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10 CFR 50.90

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U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Nine Mile Point Nuclear Station, Unit 1
Renewed Facility Operating License No. DPR-63
NRC Docket No. 50-220

Subject: License Amendment Request - Revise Technical Specifications to Apply TSTF-542, "Reactor Pressure Vessel Water Inventory Control," Revision 2

In accordance with 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit," Exelon Generation Company, LLC (Exelon) requests an amendment to the Technical Specifications, Appendix A, of Renewed Facility Operating License No. DPR-63 for Nine Mile Point Nuclear Station, Unit 1 (NMP1). The proposed amendment is consistent with NRC-approved Technical Specification Task Force (TSTF) 542, Revision 2, "Reactor Pressure Vessel Water Inventory Control."

The proposed amendment would revise the NMP1 Technical Specification (TS) by replacing the existing specifications related to Operation with a Potential for Draining the Reactor Vessel (OPDRV) with revised requirements for Reactor Pressure Vessel Water Inventory Control (RPV WIC).

Attachment 1 provides the Evaluation of Proposed Changes. Attachment 2 provides the Proposed TS Marked-Up Pages. Attachment 3 provides revised (clean) TS pages. Attachment 4 provides the Bases Marked-Up Pages.

The proposed changes have been reviewed by the NMP Plant Operations Review Committee in accordance with the requirements of the Exelon Quality Assurance Program.

Exelon requests approval of the proposed amendment by January 31, 2019. Once approved, the amendment shall be implemented no later than the start of the NMP1 Spring 2019 refueling outage.

There are no regulatory commitments contained in this request.

Exelon has concluded that the proposed change presents no significant hazards consideration under the standards set forth in 10 CFR 50.92.

In accordance with 10 CFR 50.91, "Notice for public comment; State consultation," paragraph (b), Exelon is transmitting a copy of this application and its attachments to the designated State Officials.

Should you have any questions concerning this submittal, please contact Ron Reynolds at (610) 765-5247.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 15th day of December 2017.

Respectfully,

James Barstow
Director - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Attachments:
1) Evaluation of Proposed Changes
2) Proposed Technical Specification Marked-Up Pages
3) Revised Technical Specification Pages
4) Proposed Technical Specification Bases Marked-Up Pages

cc:	USNRC Region I, Regional Administrator	w/attachments
	USNRC Senior Resident Inspector, NMP	w/attachments
	USNRC Project Manager, NMP	w/attachments
	A. L. Peterson, NYSERDA	w/attachments

ATTACHMENT 1

License Amendment Request

Nine Mile Point Nuclear Station, Unit 1

Docket No. 50-220

EVALUATION OF PROPOSED CHANGES

CONTENTS

SUBJECT: **Revise Technical Specifications to Apply TSTF-542, "Reactor Pressure Vessel Water Inventory Control," Revision 2**

1.0 DESCRIPTION

Pursuant to 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit," Exelon Generation Company, LLC (Exelon) requests an amendment to the Technical Specifications (TS), Appendix A, of Renewed Facility Operating License No. DPR-63 for Nine Mile Point Nuclear Station, Unit 1 (NMP1).

The proposed changes would replace the existing specifications related to Operation with a Potential for Draining the Reactor Vessel (OPDRV) with revised specifications for Reactor Pressure Vessel Water Inventory Control (RPV WIC).

2.0 ASSESSMENT

2.1 Applicability of Published Safety Evaluation

Exelon has reviewed the Safety Evaluation provided to the Technical Specifications Task Force on December 20, 2016 (Reference 1), as well as the information provided in TSTF-542, Revision 2, (Reference 2). Exelon has concluded that the justifications presented in TSTF-542, Revision 2, and the Safety Evaluation prepared by the NRC staff is applicable to NMP1, and justify this amendment for the incorporation of the changes to the NMP1 TS.

The following NMP1 TS are affected by the proposed changes:

	TOC
1.0	Definitions
3.1.4	Core Spray System
3.1.9/4.1.9	Reactor Pressure Vessel (RPV) Water Inventory Control (New section added by this License Amendment Request)
3.2.7	Reactor Coolant System Isolation Valves
3.4.0	Reactor Building
3.4.1	Leak Rate
3.4.2	Reactor Building Integrity –Isolation Valves
3.4.3	Access Control
3.4.4	Emergency Ventilation System
3.4.5	Control Room Air Treatment System
3.6.2/4.6.2	Protective Instrumentation

2.2 Variations

Exelon is proposing the following variations from the TS changes described in TSTF-542, Revision 2. These variations do not affect the applicability of TSTF-542, Revision 2, or the NRC staff's safety evaluation to the proposed license amendment. Similar to Cooper Nuclear Station (CNS) submittal to implement TSTF-542, Revision 2 (Reference 3), there are STS requirements on which TSTF-542, Revision 2, is based that do not appear in the NMP1 TS. The variations due to the NMP1 Custom Technical Specifications are described below.

2.2.1 NMP1 Pre-GDC Assessment

The TSTF-542, Revision 2, Traveler and Safety Evaluation discuss the applicable regulatory requirements and guidance, including the 10 CFR 50, Appendix A, General Design Criteria (GDC). NMP1 was not licensed to the 10 CFR 50, Appendix A, GDC. The NMP1 Updated Final Safety Analysis Report (UFSAR) provides an assessment against the GDC in Table I-1. This UFSAR table refers to the NMP1 Technical Supplement to Petition for Conversion from Provisional Operating License to Full-Term Operating License, July 1972, for the details of the assessment against the GDC current at that time. A review has determined that the plant-specific requirements for NMP1 are sufficiently similar to the Appendix A GDC as related to the proposed change. The proposed license change is consistent with the NMP1 current licensing basis in that the design requirements for instrumentation, reactor coolant leak detection, the reactor coolant pressure boundary, and reactor coolant makeup are unaffected. See below for excerpts (in italics) from the July 1972 NMP1 Technical Supplement to Petition for Conversion from Provisional Operating License to Full-Term Operating License describing how the NMP1 design aligns to the applicable GDC.

Criterion 13 - Instrumentation and Control
The fission process is monitored and controlled for all conditions from the source range through the power range. The neutron monitoring system detects core conditions that could potentially threaten the overall integrity of the fuel barrier due to excess power generation and provides a corresponding signal to the reactor protection system. Fission chambers, located in the core, are used to sense neutron flux from the source range through the power range. The detectors are located to provide maximum sensitivity to control-rod movement during startup and to provide optimum monitoring in the intermediate and power ranges.

Also, the reactor protection system is provided to initiate automatically appropriate action whenever specific Station conditions reach established limits. The protective system functions are tabulated in the Technical Specifications. The system is designed to mitigate the consequences of Station normal and accident transients, and operator errors, to ensure that core safety limits are not exceeded and to ensure the integrity of the reactor coolant boundary, containment and associated systems.

Instrumentation and control features of systems which can affect the fission process, the integrity of the reactor core, the reactor coolant pressure boundary, and the containment and its associated systems are described in detail in the FSAR. Also described there are instrumentation and control features of other systems associated with the reactor.

The detailed information referenced above substantiates compliance with this criterion.

Criterion 14 - Reactor Coolant Pressure Boundary
This criterion is met since these systems were designed and analyzed for all possible adverse conditions and the resultant stresses are very conservative when compared to the American National Standards Institute code B31.1 allowables. All code required tests, inspections and material certifications were performed.

Criterion 30 - Quality of Reactor Coolant Pressure Boundary
As discussed in the evaluation for Criterion 14 above, components which are part of the reactor coolant pressure boundary are designed and constructed to the highest quality

standards practical. Drywell equipment and floor drains are monitored and sampled. From analyses of the samples, the location of the source of reactor coolant leakage will be determined. In addition, a continuous air monitor is employed to monitor rises in drywell atmosphere radioactivity which can be related to leakage.

Criterion 33 - Reactor Coolant Makeup
As discussed in the accident analysis presented in the FSAR, leaks from smaller coolant lines are detected by increased drywell temperature or pressure, or by drywell sump level buildup. For line breaks with an equivalent area less than 0.15 square feet, feedwater flow provides adequate core cooling. A control-rod-drive pump is continuously available for high-pressure inventory makeup, even if all offsite power is lost. The control-rod-drive pump would deliver 50 gpm of makeup to the reactor at operating pressure.

For breaks above the capacity of these systems, or in the event that neither system is available, a redundant core spray system is provided. This system is discussed in the FSAR. Core spray coolant does not enter the reactor vessel until reactor pressure has dropped to 365 psig. For break areas less than 0.15 square feet, the reactor is depressurized by the redundant auto-relief system. This allows core spray operation and prevents significant clad damage.

As an additional means of accommodating small breaks a feedwater high pressure coolant injection system will be provided. The system consists of two redundant sets of motor-driven pumps. The system will be capable of delivering 7,600 gpm into the reactor vessel at reactor pressure. Condensate and feedwater-booster pumps are normally operating when the primary system is at pressure. The two motor-driven feedwater pumps would be automatically started on either a turbine trip or low reactor water level. The system will use off-site power for operation and on-site power for the lubrication pump. Installation of final wiring and electrical controls will make the system operable by the end of the first major refueling outage.

Based on the analysis performed in the Technical Supplement, NMP1 believes that the plant-specific requirements for NMP1 are sufficiently similar to the Appendix A GDC and represent an adequate technical basis for adopting TSTF-542, Revision 2.

2.2.2 NMP1 Custom TS Summary

The NMP1 TS are Custom TS (CTS) and are a different format, different numbering and titles than the NRC Improved Standard Technical Specifications in NUREG-1433 (STS) on which TSTF-542, revision 2, was based. As examples, the NMP1 CTS format does not capitalize definitions and uses the term Parameter instead of Function. These variations and other similar variations are discussed in the variation details that follow. These variations are administrative and do not affect the applicability of TSTF-542, Revision 2, to the NMP1 TS.

In keeping the CTS format, NMP1 includes a new Section 3.1.9 and 4.1.9 created for the Reactor Pressure Vessel (RPV) Water Inventory Control (WIC), Limiting Condition of Operations (LCOs) and associated Surveillance Requirements. Section 3.1.0 is for systems to protect the fuel cladding. Section 3.5.0 of the NMP1 TS is for Shutdown and Refueling. Locating the new TS for RPV WIC in Section 3.1.0 is the logical location to be consistent with TSTF-542, Revision 2, Proposed Safety Basis (Section 3.1.2), and therefore justified.

Additionally, the wording for the new LCO Condition, Applicability, Required Action, Completion Time, and Surveillance Requirements have been modified from the STS format in TSTF-542, Revision 2, to align to the NMP1 TS format.

The NMP1 Reactor Operating Conditions are different than the STS. The STS terminology of Modes is not used in the NMP1 TS. The table below describes the differences.

STS Mode	NMP1 TS Reactor Operating Condition
1 - Power Operation	Power Operating Condition
2 - Startup	
3 - Hot Shutdown (>200°F)	Shutdown Condition – Hot (>212°F)
4 - Cold Shutdown (≤200°F)	Shutdown Condition – Cold (≤212°F)
5 - Refueling	Refueling Condition
No Mode	Major Maintenance Condition (defueled)

The NMP1 instrumentation uses the position of the Reactor Mode Switch to enable functions. The tables in TS 3.6.2/4.6.2 Protective Instrumentation include columns titled "Reactor Mode Switch Position in Which Function Must be Operable." The table below correlates NMP1 Reactor Operating Condition to Mode Switch Position.

NMP1 TS Reactor Operating Condition	NMP1 Reactor Mode Switch Position
Power Operating Condition	Run
	Startup
Shutdown Condition – Hot (>212°F)	Shutdown
Shutdown Condition – Cold (≤212°F)	Shutdown or Refuel
Refueling Condition	Refuel
Major Maintenance Condition (defueled)	No Required Position

The TSTF-542, Revision 2, traveler is written to support a Safety Limit (SL) that requires RPV water level to remain above the Top of Active Fuel (TAF). The reactor vessel water level of -10 inches indicator scale used by NMP1 as its SL is a reflection of the limitations of the vessel level instrumentation available to the Operations staff and is not indicative of a difference from, or change to, the analysis presented in TSTF-542, Revision 2. The SL is a long-standing TS value and is not changed as part of the proposed changes to apply TSTF-542, Revision 2, to NMP1.

NMP1 TS 2.1.1.d specifies the SL for water level as -10 inches indicator scale. The TAF at NMP1 is defined in the UFSAR as -84 inches below vessel zero. All the trip settings for instruments that are relied upon for accident or transient mitigation are referenced to vessel zero. The setpoint of -10 inches indicator scale corresponds Low-Low-Low Reactor Water Level, which with a simultaneous High Drywell pressure condition, are the initiation signals for the Automatic Depressurization System (ADS). The ADS is used to rapidly depressurize the reactor when the line break is smaller than 0.30 sq. ft, so that the Low-Pressure Permissive signal can be sent to the valves and the Core Spray water admitted to the reactor.

Note also that the minimum level assumed for a Design Basis Accident Loss Of Coolant Accident (LOCA) is below the TAF, and the degree of cladding damage is a function of core uncovery (reflooded) time, and not minimum vessel level. The SL, therefore, does not directly impact reactor safety.

This SL is a variation to TSTF-542, Revision 2. NMP1 proposes to maintain the wording of protecting the SL, which will maintain RPV water level above -10 inches indicator scale, as opposed to referencing TAF. This use of "above -10 inches indicator scale" is a variation to several changes described in the proposed changes to apply TSTF-542, Revision 2, including the definition of drain time and throughout the new LCO for the RPV WIC. The variation maintains consistency within the NMP1 TS and does not affect the applicability of TSTF-542, Revision 2, to the NMP1 TS.

TSTF-542, Revision 2, identifies both a Low Pressure Core Injection (LPCI) system and a Low Pressure Core Spray (LPCS) system for RCP WIC. NMP1 does not have a LPCI system or LPCS system. NMP1 uses a Core Spray system that operates at low pressure. This is a variation to TSTF-542, Revision 2. The Core Spray system consists of two separate and independent Core Spray loops as described in NMP1 Updated Final Safety Analysis Report (UFSAR) Section VII, Engineered Safeguards. For NMP1, the Core Spray system performance is evaluated for the entire spectrum of break sizes for a postulated LOCA. Both systems (at least one subsystem in each system) are required to operate to limit peak clad temperatures below 2200°F (10 CFR 50.46(a)(1)(i) model) for the worst case line break (recirculation discharge line break). The NMP1 UFSAR, Chapter XV, Section 2.4.4, discusses a Core Spray system break, during a Design Basis Accident LOCA, reducing the Core Spray system to one sparger fed by one Core Spray pump and one topping pump. The resultant analysis demonstrated that the 10 CFR 50.46 limits are met. It is reasonable to assume, based on engineering judgment, that while the reactor coolant temperature is less than or equal to 212°F, one Core Spray subsystem can maintain adequate reactor vessel water level. Operation of one pump set and blocking valve is sufficient to establish required delivery rate and flow path. This evaluation represents an adequate technical basis for this variation to TSTF-542, Revision 2.

The Instrumentation specifications are Section 3.6.2 for NMP1. Section 4.6.2 contains the corresponding Surveillance Requirements. Section 3.6.2 is a series of Tables for the various instruments. Each instrument table uses the term Parameter, which is equivalent to the term Function in the STS. For the instrumentation changes to conform to TSTF-542, Revision 2, a new Table 3.6.2m/4.6.2m is created for RPV WIC instrumentation Parameters and associated Surveillance Requirements required for the Shutdown Condition – Cold and Refueling Conditions. The Parameters used in new Table 3.6.2m/4.6.2m come from the existing instrumentation Table 3.6.2b/4.6.2b and Table 3.6.2d/4.6.2d. The applicable notes are also retained in the new Table 3.6.2m/4.6.2m. Due to relocating some Parameters to Table 3.6.2m/4.6.2m, the applicability of those Parameters retained in the existing Table3.6.2b/4.6.2b and Table 3.6.2d/4.6.2d is also modified to align to the requirements of TSTF-542, Revision 2, for retaining applicability in the Shutdown Condition – Hot Operating Condition. This results in changing some of the existing Table 3.6.2 notes. These changes are summarized in the following variation sections where the Table changes are discussed.

