 VDC and one 125 VDC Class 1E electrical power distribution subsystems required by LCO 3.8.8, "Distribution Systems—Shutdown."

APPLICABILITY: MODES 4 and 5,
During movement of recently irradiated fuel assemblies in the secondary containment.

ACTIONS

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

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

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.5.1	----------NOTE---------- The following SRs are not required to be performed for the 250 VDC electrical power subsystem: SR 3.8.4.2 and SR 3.8.4.4. ---------- For DC electrical power subsystems 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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.2 Suspend movement of recently irradiated fuel assemblies in the secondary containment.	Immediately
	AND	
	A.2.3 Initiate actions to restore required AC and DC electrical power distribution subsystems to OPERABLE status.	Immediately
	AND	
	A.2.4 Declare associated required shutdown cooling subsystem(s) inoperable and not in operation.	Immediately

SURVEILLANCE REQUIREMENTS

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

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION REGARDING THE LICENSE AMENDMENT REQUEST FOR ADOPTION OF TSTF-542, REVISION 2, "REACTOR PRESSURE VESSEL WATER INVENTORY CONTROL" EXELON GENERATION COMPANY, LLC DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3 CAC NOS. MF9295 AND MF9296, EPID: L-2017-LLA-0176 DOCKET NOS. 50-237 AND 50-249

1.0 INTRODUCTION

By application dated February 10, 2017, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17045A006 (Reference 1), as supplemented by letters dated July 13, 2017 (Reference 2), December 20, 2017 (Reference 3), and December 21, 2017 (Reference 4) (ADAMS Accession Nos. ML17194B069, ML17354B196, and ML17356A134 respectively), Exelon Generation Company, LLC (the licensee), requested to adopt Technical Specifications Task Force Traveler (TSTF) 542, Revision 2, "Reactor Pressure Vessel Water Inventory Control" (Reference 5) for Dresden Nuclear Power Station, Units 2 and 3 (DNPS). The final safety evaluation (SE) for TSTF-542, Revision 2 (Reference 6), was approved by the U.S. Nuclear Regulatory Commission (NRC or Commission) on December 20, 2016 (ADAMS Accession No. ML16343B008).

The proposed changes replace existing technical specifications (TSs) requirements associated with "operations with the potential for draining the reactor vessel," (OPDRVs) with revised TSs providing an alternative requirement for Reactor Pressure Vessel (RPV) Water Inventory Control (WIC). These alternative requirements would protect Safety Limit 2.1.1.3. DNPS TS Section 2.0, "Safety Limits," 2.1.1.3, states "Reactor vessel water level shall be greater than the top of active irradiated fuel."

Additionally, a new definition "DRAIN TIME" is added to the DNPS TSs, Section 1.1, "Definitions." DRAIN TIME establishes requirements for the licensee to make RPV water level inventory determinations and to calculate RPV water inventory drain rates for MODE 4 and 5 outage related activities. Adequate licensee management of secondary containment requirements or mitigation of certain emergency core cooling system safety injection/spray systems during MODE 4 and 5 requires a properly calculated Drain Time.

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

The supplements dated July 13, 2017, December 20, 2017, and December 21, 2017, 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 April 11, 2017 (82 FR 17457).

2.0 REGULATORY EVALUATION

2.1 System Description

The boiling-water reactor (BWR) RPVs have a number of penetrations located below the top of active fuel (TAF). These penetrations provide entry for control rods, recirculation flow, reactor water cleanup, 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 Modes 1 (Power Operation – Reactor Mode Switch in Run), 2 (Startup – Reactor Mode Switch in Refuel (with all reactor vessel head closure bolts fully tensioned or Startup/Hot Standby), and 3 (Hot Shutdown - Reactor Mode Switch in Shutdown and average reactor coolant temperature > 212 °F (degrees Fahrenheit)), the TS for instrumentation and emergency core cooling systems (ECCS) require operability of sufficient equipment to ensure large quantities of water will be injected into the vessel should level decrease below the preselected value. These requirements are designed to mitigate the effects of a loss-of-coolant accident (LOCA), but also provide protection for other accidents and transients that involve a water inventory loss.

During BWR operation in MODE 4 (Cold Shutdown – Reactor Mode Switch in Shutdown with all reactor vessel head closure bolts fully tensioned and average reactor coolant temperature ≤ 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 ≥ 23 feet over the top of the RPV flange, and the spent fuel storage pool gates are removed).

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

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

2.2 Proposed TS Changes

Section 2.2.1 discusses the addition of a new definition, DRAIN TIME (evaluated below in Section 3.1). Section 2.2.2 discusses TS 3.3, "INSTRUMENTATION," revisions including TS 3.3.5.1, "ECCS Instrumentation;" adds new TS 3.3.5.2, "Reactor Pressure Vessel (RPV) Water Inventory Control Instrumentation" (including Table 3.3.5.2) and renumbers existing TS 3.3.5.2, "Isolation Condenser (IC) System Instrumentation" to 3.3.5.3; revises TS pages for TS 3.3.6.1, "Primary Containment Isolation Instrumentation" (including Table 3.3.6.1); revises TS 3.3.6.2, "Secondary Containment Isolation Instrumentation" (including Table 3.3.6.2); and revises TS 3.3.7.1, "Control Room Emergency Ventilation (CREV) System Instrumentation" (evaluated below in Section 3.2.1). Section 2.2.3 discusses TS 3.5, "EMERGENCY CORE COOLING SYSTEM (ECCS) AND ISOLATION CONDENSER (IC) SYSTEM," revisions including TS 3.5.2 "RPV Water Inventory Control" (evaluated below in Section 3.3.1). Section 2.2.4 discusses deletion of existing TS references to OPDRVs (evaluated below in Section 3.6). Section 2.2.5 discusses DNPS plant-specific variations to TSTF-542, Revision 2 (evaluated below in Section 3.5).

2.2.1 Addition of DRAIN TIME Definition

Reference 1 includes the following definition of "DRAIN TIME" that would be added to DNPS TS Section 1.1, "Definitions."

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

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

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

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

    2. Penetration flow paths capable of being isolated by valves that will close automatically

without offsite power prior to the RPV water level being equal to the TAF when actuated by RPV water level isolation instrumentation; or

3. Penetration flow paths with isolation devices that can be closed prior to the RPV water level being equal to the TAF by a dedicated operator trained in the task, who is in continuous communication with the control room, is stationed at the controls, and is capable of closing the penetration flow path isolation 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 DNPS TS, Section 3.3, "Instrumentation."

2.2.2.1 TS 3.3.5.1, "ECCS Instrumentation," Changes to TS Table 3.3.5.1-1, "Emergency Core Cooling System 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 Table 3.3.5.1-1, the applicability in Modes 4 and 5 was proposed for deletion because the instrumentation requirements during shutdown would be consolidated into the new TS 3.3.5.2, "RPV Water Inventory Control Instrumentation." Modes 4 and 5 Applicability and associated requirements would be deleted for the following functions:

Core Spray (CS) System

(a) Reactor Vessel Water Level - Low Low
(c) Reactor Steam Dome Pressure - Low (Permissive)
(d) CS Pump Discharge Flow-Low (Bypass)
(e) CS Pump Start-Time Delay Relay

Low Pressure Coolant Injection (LPCI) System

(a) Reactor Vessel Water Level - Low (Low)
(c) Reactor Steam Dome Pressure - Low (Permissive)
(e) Low Pressure Coolant Injection Pump Start Time Delay Relay (Pumps B and D)
(f) Low Pressure Coolant Injection Pump Discharge Flow - Low (Bypass)

Table 3.3.5.1-1 Footnote (a), which states, "When associated ECCS system(s) are required to be OPERABLE per limiting condition for operation (LCO) 3.5.2, 'ECCS Shutdown,'" would be deleted. As a result, existing Footnotes (b) and (c) would be renumbered (a) and (b), respectively.

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

The proposed insertion of 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 new TS 3.3.5.2 is shown below:

3.3.5.2 Reactor Pressure Vessel (RPV) Water Inventory Control Instrumentation

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

APPLICABILITY: According to Table 3.3.5.2-1

ACTIONS

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

Separate Condition entry is allowed for each channel.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more channels inoperable.	A.1 Enter the Condition referenced in Table 3.3.5.2-1 for the channel.	Immediately
B. As required by Required Action A.1 and referenced in Table 3.3.5.2-1.	B.1 Declare associated penetration flow path(s) incapable of automatic isolation. AND B.2 Calculate DRAIN TIME.	Immediately Immediately
C. As required by Required Action A.1 and referenced in Table 3.3.5.2-1.	C.1 Place channel in trip.	1 hour
D. As required by Required Action A.1 and referenced in Table 3.3.5.2-1.	D.1 Restore channel to OPERABLE status.	24 hours
E. Required Action and associated Completion Time of Condition C or D not met.	E.1 Declare associated low pressure ECCS injection/spray subsystem inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

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

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

SURVEILLANCE	FREQUENCY
SR 3.3.5.2.1 Perform CHANNEL CHECK.	In accordance with the Surveillance Frequency Control Program
SR 3.3.5.2.2 Perform CHANNEL FUNCTIONAL TEST.	In accordance with the Surveillance Frequency Control Program

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

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Core Spray System					
a. Reactor Steam Dome Pressure – Low (Permissive)	4,5	2	C	SR 3.3.5.2.2	≥ 308.5 psig and ≤ 341.7 psig
b. Core Spray Pump Discharge Flow-Low (Bypass)	4,5	1 per pump (a)	D	SR 3.3.5.2.2	≥ 802 gpm and ≤ 992 gpm
2. Low Pressure Coolant Injection (LPCI) System					
a. Reactor Steam Dome Pressure – Low (Permissive)	4,5	2	C	SR 3.3.5.2.2	≥ 308.5 psig and ≤ 341.7 psig
b. Low Pressure Coolant Injection Pump Discharge Flow-Low (Bypass)	4,5	1 per loop (a)	D	SR 3.3.5.2.2	≥ 1107 gpm
3. Shutdown Cooling System (SDC) Isolation					
a. Reactor Vessel Water Level - Low	(b)	1 per trip system	B	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 2.65 inches
4. Reactor Water Cleanup System Isolation					
a. Reactor Vessel Water Level - Low	(b)	1 per trip system	B	SR 3.3.5.2.1 SR 3.3.5.2.2	≥ 2.65 inches

(a) Associated with an ECCS subsystem required to be OPERABLE by LCO 3.5.2, "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, "Isolation Condenser (IC) System Instrumentation"

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

2.2.2.4 TS 3.3.6.1, "Primary Containment Isolation Instrumentation"

In Table 3.3.6.1-1, Function 6.b, Shutdown Cooling System (SDC) Isolation, Reactor Vessel Water Level – Low, the Applicability in Modes 4 and 5 was proposed for deletion. Also, Footnote (b) to Table 3.3.6.1-1 was proposed to be deleted, as it is applicable only to Function 6.b during Modes 4 and 5. This function would move to the new TS Table 3.3.5.2-1, Function 3.a, as shown above in Section 2.2.2.2 of this SE.

2.2.3 TS Section 3.5, "Emergency Core Cooling Systems (ECCS) and Isolation Condenser (IC) System"

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

The title of DNPS TS Section 3.5.2 would be revised from "ECCS – Shutdown" to "RPV Water Inventory Control," and TS 3.5.2 would be revised as follows:

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

AND

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

APPLICABILITY: Modes 4 and 5

ACTIONS

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

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

E. Required Action and associated Completion Time of Condition C or D not met. OR DRAIN TIME < 1 hour.	E.1 Initiate action to restore DRAIN TIME to ≥ 36 hours.	Immediately

The proposed SR 3.5.2 are shown below:

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.2.1	Verify DRAIN TIME ≥ 36 hours.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.2	Verify, for the required ECCS injection/spray subsystem, the: a. Suppression pool water level is ≥ 10 ft 4 inches; or b. Contaminated condensate storage tanks water volume is ≥ 140,000 available gallons.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.3	Verify, for the required ECCS injection/spray subsystem, locations susceptible to gas accumulation are sufficiently filled with water.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.4	----------NOTE---------- Not required to be met for system vent flow paths opened under administrative control. ---------- Verify for the required ECCS injection/spray subsystem each manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.5	Operate the required ECCS injection/spray subsystem through the recirculation line for ≥ 10 minutes.	In accordance with the Surveillance Frequency Control Program
SR 3.5.2.6	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 3.5.2.7	----------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 References to OPDRVs Term

In Reference 1, the licensee proposed to revise existing TS requirements related to "operations with a potential for draining the reactor vessel" or "OPDRVs," with new requirements on RPV WIC that will protect Safety Limit 2.1.1.3. To remain consistent with the TSTS-542, all references to the term OPDRVs in the DNPS TSs will be deleted. The TS location of these references are summarized as follows: `

DNPS LCO	Location of References
3.3.6.1, Primary Containment Isolation Instrumentation	Table 3.3.6.1-1 Footnote (b)
3.3.6.2, Secondary Containment Isolation Instrumentation	Table 3.3.6.2-1 Footnote (a)
3.3.7.1, Control Room Emergency Ventilation (CREV) System Instrumentation	Applicability
3.5.2, RPV Water Inventory Control	Required Action B.1, Condition C, SR 3.5.2.2
3.6.1.3, Primary Containment Isolation Valves (PCIVs)	Condition F
3.6.4.1, Secondary Containment	Applicability, Condition C
3.6.4.2, Secondary Containment Isolation Valves (SCIVs)	Applicability, Condition D
3.6.4.3, Standby Gas Treatment (SGT) System	Applicability, Condition C, Condition F
3.7.4, Control Room Emergency Ventilation (CREV) System	Applicability, Condition E
3.7.5, Control Room Emergency Ventilation Air Conditioning (AC) System	Applicability, Condition C
3.8.2, AC Sources – Shutdown	Condition A, Condition B
3.8.5, DC (direct current) Sources – Shutdown	Condition A
3.8.8, Distribution Systems – Shutdown	Condition A

Other miscellaneous changes.

In a letter dated July 13, 2017 (Reference 2), the licensee corrected the proposed change to SR 3.8.2.1, Note 2 which states;

> "SR 3.8.1.13 and SR 3.8.1.19 are not required to be met when associated ECCS subsystem(s) are not required to be OPERABLE per LCO 3.5.2, "ECCS-Shutdown."" Since the title of LCO 3.5.2 was proposed to be changed, this note will be revised to read:

> [Note] 2. SR 3.8.1.13 and SR 3.8.1.19 are not required to be met when associated ECCS subsystem(s) are not required to be OPERABLE per LCO 3.5.2, "RPV Water Inventory Control."

In a letter dated December 20, 2017 (Reference 3), the licensee corrected a typographical omission associated with TS Table 3.3.5.2-1, "RPV Water Inventory Control Instrumentation," CS Function 1.a, Reactor Steam Dome Pressure – Low (Permissive) and LPCI Function 2.a, Reactor Steam Dome Pressure – Low (Permissive). A reference to Footnote (a) was added to the REQUIRED CHANNELS PER FUNCTION column. Additionally, 2 typographical errors were corrected on TS pages 3.5.2-1 and 3.5.2-3.

In a letter dated December 21, 2017 (Reference 4), the licensee corrected an error associated with the letter dated December 20, 2017, regarding TS Table 3.3.5.2-1 Functions 1.a and 2.a.

The NRC staff reviewed this supplemental information and finds the licensee's revisions to be acceptable.

SR 3.8.2.1, Note 2 which states;

> "SR 3.8.1.13 and SR 3.8.1.19 are not required to be met when associated ECCS subsystem(s) are not required to be OPERABLE per LCO 3.5.2, "ECCS-Shutdown."" Since the title of LCO 3.5.2 was proposed to be changed, this note will be revised to read:
>
> [Note] 2. SR 3.8.1.13 and SR 3.8.1.19 are not required to be met when associated ECCS subsystem(s) are not required to be OPERABLE per LCO 3.5.2, "RPV Water Inventory Control."

2.2.5 DNPS Plant-Specific TSTF-542 TS Variations

In Section 2.2 of Reference 1, the licensee identified several DNPS plant-specific TS variations from the TSTF-542, Revision 2 (Reference 5), or the NRC-approved TSTF-542 SE (Reference 6). The licensee states these variations do not affect the applicability of the TSTF-542 or the NRC staff's SE. The staff has determined the licensee's proposed variations can be characterized as either administrative or technical. Section 3.5 of this SE includes the staff's technical evaluation of each of these technical variations.

2.2.5.1 Variation 1, Instrumentation functions - pump start time delay relays

There are DNPS-specific instrumentation functions that differ from the Standard Technical Specifications (STS) (References 7 and 8). DNPS TS Table 3.3.5.1-1, Functions 1.e and 2.e describe pump start time delay relays related to the automatic starting of the CS and LPCI pumps. The licensee proposed to remove these Functions' requirements in Modes 4 and 5 from TSs.