TSTF-542, Revision 2, uses the term "Manual Initiation" for Functions in Table 3.3.5.2-1, RPV Water Inventory Control Instrumentation. To remain consistent with the NMP1 TS, the term "Manual" is used to identify specific Parameters in Tables 3.6.2m and 4.6.2m. This is a variation to TSTF-542, Revision 2, that is administrative in nature and do not affect the applicability of TSTF-542, Revision 2, to the NMP1 TS.

The table below summarizes TSTF-542, Revision 2, TS with OPDRV related requirements using NUREG-1433, BWR/4 STS, and the corresponding NMP1 TS where changes are proposed. The NMP1 TS do not use a Setpoint Control Program. The NMP1 CTS Equivalent column includes reference to the variation discussion sections in **bold** font. The sections identified in bold font in the table are described in detail following the table.

NUREG-1433, BWR/4 ISTS Modified for TSTF-542, Rev. 2	**NMP1 CTS Equivalent**
3.3.5.1, Emergency Core Cooling System (ECCS) Instrumentation	3.6.2/4.6.2, Protective Instrumentation (**Section 2.2.4 and 2.2.5 below**) • Table 3.6.2d/4.6.2d Instrumentation That Initiates Core Spray • Table 3.6.2f/4.6.2f Instrumentation that Initiates Auto Depressurization
3.3.5.2 RPV WIC Instrumentation (added by TSTF-542, Revision 2)	3.6.2/4.6.2 Protective Instrumentation (**Section 2.2.5 below**) • Table 3.6.2b/4.6.2b Instrumentation that Initiates Primary Coolant System and Containment Isolation (Revised) • Table 3.6.2m/4.6.2m RPV WIC Instrumentation (New table added to NMP1 CTS for TSTF-542, Revision 2)
3.3.5.3 RCIC System Instrumentation (Renumbered from 3.3.5.2)	3.6.2/4.6.2 Protective Instrumentation (**Section 2.2.6 below**) • Table 3.6.2c/4.6.2c Instrumentation That Initiates or Isolates Emergency Cooling.
3.3.6.1, Primary Containment Isolation Instrumentation	3.6.2/4.6.2, Protective Instrumentation (**Section 2.2.7 below**) • Table 3.6.2b/4.6.2b Instrumentation that Initiates Primary Coolant System or Containment Isolation • Table 3.6.2c/4.6.2c Instrumentation That Initiates or Isolates Emergency Cooling.
3.3.6.2, Secondary Containment Isolation	3.6.2/4.6.2, Protective Instrumentation • Table 3.6.2j/4.6.2j, Emergency Ventilation Initiation 3.4.2 Reactor Building Integrity – Isolation Valves (**Section 2.2.8 below**)
3.3.7.1, [Main Control Room Environmental Control (MCREC)] System Instrumentation	3.4.5, Control Room Air Treatment System 3.6.2/4.6.2, Protective Instrumentation • Table 3.6.2l/4.6.2l, Control Room Air Treatment System Initiation (**Section 2.2.9 below**)

NUREG-1433, BWR/4 ISTS Modified for TSTF-542, Rev. 2	NMP1 CTS Equivalent
3.5.2, ECCS Shutdown	3.1.4, Core Spray System 3.1.5, Solenoid-Actuated Pressure Relief Valves (Automatic Depressurization System). There are no changes to Section 3.1.5. **(Section 2.2.3 below)**
3.6.1.3, Primary Containment Isolation Valves (PCIVs)	3.2.7, Reactor Coolant System Isolation Valves 3.3.4, Primary Containment Isolation Valves **(Section 2.2.10 below)**
3.6.4.1, [Secondary] Containment	3.4.0, Reactor Building 3.4.1, Leakage Rate 3.4.3, Access Control **(Section 2.2.11 below)**
3.6.4.2, Secondary Containment Isolation Valves (SCIVs)	3.4.2, Reactor Building Integrity – Isolation Valves **(Section 2.2.12 below)**
3.6.4.3, Standby Gas Treatment (SGT) System	3.4.4, Emergency Ventilation System **(Section 2.2.13 below)**
3.7.4, [Main Control Room Environmental Control (MCREC)] System	3.4.5, Control Room Air Treatment System **(Section 2.2.14 below)**
3.7.5, [Control Room Air Conditioning (AC)] System	NMP1 does not have an equivalent standalone TS that requires changes described in the traveler. **(Section 2.2.15 below)**
3.8.2, AC Sources - Shutdown	The equivalent NMP1 TS do not have OPDRV requirements in these sections and are not included.
3.8.5, DC Sources - Shutdown	
3.8.8, Inverters - Shutdown	
3.8.10, Distribution Systems- Shutdown	

2.2.3- Core Spray System Technical Specification Changes

The Applicability of TS 3.1.4, Core Spray System is modified to Power Operating Condition or Shutdown Condition – Hot, to align with the change in applicability in the STS of MODES 1, 2 or 3, as shown in the above table. The NMP1 design includes a Core Spray System to ensure adequate core cooling. The NMP1 Core Spray system consists of four Core Spray and Core Spray topping pumps. All eight pumps start on an initiation signal. Each Core spray topping pump discharge line is equipped with a PSV (relief valve) that relieves to the Torus (Suppression Chamber) to provide minimum flow protection for the Core Spray system. This water injection system is a low pressure system and requires the ADS to lower reactor vessel pressure to allow water injection. As described in the NMP1 UFSAR, Section VII, the ADS and Core Spray systems are the Engineered Safety Features (ESF) to either prevent or mitigate the consequences of major accidents. The ADS and Core Spray systems are considered the ECCS systems at NMP1. This is consistent with TSTF-542, Revision 2, Proposed Safety Basis (Section 3.1.2), and is therefore justified.

There are plant-specific TS requirements related to OPDRVs, and Required Actions to "suspend OPDRVs" that do not appear in the STS. Changes to these TS controls are justified by the discussion in TSTF-542, Revision 2, justification for Section 3.4.2, Other Proposed Changes – Containment, Containment Isolation Valves, and Standby Gas Treatment System Requirements. Affected NMP1 TS are listed in Section 2.1 above.

In alignment with TSTF-542, Revision 2, Proposed Safety Basis (Section 3.1.2), the existing NMP1 TS 3.1.4.h requirement to suspend core alterations as an action for Core Spray subsystem inoperability is no longer warranted since there are no postulated events associated with core alterations that are prevented or mitigated by the proposed RPV WIC requirements. In addition, loss of RPV inventory events are not initiated by core alteration operations. Refueling Limiting Conditions for Operation (LCOs) provide requirements to ensure safe operation during core alterations. Therefore, NMP1 proposes to delete TS 3.1.4.h.

The SRs in TSTF-542, Revision 2, for LCO 3.5.2 are included in the new SR 4.1.9, except for an equivalent for SR 3.5.2.4 to verify the required ECCS injection/spray subsystem, the piping is filled with water from the pump discharge valve to the injection valve. The current SR 4.1.9.g is limited in applicability to greater than 212°F; therefore, this surveillance is currently not required when in the Shutdown Condition – Cold or Refuel and is not being added. The system design and configuration is not susceptible to voiding and would not result in a system inoperability, as reported in the Generic Letter 2008-01 responses provided (References 4 and 5).

The following summary is the alignment from TSTF-542, Revision 2, TS 3.5.2 SRs to the applicable SRs in the new SR 4.1.9.

TSTF-542 LCO 3.5.2 SR number	Equivalent LCO 4.1.9 SR number
3.5.2.1	4.1.9.a
3.5.2.2	Not applicable. NMP1 does not have a LPCI subsystem.
3.5.2.3	4.1.9.b, modified for plant specific configuration
3.5.2.4	Not applicable
3.5.2.5	4.1.9.c
3.5.2.6	NMP1 does not have a recirculation line for the Core Spray System.
3.5.2.7	4.1.9.d
3.5.2.8	4.1.9.e

2.2.4 Instrumentation Technical Specification Variations (Table 3.3.5.1-1)

TSTF-542, Revision 2, Table 3.3.5.1-1, "Emergency Core Cooling System Instrumentation," corresponds to the NMP1 Table 3.6.2/4.6.2, "Protective Instrumentation."

2.2.4.1 TSTF-542, Revision 2, Table 3.3.5.1-1, "Emergency Core Cooling System Instrumentation," Function 1 for Core Spray system uses five different functions. NMP1 has three Parameters for Core Spray Initiation as described in paragraph 2.2.5.1 below. The following Functions in TSTF-542, Revision 2, Table 3.3.5.1-1, Function 1, do not have NMP1 equivalent Parameters:

1.c, Reactor Steam Dome Pressure – Low (Injection Permissive)
1.d, Core Spray Pump Discharge Flow- Low (Bypass)

The NMP1 Core Spray system utilizes the Parameter Low-Low Reactor Water Level, instead of TSTF-542, Revision 2, Function 1.a, Reactor Vessel Water Level – Low, Low, Low, Level 1.

2.2.4.2 TSTF-542, Revision 2, Table 3.3.5.1-1, "Emergency Core Cooling System Instrumentation," Function 2 for Low Pressure Coolant Injection (LPCI) system, does not have a direct correlation for NMP1. The NMP1 Core Spray System described in Section 2.2.3 above performs the low pressure injection Parameter.

2.2.4.3 TSTF-542, Revision 2, Table 3.3.5.1-1, "Emergency Core Cooling System Instrumentation," Function 3 for High Pressure Coolant Injection (HPCI) System, has seven functions. The NMP1 HPCI system is a mode of operation of the existing Feed and Condensate system and is not an ECCS system for NMP1, as discussed in the NMP1 UFSAR, Section VII, Engineered Safeguards. (See Section 2.2.3 above.) Therefore, no changes are required to Table 3.6.2k for Parameters to initiate HPCI.

2.2.4.4 TSTF-542, Revision 2, Table 3.3.5.1-1, "Emergency Core Cooling System Instrumentation," Functions 4 and 5 for ADS, Trip System A and Trip System B, respectively, have eight functions. The NMP1 ADS Initiation Parameters are in Table 3.6.2f. The NMP1 ADS system requires two Parameters to initiate, (1)a. Low-Low-Low Reactor Water Level and (1)b. High Drywell Pressure. The following Functions in TSTF-542, Revision 2, Table 3.3.5.1-1, Functions 4 and 5, do not have NMP1 equivalents:

5.c, Automatic Depressurization System Initiation Timer
5.d, Reactor Vessel Water Level - Low, Level 3 (Confirmatory)
5.e. Core Spray Pump Discharge Pressure – High
5.f. Low Pressure Coolant Injection Pump Discharge Pressure – High
5.g. Automatic Depressurization System Low Water Level Actuation Timer
5.h. Manual Initiation

There are no changes proposed to Table 3.6.2f. The ADS is only required to lower reactor coolant system pressure to allow Core Spray injection. The existing note (b) allows for the Parameter to be bypassed when reactor pressure is less than 110 psig and reactor coolant temperature is less than the corresponding saturation temperature.

2.2.5 <u>Instrumentation Technical Specification Variations (Table 3.3.5.2-1)</u>

2.2.5.1 TSTF-542, Revision 2, Table 3.3.5.2-1, "RPV Water Inventory Control Instrumentation," Function 1 for the Core Spray system uses Reactor Steam Dome Pressure- Low (Injection Permissive), Core Spray Pump Discharge Flow- Low (Bypass) and Manual Initiation. For NMP1, the Core Spray system Initiation Parameters are identified in Table 3.6.2d. To start the Core Spray pumps, either Parameter (1) High Drywell Pressure or (2) Low-Low Reactor Water Level, is required. Additionally, Table 3.6.2d includes Parameter (3) Reactor Pressure to open the Core Spray discharge valves, in conjunction

with one of either Core Spray pump start Parameters. In alignment with TSTF-542, Revision 2, Proposed Safety Basis (Section 3.3.1), the High Drywell Pressure Parameter is not realistic in the Shutdown Condition – Cold and is not transferred to the new Table 3.6.2m/4.6.2m.

The current Table 3.6.2d is modified with Note (g) for the Shutdown position of the mode switch. Note (g) states, "The Parameters for Start Core Spray Pumps and Open Core Spray Discharge Valves in Table 3.6.2d are only applicable in the Shutdown Condition - Hot. See Table 3.6.2m for Parameter applicability in the Shutdown Condition – Cold." The applicability in the Refuel position of the mode switch is removed from Table 3.6.2d, for the Parameters Start Core Spray Pumps and Open Core Spray Discharge Valves. This Note is added to provide clarification and to direct the reader to TS Table 3.6.2m for the corresponding Parameter applicability in the Shutdown Condition – Cold. This is a variation to TSTF-542, Revision 2, and is administrative in nature and does not affect the applicability of TSTF-542, Revision 2, to the NMP1 TS.

New Table 3.6.2m is organized consistent with TSTF-542, Revision 2, Table 3.3.5.2-1. The Parameters necessary to inject water into the core are listed first, followed by Primary Coolant Isolation Parameters. The Parameters from Table 3.6.2d/4.6.2d are for opening of the discharge valves and are on new TS page 247b. The automatic start surveillance requirement in new Table 4.6.2m is replaced with "Manual" Initiation to align with TSTF-542, Revision 2, Table 3.3.5.2-1. Table 3.6.2m/4.6.2m retains the Note (f) content, as relabeled Note (d) because it is applicable in all conditions. Table 3.6.2m/4.6.2m also retains the Note (e) content, as relabeled Note (c) because it is applicable in the Refuel Condition. Note (b) is also retained in new Table 3.6.2m/4.6.2m, and is not relabeled. These variations align with TSTF-542, Revision 2, Proposed Safety Basis (Section 3.3.1), for instrumentation required to support automatic isolation of penetration flow paths that may be credited in a calculation of drain time.

New Table 4.6.2m contains the applicable surveillance requirements from Table 4.6.2d, and is modified with Note 1 to indicate the surveillance intervals are specified in the Surveillance Frequency Control Program unless otherwise noted in Table 4.6.2m. Note (d) from Table 4.6.2d is retained in the new Table 4.6.2m and relabeled as Note (g).

2.2.5.2 TSTF-542, Revision 2, Table 3.3.5.2-1, "RPV Water Inventory Control Instrumentation," Function 2 for Low Pressure Coolant Injection (LPCI) System, does not have a direct correlation for NMP1. The NMP1 Core Spray system described in Section 2.2.3 above performs the low pressure injection function.

2.2.5.3 TSTF-542, Revision 2, Table 3.3.5.2-1, "RPV Water Inventory Control Instrumentation," Function 3 for RHR System Isolation, corresponds to the Shutdown Cooling System Isolation Parameter in NMP1 Section 3.6.2, Protective Instrumentation, Table 3.6.2b, Instrumentation that Initiates Primary Coolant System or Containment Isolation. The Parameters in Table 3.6.2b for Shutdown Cooling System Isolation are (1)(b) Low-Low Reactor Water Level and (2) Manual. These parameters for the Shutdown Condition – Cold are added to the new Table 3.6.2m.

The current Table 3.6.2b is modified with Note (k) for the Shutdown position of the mode switch. Note (k) states, "The Primary Coolant Isolation Parameters for Cleanup and Shutdown Cooling in Table 3.6.2b are only applicable in the Shutdown Condition - Hot. See Table 3.6.2m for Parameter applicability in the Shutdown Condition – Cold." This Note is added to provide clarification and to direct the reader to TS Table 3.6.2m for the corresponding Parameter applicability in the Shutdown Condition – Cold. This is a variation to TSTF-542, Revision 2, and is administrative in nature and does not affect the applicability of TSTF-542, Revision 2, to the NMP1 TS. The applicability in the Refuel position of the mode switch is removed from Table 3.6.2b, for the Primary Coolant Isolation Parameters of (1)(b) Shutdown Cooling, and (2) Manual. Additionally, Table 3.6.2b/4.6.2b Note (i) is retained in the Notes section since it is used for other instruments not transferring to Table 3.6.2m. Note (j) is deleted from the Notes section because it only applies to the Parameters moving to Table 3.6.2m/4.6.2m in the Shutdown Condition – Cold or Refuel Condition. Table 3.6.2m/4.6.2m retains the Note (j) content, as Note (e) because it is only applicable in the Shutdown Condition – Cold. These variations align with TSTF-542, Revision 2, Proposed Safety Basis (Section 3.3.1), for instrumentation required to support automatic isolation of penetration flow paths that may be credited in a calculation of drain time.

New Table 3.6.2m is organized consistent to TSTF-542, Revision 2, Table 3.3.5.2-1. The Parameters necessary to inject water into the core are first, followed by Primary Coolant Isolation Parameters. The Parameters from Table 3.6.2b/4.6.2b are for Primary Coolant Isolation and are on new TS page 247c. Parameter (1)(a) automatically isolates Cleanup on Low-Low Reactor Water Level. The applicability is annotated with Note (a) which states, "The Parameters in this table are only applicable in the Shutdown Condition – Cold and Refuel. See Table 3.6.2b or Table 3.6.2d for Parameter applicability in the Shutdown Condition – Hot." The Note (f) is the same Note (f) from Table 3.6.2b/4.6.2b. Table 3.6.2m/4.6.2m Note (e) is the Note (j) content from Table 3.6.2b/4.6.2b because it is only applicable in the Shutdown Condition – Cold.

2.2.5.4 TSTF-542, Revision 2, Table 3.3.5.2-1, "RPV Water Inventory Control Instrumentation," Function 4 for Reactor Water Cleanup (RWCU) System Isolation, is called Cleanup at NMP1, and is in Section 3.6.2, Protective Instrumentation, Table 3.6.2b, Instrumentation that Initiates Primary Coolant System or Containment Isolation. The Parameters in Table 3.6.2b for Cleanup System Isolation are (1)(a) Low-Low Reactor Water Level and (2) Manual. These Parameters for the shutdown condition are being removed from table 3.6.2b and added to the new Table 3.6.2m. This variation aligns with TSTF-542, Revision 2, Proposed Safety Basis (Section 3.3.1), for instrumentation required to support automatic isolation of penetration flow paths that may be credited in a calculation of drain time.

2.2.5.5 The corresponding surveillances are for the Primary Coolant Isolation for the Cleanup and Shutdown Cooling Isolation Parameters for Low-Low Reactor Water Level (Table 4.6.2b(1)) and Manual (Table 4.6.2b(2)). New Table 4.6.2m contains the applicable surveillance requirements from Table 4.6.2b, and is modified with Note 1 to indicate the surveillance intervals are specified in the Surveillance Frequency Control Program unless otherwise noted in Table 4.6.2m. Note (c) from Table 4.6.2b is retained in the new Table 4.6.2m and relabeled as Note (g). These variations align with TSTF-542,

Revision 2, Proposed Safety Basis (Section 3.3.1), for instrumentation required to support automatic isolation of penetration flow paths that may be credited in a calculation of drain time.

2.2.6 RCIC System Instrumentation (3.3.5.3)

TSTF-542, Revision 2, renumbered the existing RCIC system instrumentation section to support insertion of the new 3.3.5.2 for RPV WIC Instrumentation section. NMP1 has chosen to insert the new instrumentation section at the end of the existing tables. Therefore, renumbering of the previous tables is not required. A new Table 3.6.2m/4.6.2m for the RPV WIC Instrumentation is created.

The Emergency Cooling system at NMP1 has two instrumentation Parameters for initiation of Emergency Cooling that are applicable in the Shutdown Condition – Hot. This is not addressed for the equivalent system (RCIC) in TSTF-542, Revision 2, because RCIC is not applicable in modes 4 or 5. For NMP1, Table 3.6.2c, "Instrumentation That Initiates or Isolates Emergency Cooling," the Initiation Parameters (1) and (2) for the Shutdown position of the Reactor Mode Switch are retained in Table 3.6.2c. They are not applicable to the RPV WIC Instrumentation because they do not have an applicability in the Shutdown Condition- Cold or in Refuel. This is consistent with TSTF-542, Revision 2, Proposed Safety Basis (Section 3.1.2) and therefore justified.

2.2.7 Primary Containment Isolation Instrumentation (3.3.6.1)

TSTF-542, Revision 2, deletes Required Action J.2 from 3.3.6.1. This is discussed above in Section 2.2.5.3 as part of the variation for the Shutdown Cooling Isolation instrumentation. No additional changes required.

2.2.8 Secondary Containment Isolation Instrumentation (3.3.6.2)

TSTF-542, Revision 2, deletes the OPDRV related requirement for the instrumentation isolation signals for Secondary Containment. Instrumentation in Table 3.6.2j/4.6.2j, "Emergency Ventilation Initiation," is revised to remove the OPDRV related requirement in Note (a). Secondary containment isolation requirements associated with OPDRVs are also contained in Section 3.4.2, "Reactor Building Integrity - Isolation Valves." The TS markups provided in Attachment 2 have deleted the OPDRV requirement from these sections, consistent with TSTF-542, Revision 2.

2.2.9 Main Control Room Environmental Control (MCREC) System Instrumentation (3.3.7.1)

TSTF-542, Revision 2, deletes the OPDRV related requirement for the MCREC system instrumentation. NMP1 TS Section 3.6.2, Protective Instrumentation, Table 3.6.2l/4.6.2l, Control Room Air Treatment System Initiation, contains the Initiation Parameters (1) and (4) for the Shutdown position of the Reactor Mode Switch. These Parameters are only applicable in the Shutdown Condition – Hot and are not relocated to Table 3.6.2m. The Control Room Air Treatment System isolation requirements associate with OPDRVs is contained in Section 3.4.5. The TS markups provided in Attachment 2 have deleted the OPDRV requirement from this section, consistent with TSTF-542, Revision 2. This is consistent with TSTF-542, Revision 2, Proposed Safety Basis (Section 3.1.2) and therefore justified.

2.2.10 Primary Containment Isolation Valves (PCIVs) (3.6.1.3)

TSTF-542, Revision 2, revises LCO 3.6.1.3, Action H to remove the OPDRV related Condition, Required Action H.1 and associated Completion Time. NMP1 TS 3.2.7, "Reactor Coolant System Isolation Valves," LCO 3.2.7.f is the NMP1 equivalent section. The TS markups provided in Attachment 2 have deleted the OPDRV requirement from this section, consistent with TSTF-542, Revision 2. NMP1 TS 3.3.4, "Primary Containment Isolation Valves," does not include reference to OPDRVs. Therefore, no changes to NMP1 TS 3.3.4 are required.

2.2.11 Secondary Containment (3.6.4.1)

TSTF-542, Revision 2, deletes the OPDRV related requirement for Secondary Containment. The corresponding sections for NMP1 TS for Secondary Containment Isolation requirements associate with OPDRVs are contained in Section 3.4.0, "Reactor Building" and 3.4.1, "Leakage Rate," and 3.4.3, "Access Control." The TS markups provided in Attachment 2 have deleted the OPDRV requirement from these sections, consistent with TSTF-542, Revision 2.

2.2.12 Secondary Containment Isolation Valves (3.6.4.2)

TSTF-542, Revision 2, deletes the OPDRV related Applicability statement from LCO 3.6.4.2, and revises Action D to remove the OPDRV related Condition, Required Action and associated Completion Time. Secondary Containment Isolation requirements associate with OPDRVs are contained in Section 3.4.2, "Reactor Building Integrity - Isolation Valves." The TS markups provided in Attachment 2 have deleted the OPDRV requirement from this section, consistent with TSTF-542, Revision 2.

2.2.13 Standby Gas Treatment (SGT) System (3.6.4.3)

TSTF-542, Revision 2, deletes the OPDRV related Applicability statement from LCO 3.6.4.3, and revises Actions C and E to remove the OPDRV related Condition, Required Action and associated Completion Time. The equivalent NMP1 requirements associate with OPDRVs are contained in 3.4.4, "Emergency Ventilation System," LCO 3.4.4.e. The TS markups provided in Attachment 2 have deleted the OPDRV requirement from this section, consistent with TSTF-542, Revision 2.

2.2.14 Main Control Room Environmental Control (MCREC) System (3.7.4)

TSTF-542, Revision 2, deletes the OPDRV related Applicability statement from LCO 3.7.4. requirement and revises Actions D and F to remove the OPDRV related Condition, Required Action and associated Completion Time. The NMP1 TS equivalent is the Control Room Air Treatment System Isolation requirements associate with OPDRVs is contained in Section 3.4.5.a and 3.4.5.h. The TS markups provided in Attachment 2 have deleted the OPDRV requirement from this section, consistent with TSTF-542, Revision 2.

2.2.15 Control Room Air Conditioning (AC) System (3.7.5)

The NMP1 TS do not include a separate LCO for Control Room Air Conditioning. Therefore, the changes proposed in the traveler to delete the references to OPDRVs is not implemented for NMP1.

2.2.16 Surveillance Frequency Control Program

The NMP1 TS contain a Surveillance Frequency Control Program. Therefore, the Surveillance Requirement Frequencies for Specifications 4.1.9 and 4.6.2 are "In accordance with the Surveillance Frequency Control Program."

3.0 REGULATORY ANALYSIS

3.1 No Significant Hazards Consideration

Exelon requests adoption of TSTF-542, Revision 2, "Reactor Pressure Vessel Water Inventory Control," which is an approved change to the Standard Technical Specifications (STS), into the NMP1 Technical Specifications (TS). The proposed amendment replaces the existing requirements in the TS related to "Operations with a Potential for Draining the Reactor Vessel" (OPDRV) with new requirements on Reactor Pressure Vessel Water Inventory Control (RPV WIC) to ensure RPV water level remains above -10 inches indicator scale (74 inches above the Top of Active Fuel).

Exelon has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. **Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?**

   Response: No.

   The proposed changes replace existing TS requirements related to OPDRVs with new requirements on RPV WIC that will ensure RPV water level remains above -10 inches indicator scale. Draining of RPV water inventory in the cold shutdown and refueling conditions is not an accident previously evaluated; therefore, replacing the existing TS controls to prevent or mitigate such an event with a new set of controls has no effect on any accident previously evaluated. RPV water inventory control in the cold shutdown or refueling condition is not an initiator of any accident previously evaluated. The existing OPDRV controls or the proposed RPV WIC controls are not mitigating actions assumed in any accident previously evaluated.

   The proposed changes reduce the probability of an unexpected draining event (which is not a previously evaluated accident) by imposing new requirements on the limiting time in which an unexpected draining event could result in the reactor vessel water level dropping to -10 inches indicator scale. These controls require cognizance of the plant configuration and control of configurations with unacceptably short drain times. These requirements reduce the probability of an unexpected draining event. The current TS

requirements are only mitigating actions and impose no requirements that reduce the probability of an unexpected draining event.

The proposed changes reduce the consequences of an unexpected draining event (which is not a previously evaluated accident) by requiring a Core Spray subsystem to be operable at all times in the cold shutdown and refueling conditions. The change in requirement from two Core Spray subsystems to one Core Spray subsystem in the cold shutdown or refueling conditions does not significantly affect the consequences of an unexpected draining event because the proposed Actions ensure equipment is available within the limiting drain time that is as capable of mitigating the event as the current requirements. The proposed controls provide escalating compensatory measures to be established as calculated drain times decrease, such as verification of a second method of water injection and additional confirmations that containment and/or filtration would be available if needed.

The proposed changes reduce or eliminate some requirements that were determined to be unnecessary to manage the consequences of an unexpected draining event, such as automatic initiation of a Core Spray subsystem and control room ventilation. These changes do not affect the consequences of any accident previously evaluated since a draining event in the cold shutdown or refueling condition is not a previously evaluated accident and the requirements are not needed to adequately respond to a draining event.

Therefore, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The proposed changes replace existing TS requirements related to OPDRVs with new requirements on RPV WIC that will maintain RPV water level above -10 inches indicator scale. The proposed changes will not alter the design function of the equipment involved. Under the proposed changes, some systems that are currently required to be operable during OPDRVs would be required to be available within the limiting drain time or to be in service depending on the limiting drain time. Should those systems be unable to be placed into service, the consequences are no different than if those systems were unable to perform their function under the current TS requirements.

The event of concern under the current requirements and the proposed change is an unexpected draining event. The proposed changes do not create new failure mechanisms, malfunctions, or accident initiators that would cause a draining event or a new or different kind of accident not previously evaluated or included in the design and licensing bases.

Therefore, the proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No.

The proposed changes replace existing TS requirements related to OPDRVs with new requirements on RPV WIC. The current requirements do not have a stated safety basis and no margin of safety is established in the licensing basis. The safety basis for the new requirements is to maintain RPV water level above -10 inches indicator scale. New requirements are added to determine the limiting time in which the RPV water inventory could drain to the top of the fuel in the reactor vessel should an unexpected draining event occur. Plant configurations that could result in lowering the RPV water level to -10 inches indicator scale within one hour are now prohibited. New escalating compensatory measures based on the limiting drain time replace the current controls. The proposed TS establish a safety margin by providing defense-in-depth to maintain RPV water level above -10 inches indicator scale to protect the public health and safety. While some less restrictive requirements are proposed for plant configurations with long calculated drain times, the overall effect of the change is to improve plant safety and to add safety margin.

Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

Based on the above, Exelon concludes that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c) and, accordingly, a finding of "no significant hazards consideration" is justified.

4.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

5.0 REFERENCES

1. Final Safety Evaluation of Technical Specifications Task Force Traveler TSTF-542, Revision 2, "Reactor Pressure Vessel Water Inventory Control" (TAC No. MF3487) dated December 20, 2016, ADAMS Accession No. ML16343B008

2. TSTF-542, Revision 2, "Reactor Pressure Vessel Water Inventory Control," dated December 20, 2016

3. Letter from Nebraska Public Power District (NPPD) to US NRC, "Application to Revise Technical Specifications to Adopt TSTF-542, Revision 2, "Reactor Pressure Vessel Water Inventory Control" Cooper Nuclear Station, Docket No. 50-298, License No. DPR-46," dated August 7, 2017, ADAMS Accession No. ML17228A042

4. Letter from Constellation Energy, Nine Mile Point Nuclear Station to US NRC, "Three Month Response to NRC Generic Letter 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems," dated April 10, 2008

5. Letter from Constellation Energy, Nine Mile Point Nuclear Station to US NRC, "Supplemental Response to NRC Generic Letter 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems," dated July 6, 2009

ATTACHMENT 2

License Amendment Request

Nine Mile Point Nuclear Station, Unit 1
Docket No. 50-220

Revise Technical Specifications to Adopt TSTF-542,
"Reactor Pressure Vessel Water Inventory Control," Revision 2

Proposed Technical Specification Marked-Up Pages

TS Pages

TOC
8
54
55
56
79a thru 79c
109 (note page 108 is not changed, but included for continuity)
164
165
168
171 (note page 170 is not changed, but included for continuity)
174 (note page 173 is not changed, but included for continuity)
175
178
179
194
196 (note page 195 is not changed, but included for continuity)
205
213 (note page 212 is not changed, but included for continuity)
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242
247b thru 247h

NINE MILE POINT NUCLEAR STATION
UNIT 1 - TECHNICAL SPECIFICATIONS
CONTENTS

1.28 (Deleted)

1.29 (Deleted)

1.30 Reactor Coolant Leakage

a. Identified Leakage

(1) Leakage into closed systems, such as pump seal or valve packing leaks that are captured, flow metered and conducted to a sump or collecting tank, or

(2) Leakage into the primary containment atmosphere from sources that are both specifically located and known not to be from a through-wall crack in the piping within the reactor coolant pressure boundary.

b. Unidentified Leakage

All other leakage of reactor coolant into the primary containment area.