2.2.5.2 Variation 2, Dedicated SDC

The DNPS design features a SDC system that is dedicated to the removal of core decay heat and maintaining the temperature of the reactor coolant. Residual heat removal (RHR) is not a mode of another system like LPCI; therefore, the potential for system misalignments are less likely for the DNPS SDC system. This Function was proposed to be moved from TS 3.3.6.1, Table 3.3.6.1-1, Function 6.b, to new TS 3.3.5.2, Table 3.3.5.2-1 Function 3.a.

The licensee also proposed a variation to retain TS 3.3.6.1, "Primary Containment Isolation Instrumentation," Required Actions I.1 and I.2, which require for an inoperable channel to either immediately restore the channel to operable status or to immediately initiate action to isolate the SDC system. DNPS TS 3.3.6.1, Required Action I.2, "Initiate action to isolate the Shutdown Cooling System," is similar to STS 3.3.6.1 Required Action J.2, "Initiate action to isolate the Residual Heat Removal (RHR) Shutdown Cooling System," which is deleted by TSTF-542. The licensee stated in Reference 1 that:

> "TS 3.3.6.1 Required Action I.2 is retained to account for SDC system flow path isolation in Mode 3..."

2.2.5.3 Variation 3, Channel checks

DNPS does not currently have the capability to perform Channel Checks for the following proposed new Table 3.3.5.2-1, Functions;

1.a, "Reactor Steam Dome Pressure-Low (Permissive),"
1.b, "Core Spray Pump Discharge Flow-Low (Bypass),"
2.a, "Reactor Steam Dome Pressure-Low (Permissive)," and
2.b, "Low Pressure Coolant Injection Pump Discharge Flow-Low (Bypass)."

Since the existing DNPS TSs do not include Channel Checks for these functions, no Channel Check SR was proposed for these functions.

2.2.5.4 Variation 4, Channels per loop

Each DNPS unit has two LPCI loops with two pumps in each loop (i.e., four LPCI pumps per unit). The existing DNPS TSs require one operable channel for each LPCI loop for the "Low Pressure Coolant Injection Pump Discharge Flow-Low (Bypass)," Function. The licensee proposed to maintain the one channel per loop for new TS 3.3.5.2, Function 2.b, in lieu of one channel per pump as described in the TSTF-542, since DNPS has only one flow transmitter for each loop which monitors the flow of both pumps in that loop.

2.2.5.5 Variation 5, Manual initiation logic

The existing DNPS TSs do not include a manual initiation logic function for the CS or LPCI subsystems. Since this function does not exist at DNPS, manual initiation functions for LPCI and CS were not proposed for new Table 3.3.5.2-1. Therefore, new TS 3.3.5.2 as proposed for DNPS does not include a logic system functional test SR, which would only apply to the manual initiation functions. As an alternative, the licensee proposed that TS 3.5.2, "Reactor Pressure Vessel (RPV) Water Inventory Control," include SR 3.5.2.7 to verify that the DNPS LPCI and CS subsystems can be manually operated through the manipulation of subsystem components from the main control room (MCR).

2.2.5.6 Variation 6, Reactor water cleanup isolation

The DNPS design provides for isolation of the reactor water cleanup (RWCU) system at Reactor Vessel Water Level-Low versus Reactor Vessel Water Level-Low Low as specified in TSTF-542; therefore, the proposed new Table 3.3.5.2-1 reflects this RWCU isolation difference.

2.2.5.7 Variation 7, Automatic isolation on low water level

The automatic isolation on Reactor Vessel Water Level-Low functions for the RWCU and SDC systems at DNPS varies slightly from the system described in the STS (Reference 7). These functions receive input from four reactor vessel water level channels. Each channel provides input to a trip string. There are two trip systems, each having two trip strings. In order to cause an isolation of the RWCU or SDC, the trip logic scheme requires one-out-of-two taken twice (i.e., at least one trip). Proposed Table 3.3.5.2-1 has been revised from TSTF-542 to reflect the DNPS requirement for one operable channel in each Reactor Vessel Water Level-Low isolation trip system for RWCU and SDC.

2.2.5.8 Variation 8, Note for TS LCO 3.5.2

The existing DNPS TSs do not contain a Note applicable to LCO 3.5.2 regarding realignment to the LPCI mode, as specified in TSTF-542, Revision 2. This Note is not applicable to DNPS because of the separate SDC system that provides for the removal of reactor residual heat.

2.2.5.9 Variation 9, Suppression Pool and Contaminated Condensate Storage Tank

At DNPS, verification of suppression pool and contaminated condensate storage tank volumes is contained in a single SR (i.e., SR 3.5.2.2) versus in separate SRs in the STS (SRs 3.5.2.1 and 3.5.2.2).

2.2.5.10 Variation 10, TS 3.6.1.3, Condition F

The licensee proposed to delete DNPS TS 3.6.1.3, Condition F, and all of its associated Required Actions. The Applicability for TS 3.6.1.3, "Primary Containment Isolation Valves (PCIVs);" is "When associated instrumentation is required to be OPERABLE per LCO 3.3.6.1, "Primary Containment Isolation Instrumentation."" This change was proposed because the MODE 4 and 5 PCIV requirements in TSs 3.3.6.1 and 3.6.1.3 would be moved to new TS 3.3.5.2.

2.3 Applicable Regulatory Requirements

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

As required by 10 CFR 50.36(c)(1)(i)(A), Technical specifications will include items in the following categories: (1) *Safety limits, limiting safety system settings, and limiting control settings*. (i)(A) Safety limits for nuclear reactors are limits upon important process variables that are found to be necessary to reasonably protect the integrity of certain of the physical barriers that guard against the uncontrolled release of radioactivity. If any safety limit is exceeded, the reactor must be shut down. The licensee shall notify the Commission, review the matter, and record the results of the review, including the cause of the condition and the basis for corrective action taken to preclude recurrence. Operation must not be resumed until authorized by the Commission.

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

The regulation at 10 CFR 50.36(c)(2)(ii) requires licensees to establish TS LCOs for items meeting one or more of the listed criteria. 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 at 10 CFR 50.36(c)(3) requires TSs to include items in the category of SRs, which are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the LCOs will be met.

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

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

NUREG-1433, Revision 4, contains the STS for BWR/4 plants;[1] and is part of the regulatory standardization effort, the NRC staff has prepared STS for each of the light-water reactor nuclear designs. The changes would be incorporated into future revisions of NUREG-1433, Volumes 1 and 2 (References 7 and 8).

The NRC staff's guidance for review of TSs is in Chapter 16, *Technical Specifications*, of NUREG-0800, Revision 3, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants" (SRP), dated March 2010 (ADAMS Accession No. ML100351425) (Reference 9).

2.3.1 DNPS, Unit 3, Applicable Design Requirements

DNPS updated final safety analysis report (UFSAR), Section 3.1.1, "Compliance with Draft Design Criteria," describes an evaluation of the proposed general design criteria (GDC) (issued July 1967) which were used by the Atomic Energy Commission to evaluate the original design of DNPS station. The following criteria are related to this license amendment request (LAR):

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[1] Dresden Nuclear Power Station, Units 2 and 3 are BWR/3 Mark 1 designs and have adopted the improved STS (BWR/4).

Criterion 9 – "Reactor Coolant Pressure Boundary." The reactor coolant pressure boundary (RCPB) shall be designed and constructed so as to have an exceedingly low probability of gross rupture or significant leakage throughout its design lifetime.

Criterion 12 – "Instrumentation and Control Systems." Instrumentation and controls shall be provided as required to monitor and maintain variables within prescribed operating ranges.

Criterion 13 – "Fission Process Monitors and Controls." Means shall be provided for monitoring and maintaining control over the fission process throughout core life and for all conditions that can be reasonably be anticipated to cause variations in reactivity of the core, such as indication of position of control rods and concentration of soluble reactivity control poisons.

Criterion 16 – "Monitoring Reactor Coolant Pressure Boundary." Means shall be provided for monitoring the RCPB to detect leakage.

Criterion 33 – "Reactor Coolant Pressure Boundary Capability." The RCPB shall be capable of accommodating without rupture, and with only limited allowance for energy absorption through plastic deformation, the static and dynamic loads imposed on any boundary component as a result of any inadvertent and sudden release of energy to the coolant. As a design reference, this sudden release shall be taken as that which would result from a sudden reactivity insertion such as a rod ejection (unless prevented by positive mechanical means), rod dropout, or cold water addition.

Criterion 37 – "Engineered Safety Features Basis for Design." Engineered safety features (ESFs) shall be provided in the facility to back up the safety provided by the core design, the RCPB, and their protection systems. As a minimum, such ESFs shall be designed to cope with any size RCPB break up to and including the circumferential rupture of any pipe in that boundary assuming unobstructed discharge from both ends.