1.31 Core Operating Limits Report

The CORE OPERATING LIMITS REPORT is the unit-specific document that provides core operating limits for the current operating reload cycle. These cycle-specific core operating limits shall be determined for each reload cycle in accordance with Specification 6.6.5. Plant operation within these operating limits is addressed in individual specifications.

1.32 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 ≥ 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.

1.33 INSERVICE TESTING PROGRAM

The INSERVICE TESTING PROGRAM is the licensee program that fulfills the requirements of 10 CFR 50.55a(f).

Insert A

Insert A

1.34 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 -10 inches indicator scale (74 inches above the top of the active fuel seated in the RPV) assuming:

a. The water inventory above -10 inches indicator scale 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 -10 inches indicated scale 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 -10 inches indicator scale 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 -10 inches indicated scale 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.

LIMITING CONDITION FOR OPERATION

3.1.4 CORE SPRAY SYSTEM

Applicability:

Applies to the operating status of the core spray systems when in the Power Operating Condition or Shutdown Condition - Hot.

Objective:

To assure the capability of the core spray systems to cool reactor fuel in the event of a loss-of-coolant accident.

Specification:

a. Whenever irradiated fuel is in the reactor vessel and the reactor coolant temperature is greater than 212°F, each of the two core spray systems shall be operable except as specified in Specifications b and c below.

b. If a redundant component of a core spray system becomes inoperable, that system shall be considered operable provided that the component is returned to an operable condition within 7 days and the additional surveillance required is performed.

c. If a redundant component in each of the core spray systems becomes inoperable, both systems shall be considered operable provided that the component is returned to an operable condition within 7 days and the additional surveillance required is performed.

SURVEILLANCE REQUIREMENT

4.1.4 CORE SPRAY SYSTEM

Applicability:

Applies to the periodic testing requirements for the core spray systems.

Objective:

To verify the operability of the core spray systems.

Specification:

The core spray system surveillance shall be performed as indicated below.

a. In accordance with the Surveillance Frequency Control Program automatic actuation of each subsystem in each core spray system shall be demonstrated.

b. In accordance with the Surveillance Frequency Control Program pump operability shall be checked.

c. In accordance with the Surveillance Frequency Control Program the operability of power-operated valves required for proper system operation shall be checked.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
d. If Specifications a, b and c are not met, a normal orderly shutdown shall be initiated within one hour and the reactor shall be in the cold shutdown condition within ten hours.	d. (Deleted)
e. During reactor operation, except during core spray system surveillance testing, core spray isolation valves 40-02 and 40-12 shall be in the open position and the associated valve motor starter circuit breakers for these valves shall be locked in the off position. In addition, redundant valve position indication shall be available in the control room.	e. Surveillance with Inoperable Components When a component becomes inoperable its redundant component or system shall be verified to be operable immediately and in accordance with the Surveillance Frequency Control Program thereafter.
f. ~~Whenever irradiated fuel is in the reactor vessel and the reactor coolant temperature is less than or equal to 212°F, two core spray subsystems shall be operable except as specified in g and h below.~~ (Deleted)	f. With a core spray subsystem suction from the CST, CST level shall be checked in accordance with the Surveillance Frequency Control Program.
g. ~~If one of the above required subsystems becomes inoperable, restore at least two subsystems to an operable status within 4 hours or suspend all operations that have a potential for draining the reactor vessel.~~ (Deleted)	g. In accordance with the Surveillance Frequency Control Program when the reactor coolant temperature is greater than 212°F, verify that the piping system between valves 40-03, 13 and 40-01, 09, 10, 11 is filled with water.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
h. ~~If both of the above required subsystems become inoperable, suspend core alterations and all operations that have a potential for draining the reactor vessel. Restore at least one subsystem to operable status within 4 hours or establish secondary containment integrity within the next 12 hours.~~ (Deleted)	
i. With the downcomers in the suppression chamber having less than three and one half foot submergence, two core spray subsystems and the associated raw water pumps shall be operable with the core spray suction from the condensate storage tanks (CST), and the CST inventory shall not be less than 300,000 gallons.	

LIMITING CONDITION FOR OPERATION

3.1.9 Reactor Pressure Vessel (RPV) Water Inventory Control

Applicability:

Applies to the operating status of the core spray systems and Reactor Water Inventory Control when the reactor coolant temperature is less than or equal to 212°F.

Objective:

To assure the RPV water inventory is maintained -10 inches indicator scale.

Specification:

a. Whenever irradiated fuel is in the reactor vessel and the reactor coolant temperature is less than or equal to 212°F, drain time of RPV water inventory to the TAF shall be ≥ 36 hours and one core spray subsystem shall be operable except as specified in Specifications b through f below.

b. If the required core spray subsystem becomes inoperable, the component shall be returned to an operable condition within 4 hours.

c. If Specifications a and b are not met, then immediately initiate action to establish a method of water injection capable of operating without offsite electrical power.

SURVEILLANCE REQUIREMENT

4.1.9 Reactor Pressure Vessel (RPV) Water Inventory Control

Applicability

Applies to the periodic testing requirements for the core spray system and RPV water inventory.

Objective:

To verify the operability of the core spray system and RPV water inventory.

Specification:

a. Verify drain time ≥ 36 hours in accordance with the Surveillance Frequency Control Program.

b. Verify, for a required core spray subsystem, the downcomers in the suppression chamber have greater than or equal to three and one half foot of submergence or the condensate storage tank inventory is not less than 300,000 gallons, in accordance with the Surveillance Frequency Control Program.

c. Verify for the required core 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.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
d. If drain time < 36 hours and ≥ 8 hours, within 4 hours perform the following actions: (1) Verify secondary containment boundary is capable of being established in less than the drain time. and (2) Verify each secondary containment penetration flow path is capable of being isolated in less than the drain time, and (3) Verify one RBEVS is capable of being placed in operation in less than the drain time.	d. 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.
e. If drain time < 8 hours, immediately perform the following actions: (1) Initiate action to establish an additional method of water injection with water sources capable of maintaining RPV water level above -10 inches indicator scale for ≥ 36 hours. and (2) Initiate action to establish secondary containment boundary, and (3) Initiate action to isolate each secondary containment penetration flow path or verify it can be manually isolated from the control room. and (4) Initiate action to verify one RBEVS is capable of being placed in operation.	e. Verify the required core spray subsystem actuates on a manual initiation signal, in accordance with the Surveillance Frequency Control Program. Vessel spray may be excluded.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
f. Specifications d and e not met, or drain time is < 1 hour, immediately initiate action to restore drain time to ≥ 36 hour.	

LIMITING CONDITION FOR OPERATION

3.2.7 REACTOR COOLANT SYSTEM ISOLATION VALVES

Applicability:

Applies to the operating status of the system of isolation valves on lines connected to the reactor coolant system.

Objective:

To assure the capability of the reactor coolant system isolation valves to minimize reactor coolant loss in the event of a rupture of a line connected to the nuclear steam supply system, and to minimize potential leakage paths from the primary containment in the event of a loss-of-coolant accident.

Specification:

a. Whenever fuel is in the reactor vessel and the reactor coolant temperature is greater than 212°F, all reactor coolant system isolation valves on lines connected to the reactor coolant system shall be operable except as specified in Specification 3.2.7.b below.

b. In the event any isolation valve becomes inoperable whenever fuel is in the reactor vessel and the reactor coolant temperature is greater than 212°F, the system shall be considered operable provided that within 4 hours at least one valve in each line having an inoperable valve is in the mode corresponding to the isolated condition, except as noted in Specification 3.1.1.e.

SURVEILLANCE REQUIREMENT

4.2.7 REACTOR COOLANT SYSTEM ISOLATION VALVES

Applicability:

Applies to the periodic testing requirement for the reactor coolant system isolation valves.

Objective:

To assure the capability of the reactor coolant system isolation valves to minimize reactor coolant loss in the event of a rupture of a line connected to the nuclear steam supply system, and to limit potential leakage paths from the primary containment in the event of a loss-of-coolant accident.

Specification:

The reactor coolant system isolation valves surveillance shall be performed as indicated below.

a. In accordance with the Surveillance Frequency Control Program the operable automatically initiated power-operated isolation valves shall be tested for automatic initiation and closure times.

b. Additional surveillances shall be performed as required by the INSERVICE TESTING PROGRAM.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
c. If Specifications 3.2.7a and b above are not met, initiate normal orderly shutdown within one hour and have reactor in the cold shutdown condition within ten hours.	c. In accordance with the Surveillance Frequency Control Program the feedwater and main-steam line power-operated isolation valves shall be exercised by partial closure and subsequent reopening.
d. Whenever fuel is in the reactor vessel and the reactor coolant temperature is less than or equal to 212°F, the isolation valves on the shutdown cooling system lines connected to the reactor coolant system shall be operable except as specified in Specification 3.2.7.e below.	d. At least once per plant cold shutdown the feedwater and main steam line power-operated isolation valves shall be fully closed and reopened, unless this test has been performed within the previous 92 days.
e. In the event any shutdown cooling system isolation valve becomes inoperable whenever fuel is in the reactor vessel and the reactor coolant temperature is less than or equal to 212°F, the system shall be considered operable provided that, within 4 hours, at least one valve in each line having an inoperable valve is in the mode corresponding to the isolated condition.	
f. If Specifications 3.2.7.d and 3.2.7.e above are not met, immediately initiate action to restore the valve(s) to operable status. ~~either~~:	
~~(1) Immediately initiate action to suspend operations with a potential for draining the reactor vessel (OPDRVs); or~~	
~~(2) Immediately initiate action to restore the valve(s) to operable status.~~	

3.4.0 REACTOR BUILDING

APPLICABILITY

Applies to the operating status of the reactor building (secondary containment).

OBJECTIVE

To assure the integrity of the reactor building.

SPECIFICATION

Reactor building integrity must be in effect for the following conditions:

a. Power operating condition,

b. When the reactor water temperature is above 215°F, or

c. Whenever recently irradiated fuel or an irradiated fuel cask is being handled in the Reactor Building~~, and~~.

~~d. During operations with a potential for draining the reactor vessel (OPDRVs).~~

LIMITING CONDITION FOR OPERATION

3.4.1 LEAKAGE RATE

Applicability:

Applies to the leakage rate of the secondary containment.

Objective:

To specify the requirements necessary to limit exfiltration of fission products released to the secondary containment as a result of an accident.

Specification:

At all times when secondary containment integrity is required, the reactor building leakage rate as determined by Specification 4.4.1 shall not exceed 1600 cfm. If this cannot be met after a routine surveillance check, then the actions listed below shall be taken:

a. Suspend any of the following activities:

1. Handling of recently irradiated fuel in the reactor building.

2. Irradiated fuel cask operations in the reactor building.

~~3. Operations with a potential for draining the reactor vessel (OPDRVs).~~

b. Restore the reactor building leakage rates to within specified limits within 4 hours or initiate normal orderly shutdown and be in a cold shutdown condition within 10 hours.

SURVEILLANCE REQUIREMENT

4.4.1 LEAKAGE RATE

Applicability:

Applies to the periodic testing requirements of the secondary containment leakage rate.

Objective:

To assure the capability of the secondary containment to maintain leakage within allowable limits.

Specification:

In accordance with the Surveillance Frequency Control Program - isolate the reactor building and start emergency ventilation system fan to demonstrate negative pressure in the building relative to external static pressure. The fan flow rate shall be varied so that the building internal differential pressure is at least as negative as that on Figure 3.4.1 for the wind speed at which the test is conducted. The fan flow rate represents the reactor building leakage referenced to zero mph with building internal pressure at least 0.25 inch of water less than atmospheric pressure. The test shall be done at wind speeds less than 20 miles per hour.

LIMITING CONDITION FOR OPERATION

3.4.2 REACTOR BUILDING INTEGRITY - ISOLATION VALVES

Applicability:

Applies to the operational status of the reactor building isolation valves.

Objective:

To assure that fission products released to the secondary containment are discharged to the environment in a controlled manner using the emergency ventilation system.

Specification:

a. The normal Ventilation System isolation valves shall be operable at all times when secondary containment integrity is required.

b. If Specification 3.4.2.a is not met, then the actions listed below shall be taken:

1. The reactor shall be in the cold shutdown condition within ten hours.

2. Suspend any of the following activities:

a. Handling of recently irradiated fuel in the reactor building,

b. Irradiated fuel cask handling operations in the reactor building,

~~c. Operations with a potential for draining the reactor vessel (OPDRVs).~~

SURVEILLANCE REQUIREMENT

4.4.2 REACTOR BUILDING INTEGRITY - ISOLATION VALVES

Applicability:

Applies to the periodic testing requirements of the reactor building isolation valves.

Objective:

To assure the operability of the reactor building isolation valves.

Specification:

In accordance with the Surveillance Frequency Control Program, automatic initiation of valves shall be checked.

LIMITING CONDITION FOR OPERATION

3.4.3 ACCESS CONTROL

Applicability:

Applies to the access control to the reactor building.

Objective:

To specify the requirements necessary to assure the integrity of the secondary containment system.

Specification:

a. At all times when secondary containment integrity is required, the following conditions will be met:

   1. Only one door in each of the double-doored access ways shall be opened at one time, except when the access opening is being used for entry and exit.

   2. Only one door or closeup of the railroad bay shall be opened at one time.

   3. The core spray and containment spray pump compartments' doors shall be closed at all times except during passage in order to consider the core spray system and the containment spray system operable.

SURVEILLANCE REQUIREMENT

4.4.3 ACCESS CONTROL

Applicability:

Applies to the periodic checking of the condition of portions of the reactor building.

Objective:

To assure that pump compartments are properly closed at all times and to assure the integrity of the secondary containment system by verifying that reactor building access doors are closed, as required by Specifications 3.4.3.a.1 and 3.4.3.a.2.

Specification:

a. The core and containment spray pump compartments shall be checked in accordance with the Surveillance Frequency Control Program and after each entry.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
b. If these conditions cannot be met, then the actions listed below shall be taken: 1. If in the power operating condition, restore reactor building integrity within 4 hours or be in at least the hot shutdown condition within the next 12 hours and in the cold shutdown condition within the following 24 hours. OR If the reactor coolant system temperature is above 215°F, restore reactor building integrity within 4 hours or be in cold shutdown within the following 24 hours. 2. Suspend any of the following activities: a. Handling of recently irradiated fuel in the reactor building, b. Irradiated fuel cask handling operations in the reactor building, ~~c. Operations with a potential for draining the reactor vessel (OPDRVs).~~	b. Verify in accordance with the Surveillance Frequency Control Program that: 1. At least one door in each access to the secondary containment is closed, except when the access opening is being used for entry and exit. 2. At least one door or closeup of the railroad bay is closed.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT

3.4.4 EMERGENCY VENTILATION SYSTEM

Applicability:

Applies to the operating status of the emergency ventilation system.

Objective:

To assure the capability of the emergency ventilation system to minimize the release of radioactivity to the environment in the event of an incident within the primary containment or reactor building.

Specification:

a. Except as specified in Specification 3.4.4e below, both circuits of the emergency ventilation system shall be operable at all times when secondary containment integrity is required.

b. The results of the in-place cold DOP and halogenated hydrocarbon tests at design flows on HEPA filters and charcoal adsorber banks shall show ≥ 99% DOP removal and ≥ 99% halogenated hydrocarbon removal when tested in accordance with ANSI N.510-1980.