Criterion 41 – "ESF Performance Capability." ESFs such as emergency core cooling and containment heat removal systems shall provide sufficient performance capability to accommodate partial loss of installed capacity and still fulfill the required safety function. As a minimum, each ESF shall provide this required safety function assuming a failure of a single active component.

Criterion 44 – "Emergency Core Cooling System Capability." At least two emergency core cooling systems, preferably of different design principles, each with a capability for accomplishing abundant emergency core cooling, shall be provided. Each emergency core cooling system and the core shall be designed to prevent fuel and clad damage that would interfere with the emergency core cooling function and to limit the clad metal-water reaction to negligible amounts for all sizes of breaks in the reactor coolant pressure boundary, including the double-ended rupture of the largest pipe. The performance of each emergency core cooling system shall be evaluated conservatively in each area of uncertainty. The systems shall not share active components and shall not share other features or components unless it can be demonstrated that: (a) the capability of the shared feature or component to perform its required function can be readily ascertained during reactor operation, (b) failure of the shared feature or component does not initiate a loss-of-coolant accident, and (c) capability of the shared feature or component to perform its required function is not impaired by the effects of a loss-of-coolant accident and is not lost during the entire period this function is required following the accident.

2.3.2 DNPS, Unit 2, Applicable Design Requirements

DNPS, UFSAR, Section 3.1.2, "Compliance with Final Design Criteria," describes an evaluation of the design basis of the DNPS, Unit 2, as measured against the NRC GDC for nuclear power plants, Appendix A of 10 CFR 50, effective May 21, 1971, and subsequently amended July 7, 1971. The following criteria are related to this LAR.

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

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

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

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

Criterion 35 – "Emergency Core Cooling." A system to provide abundant emergency core cooling shall be provided. The system safety function shall be to transfer heat from the reactor core following any loss of reactor coolant at a rate such that: (1) fuel and clad damage that could interfere with continued effective core cooling is prevented, and (2) clad metal-water reaction is limited to negligible amounts. Suitable redundancy in components and features and suitable interconnections, leak detection, isolation and containment capabilities shall be provided to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) the system safety function can be accomplished, assuming a single failure.

3.0 TECHNICAL EVALUATION

Section 2.2 above lists proposed TS changes, as included in References 1 and 2, for the licensee to adopt TSTF-542, Revision 2. 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 above, the DRAIN TIME is the time it would take the RPV water inventory to drain from the current level to the TAF assuming the most limiting of the RPV penetrations flow paths with the largest flow rate, or a combination of penetration flow paths that could open due to a common mode failure, were to open and the licensee took no mitigating action.

The NRC staff reviewed the proposed DRAIN TIME definition from the TSTF-542 traveler. For the purpose of NRC staff considerations, the term "break" describes a pathway for water to drain from the RPV that has not been prescribed in the "DRAIN TIME" definition proposed in TSTF-542. Based on information furnished by the licensee in Reference 1, the NRC staff have determined the licensee is appropriately adopting the principles of DRAIN TIME as specified in TSTF-542. The NRC has reasonable assurance 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 reactor flange; (2) water level above RPV flange with fuel pool gates installed, and; (3) water level above reactor 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 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 the licensee's proposed addition of DRAIN TIME definition to DNPS TSs to be acceptable.

3.2 TS 3.3.5.2, RPV WIC Instrumentation

The existing TS 3.3.5.2, "Isolation Condenser (IC) System Instrumentation," is renumbered as TS 3.3.5.3. This achieves consistency within the DNPS TSs and is acceptable.

The purpose of the RPV WIC instrumentation is to support the requirements of new TS LCO 3.5.2, and the definition of DRAIN TIME. There are instrumentation and controls and their signal functions that are required for manual pump starts or required as a permissive or operational controls on the equipment of the systems that provide water injection capability, certain start commands, pump protection, and isolation functions. These instruments are required to be operable if the systems that provide water injection and isolation functions are to be considered operable as described in Section 3.3 of this SE for new TS 3.5.2. For DNPS, reactor operators have alternate, often more complex means, of starting and injecting water than the preferred simple push button start.

Specifically, the RPV WIC instrumentation supports operation of the CS and LPCI including manual starts when needed as well as the system isolation of the SDC system and the RWCU system. The equipment involved with each of these systems is described in the evaluation of TS 3.5.2 and the Bases for LCO 3.5.2.

3.2.1 Staff Evaluation of Proposed TS 3.3.5.2 LCO and Applicability

In Reference 1, the licensee proposed a 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 existing TSs contain instrumentation requirements related to OPDRVs in TS Tables 3.3.5.1-1, 3.3.6.1-1, 3.3.6.2-1, and 3.3.7.1. These requirements from Tables 3.3.5.1-1 and 3.3.6.1-1 would be consolidated into new TS 3.3.5.2.

The proposed LCO 3.3.5.2 would state:

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

The proposed Applicability would state:

> "According to Table 3.3.5.2-1."

TSTF-542 selected Table 3.3.5.2-1 to contain those instrumentation Functions needed to support manual initiation of the 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 Table 3.3.5.2-1 are moved from existing TS 3.3.5.1, "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 2.2.5.5 above (Variation 5), the DNPS current design-basis does not include a manual initiation logic for the CS or LPCI systems. Therefore, as an alternative, the licensee proposed to add new SR 3.5.2.7 to TS 3.5.2 to verify that CS and LPCI can be manually operated through the manipulation of subsystem components from the MCR.

The NRC staff concluded the licensee's proposed alternative is acceptable for DNPS 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 requirements of TSTF-542.

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 the licensee's proposed 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 Table 3.3.5.2-1 and directs the licensee to immediately enter the Condition referenced in Table 3.3.5.2-1 for that channel.
>
> Action B (concerning the SDC system isolation and RWCU system isolation functions) would be applicable when automatic isolation of the associated penetration flow path is credited as a path for potential drainage in calculating drain time. If the instrumentation is inoperable, Required Action B.1 directs an immediate declaration that the associated penetration flow path(s) are incapable of automatic isolation. Required Action B.2 requires an immediate re-calculation of drain time, but automatic isolation of the affected penetration flow paths cannot be credited.

Action C (concerning low reactor steam dome 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 one-hour. With the permissive function instrument in the trip condition, manual injection valve opening may now be performed using the preferred control board switches. This one-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. The time of one-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 there is a possible 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. Similar to justification in Action C, while this is not the preferred method, the CS and LPCI subsystem pumps can be started manually and the valves can be opened manually. The 24-hour completion time is acceptable, because the functions can be performed manually and it allows time for the operator to evaluate and have necessary repairs completed.

Action E would be needed and become necessary if the Required Actions and associated completion times of Condition C or D, were not met. If they were not met, then the associated low pressure ECCS injection/spray subsystem might be incapable of performing the intended function, and the CS/LPCI subsystem would be declared inoperable immediately.

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

3.2.3 Staff Evaluation of Proposed TS 3.3.5.2 Surveillances

The proposed 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 finds these tests are sufficient and adequate because they are essential to ensure the Functions of TS 3.3.5.2 are operable (i.e., capable of performing the specified safety function in support of TS 3.5.2, DRAIN TIME, and the protection from a potential drain down of the RPV in Modes 4 and 5). The NRC staff finds the proposed SRs of LCO 3.3.5.2 as described in Section 3.3.3 of 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.

SR 3.3.5.2.1 would require a Channel Check and applies to system isolation functions in TS Table 3.3.5.2-1 for SDC isolation and RWCU system isolation. Performance of the Channel Check would ensure that a gross failure of instrumentation has not occurred. A Channel Check is normally a comparison of the parameter indicated on one channel to a similar parameter on other related channels. A Channel Check is significant in assuring that there is a low probability of an undetected complete channel failure and is a key safety practice to verifying the instrumentation continues to operate properly between each Channel Functional test. The NRC

staff has determined this is acceptable because the frequency is in accordance with the surveillance frequency control program (SFCP), which is consistent with the existing requirements and supports operating shift situational awareness.

SR 3.3.5.2.2 would require a Channel Functional test and applies to all functions in 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 is in accordance with the SFCP. The NRC staff has determined 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.

TSTF-542 did not include SRs to verify or adjust the instrument setpoint derived from the allowable value using a Channel Calibration or a surveillance to calibrate the trip unit. A draining event in MODE 4 or 5 is not an analyzed accident and, therefore, there is no accident analysis on which to base the calculation of a setpoint. The purpose of the Functions 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 TSs 3.3.5.1 and 3.3.6.1 continue to require the Functions to be calibrated on an established interval. Also, a draining event in MODE 4 or 5 is not an analyzed accident and, therefore, there are no accident analysis assumptions on response time. The staff has determined this is acceptable, because 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 determinations, the NRC staff has concluded 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 is therefore acceptable.

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

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

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, "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, 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 that the channels of instrumentation respond with the required accuracy permitting pumps and associated subsystems to operate to inject water when needed and isolating equipment when commanded to support the prevention of or to 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 a low pressure 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 drain times less than 1 hour), there is sufficient time for the reactor operators to take manual action to stop the draining event and to manually start a low pressure ECCS injection/spray subsystem or additional method of water injection as needed. Consequently, there is no need for automatic initiation of ECCS to respond to an unexpected draining event. This is acceptable, because a draining event is a slow evolution when compared to a design basis LOCA assumed to occur at a significant power level.

3.2.4.1 Staff Evaluation of Proposed Table 3.3.5.2-1 Functions

For the Table 3.3.5.2-1, Functions 1.a and 2.a, CS and LPCI systems, Reactor Steam Dome Pressure - Low (Permissive), these signals would be 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 steam dome pressure is expected to virtually always be below the ECCS maximum design pumping pressure during Modes 4 and 5, the Reactor Steam Dome Pressure - Low signals would be required to be operable and capable of permitting initiation of the ECCS. The proposed allowable value would be between $\geq$ 308.5 pounds per square inch gauge (psig) and $\leq$ 341.7 psig, with two required channels per function, as it is currently in DNPS TS Table 3.3.5.1-1.

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

For LPCI, the minimum flow line valve is opened when low flow is sensed, and the valve is automatically closed when the flow rate is adequate to protect the pump. The proposed required channels per function would be one per pump, as it is currently found in DNPS TS Table 3.3.5.1-1.

For CS, the minimum flow line valve is opened when low flow is sensed, and the valve is automatically closed when the flow rate is adequate to protect the pump, yet low enough to ensure that the closure of the minimum flow valve is initiated to allow full flow into the core. The proposed required channels per function is one per loop, as it is currently found in DNPS TS Table 3.3.5.1-1.

The proposed allowable values for Functions 1.b and 2.b are as follows (moved from DNPS TS Table 3.3.5.1-1):

CS	≥ 802 gpm and ≤ 992 gpm
LPCI	≥ 1107 gpm

For Table 3.3.5.2-1, Function 3.a, [SDC] system isolation, Reactor Vessel Water Level - Low, the function would only be required to be operable when automatic isolation of the associated penetration flow path is credited in the DRAIN TIME calculation. The proposed number of required instrument channels is one per trip system, which retains the requirement specified in existing TS Table 3.3.6.1-1 footnote (b) which states,

> "In MODES 4 and 5, provided Shutdown Cooling System integrity is maintained, only one channel per trip system with an isolation signal available to one shutdown cooling pump suction isolation valve is required."

The condition that the SDC system integrity be maintained is a concept related to OPDRVs, so it would not be carried over into TS 3.3.5.2 for RPV WIC instrumentation.

The Reactor Vessel Water Level-Low Function receives input from four reactor vessel water level channels. Each channel inputs into one of four trip strings. Two trip strings make up a trip system and both trip systems must trip to cause an isolation of the SDC suction isolation valves. Any channel will trip the associated trip string. Only one trip string must trip to trip the associated trip system. The trip strings are arranged in a one-out-of-two taken twice logic to initiate isolation. Therefore, one trip string in each trip system is required to provide for automatic SDC system isolation. The Allowable Value was chosen to be the same as the Primary Containment Isolation Instrumentation Reactor Vessel Water Level - Low, Allowable Value from LCO 3.3.6.1 ($\geq$ 2.65 inches).

For Table 3.3.5.2-1, Function 4.a, RWCU system isolation, Reactor Vessel Water Level - Low, the function is only required to be operable when automatic isolation of the associated penetration flow path is credited in the DRAIN TIME calculation. The proposed number of required channels is one per trip system. The Reactor Vessel Water Level-Low Isolation Function receives input from four reactor vessel water level channels. Each channel inputs into one of four trip strings. Two trip strings make up a trip system and both trip systems must trip to cause an isolation of the RWCU valves. Any channel will trip the associated trip string. Only one trip string must trip to trip the associated trip system. The trip strings are arranged in a one-out-of-two taken twice logic to initiate isolation. Therefore, one trip string in each trip system is required to provide for automatic RWCU system isolation. This proposed change is a new requirement in Modes 4 and 5 for the RWCU system. However, the instrumentation function is the same as TS Table 3.3.6.1, Function 6.b, which contains the requirements for Modes 1, 2, and 3, with the same allowable value, ≥ 2.65 inches.

The NRC staff finds that proposed 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 has determined the licensee's proposed changes to LCO 3.3.5.2 are acceptable.

3.3 TS 3.5.2 – RPV WIC

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

LCO 3.5.2 would state, in part;

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

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

The ECCS pumps are high-capacity pumps, with flow rates of thousands of gpm. Most RPV penetration flow paths would have a drain rate on the order of tens or hundreds of gpm. The manual initiation/start of an ECCS pump would provide the necessary water source to counter these expected drain rates. Decay heat removal (DHR) in Modes 4 and 5 is not affected by the proposed DNPS TS change as these requirements on the number of SDC subsystems that must be operable and in operation to ensure adequate DHR from the core are unchanged. These requirements can be found in the DNPS TS 3.4.8, "Shutdown Cooling (SDC) System – Cold Shutdown," TS 3.9.7, "Reactor Pressure Vessel (RPV) Water Level – New Fuel or Control Rods," TS 3.9.8, "Shutdown Cooling (SDC) – High Water Level," and TS 3.9.9, "Shutdown Cooling (SDC) – Low Water Level." These DNPS DHR requirements are similar to the NUREG and can be found in the NUREG-1433 TS 3.4.9, "Residual Heat Removal (RHR) Shutdown Cooling System – Cold Shutdown," TS 3.9.8, "Residual Heat Removal (RHR) – High Water Level, " and TS 3.9.10, "Residual Heat Removal (RHR) – Low Water Level." Based on these considerations, the NRC staff finds that the water sources provide assurances that the lowest functional capability required for safe operation is maintained and protecting the safety limit.

The proposed TS 3.5.2, "RPV Water Inventory Control," LCO contains two parts. The first part states that DRAIN TIME of RPV WIC to the TAF shall be ≥ 36 hours, and the second part states that one low pressure ECCS injection/spray subsystem shall be OPERABLE. The proposed Applicability for TS 3.5.2 is Modes 4 and 5.

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

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

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

The proposed Condition A states that if the required low pressure ECCS injection/spray subsystem is inoperable, it is to be restored to operable status within 4 hours. Proposed Condition B states that if Condition A is not met, a method of water injection capable of operating without offsite electrical power shall be established immediately. The proposed Condition B provides adequate assurance of an available water source should Condition A not be met within the 4-hour completion time.

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

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

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

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

3.3.1 Staff Evaluation of Proposed TS 3.5.2 Surveillances

The proposed TS 3.5.2 SRs (Section 2.2.3 above) includes verification of Drain Time, verification of water levels/volumes that support low pressure ECCS injection/spray subsystems, verification of water filled pipes to preclude water hammer events, verification of correct valves positions for the required low pressure ECCS injection/spray subsystem, operation of the low pressure ECCS injection/spray systems in the recirculation line, verification of valves credited for automatic isolation actuated to the isolation position, and verification that the required low pressure ECCS injection/spray subsystem can be manually operated. Each of the seven SRs are described below.

SR 3.5.2.1: The DRAIN TIME would be determined or calculated, and required to be verified to be ≥ 36 hours in accordance with the SFCP. The NRC staff has determined the option to place this frequency in the licensees SFCP is appropriate and consistent with similar LCOs and surveillances. This surveillance would verify the LCO for DRAIN TIME is met. Numerous indications of changes in RPV level are available to the operator. The period of 36 hours is considered reasonable to identify and initiate action to mitigate draining of reactor coolant (normally 3 operator shifts). Changes in RPV level would necessitate recalculation of the DRAIN TIME. As plant conditions change, the DRAIN TIME must be confirmed to be ≥ 36 hours or the LCO must be declared not met and the appropriate TS Actions followed.

SR 3.5.2.2: The suppression pool water level (≥ 10 feet 4 inches) or contaminated condensate storage tank level (≥ 140,000 available gallons) for a required ECCS injection/spray subsystem would be required to be verified to ensure pump net positive suction head and vortex prevention is available for the ECCS injection/spray subsystem required to be operable by the LCO. Indications are available either locally or in the control room regarding suppression pool water level and contaminated condensate storage tank level. This surveillance would be required to be performed in accordance with the SFCP.