4.4.4 EMERGENCY VENTILATION SYSTEM

Applicability:

Applies to the testing of the emergency ventilation system.

Objective:

To assure the operability of the emergency ventilation system.

Specification:

Emergency ventilation system surveillance shall be performed as indicated below:

a. In accordance with the Surveillance Frequency Control Program, the following conditions shall be demonstrated:

(1) Pressure drop across the combined HEPA filters and charcoal adsorber banks is less than 6 inches of water at the system rated flow rate (± 10%).

(2) Deleted

c. The results of laboratory carbon sample analysis shall show ≥95% radioactive methyl iodide removal when tested in accordance with ASTM D3803-1989 at 30°C and 95% R.H.

d. Fans shall be shown to operate within ±10% design flow.

e. During reactor operation, including when the reactor coolant system temperature is above 215°F, from and after the date that one circuit of the emergency ventilation system is made or found to be inoperable for any reason, reactor operation is permissible only during the succeeding seven days unless such circuit is sooner made operable, provided that during such seven days all active components of the other emergency ventilation circuit shall be operable.

During handling of recently irradiated fuel in the reactor building~~,~~ or handling of an irradiated fuel cask in the reactor building~~, and operations with a potential for draining the reactor vessel (OPDRVs),~~ from and after the date that one circuit of the emergency ventilation system is made or found to be inoperable for any reason, recently irradiated fuel handling in the reactor building~~,~~ or irradiated fuel cask handling in the reactor building~~, or OPDRVs are~~ is permissible during the succeeding seven days unless such circuit is sooner made operable, provided that

b. The tests and sample analysis of Specification 3.4.4b, c and d shall be performed in accordance with the Surveillance Frequency Control Program, or after 720 hours of system operation, whichever occurs first or following significant painting, fire or chemical release in any ventilation zone communicating with the system.

c. Cold DOP testing shall be performed after each complete or partial replacement of the HEPA filter bank or after any structural maintenance on the system housing.

d. Halogenated hydrocarbon testing shall be performed after each complete or partial replacement of the charcoal adsorber bank or after any structural maintenance on the system housing.

e. Each circuit shall be operated at least 15 minutes in accordance with the Surveillance Frequency Control Program.

f. Test sealing of gaskets for housing doors downstream of the HEPA filters and charcoal adsorbers shall be performed at and in conformance with each test performed for compliance with Specification 4.4.4b and Specification 3.4.4b.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
during such seven days all active components of the other emergency ventilation circuit shall be operable. Recently irradiated fuel handling in the reactor building~~,~~ or irradiated fuel cask handling in the reactor building~~, or OPDRVs~~ may continue beyond seven days provided the operable emergency ventilation circuit is in operation.	
f. If these conditions cannot be met, within 36 hours, the reactor shall be placed in a condition for which the emergency ventilation system is not required.	
	g. In accordance with the Surveillance Frequency Control Program, automatic initiation of each branch of the emergency ventilation system shall be demonstrated.
	h. In accordance with the Surveillance Frequency Control Program, manual operability of the bypass valve for filter cooling shall be demonstrated.
	i. When one circuit of the emergency ventilation system becomes inoperable all active components in the other emergency ventilation circuit shall be verified to be operable within two hours and in accordance with the Surveillance Frequency Control Program thereafter.

LIMITING CONDITION FOR OPERATION

3.4.5 CONTROL ROOM AIR TREATMENT SYSTEM

Applicability:

Applies to the operating status of the control room air treatment system and Control Room Envelope (CRE) boundary.

----------NOTE----------
The CRE boundary may be opened intermittently under administrative control.

Objective:

To assure the capability of the control room air treatment system to minimize the amount of radioactivity or other gases entering the control room in the event of an incident.

Specification:

a. Except as specified below, the control room air treatment system shall be operable for the following conditions:

1. Power operating condition, and whenever the reactor coolant system temperature is greater than 212°F~~,~~.

2. Whenever recently irradiated fuel or an irradiated fuel cask is being handled in the reactor building~~,~~. ~~and~~

~~3. During operations with a potential for draining the reactor vessel (OPDRVs).~~

b. The results of the in-place cold DOP and halogenated hydrocarbon tests at design flows on HEPA filters and charcoal adsorber banks shall show ≥ 99% DOP removal and ≥ 99% halogenated hydrocarbon removal when tested in accordance with ANSI N.510-1980.

SURVEILLANCE REQUIREMENT

4.4.5 CONTROL ROOM AIR TREATMENT SYSTEM

Applicability:

Applies to the testing of the control room air treatment system and CRE boundary.

Objective:

To assure the operability of the control room air treatment system.

Specification:

a. In accordance with the Surveillance Frequency Control Program, the pressure drop across the combined HEPA filters and charcoal adsorber banks shall be demonstrated to be less than 1.5 inches of water at system design flow rate (± 10%).

b. The tests and sample analysis of Specification 3.4.5b, c and d shall be performed in accordance with the Surveillance Frequency Control Program, or after 720 hours of system operation, whichever occurs first or following significant painting, fire or chemical release i any ventilation zone communicating with the system.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
c. The results of laboratory carbon sample analysis shall show ≥95% radioactive methyl iodine removal when tested in accordance with ASTM D3803-1989 at 30°C and 95% R.H.	c. Cold DOP testing shall be performed after each complete or partial replacement of the HEPA filter bank or after any structural maintenance on the system housing.
d. Fans shall be shown to operate within ±10% design flow.	d. Halogenated hydrocarbon testing shall be performed after each complete or partial replacement of the charcoal absorber bank or after any structural maintenance on the system housing.
e. From and after the date that the control room air treatment system is made or found to be inoperable for any reason, except for an inoperable CRE boundary during the power operating condition, restore the system to operable within the succeeding seven days.	e. The system shall be operated at least 15 minutes in accordance with the Surveillance Frequency Control Program.
f. If the control room air treatment system is made or found to be inoperable due to an inoperable CRE boundary during the power operating condition: immediately initiate action to implement mitigating actions; within 24 hours, verify mitigating actions ensure CRE occupant exposures to radiological, chemical, and smoke hazards will not exceed limits; and within 90 days, restore the CRE boundary to operable status.	f. In accordance with the Surveillance Frequency Control Program, automatic initiation of the control room air treatment system shall be demonstrated.
g. If Specifications 3.4.5.e or 3.4.5.f cannot be met during the power operating condition, or when reactor coolant system temperature is greater than 212°F, reactor shutdown shall be initiated and the reactor shall be in cold shutdown within 36 hours.	g. In accordance with the frequency and specifications of the Control Room Envelope Habitability Program, perform required CRE unfiltered air inleakage testing.
h. If Specification 3.4.5.e cannot be met whenever recently irradiated fuel or an irradiated fuel cask is being handled in the reactor building, ~~or during OPDRVs:~~ immediately suspend handling of recently irradiated fuel or the irradiated fuel cask in the reactor building~~; and immediately initiate action to suspend OPDRVs~~.	

LIMITING CONDITION FOR OPERATION

3.6.2 PROTECTIVE INSTRUMENTATION

Applicability:

Applies to the operability of the plant instrumentation that performs a safety function.

Objective:

To assure the operability of the instrumentation required for safe operation.

Specification:

a. The set points, minimum number of trip systems, and minimum number of instrument channels that must be operable for each position of the reactor mode switch shall be as given in Tables 3.6.2a to 3.6.~~2l~~2m.

If the requirements of a table are not met, the actions listed below for the respective type of instrumentation shall be taken.

(1) Instrumentation that initiates scram - control rods shall be inserted, unless there is no fuel in the reactor vessel.

SURVEILLANCE REQUIREMENT

4.6.2 PROTECTIVE INSTRUMENTATION

Applicability:

Applies to the surveillance of the instrumentation that performs a safety function.

Objective:

To verify the operability of protective instrumentation.

Specification:

a. Sensors and instrument channels shall be checked, tested and calibrated at the frequency specified in the Surveillance Frequency Control Program unless otherwise noted in Tables 4.6.2a to 4.6.~~2l~~2m.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
(2) Primary Coolant and Containment Isolation - Isolation valves shall be closed or the valves shall be considered inoperable and Specifications 3.2.7 and 3.3.4 shall be applied.	b. Each trip system shall be tested each time the respective instrument channel is tested.
(3) Emergency Cooling Initiation or Isolation - The emergency cooling system shall be considered inoperable and Specification 3.1.3 shall be applied.	
(4) Core Spray Initiation - The core spray system shall be considered inoperable and Specification 3.1.4 shall be applied.	
(5) Containment Spray Initiation - The containment spray system shall be considered inoperable and Specification 3.3.7 shall be applied.	
(6) Auto Depressurization Initiation - The auto depressurization system shall be considered inoperable and Specification 3.1.5 shall be applied.	
(7) Control Rod Withdrawal Block - No control rods shall be withdrawn.	

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
(8) Mechanical Vacuum Pump Isolation - The mechanical vacuum pump shall be isolated or the instrument channel shall be considered inoperable and Specification 3.6.1 shall be applied.	
(9) Diesel Generator Initiation - The diesel generator shall be considered inoperable and Specification 3.6.3 shall be applied.	
(10) Emergency Ventilation Initiation - The emergency ventilation system shall be considered inoperable and Specification 3.4.4 shall be applied.	
(11) High Pressure Coolant Injection Initiation - The high pressure coolant injection system shall be considered inoperable and Specifi-cation 3.1.8.c shall be applied.	
(12) Control Room Ventilation - The control room ventilation system shall be considered inoperable and Specification 3.4.5 shall be applied.	
(13) Reactor Pressure Vessel Water Inventory Control - Specification 3.1.9 shall be applied for the applicable drain time.	

TABLE 3.6.2b

INSTRUMENTATION THAT INITIATES
PRIMARY COOLANT SYSTEM OR CONTAINMENT ISOLATION

Limiting Condition for Operation

Parameter	Minimum No. of Tripped or Operable Trip Systems	Minimum No. of Operable Instrument Channels per Operable Trip System	Set Point	Reactor Mode Switch Position in Which Function Must Be Operable: Shutdown	Refuel	Startup	Run
PRIMARY COOLANT ISOLATION							
(Main Steam, Cleanup, and Shutdown Cooling)							
(1) Low-Low Reactor Water Level							
(a) Main Steam and Cleanup	2	2(f)	≥ 5 inches (Indicator Scale)	~~(i)~~(k)		x	x
(b) Shutdown Cooling	2~~(j)~~	2(f)~~(j)~~	≥ 5 inches (Indicator Scale)	~~X~~(k)	~~x~~	x	x
(2) Manual	2	1	---	~~X~~(k)	~~x~~	x	x
MAIN-STEAM-LINE ISOLATION							
(3) High Steam Flow Main-Steam Line	2	2(f)	≤ 105 psid			x	x

NOTES FOR TABLES 3.6.2b and 4.6.2b

(a) May be bypassed in the refuel and startup positions of the reactor mode switch when reactor pressure is less than 600 psi.

(b) May be bypassed when necessary for containment inerting.

(c) May be bypassed in the shutdown mode whenever the reactor coolant system temperature is less than 215°F.

(d) The trip circuit will be calibrated and tested in accordance with the Surveillance Frequency Control Program, the primary sensor will be calibrated and tested in accordance with the Surveillance Frequency Control Program.

(e) Deleted.

(f) A channel may be placed in an inoperable status for up to 6 hours for required surveillances without placing the Trip System in the tripped condition provided at least one Operable Instrument Channel in the same Trip System is monitoring that Parameter.

With the number of Operable Channels one less than required by the Minimum Number of Operable Instrument Channels per Operable Trip System requirement for one trip system, either

1. Place the inoperable channel(s) in the tripped condition within

   a. 12 hours for Parameters common to SCRAM Instrumentation, and
   b. 24 hours for Parameters not common to SCRAM Instrumentation.

or

2. Take the ACTION required by Specification 3.6.2a for that Parameter.

With the number of Operable Channels one less than required by the Minimum Number of Operable Instrument Channels per Operable Trip System requirement for both trip systems,

1. Place the inoperable channel(s) in one trip system in the tripped condition within one hour.

and

2. a. Place the inoperable channel(s) in the remaining trip system in the tripped condition within

      (1) 12 hours for Parameters common to SCRAM Instrumentation, and
      (2) 24 hours for Parameters not common to SCRAM Instrumentation.

   or

   b. take the ACTION required by Specification 3.6.2a for that Parameter.

(g) A channel may be placed in an inoperable status for up to 6 hours for required surveillances without placing the Trip System in tripped condition provided at least one Operable Instrument Channel in the same Trip System is monitoring that Parameter.

With the number of Operable channels one less than required by the Minimum Number of Operable Instrument Channels for the Operable Trip System, either

1. Place the inoperable channel(s) in the tripped condition within 24 hours.
or
2. Take the ACTION required by Specification 3.6.2a for that Parameter.

(h) Only applicable during startup mode while operating in IRM range 10.

(i) May be bypassed in the cold shutdown condition.

(j) ~~In the cold shutdown and refueling conditions, only one Operable Trip System is required provided shutdown cooling system integrity is maintained. With one of the two required Operable Channels in the required Trip System not operable, place the inoperable channel in the tripped condition within 12 hours. Otherwise, either:~~

~~1. Immediately initiate action to restore the channel to operable status.~~
~~or~~
~~Immediately initiate action to isolate the shutdown cooling system.~~ Deleted

(k) The Primary Coolant Isolation Parameters for Cleanup and Shutdown Cooling in Table 3.6.2b are only applicable in the Shutdown Condition - Hot. See Table 3.6.2m for Parameter applicability in the Shutdown Condition – Cold.

Note 1: Surveillance intervals are specified in the Surveillance Frequency Control Program unless otherwise noted in Table 4.6.2b.

TABLE 3.6.2d

INSTRUMENTATION THAT INITIATES CORE SPRAY[e]

Limiting Condition for Operation

Parameter	Minimum No. of Tripped or Operable Trip Systems	Minimum No. of Operable Instrument Channels per Operable Trip System (f)	Set Point	Reactor Mode Switch Position in Which Function Must Be Operable: Shutdown	Refuel	Startup	Run
START CORE SPRAY PUMPS							
(1) High Drywell Pressure	2	2	≤ 3.5 psig	(d)(g)	x	(a)	(a)
(2) Low-Low Reactor Water Level	2	2	≥ 5 inches (Indicator Scale)	(b)(g)	x	x	x
OPEN CORE SPRAY DISCHARGE VALVES							
(3) Reactor Pressure and either (1) or (2) above.	2	2	≥ 365 psig	~~x~~(g)	x	x	x

NOTES FOR TABLES 3.6.2d AND 4.6.2d

(a) May be bypassed when necessary for containment inerting.

(b) May be bypassed when necessary for performing major maintenance as specified in Specification 2.1.1.e.

(c) The trip circuit will be calibrated and tested in accordance with the Surveillance Frequency Control Program, the primary sensor will be calibrated and tested in accordance with the Surveillance Frequency Control Program.

(d) May be bypassed when necessary for integrated leak rate testing.

(e) The instrumentation that initiates the Core Spray System is not required to be operable, if there is no fuel in the reactor vessel.

(f) A channel may be placed in an inoperable status for up to 6 hours for required surveillances without placing the Trip System in the tripped condition provided at least one Operable Instrument Channel in the same Trip System is monitoring that parameter.

With the number of Operable channels less than required by the Minimum Number of Operable Instrument Channels per Operable Trip System requirement:

1. With one channel inoperable, place the inoperable channel in the tripped condition within 24 hours or take the ACTION required by Specification 3.6.2a for that Parameter.

2. With more than one channel inoperable, take the ACTION required by Specification 3.6.2a for that Parameter.

(g) The Parameters for Start Core Spray Pumps and Open Core Spray Discharge Valves in Table 3.6.2d are only applicable in the Shutdown Condition - Hot. See Table 3.6.2m for Parameter applicability in the Shutdown Condition – Cold.

Note 1: Surveillance intervals are specified in the Surveillance Frequency Control Program unless otherwise noted in Table 4.6.2d.

NOTES FOR TABLES 3.6.2j AND 4.6.2j

(a) This function shall be operable whenever recently irradiated fuel or an irradiated fuel cask is being handled in the reactor building~~, and during operations with a potential for draining the reactor vessel (OPDRVs)~~.

(b) Deleted.

(c) Immediately prior to when function is required and in accordance with the Surveillance Frequency Control Program thereafter until function is no longer required.

(d) A channel may be placed in an inoperable status for up to 6 hours for required surveillances without placing the Trip System in the tripped condition provided at least one Operable Instrument Channel in the same Trip System is monitoring that parameter.

With the number of Operable channels one less than required by the Minimum Number of Operable Instrument Channels for the Operable Trip System, either

1) Place the inoperable channel(s) in the tripped condition within 24 hours.
or
2) Take the ACTION required by Specification 3.6.2a for that Parameter.

Note 1: Surveillance intervals are specified in the Surveillance Frequency Control Program unless otherwise noted in Table 4.6.2j.

TABLE 3.6.2m

RPV WATER INVENTORY CONTROL INSTRUMENTATION

Limiting Condition for Operation

Parameter	Minimum No. of Tripped or Operable Trip Systems	Minimum No. of Operable Instrument Channels per Operable Trip System	Set Point	Reactor Mode Switch Position in Which Function Must Be Operable			
				Shutdown	Refuel	Startup	Run
START CORE SPRAY PUMPS (c)							
(1) Manual	1	1 (d)	---	(a)(b)	(a)(b)		
OPEN CORE SPRAY DISCHARGE VALVES (c)							
(2) Reactor Pressure and (1) above.	1 per pump	1 per pump (d)	≥ 365 psig	(a)	(a)		

TABLE 3.6.2m

RPV WATER INVENTORY CONTROL INSTRUMENTATION

Limiting Condition for Operation

Parameter	Minimum No. of Tripped or Operable Trip Systems	Minimum No. of Operable Instrument Channels per Operable Trip System	Set Point	Reactor Mode Switch Position in Which Function Must Be Operable			
				Shutdown	Refuel	Startup	Run
PRIMARY COOLANT ISOLATION							
(1) Low-Low Reactor Water Level							
(a) Cleanup	2	2(f)	≥ 5 inches (Indicator Scale)	(a)	(a)		
(b) Shutdown Cooling	2(e)	2(e)(f)	≥ 5 inches (Indicator Scale)	(a)	(a)		
(2) Manual	2	1	---	(a)	(a)		

TABLE 4.6.2m

RPV WATER INVENTORY CONTROL INSTRUMENTATION

Surveillance Requirement

Parameter	Sensor Check	Instrument Channel Test	Instrument Channel Calibration
START CORE SPRAY PUMPS			
(1) Manual	Note 1	Note 1[g]	Note 1[g]
OPEN CORE SPRAY DISCHARGE VALVES			
(2) Reactor Pressure and (1) above	Note 1	Note 1[g]	Note 1[g]

TABLE 4.6.2m

RPV WATER INVENTORY CONTROL INSTRUMENTATION

Surveillance Requirement

Parameter	Sensor Check	Instrument Channel Test	Instrument Channel Calibration
PRIMARY COOLANT ISOLATION (Cleanup and Shutdown Cooling)			
(1) Low-Low Reactor Water Level	Note 1	Note 1[g]	Note 1[g]
(2) Manual	---	Note 1	---

NOTES FOR TABLES 3.6.2m AND 4.6.2m

(a) The Parameters in this table are only applicable in the Shutdown Condition – Cold and Refuel. See Table 3.6.2b or Table 3.6.2d for Parameter applicability in the Shutdown Condition – Hot.

(b) May be bypassed when necessary for performing major maintenance as specified in Specification 2.1.1.e.

(c) The instrumentation that initiates the Core Spray System is not required to be operable if there is no fuel in the reactor vessel.

(d) A channel may be placed in an inoperable status for up to 6 hours for required surveillances without placing the Trip System in the tripped condition provided at least one Operable Instrument Channel in the same Trip System is monitoring that parameter.

With the number of Operable channels less than required by the Minimum Number of Operable Instrument Channels per Operable Trip System requirement:

1. With one channel inoperable, place the inoperable channel in the tripped condition within 24 hours or take the ACTION required by Specification 3.6.2a for that Parameter.
2. With more than one channel inoperable, take the ACTION required by Specification 3.6.2a for that Parameter.

(e) In the cold shutdown and refueling conditions, only one Operable Trip System is required provided shutdown cooling system integrity is maintained.

With one of the two required Operable Channels in the required Trip System not operable, place the inoperable channel in the tripped condition within 12 hours, otherwise

1. Declare associated penetration flow path(s) incapable of automatic isolation,

and

2. Calculate drain time,

and

3. a. Immediately initiate action to restore the channel to operable status,

or

b Immediately initiate action to isolate the shutdown cooling system.

(f) A channel may be placed in an inoperable status for up to 6 hours for required surveillances without placing the Trip System in the tripped condition provided at least one Operable Instrument Channel in the same Trip System is monitoring that Parameter.

With the number of Operable Channels one less than required by the Minimum Number of Operable Instrument Channels per Operable Trip System requirement for one trip system:

1. Declare associated penetration flow path(s) incapable of automatic isolation,

and

2. Calculate drain time,

and

3. Place the inoperable channel(s) in the tripped condition within,
   a. 12 hours for Parameters common to SCRAM Instrumentation, and
   b. 24 hours for Parameters not common to SCRAM Instrumentation,

or

4. Take the ACTION required by Specification 3.6.2a for that Parameter.

With the number of Operable Channels one less than required by the Minimum Number of Operable Instrument Channels per Operable Trip System requirement for both trip systems:

1. Declare associated penetration flow path(s) incapable of automatic isolation,

and

2. Calculate drain time,

and

3. Place the inoperable channel(s) in one trip system in the tripped condition within one hour,

and

4. Place the inoperable channel(s) in the remaining trip system in the tripped condition within,
   a. 12 hours for Parameters common to SCRAM Instrumentation, and
   b. 24 hours for Parameters not common to SCRAM Instrumentation,

or

5. Take the ACTION required by Specification 3.6.2a for that Parameter.

NOTES FOR TABLES 3.6.2m AND 4.6.2m

(g) The trip circuit will be calibrated and tested in accordance with the Surveillance Frequency Control Program, the primary sensor will be calibrated and tested in accordance with the Surveillance Frequency Control Program.

Note 1: Surveillance intervals are specified in the Surveillance Frequency Control Program unless otherwise noted in Table 4.6.2m.

ATTACHMENT 3

License Amendment Request

Nine Mile Point Nuclear Station, Unit 1
Docket No. 50-220

Revise Technical Specifications to Adopt TSTF-542,
"Reactor Pressure Vessel Water Inventory Control," Revision 2

Revised Technical Specification Pages

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NINE MILE POINT NUCLEAR STATION
UNIT 1 - TECHNICAL SPECIFICATIONS
CONTENTS

1.34 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 -10 inches indicator scale (74 inches above the top of the active fuel seated in the RPV) assuming:

a. The water inventory above -10 inches indicator scale 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 -10 inches indicator scale except:

   1. Penetration flow paths connected to an intact closed system, or isolate 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 -10 inches indicator scale 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 -10 inches indicator scale 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.

LIMITING CONDITION FOR OPERATION

3.1.4 CORE SPRAY SYSTEM

Applicability:

Applies to the operating status of the core spray systems when in the Power Operating Condition or Shutdown Condition - Hot.

Objective:

To assure the capability of the core spray systems to cool reactor fuel in the event of a loss-of-coolant accident.

Specification:

a. Whenever irradiated fuel is in the reactor vessel and the reactor coolant temperature is greater than 212°F, each of the two core spray systems shall be operable except as specified in Specifications b and c below.

b. If a redundant component of a core spray system becomes inoperable, that system shall be considered operable provided that the component is returned to an operable condition within 7 days and the additional surveillance required is performed.

c. If a redundant component in each of the core spray systems becomes inoperable, both systems shall be considered operable provided that the component is returned to an operable condition within 7 days and the additional surveillance required is performed.

SURVEILLANCE REQUIREMENT

4.1.4 CORE SPRAY SYSTEM

Applicability:

Applies to the periodic testing requirements for the core spray systems.

Objective:

To verify the operability of the core spray systems.

Specification:

The core spray system surveillance shall be performed as indicated below.

a. In accordance with the Surveillance Frequency Control Program automatic actuation of each subsystem in each core spray system shall be demonstrated.

b. In accordance with the Surveillance Frequency Control Program pump operability shall be checked.

c. In accordance with the Surveillance Frequency Control Program the operability of power-operated valves required for proper system operation shall be checked.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
d. If Specifications a, b and c are not met, a normal orderly shutdown shall be initiated within one hour and the reactor shall be in the cold shutdown condition within ten hours.	d. (Deleted)
e. During reactor operation, except during core spray system surveillance testing, core spray isolation valves 40-02 and 40-12 shall be in the open position and the associated valve motor starter circuit breakers for these valves shall be locked in the off position. In addition, redundant valve position indication shall be available in the control room.	e. Surveillance with Inoperable Components When a component becomes inoperable its redundant component or system shall be verified to be operable immediately and in accordance with the Surveillance Frequency Control Program thereafter.
f. (Deleted)	f. With a core spray subsystem suction from the CST, CST level shall be checked in accordance with the Surveillance Frequency Control Program.
g. (Deleted)	g. In accordance with the Surveillance Frequency Control Program when the reactor coolant temperature is greater than 212°F, verify that the piping system between valves 40-03, 13 and 40-01, 09, 10, 11 is filled with water.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
h. (Deleted)	
i. With the downcomers in the suppression chamber having less than three and one half foot submergence, two core spray subsystems and the associated raw water pumps shall be operable with the core spray suction from the condensate storage tanks (CST), and the CST inventory shall not be less than 300,000 gallons.	

LIMITING CONDITION FOR OPERATION

3.1.9 Reactor Pressure Vessel (RPV) Water Inventory Control

Applicability:

Applies to the operating status of the core spray systems and Reactor Water Inventory Control when the reactor coolant temperature is less than or equal to 212°F.

Objective:

To assure the RPV water inventory is maintained -10 inches indicator scale.

Specification:

a. Whenever irradiated fuel is in the reactor vessel and the reactor coolant temperature is less than or equal to 212°F, drain time of RPV water inventory to -10 inches indicator scale shall be ≥36 hours and one core spray subsystem shall be operable except as specified in Specifications b through f below.

b. If the required core spray subsystem becomes inoperable, the component shall be returned to an operable condition within 4 hours.

c. If Specifications a and b are not met, then immediately initiate action to establish a method of water injection capable of operating without offsite electrical power.

SURVEILLANCE REQUIREMENT

4.1.9 Reactor Pressure Vessel (RPV) Water Inventory Control

Applicability:

Applies to the periodic testing requirements for the core spray system and RPV water inventory.

Objective:

To verify the operability of the core spray system and RPV water inventory.

Specification:

a. Verify drain time ≥36 hours in accordance with the Surveillance Frequency Control Program.

b. Verify, for a required core spray subsystem, the downcomers in the suppression chamber have greater than or equal to three and one half foot of submergence or the condensate storage tank inventory is not less than 300,000 gallons, in accordance with the Surveillance Frequency Control Program.

c. Verify for the required core 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.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
d. If drain time <36 hours and ≥8 hours, within 4 hours perform the following actions: (1) Verify secondary containment boundary is capable of being established in less than the drain time, and (2) Verify each secondary containment penetration flow path is capable of being isolated in less than the drain time, and (3) Verify one RBEVS is capable of being placed in operation in less than the drain time.	d. 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.
e. If drain time <8 hours, immediately perform the following actions: (1) Initiate action to establish an additional method of water injection with water sources capable of maintaining RPV water level above -10 inches indicator scale for ≥36 hours, and (2) Initiate action to establish secondary containment boundary, and (3) Initiate action to isolate each secondary containment penetration flow path or verify it can be manually isolated from the control room, and (4) Initiate action to verify one RBEVS is capable of being placed in operation.	e. Verify the required core spray subsystem actuates on a manual initiation signal, in accordance with the Surveillance Frequency Control Program. Vessel spray may be excluded.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
f. Specifications d and e not met, or drain time is <1 hour, immediately initiate action to restore drain time to ≥36 hours.	

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
c. If Specifications 3.2.7a and b above are not met, initiate normal orderly shutdown within one hour and have reactor in the cold shutdown condition within ten hours.	c. In accordance with the Surveillance Frequency Control Program the feedwater and main-steam line power-operated isolation valves shall be exercised by partial closure and subsequent reopening.
d. Whenever fuel is in the reactor vessel and the reactor coolant temperature is less than or equal to 212°F, the isolation valves on the shutdown cooling system lines connected to the reactor coolant system shall be operable except as specified in Specification 3.2.7.e below.	d. At least once per plant cold shutdown the feedwater and main steam line power-operated isolation valves shall be fully closed and reopened, unless this test has been performed within the previous 92 days.
e. In the event any shutdown cooling system isolation valve becomes inoperable whenever fuel is in the reactor vessel and the reactor coolant temperature is less than or equal to 212°F, the system shall be considered operable provided that, within 4 hours, at least one valve in each line having an inoperable valve is in the mode corresponding to the isolated condition.	
f. If Specifications 3.2.7.d and 3.2.7.e above are not met, immediately initiate action to restore the valve(s) to operable status.	

3.4.0 REACTOR BUILDING

APPLICABILITY

Applies to the operating status of the reactor building (secondary containment).

OBJECTIVE

To assure the integrity of the reactor building.

SPECIFICATION

Reactor building integrity must be in effect for the following conditions:

a. Power operating condition,

b. When the reactor water temperature is above 215°F, or

c. Whenever recently irradiated fuel or an irradiated fuel cask is being handled in the Reactor Building.

LIMITING CONDITION FOR OPERATION

3.4.1 LEAKAGE RATE

Applicability:

Applies to the leakage rate of the secondary containment.

Objective:

To specify the requirements necessary to limit exfiltration of fission products released to the secondary containment as a result of an accident.

Specification:

At all times when secondary containment integrity is required, the reactor building leakage rate as determined by Specification 4.4.1 shall not exceed 1600 cfm. If this cannot be met after a routine surveillance check, then the actions listed below shall be taken:

a. Suspend any of the following activities:

   1. Handling of recently irradiated fuel in the reactor building.

   2. Irradiated fuel cask operations in the reactor building.

b. Restore the reactor building leakage rates to within specified limits within 4 hours or initiate normal orderly shutdown and be in a cold shutdown condition within 10 hours.

SURVEILLANCE REQUIREMENT

4.4.1 LEAKAGE RATE

Applicability:

Applies to the periodic testing requirements of the secondary containment leakage rate.

Objective:

To assure the capability of the secondary containment to maintain leakage within allowable limits.

Specification:

In accordance with the Surveillance Frequency Control Program - isolate the reactor building and start emergency ventilation system fan to demonstrate negative pressure in the building relative to external static pressure. The fan flow rate shall be varied so that the building internal differential pressure is at least as negative as that on Figure 3.4.1 for the wind speed at which the test is conducted. The fan flow rate represents the reactor building leakage referenced to zero mph with building internal pressure at least 0.25 inch of water less than atmospheric pressure. The test shall be done at wind speeds less than 20 miles per hour.

LIMITING CONDITION FOR OPERATION

3.4.2 REACTOR BUILDING INTEGRITY - ISOLATION VALVES

Applicability:

Applies to the operational status of the reactor building isolation valves.