SR 3.5.2.3: The surveillance requirement to verify the ECCS injection/spray subsystem piping is sufficiently filled of water would be retained from the existing TS 3.5.2. The proposed change would update the SR to reflect the change to LCO 3.5.2, which would require, in part, one low pressure ECCS injection/spray subsystem to be operable instead of two. SR 3.5.2.3 wording would change from "Verify, for each required ECCS..." to "Verify, for the required ECCS..." This change clarifies the requirement to maintain consistency with the proposed LCO. Maintaining the pump discharge lines of the required ECCS injection/spray subsystem sufficiently full of water ensures that the ECCS subsystem will perform properly. Acceptance criteria are established for the volume of accumulated gas at susceptible locations. If accumulated gas is discovered that exceeds the acceptance criteria for the susceptible location (or the volume of accumulated gas at one or more susceptible locations exceeds an acceptance criterion for gas volume at the suction or discharge of a pump), then the surveillance is not met. This surveillance would be required to be performed in accordance with the SFCP.

SR 3.5.2.4: The SR to verify the correct alignment for manual, power operated, and automatic valves in the required ECCS subsystem flow path would be retained from the existing TS 3.5.2. Similar to the change discussed above for proposed SR 3.5.2.3, changes to SR 3.5.2.4 would clarify a proposed requirement for LCO 3.5.2. The proposed SR wording, "Verify for the required ECCS injection/spray subsystem each manual..." would replace "Verify each required ECCS injection/spray subsystem manual..." SR 3.5.2.4 would provide assurance that the proper flow path will be available for ECCS operation to support TS 3.5.2. This SR would not apply to valves that are locked, sealed, or otherwise secured in position, since these valves would be verified to be in the correct position prior to locking, sealing, or securing. This

surveillance would be required to be performed in accordance with the SFCP.

SR 3.5.2.5: 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, RPV water inventory control. Testing the ECCS injection/spray subsystem through the recirculation line is necessary to avoid overfilling the refueling cavity. The minimum operating time of 10 minutes is based on engineering judgement.

SR 3.5.2.6: Verification that each valve credited for automatically isolating a penetration flow path actuates to the isolation position on an actual or simulated RPV water level isolation signal would be required to prevent RPV water inventory from dropping below the TAF should an unexpected draining event occur. This surveillance would be required to be performed in accordance with the SFCP.

SR 3.5.2.7: This SR would state, "Verify the required ECCS injection/spray subsystem can be manually operated." It would demonstrate that the required CS or LPCI subsystem could be manually initiated 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 existing Note. This surveillance would be required to be performed in accordance with the SFCP.

The NRC staff evaluated each of these proposed SRs associated with the new LCO 3.5.2 and concluded they are appropriate for ensuring the operability of the equipment and instrumentation specified in LCO 3.5.2. As indicated in the traveler for TSTF-542, Revision 2, there has been only one traveler approved since the issuance of Revision 4 of NUREG-1433 and NUREG-1434 which affects the TSs revised by TSTF-542. That traveler is TSTF-523, "Generic Letter 2008-01, Managing Gas Accumulation," which was approved by the NRC on January 15, 2014. TSTF-523 affected SR 3.5.2.3, which verifies that the ECCS piping is full of water, and SR 3.5.2.4, which verifies that valves are in the correct position. Furthermore, the staff concluded that each of the proposed SRs are acceptable since they meet the requirements of 10 CFR 50.36(c)(2)(ii) regarding insights gained via operating experience and 10 CFR 50.36(c)(3) for surveillances by ensuring that the necessary quality of systems and components are maintained.

3.4 TS Table 3.3.5.1, Emergency Core Cooling System Instrumentation

3.4.1 Staff Evaluation of Proposed Changes to TS Table 3.3.5.1-1

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

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

1. CS system functions: (a) Reactor Vessel Water Level - Low Low, (c) Reactor Steam Dome Pressure - Low (Permissive), (d) Core Spray Pump Discharge Flow-Low (Bypass), (e) Core Spray Pump Start-Time Delay Relay,

and

2. LPCI functions; (a) Reactor Vessel Water Level - Low Low, (c) Reactor Steam Dome Pressure - Low (Permissive), (e) Low Pressure Coolant Injection Pump Start Time Delay Relay (Pumps B and D), (f) Low Pressure Coolant Injection Pump Discharge Flow - Low (Bypass)

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

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

The NRC staff has determined it is acceptable to delete TS Table 3.3.5.1-1 Functions 1(a) and 2(a) on the bases that manual ECCS initiation is preferred over automatic initiation during Modes 4 and 5, and the operator would be able to use other, more appropriately sized pumps if needed to mitigate a draining event. The deletion of Functions 1.e and 2.e is evaluated below in Section 3.5.1 of this SE.

3.5 Staff Evaluation of Proposed Technical Variations

The licensee proposed the following technical variations from the TS changes described in TSTF-542 or the applicable parts of the NRC staff's SE. The licensee stated in the LAR (Reference 1), that these variations do not affect the applicability of TSTF-542 or the NRC staff's SE to the proposed license amendment. The NRC staff evaluated each variation below.

3.5.1 Variation 1, Instrumentation functions – pump start time delay relays

DNPS TS Table 3.3.5.1, Functions 1.e and 2.e, describe pump start time delay relays for the CS and LPCI pumps. These functions do not have an equivalent as described in the STS. The purpose of these pump start time delays is to stagger the automatic starting of the pumps thus limiting the starting electrical transients on the 4.16 kV emergency buses. The staggered starting of the CS and LPCI pumps is unnecessary for manual operation. Therefore, the staff finds that the deletion of the Mode 4 and 5 requirements listed TS Table 3.3.5.1 Functions 1.e and 2.e for the CS and LPCI pump start time delay relays, to be acceptable.

3.5.2 Variation 2, Dedicated Shutdown Cooling

As stated in Reference 1, DNPS uses the SDC system which is dedicated to DHR. The DNPS SDC system is similar to the shutdown cooling function of the RHR system described the STS, except that SDC is not a mode of another system. The licensee proposed to use "Shutdown Cooling (SDC) System Isolation" instead of "RHR System Isolation" for Function 3 of TS Table 3.3.5.2-1, RPV WIC instrumentation.

The NRC staff determined the proposed variation is acceptable because the DNPS SDC system has a DHR function equivalent to the RHR system, and retaining the system name for TS Table 3.3.5.2-1 is consistent with the current licensing basis.

The licensee proposed a variation to retain TS 3.3.6.1, "Primary Containment Isolation Instrumentation," Required Actions I.1 and I.2, which require for an inoperable channel to either immediately restore the channel to operable status or to immediately initiate action to isolate the Shutdown Cooling System. DNPS TS 3.3.6.1, Required Action I.2, "Initiate action to isolate the Shutdown Cooling System," is similar to STS 3.3.6.1 Required Action J.2, "Initiate action to isolate the Residual Heat Removal (RHR) Shutdown Cooling System," which is deleted by TSTF-542. The licensee stated in Reference 1, that, "TS 3.3.6.1 Required Action I.2 is retained to account for SDC system flow path isolation in Mode 3..."

The NRC staff determined that retaining TS 3.3.6.1, Required Action I.2, "Initiate action to isolate the Shutdown Cooling System," for reactor level channel inoperability is acceptable since this action is applicable to MODE 3, SDC isolation requirements.

Based on these determinations, the NRC staff concludes that the licensees proposed variations regarding the SDC are acceptable to support the adoption of TSTF-542 at DNPS.

3.5.3 Variation 3, Channel checks

As identified in Section 2.2.5.3 above, DNPS does not currently have the capability to perform Channel Checks for the following proposed Table 3.3.5.2-1 Functions:

1.a, "Reactor Steam Dome Pressure-Low (Permissive),"
1.b, "Core Spray Pump Discharge Flow-Low (Bypass),"
2.a, "Reactor Steam Dome Pressure-Low (Permissive)," and
2.b, "Low Pressure Coolant Injection Pump Discharge Flow-Low (Bypass)."

The NRC staff has determined that the above instrument Functions do not have existing Channel Checks (TS Table 3.3.5.1-1) and no future Channel Checks were proposed for the instruments being relocated to new TS Table 3.3.5.2-1. Since Channel Checks for these Functions have no impact on manual low pressure ECCS injection/spray capabilities for CS or LPCI and the licensee will retain its current licensing basis for these instruments, the NRC staff has determined the proposed variation to be acceptable.

3.5.4 Variation 4, Channels per loop

Each DNPS unit has two LPCI loops with two pumps in each loop. The DNPS TSs currently require one operable channel for each LPCI loop for the "Low Pressure Coolant Injection Pump Discharge Flow-Low (Bypass)," Function. The licensee proposed to maintain the one channel per loop for TS 3.3.5.2, Function 2.b, in lieu of one channel per pump as described in the STS, since at DNPS, there is only one flow transmitter for each loop that monitors the flow of both pumps in that loop (i.e., two LPCI loop flow transmitters per unit).

The NRC staff reviewed this variation and determined that the slight design differences between DNPS (loop) and STS (pump) do not have a negative impact associated with DRAIN TIME, and automatic actions to the LPCI pump protection for overheating during low flow conditions. The licensee has chosen to retain the current licensing basis for these instruments, and, therefore, the NRC staff finds the proposed variation to be acceptable.

3.5.5 Variation 5, Manual initiation logic

The existing DNPS TSs do not include a manual initiation logic function for the CS or LPCI subsystems. This is due to the fact that the DNPS design does not include this feature. Therefore, since this function does not exist at DNPS, manual initiation functions for LPCI and

CS were not proposed in TS 3.3.5.2, "Reactor Pressure Vessel (RPV) Water Inventory Control," Table 3.3.5.2-1. Additionally, since the manual initiation functions are not included in Table 3.3.5.2-1, the associated logic system functional test would likewise not be required for TS 3.3.5.2. Therefore, TS 3.3.5.2 as proposed for DNPS does not include a logic system functional test SR. As an alternative, the licensee proposed that TS 3.5.2, "Reactor Pressure Vessel (RPV) Water Inventory Control," include SR 3.5.2.7 to verify that the CS and LPCI subsystems can be manually operated through the manipulation of subsystem components from licensed operators in the DNPS MCR.

The NRC staff reviewed the licensee proposed alternative and determined that although DNPS does not have the capability to start an ECCS subsystem with a single push button, the components that provide low pressure 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 3.5.2.7. This SR verifies that the required CS or LPCI subsystem (including associated pump switches, and valve(s)) can be manually operated to provide additional RPV water inventory, if needed. Therefore, the NRC staff concludes that the licensees proposed alternative (variation) is acceptable.

3.5.6 Variation 6, RWCU System Isolation

The DNPS design provides for isolation of the RWCU system at the Reactor Vessel Water Level-Low signal versus the Reactor Vessel Water Level-Low Low signal in STS. The licensee proposed that Table 3.3.5.2-1 reflects this RWCU isolation difference.

The NRC staff evaluated this variation and made the comparison to that specified in STS Table 3.3.5.2-1, Function 4.a, RWCU system isolation, Reactor Vessel Water Level – Low Low, Level 2 (Reference 7) which has an Allowable Value of ≥ -47 inches. The licensee will retain the current licensing basis for DNPS by proposing TS Table 3.3.5.2-1, Function 4.a, RWCU system isolation, Reactor Vessel Water Level – Low, which has an Allowable Value of ≥ 2.65 inches. The NRC staff has concluded the licensees proposed variation for the RWCU system isolation Allowable Value includes increased conservatisms compared to the STS value and meets the TSTF-542 requirements and is, therefore, acceptable.

3.5.7 Variation 7, Automatic Isolation on Reactor Water Level

DNPS Table 3.3.5.2-1, Functions 3.a and 4.a, specify requirements for the automatic isolation on Reactor Vessel Water Level-Low for the SDC and RWCU, which at DNPS varies slightly from the STS (Reference 7). These functions receive input from four reactor vessel water level channels. Each channel inputs into one of four trip strings and two trip strings make up a trip system. The trip systems are aligned in a parallel configuration, both trip systems must trip in order to cause an isolation of the SDC or RWCU subsystem valves. Any channel will trip its associated trip string and trip system. Therefore, both trip systems with one trip string in each trip system is required to provide for automatic SDC and RWCU system isolation. The licensee's proposed Table 3.3.5.2-1 has been revised from TSTF-542 to reflect the DNPS requirement for one operable channel in each Reactor Vessel Water Level-Low isolation trip system for SDC and RWCU.

The NRC staff has determined that the differences between the DNPS and STS requirements for RWCU and RHR/SDC system trip systems do not negatively affect the ability of DNPS to initiate system isolation when needed to support DRAIN TIME. The staff have concluded that any single channel will trip its associated trip string and trip system; and, therefore, the proposed variation is acceptable.

3.5.8 Variation 8, Note for TS LCO 3.5.2

The existing DNPS TSs do not contain a Note applicable to LCO 3.5.2 regarding realignment to the low pressure coolant injection mode. This Note is not applicable to DNPS because of the separate SDC system that provides for the removal of reactor residual heat. This has no effect on the adoption of TSTF-542.

The NRC staff reviewed this variation and has concluded that the absence of this LCO 3.5.2 Note from the existing DNPS TSs has no effect on the adoption of TSTF-542, and, is, therefore, acceptable.

3.5.9 Variation 9, Suppression Pool and CCST

Verification of DNPS suppression pool and CCST volumes is contained in a single SR (i.e., SR 3.5.2.2) versus in separate SRs specified in the STS (SRs 3.5.2.1 and 3.5.2.2).

The NRC staff has concluded that the licensee proposed variation is equivalent to the STS and has no impact on the adoption of TSTF-542 at DNPS, therefore, this variation is acceptable.

3.5.10 Variation 10, TS 3.6.1.3, Condition F

The licensee proposed to delete DNPS TS 3.6.1.3, Condition F, and all of its associated Required Actions. The Applicability for TS 3.6.1.3, "Primary Containment Isolation Valves (PCIVs);" is "When associated instrumentation is required to be OPERABLE per LCO 3.3.6.1, 'Primary Containment Isolation Instrumentation." In Reference 1, the licensee states;

> "This change is justified since OPDRVs requirements have been deleted, and Mode 4 and 5 PCIV requirements have been relocated from TS 3.3.6.1 and 3.6.1.3 to the proposed TS 3.3.5.2. Thus, there are no longer any PCIVs required to be operable by TS 3.6.1.3 during Mode 4 or 5. These requirements are addressed by the proposed TS 3.3.5.2 in their entirety. Following the removal of OPDRVs and relocation of Mode 4 and 5 requirements as discussed above, this Condition and associated Actions in TS 3.6.1 .3 would never be applicable; therefore, are no longer necessary. These requirements are addressed by the proposed TS 3.3.5.2 in their entirety."

The NRC staff evaluated the licensees proposed variation. DNPS TS 3.6.1.3, Condition F, states, "Required Action and associated Completion Time of Condition A, B, C, or D not met for PCIV(s) required to be OPERABLE during MODE 4 or 5." (TS 3.6.1.3, Condition E, is similar to Condition F, but applies to Modes 1, 2, or 3). The staff determined that since the RPV WIC requirements would be consolidated into TSs 3.3.5.2 and 3.5.2, the Modes 4 and 5 requirements in TS 3.6.1.3 would no longer be applicable. Therefore, the NRC staff have concluded that the proposed variation is consistent with the requirements of TSTF-542 and is, therefore, acceptable.

3.6 Staff Evaluation of Proposed Deletion of References to OPDRVs Term

Section 2.2.4 above lists the numerous OPDRVs references proposed for deletion. The proposed changes would replace the existing specifications related to OPDRVs with revised specifications for RPV WIC. For example, the proposed change removes; "operations with a potential for draining the reactor vessel," "OPDRVs," related concepts such as "Shutdown

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

The existing DNPS TSs contain instrumentation requirements related to OPDRVs in four separate TS. 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 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 greatly clarified and simplified alternative set of controls for ensuring water level is maintained above the TAF and is therefore acceptable.

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

The current DNPS TSs describe TS LCO 3.10.8, "Inservice Leak and Hydrostatic Testing Operations," allowed 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 standby gas treatment system LCOs were met.

DNPS adoption of TSTF-484 (Reference 11) 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 3.10.8 and TSTF-484 for DNPS the NRC stated that, ..."two low pressure ECCS [Emergency Core Cooling Systems] injection/spray (i.e., core spray or LPCI) subsystems are required to be operable in Mode 4 at DNPS ... per TS 3.5.2, ECCS-Shutdown;" however, per the new LCO 3.5.2 adopted as part of TSTF-542 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 satisfactory because this level of redundancy is not required, even during application of LCO 3.10.8. When the licensee applies LCO 3.10.8 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 that 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 true.

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 level would be lowered to the TAF.

Using the reasoning presented elsewhere in this SE for TSTF-542 and after additional review of the SE for DNPS TS 3.10.8 and TSTF-484, the NRC staff determined that the LCOs 3.3.5.2.1 and 3.5.2 adopted as part of TSTF-542 are satisfactory and will therefore be acceptable even during application of LCO 3.10.8.