Objective:

To assure that fission products released to the secondary containment are discharged to the environment in a controlled manner using the emergency ventilation system.

Specification:

a. The normal Ventilation System isolation valves shall be operable at all times when secondary containment integrity is required.

b. If Specification 3.4.2.a is not met, then the actions listed below shall be taken:

   1. The reactor shall be in the cold shutdown condition within ten hours.

   2. Suspend any of the following activities:

      a. Handling of recently irradiated fuel in the reactor building,

      b. Irradiated fuel cask handling operations in the reactor building.

SURVEILLANCE REQUIREMENT

4.4.2 REACTOR BUILDING INTEGRITY - ISOLATION VALVES

Applicability:

Applies to the periodic testing requirements of the reactor building isolation valves.

Objective:

To assure the operability of the reactor building isolation valves.

Specification:

In accordance with the Surveillance Frequency Control Program, automatic initiation of valves shall be checked.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
b. If these conditions cannot be met, then the actions listed below shall be taken: 1. If in the power operating condition, restore reactor building integrity within 4 hours or be in at least the hot shutdown condition within the next 12 hours and in the cold shutdown condition within the following 24 hours. OR If the reactor coolant system temperature is above 215°F, restore reactor building integrity within 4 hours or be in cold shutdown within the following 24 hours. 2. Suspend any of the following activities: a. Handling of recently irradiated fuel in the reactor building, b. Irradiated fuel cask handling operations in the reactor building.	b. Verify in accordance with the Surveillance Frequency Control Program that: 1. At least one door in each access to the secondary containment is closed, except when the access opening is being used for entry and exit. 2. At least one door or closeup of the railroad bay is closed.

c. The results of laboratory carbon sample analysis shall show ≥95% radioactive methyl iodide removal when tested in accordance with ASTM D3803-1989 at 30°C and 95% R.H.

d. Fans shall be shown to operate within ±10% design flow.

e. During reactor operation, including when the reactor coolant system temperature is above 215°F, from and after the date that one circuit of the emergency ventilation system is made or found to be inoperable for any reason, reactor operation is permissible only during the succeeding seven days unless such circuit is sooner made operable, provided that during such seven days all active components of the other emergency ventilation circuit shall be operable.

During handling of recently irradiated fuel in the reactor building or handling of an irradiated fuel cask in the reactor building from and after the date that one circuit of the emergency ventilation system is made or found to be inoperable for any reason, recently irradiated fuel handling in the reactor building or irradiated fuel cask handling in the reactor building is permissible during the succeeding seven days unless such circuit is sooner made operable, provided that

b. The tests and sample analysis of Specification 3.4.4b, c and d shall be performed in accordance with the Surveillance Frequency Control Program, or after 720 hours of system operation, whichever occurs first or following significant painting, fire or chemical release in any ventilation zone communicating with the system.

c. Cold DOP testing shall be performed after each complete or partial replacement of the HEPA filter bank or after any structural maintenance on the system housing.

d. Halogenated hydrocarbon testing shall be performed after each complete or partial replacement of the charcoal adsorber bank or after any structural maintenance on the system housing.

e. Each circuit shall be operated at least 15 minutes in accordance with the Surveillance Frequency Control Program.

f. Test sealing of gaskets for housing doors downstream of the HEPA filters and charcoal adsorbers shall be performed at and in conformance with each test performed for compliance with Specification 4.4.4b and Specification 3.4.4b.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
during such seven days all active components of the other emergency ventilation circuit shall be operable. Recently irradiated fuel handling in the reactor building or irradiated fuel cask handling in the reactor building may continue beyond seven days provided the operable emergency ventilation circuit is in operation.	
f. If these conditions cannot be met, within 36 hours, the reactor shall be placed in a condition for which the emergency ventilation system is not required.	
	g. In accordance with the Surveillance Frequency Control Program, automatic initiation of each branch of the emergency ventilation system shall be demonstrated.
	h. In accordance with the Surveillance Frequency Control Program, manual operability of the bypass valve for filter cooling shall be demonstrated.
	i. When one circuit of the emergency ventilation system becomes inoperable all active components in the other emergency ventilation circuit shall be verified to be operable within two hours and in accordance with the Surveillance Frequency Control Program thereafter.

LIMITING CONDITION FOR OPERATION

3.4.5 CONTROL ROOM AIR TREATMENT SYSTEM

Applicability:

Applies to the operating status of the control room air treatment system and Control Room Envelope (CRE) boundary.

----------NOTE----------
The CRE boundary may be opened intermittently under administrative control.

Objective:

To assure the capability of the control room air treatment system to minimize the amount of radioactivity or other gases entering the control room in the event of an incident.

Specification:

a. Except as specified below, the control room air treatment system shall be operable for the following conditions:

   1. Power operating condition, and whenever the reactor coolant system temperature is greater than 212°F.

   2. Whenever recently irradiated fuel or an irradiated fuel cask is being handled in the reactor building.

b. The results of the in-place cold DOP and halogenated hydrocarbon tests at design flows on HEPA filters and charcoal adsorber banks shall show ≥ 99% DOP removal and ≥ 99% halogenated hydrocarbon removal when tested in accordance with ANSI N.510-1980.

SURVEILLANCE REQUIREMENT

4.4.5 CONTROL ROOM AIR TREATMENT SYSTEM

Applicability:

Applies to the testing of the control room air treatment system and CRE boundary.

Objective:

To assure the operability of the control room air treatment system.

Specification:

a. In accordance with the Surveillance Frequency Control Program, the pressure drop across the combined HEPA filters and charcoal adsorber banks shall be demonstrated to be less than 1.5 inches of water at system design flow rate (± 10%).

b. The tests and sample analysis of Specification 3.4.5b, c and d shall be performed in accordance with the Surveillance Frequency Control Program, or after 720 hours of system operation, whichever occurs first or following significant painting, fire or chemical release any ventilation zone communicating with the system.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
c. The results of laboratory carbon sample analysis shall show ≥95% radioactive methyl iodine removal when tested in accordance with ASTM D3803-1989 at 30°C and 95% R.H.	c. Cold DOP testing shall be performed after each complete or partial replacement of the HEPA filter bank or after any structural maintenance on the system housing.
d. Fans shall be shown to operate within ±10% design flow.	d. Halogenated hydrocarbon testing shall be performed after each complete or partial replacement of the charcoal absorber bank or after any structural maintenance on the system housing.
e. From and after the date that the control room air treatment system is made or found to be inoperable for any reason, except for an inoperable CRE boundary during the power operating condition, restore the system to operable within the succeeding seven days.	e. The system shall be operated at least 15 minutes in accordance with the Surveillance Frequency Control Program.
f. If the control room air treatment system is made or found to be inoperable due to an inoperable CRE boundary during the power operating condition: immediately initiate action to implement mitigating actions; within 24 hours, verify mitigating actions ensure CRE occupant exposures to radiological, chemical, and smoke hazards will not exceed limits; and within 90 days, restore the CRE boundary to operable status.	f. In accordance with the Surveillance Frequency Control Program, automatic initiation of the control room air treatment system shall be demonstrated.
g. If Specifications 3.4.5.e or 3.4.5.f cannot be met during the power operating condition, or when reactor coolant system temperature is greater than 212°F, reactor shutdown shall be initiated and the reactor shall be in cold shutdown within 36 hours.	g. In accordance with the frequency and specifications of the Control Room Envelope Habitability Program, perform required CRE unfiltered air inleakage testing.
h. If Specification 3.4.5.e cannot be met whenever recently irradiated fuel or an irradiated fuel cask is being handled in the reactor building, immediately suspend handling of recently irradiated fuel or the irradiated fuel cask in the reactor building.	

LIMITING CONDITION FOR OPERATION

3.6.2 PROTECTIVE INSTRUMENTATION

Applicability:

Applies to the operability of the plant instrumentation that performs a safety function.

Objective:

To assure the operability of the instrumentation required for safe operation.

Specification:

a. The set points, minimum number of trip systems, and minimum number of instrument channels that must be operable for each position of the reactor mode switch shall be as given in Tables 3.6.2a to 3.6.2m.

If the requirements of a table are not met, the actions listed below for the respective type of instrumentation shall be taken.

(1) Instrumentation that initiates scram - control rods shall be inserted, unless there is no fuel in the reactor vessel.

SURVEILLANCE REQUIREMENT

4.6.2 PROTECTIVE INSTRUMENTATION

Applicability:

Applies to the surveillance of the instrumentation that performs a safety function.

Objective:

To verify the operability of protective instrumentation.

Specification:

a. Sensors and instrument channels shall be checked, tested and calibrated at the frequency specified in the Surveillance Frequency Control Program unless otherwise noted in Tables 4.6.2a to 4.6.2m.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
(8) Mechanical Vacuum Pump Isolation - The mechanical vacuum pump shall be isolated or the instrument channel shall be considered inoperable and Specification 3.6.1 shall be applied.	
(9) Diesel Generator Initiation - The diesel generator shall be considered inoperable and Specification 3.6.3 shall be applied.	
(10) Emergency Ventilation Initiation - The emergency ventilation system shall be considered inoperable and Specification 3.4.4 shall be applied.	
(11) High Pressure Coolant Injection Initiation - The high pressure coolant injection system shall be considered inoperable and Specification 3.1.8.c shall be applied.	
(12) Control Room Ventilation - The control room ventilation system shall be considered inoperable and Specification 3.4.5 shall be applied.	
(13) Reactor Pressure Vessel Water Inventory Control - Specification 3.1.9 shall be applied for the applicable drain time.	

TABLE 3.6.2b

INSTRUMENTATION THAT INITIATES
PRIMARY COOLANT SYSTEM OR CONTAINMENT ISOLATION

Limiting Condition for Operation

Parameter	Minimum No. of Tripped or Operable Trip Systems	Minimum No. of Operable Instrument Channels per Operable Trip System	Set Point	Reactor Mode Switch Position in Which Function Must Be Operable: Shutdown	Refuel	Startup	Run
PRIMARY COOLANT ISOLATION							
(Main Steam, Cleanup, and Shutdown Cooling)							
(1) Low-Low Reactor Water Level							
(a) Main Steam and Cleanup	2	2(f)	≥ 5 inches (Indicator Scale)	(k)		x	x
(b) Shutdown Cooling	2	2(f)	≥ 5 inches (Indicator Scale)	(k)		x	x
(2) Manual	2	1	---	(k)		x	x
MAIN-STEAM-LINE ISOLATION							
(3) High Steam Flow Main-Steam Line	2	2(f)	≤ 105 psid			x	x

(g) A channel may be placed in an inoperable status for up to 6 hours for required surveillances without placing the Trip System in tripped condition provided at least one Operable Instrument Channel in the same Trip System is monitoring that Parameter.

With the number of Operable channels one less than required by the Minimum Number of Operable Instrument Channels for the Operable Trip System, either

1. Place the inoperable channel(s) in the tripped condition within 24 hours.

or

2. Take the ACTION required by Specification 3.6.2a for that Parameter.

(h) Only applicable during startup mode while operating in IRM range 10.

(i) May be bypassed in the cold shutdown condition.

(j) Deleted.

(k) The Primary Coolant Isolation Parameters for Cleanup and Shutdown Cooling in Table 3.6.2b are only applicable in the Shutdown Condition - Hot. See Table 3.6.2m for Parameter applicability in the Shutdown Condition - Cold.

Note 1: Surveillance intervals are specified in the Surveillance Frequency Control Program unless otherwise noted in Table 4.6.2b.

TABLE 3.6.2d

INSTRUMENTATION THAT INITIATES CORE SPRAY[E]

Limiting Condition for Operation

	Parameter	Minimum No. of Tripped or Operable Trip Systems	Minimum No. of Operable Instrument Channels per Operable Trip System (f)	Set Point	Reactor Mode Switch Position in Which Function Must Be Operable: Shutdown	Refuel	Startup	Run
	START CORE SPRAY PUMPS							
(1)	High Drywell Pressure	2	2	≤ 3.5 psig	(d)(g)	x	(a)	(a)
(2)	Low-Low Reactor Water Level	2	2	≥ 5 inches (Indicator Scale)	(b)(g)	x	x	x
	OPEN CORE SPRAY DISCHARGE VALVES							
(3)	Reactor Pressure and either (1) or (2) above.	2	2	≥ 365 psig	(g)	x	x	x

NOTES FOR TABLES 3.6.2d AND 4.6.2d

(a) May be bypassed when necessary for containment inerting.

(b) May be bypassed when necessary for performing major maintenance as specified in Specification 2.1.1.e.

(c) The trip circuit will be calibrated and tested in accordance with the Surveillance Frequency Control Program, the primary sensor will be calibrated and tested in accordance with the Surveillance Frequency Control Program.

(d) May be bypassed when necessary for integrated leak rate testing.

(e) The instrumentation that initiates the Core Spray System is not required to be operable, if there is no fuel in the reactor vessel.

(f) A channel may be placed in an inoperable status for up to 6 hours for required surveillances without placing the Trip System in the tripped condition provided at least one Operable Instrument Channel in the same Trip System is monitoring that parameter.

With the number of Operable channels less than required by the Minimum Number of Operable Instrument Channels per Operable Trip System requirement:

1. With one channel inoperable, place the inoperable channel in the tripped condition within 24 hours or take the ACTION required by Specification 3.6.2a for that Parameter.

2. With more than one channel inoperable, take the ACTION required by Specification 3.6.2a for that Parameter.

(g) The Parameters for Start Core Spray Pumps and Open Core Spray Discharge Valves in Table 3.6.2d are only applicable in the Shutdown Condition - Hot. See Table 3.6.2m for Parameter applicability in the Shutdown Condition - Cold.

Note 1: Surveillance intervals are specified in the Surveillance Frequency Control Program unless otherwise noted in Table 4.6.2d.

NOTES FOR TABLES 3.6.2j AND 4.6.2j

(a) This function shall be operable whenever recently irradiated fuel or an irradiated fuel cask is being handled in the reactor building.

(b) Deleted.

(c) Immediately prior to when function is required and in accordance with the Surveillance Frequency Control Program thereafter until function is no longer required.

(d) A channel may be placed in an inoperable status for up to 6 hours for required surveillances without placing the Trip System in the tripped condition provided at least one Operable Instrument Channel in the same Trip System is monitoring that parameter.

With the number of Operable channels one less than required by the Minimum Number of Operable Instrument Channels for the Operable Trip System, either

1) Place the inoperable channel(s) in the tripped condition within 24 hours.
or
2) Take the ACTION required by Specification 3.6.2a for that Parameter.

Note 1: Surveillance intervals are specified in the Surveillance Frequency Control Program unless otherwise noted in Table 4.6.2j.