3.8 Technical Conclusion

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

The reactor coolant system is at a low operating temperature ($\leq$212 °F) and is depressurized during Modes 4 and 5 conditions (except during Special Operations per TS 3.10.8, "Leak and Hydrostatic Testing Operation," when allowed to be > 212 °F). An event involving a loss of inventory while in the shutdown condition is judged to not exceed the capacity of one low pressure ECCS injection/spray subsystem. The accidents that are postulated to occur during shutdown conditions, the fuel handling accident (UFSAR 15.7.3) and the gas waste system leak or failure (UFSAR 15.7.1), do not involve a loss of RPV inventory. The equipment and instrumentation associated with the RPV WIC TSs do not provide detection or mitigation related to these design basis accidents.

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

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

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

The NRC staff evaluated the proposed DRAIN TIME definition, TS 3.5.2, which contains the requirements for RPV WIC, and TS 3.3.5.2, which contains the requirements for instrumentation necessary to support TS 3.5.2. Based on the considerations discussed above, the NRC staff concludes that the proposed revisions are acceptable because they consolidate and clarify the RPV WIC requirements, which meet 10 CFR 50.36(c)(2)(ii), Criterion 4, to establish LCOs for structures, systems, or components significant to public health and safety as evidenced by operating experience.

The licensee proposed to delete phrases used for controls during OPDRVs from the TS Applicability, Condition, Required Actions, and Footnotes. The NRC staff has reviewed the proposed changes and determined that 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 greatly clarified and simplified alternative set of controls for ensuring water level is maintained above the TAF.

The NRC staff reviewed the SRs associated with the new LCOs 3.5.2 and 3.3.5.2. The NRC staff finds that the proposed TS SRs 3.5.2 are acceptable since they support TS 3.5.2 DRAIN TIME requirements, assure that water inventory is available for low pressure ECCS injection/spray subsystem RPV injection and pump performance, low pressure ECCS injection/spray subsystem are adequately filled (mitigates effects of gas accumulation or voiding), the subsystems have verified valve positions to support RPV injection, verified pumps provide adequate flow to support DRAIN TIME and RPV injection, verification of automatic isolation, and low pressure 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)(2)(ii) and 10 CFR 50.36(c)(3).

The NRC staff evaluated the proposed DNPS changes against each of the unit applicable design requirements per the UFSAR as detailed in Section 2.3 1 (Unit 3) and Section 2.3.2 (Unit 2) (Reference 10) of this SE. The NRC staff finds that the proposed changes for Mode 4 and 5 operations, as they relate to the proposed TS changes for the new DRAIN TIME definition and the removal of OPDRVs references, remain consistent with the GDCs in that the DNPS design requirements for instrumentation, reactor coolant leakage detection, the reactor coolant pressure boundary, and reactor coolant makeup are unaffected.

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

Additionally, the proposed TS changes were reviewed for technical clarity and consistency with the existing DNPS requirements for customary terminology and formatting. The NRC staff found that the proposed changes were consistent with Traveler TSTF-542, Revision 2 (Reference 5) and Chapter 16 of the SRP (Reference 9).

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the appropriate official for the State of Illinois was notified of the NRC's proposed issuance of the amendment on October 18, 2017. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. 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 (*Federal Register* 82 FR 17457, dated April 11, 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.

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Date of issuance: January 8, 2018

7.0 REFERENCES

1. Letter from Exelon Generation Company, LLC, Dresden Nuclear Power Station, Units 2 and 3, Application to Revise Technical Specifications to Adopt Traveler TSTF-542, Revision 2, "Reactor Pressure Vessel Water Inventory Control," (RS-17-029), dated February 10, 2017, ADAMS Accession No. ML17045A006.

2. Letter from Exelon Generation Company, LLC, Dresden Nuclear Power Station, Units 2 and 3, Supplement to Application to Revise Technical Specifications to Adopt Traveler TSTF-542, Revision 2, "Reactor Pressure Vessel Water Inventory Control," (RS-17-086), dated July 13, 2017, ADAMS Accession No. ML17194B069.

3. Letter from Exelon Generation Company, LLC, Dresden Nuclear Power Station, Units 2 and 3 to NRC, "Supplement to Dresden Nuclear Power Station, Units 2 and 3 Application to Revise Technical Specifications to Adopt TSTF-542, 'Reactor Pressure Vessel Water Inventory Control,'" dated December 20, 2017, ADAMS Accession No. ML17354B196

4. Letter from Exelon Generation Company, LLC, Dresden Nuclear Power Station, Units 2 and 3 to NRC, "Supplement to Dresden Nuclear Power Station, Units 2 and 3 Application to Revise Technical Specifications to Adopt TSTF-542, 'Reactor Pressure Vessel Water Inventory Control,'" dated December 21, 2017, ADAMS Accession No. ML17356A134.

5. Enclosure to Technical Specifications Task Force Traveler TSTF-542, Revision 2, "Reactor Pressure Vessel Water Inventory Control," dated March 14, 2016, ADAMS Accession No. ML16074A448.

6. Final Safety Evaluation for 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.

7. U.S. Nuclear Regulatory Commission (USNRC), "Standard Technical Specifications, General Electric BWR/4 Plants," NUREG-1433, Vol. 1, "Specifications," Rev. 4.0, dated April 2012, ADAMS Accession No. ML12104A192.

8. U.S. Nuclear Regulatory Commission (USNRC), "Standard Technical Specifications, General Electric BWR/4 Plants," NUREG-1433, Vol. 2, "Bases," Rev. 4.0, dated April 2012, ADAMS Accession No. ML12104A193.

9. NUREG-0800, Revision 3, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants" (SRP), Section 16, "*Technical Specifications,*" dated March 2010, ADAMS Accession No. ML100351425.

10. Dresden Nuclear Power Station, Units 2 and 3, Updated Final Safety Analysis Report (UFSAR), Sections 3.1.1. & 3.1.2.

11. Letter from US NRC to Exelon Generation Company, LLC, "Dresden Nuclear Power Station, Units 2 and 3; LaSalle County Station, Units 1 and 2; and Quad Cities Nuclear Power Station, Units 1 and 2 - Issuance of Amendments to Add Technical Specification 3.10.8, "Inservice Leak and Hydrostatic Testing Operations" (CAC Nos. MF5471-MF5476)," dated December 17, 2015, ADAMS Accession No. ML15324A439.

LIST OF ACRONYMS

AC	Air conditioning
ADAMS	Agencywide Documents Access and Management System
BWR	Boiling-Water Reactor
CCST	Contaminated Condensate Storage Tank
CFR	[Title 10 of the] *Code of Federal Regulations*
CREV	Control Room Emergency Ventilation
CS	Core Spray
DC	Direct Current
DHR	Decay Heat Removal
DID	Defense in Depth
DNPS	Dresden Nuclear Power Station
ECCS	Emergency Core Cooling System
ESF	Engineered Safety Feature
° F	degree Fahrenheit
GDC	General Design Criteria
gpm	gallons per minute
IC	Isolation Condenser
LAR	License Amendment Request
LCO	Limiting Condition for Operation
LOCA	Loss-Of-Coolant Accident
LPCI	Low Pressure Coolant Injection
OPDRVs	operations with potential for draining the reactor vessel
NRC	Nuclear Regulatory Commission
psig	pounds per square inch gauge
PCIV	Primary Containment Isolation Valve
RCPB	Reactor Coolant Pressure Boundary
RHR	Residual Heat Removal
RPV	Reactor Pressure Vessel
RWCU	Reactor Water Clean Up
SCIV	Secondary Containment Isolation Valve
SDC	Shutdown Cooling
SE	Safety Evaluation
SFCP	Surveillance Frequency Control Program
SGT	Standby Gas Treatment
SR	Surveillance Requirement
SRP	Standard Review Plan
STS	Standard Technical Specification

TAF	top of active fuel
TS	Technical Specification
TSTF	Technical Specification Task Force
UFSAR	Updated Final Safety Analysis Report
USNRC	United States Nuclear Regulatory Commission
WIC	Water Inventory Control

SUBJECT: DRESDEN NUCLEAR POWER STATION, UNIT NOS. 2 AND 3 - ISSUANCE OF AMENDMENTS TO RENEWED FACILITY OPERATING LICENSE NOS. DPR-19 AND DPR-25 TO REVISE TECHNICAL SPECIFICATIONS TO ADOPT TECHNICAL SPECIFICATION TRAVELER FORCE 542, REVISION 2, "REACTOR PRESSURE VESSEL WATER INVENTORY CONTROL" (CAC NOS. MF9295 AND MF9296; EPID L-2017-LLA-0176) DATED JANUARY 8, 2018

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