TABLE 3.6.2m

RPV WATER INVENTORY CONTROL INSTRUMENTATION

Limiting Condition for Operation

Parameter	Minimum No. of Tripped or Operable Trip Systems	Minimum No. of Operable Instrument Channels per Operable Trip System	Set Point	Reactor Mode Switch Position in Which Function Must Be Operable			
				Shutdown	Refuel	Startup	Run
START CORE SPRAY PUMPS [c]							
(1) Manual	1	1 (d)	---	(a)(b)	(a)(b)		
OPEN CORE SPRAY DISCHARGE VALVES [c]							
(2) Reactor Pressure and (1) above.	1 per pump	1 per pump (d)	≥ 365 psig	(a)	(a)		

TABLE 3.6.2m

RPV WATER INVENTORY CONTROL INSTRUMENTATION

Limiting Condition for Operation

Parameter	Minimum No. of Tripped or Operable Trip Systems	Minimum No. of Operable Instrument Channels per Operable Trip System	Set Point	Reactor Mode Switch Position in Which Function Must Be Operable			
				Shutdown	Refuel	Startup	Run
PRIMARY COOLANT ISOLATION							
(1) Low-Low Reactor Water Level							
(a) Cleanup	2(f)	2(f)	≥5 inches (Indicator Scale)	(a)	(a)		
(b) Shutdown Cooling	2(e)	2(e)(f)	≥5 inches (Indicator Scale)	(a)	(a)		
(2) Manual	2	1	---	(a)	(a)		

TABLE 4.6.2m

RPV WATER INVENTORY CONTROL INSTRUMENTATION

Surveillance Requirement

Parameter	Sensor Check	Instrument Channel Test	Instrument Channel Calibration
START CORE SPRAY PUMPS			
(1) Manual	Note 1	Note 1[g]	Note 1[g]
OPEN CORE SPRAY DISCHARGE VALVES			
(2) Reactor Pressure and (1) above	Note 1	Note 1[g]	Note 1[g]

TABLE 4.6.2m

RPV WATER INVENTORY CONTROL INSTRUMENTATION

Surveillance Requirement

Parameter	Sensor Check	Instrument Channel Test	Instrument Channel Calibration
PRIMARY COOLANT ISOLATION (Cleanup and Shutdown Cooling)			
(1) Low-Low Reactor Water Level	Note 1	Note 1[g]	Note 1[g]
(2) Manual	---	Note 1	---

NOTES FOR TABLES 3.6.2m AND 4.6.2m

(a) The Parameters in this table are only applicable in the Shutdown Condition – Cold and Refuel. See Table 3.6.2b or Table 3.6.2d for Parameter applicability in the Shutdown Condition – Hot.

(b) May be bypassed when necessary for performing major maintenance as specified in Specification 2.1.1.e.

(c) The instrumentation that initiates the Core Spray System is not required to be operable if there is no fuel in the reactor vessel.

(d) A channel may be placed in an inoperable status for up to 6 hours for required surveillances without placing the Trip System in the tripped condition provided at least one Operable Instrument Channel in the same Trip System is monitoring that parameter.

With the number of Operable channels less than required by the Minimum Number of Operable Instrument Channels per Operable Trip System requirement:

1. With one channel inoperable, place the inoperable channel in the tripped condition within 24 hours or take the ACTION required by Specification 3.6.2a for that Parameter.
2. With more than one channel inoperable, take the ACTION required by Specification 3.6.2a for that Parameter.

(e) In the cold shutdown and refueling conditions, only one Operable Trip System is required provided shutdown cooling system integrity is maintained.

With one of the two required Operable Channels in the required Trip System not operable, place the inoperable channel in the tripped condition within 12 hours, otherwise

1. Declare associated penetration flow path(s) incapable of automatic isolation,

and

2. Calculate drain time,

and

3. a. Immediately initiate action to restore the channel to operable status,

or

b Immediately initiate action to isolate the shutdown cooling system.

(f) A channel may be placed in an inoperable status for up to 6 hours for required surveillances without placing the Trip System in the tripped condition provided at least one Operable Instrument Channel in the same Trip System is monitoring that Parameter.

With the number of Operable Channels one less than required by the Minimum Number of Operable Instrument Channels per Operable Trip System requirement for one trip system:

1. Declare associated penetration flow path(s) incapable of automatic isolation,
and
2. Calculate drain time,
and
3. Place the inoperable channel(s) in the tripped condition within,
   a. 12 hours for Parameters common to SCRAM Instrumentation,
   and
   b. 24 hours for Parameters not common to SCRAM Instrumentation,
or
4. Take the ACTION required by Specification 3.6.2a for that Parameter.

With the number of Operable Channels one less than required by the Minimum Number of Operable Instrument Channels per Operable Trip System requirement for both trip systems:

1. Declare associated penetration flow path(s) incapable of automatic isolation,
and
2. Calculate drain time,
and
3. Place the inoperable channel(s) in one trip system in the tripped condition within one hour,
and
4. Place the inoperable channel(s) in the remaining trip system in the tripped condition within,
   a. 12 hours for Parameters common to SCRAM Instrumentation,
   and
   b. 24 hours for Parameters not common to SCRAM Instrumentation,
or
5. Take the ACTION required by Specification 3.6.2a for that Parameter.

(g) The trip circuit will be calibrated and tested in accordance with the Surveillance Frequency Control Program, the primary sensor will be calibrated and tested in accordance with the Surveillance Frequency Control Program.

Note 1: Surveillance intervals are specified in the Surveillance Frequency Control Program unless otherwise noted in Table 4.6.2m.

ATTACHMENT 4

License Amendment Request

Nine Mile Point Nuclear Station, Unit 1
Docket No. 50-220

Revise Technical Specifications to Adopt TSTF-542,
"Reactor Pressure Vessel Water Inventory Control," Revision 2

Proposed Technical Specification Bases Marked-Up Pages
(for information only)

Bases Pages

79d thru 79f
115a
167
169
172
177
180a
181
248a
249
249a

During reactor startup with periods of low reactor water feed demand, one feedwater train is operated with a blocking valve closed downstream of the main flow control valve when core power is less than or equal to 25% of rated thermal power. This allows the low flow control valve to control the reactor water flow during the startup period when feedwater flow demand is low. Use of the low flow control valve provides more uniform feedwater flow which reduces thermal cycling at the reactor pressure vessel feedwater nozzles and in the feedwater piping as well as eliminating a severe service condition in the main flow control valves during reactor startup. Under low feedwater flow conditions, the main flow control valves also experience high pressure drops and fluid velocities which shorten the valve's life and can cause plant transients due to control valve failure. Reactor startup with one HPCI train available is acceptable since LOCA makeup requirements are reduced during startup because of lower reactor pressure, less decay heat, and lower reactor power than assumed in LOCA analyses performed to 10 CFR 50.46(a)(1)(i) requirements. The other feedwater train (other HPCI loop) with its blocking valve open would remain capable of supplying 3,420 gpm of feedwater upon automatic HPCI initiation at all reactor pressures.

Insert C to follow Insert B

BASES FOR 3.1.9 AND 4.1.9 Reactor Pressure Vessel (RPV) Water Inventory Control

The RPV contains penetrations below -10 inches indicator scale (74 inches above top of active fuel) that have the potential to drain the reactor coolant inventory to below -10 inches indicator scale. If the water level should drop below -10 inches indicator scale, the ability to remove decay heat is reduced, which could lead to elevated cladding temperatures and clad perforation.

The Core Spray System performance is evaluated for the entire spectrum of break sizes for a postulated loss of coolant accident (LOCA). Both systems (at least one subsystem in each system) are required to operate to limit peak clad temperatures below 2200°F (10 CFR 50.46(a)(1)(i) model) for the worst case line break (recirculation discharge line break). It is reasonable to assume, based on engineering judgment, while in the cold shutdown or refueling conditions, one Core Spray subsystem can maintain adequate reactor vessel water level. The RPV water level must be controlled when in the cold shutdown or refueling conditions to ensure that if an unexpected draining event should occur, the reactor coolant water level remains above -10 inches indicator scale. The Limiting Condition for Operation (LCO) requires the drain time of RPV water inventory to -10 inches indicator scale to be ≥36 hours. A drain time of 36 hours is considered reasonable to identify and initiate action to mitigate unexpected draining of reactor coolant. An event that could cause loss of RPV water inventory and result in the RPV water level reaching -10 inches indicator scale in greater than 36 hours does not represent a significant challenge to core uncovery and can be managed as part of normal plant operation.

One Core Spray subsystem is required to be operable and capable of being manually started to provide defense-in-depth should an unexpected draining event occur. The Core Spray subsystem consists of one motor driven pump set (two pumps in series), piping, and valves to transfer water from the torus to the RPV. The necessary portions of the Service Water System and Ultimate Heat Sink capable of providing cooling are also required for a Core Spray subsystem. Management of gas voids is important to Core Spray subsystem operability.

RPV water inventory control is required when in the cold shutdown or refueling conditions. RPV water inventory control is required whenever irradiated fuel is in the reactor vessel.

A double-ended guillotine break of the Reactor Coolant System (RCS) is not postulated when in the cold shutdown or refueling conditions, due to the reduced RCS pressure, reduced piping stresses, and ductile piping systems. Instead, an event is considered in which single operator error or initiating event allows draining of the RPV water inventory 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).

The RPV water level must be controlled when in the cold shutdown or refueling conditions, to ensure that if an unexpected draining event should occur, the reactor coolant water level remains above -10 inches indicator scale.

BASES FOR 3.1.9 AND 4.1.9 Reactor Pressure Vessel (RPV) Water Inventory Control

The 4 hour Completion Time for restoring the required core spray subsystem to operable status is based on engineering judgment that the LCO controls on drain time and the low probability of an unexpected vessel draindown event that would result in loss of RPV water inventory.

If the inoperable Core Spray subsystem is not restored to operable status within the required Completion Time, action must be immediately initiated to establish a method of water injection capable of operating without offsite electrical power. The method of water injection includes the necessary instrumentation and controls, water sources, and pumps and valves needed to add water to the RPV or refueling cavity should an unexpected draining event occur. The method of water injection may be manually initiated and may consist of one or more systems or subsystems, and must be able to access water inventory capable of maintaining the RPV water level above -10 inches indicator scale for ≥36 hours. If recirculation of injected water would occur, it may be credited in determining the necessary water volume.

With the drain time less than 36 hours but greater than or equal to 8 hours, compensatory measures should be taken to ensure the ability to implement mitigating actions should an unexpected draining event occur. Should a draining event lower the reactor coolant level to below -10 inches indicator scale, there is potential for damage to the reactor fuel cladding and release of radioactive material. Additional actions are taken to ensure that radioactive material will be contained, diluted, and processed prior to being released to the environment.

The secondary containment provides a controlled volume in which fission products can be contained, diluted, and processed prior to release to the environment. Action 3.1.9.d(1) requires verification of the capability to establish the secondary containment boundary in less than the drain time. The required verification confirms actions to establish the secondary containment boundary are preplanned and necessary materials are available. The secondary containment boundary is considered established when one Reactor Building Emergency Ventilation (RBEV) subsystem is capable of maintaining a negative pressure in the secondary containment with respect to the environment. Verification that the secondary containment boundary can be established must be performed within 4 hours. The required verification is an administrative activity and does not require manipulation or testing of equipment.

Secondary containment penetration flow paths form a part of the secondary containment boundary. Action 3.1.9.d(2) requires verification of the capability to isolate each secondary containment penetration flow path in less than the drain time. The required verification confirms actions to isolate the secondary containment penetration flow paths are preplanned and necessary materials are available. Power operated valves are not required to receive automatic isolation signals if they can be closed manually within the required time. Verification that the secondary containment penetration flow paths can be isolated must be performed within 4 hours. The required verification is an administrative activity and does not require manipulation or testing of equipment. One RBEV circuit is capable of maintaining the secondary containment at a negative pressure with respect to the environment and filter gaseous releases.

Action 3.1.9.d(3) requires verification of the capability to place one RBEV circuit in operation in less than the drain time. The required verification confirms actions to place an RBEV circuit in operation are preplanned and necessary materials are available. Verification that an RBEV circuit can be placed in operation must be performed within 4 hours. The required verification is an administrative activity and does not require manipulation or testing of equipment.

With the drain time less than 8 hours, mitigating actions are implemented in case an unexpected draining event should occur.

Action 3.1.9.e(1) requires immediate action to establish an additional method of water injection augmenting the Core Spray subsystem required by the LCO. The additional method of water injection includes the necessary instrumentation and controls, water sources, and pumps and valves needed to add water to the RPV or refueling cavity should an unexpected draining event occur. For Action 3.1.9.e(1), either the Core Spray subsystem or the additional method of water injection must be capable of operating without offsite electrical power. The additional method of water injection may be manually initiated and may consist of one or more systems or subsystems. The additional method of water injection must be able to access water inventory capable of being injected to maintain the RPV water level above -10 inches indicator scale for ≥36 hours. The additional method of water injection and the Core Spray subsystem may share all or part of the same water sources. If recirculation of injected water would occur, it may be credited in determining the required water volume.

Action 3.1.9.e(2) requires that actions be immediately initiated to establish the secondary containment boundary. With the secondary containment boundary established, one RBEV circuit is capable of maintaining a negative pressure in the secondary containment with respect to the environment. The secondary containment penetrations form a part of the secondary containment boundary.

Action 3.1.9.e(3) requires that actions be immediately initiated to verify that each secondary containment penetration flow path is isolated or to verify that it can be manually isolated from the control room.

Action 3.1.9.e(4) requires that actions be immediately initiated to verify that at least one RBEV circuit is capable of being placed in operation. The required verification is an administrative activity and does not require manipulation or testing of equipment.

If the Required Actions and associated Completion times of Specifications 3.1.9.d and 3.1.9.e are not met or if the drain time is less than 1 hour, actions must be initiated immediately to restore the drain time to ≥36 hours. In this condition, there may be insufficient time to respond to an unexpected draining event to prevent the RPV water inventory from reaching -10 inches indicator scale. Note that the Actions of 3.1.9.e are also applicable when drain time is less than 1 hour.

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requiring primary containment isolation. The seal water, supplied from the core spray system, would pressurize the piping between the inboard and outboard isolation valves. To prevent a spurious or inadvertent valve opening from defeating the water seal, the motor-operated shutdown cooling system isolation valves are required to be de-activated (power is removed) during normal plant operation. Thus, the motor-operated shutdown cooling system isolation valves are considered operable when the valves are closed and de-activated and the water seal is capable of performing its function.

When the shutdown cooling system is placed in service for plant cooldown (with reactor pressure ≤ 120 psig and temperature ≤ 350°F), power for the motor-operated isolation valves must be restored and the valves opened. Should a loss of coolant accident occur at this time, failure of an isolation valve to close upon receipt of an isolation signal could cause a loss of the water seal. The risk associated with this potential single failure has been determined to be acceptable based on the low probability of a core damage event occurring during shutdown cooling system operation[(2)].

Specification 3.2.7.d requires operability of the shutdown cooling system isolation valves whenever fuel is in the reactor vessel and the reactor coolant temperature is less than or equal to 212°F. If any isolation valve becomes inoperable, Specification 3.2.7.e requires that, within 4 hours, at least one valve in each line having an inoperable valve is in the mode corresponding to the isolated condition. However, if the shutdown cooling function is needed to provide core cooling, isolating the shutdown cooling line is not desirable. Specification 3.2.7.f allows the shutdown cooling line to remain unisolated provided drain time is ≥36 hours. If drain time is less than 36 hours, then Specification 3.1.9 applies. The action is immediately initiated to suspend operations with a potential for draining the reactor vessel (OPDRVs). If suspending the OPDRVs would result in closing the shutdown cooling system isolation valves, an alternative action is provided to immediately initiate action to restore the valve(s) to operable status. This allows the shutdown cooling system to remain in service while actions are being taken to restore the valve(s). The term "immediately" means that the action should be pursued without delay and in a controlled manner. ~~Either of the actions identified in Specification 3.2.7.f must continue until OPDRVs are suspended or the valves are restored to operable status. Operation with the shutdown cooling system in service is not considered an OPDRV so long as system integrity is maintained.~~ System integrity is maintained provided the piping is intact and no maintenance is being performed that has the potential for draining the reactor vessel through the system. In addition, with the reactor coolant temperature less than or equal to 212°F, the water seal function is not required to consider the shutdown cooling system isolation valves operable since primary containment integrity is not required with reactor coolant temperature less than or equal to 215°F.

Results obtained during closure testing are not expected to differ appreciably from closure times under accident conditions as in most cases, flow helps to seal the valve.

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(2) Letter from G. E. Edison (NRC) to B. R. Sylvia (NMPC) dated March 20, 1995, Issuance of Amendment for Nine Mile Point Nuclear Station Unit No. 1 (License Amendment No. 154).

The secondary containment is designed to minimize any ground level release of radioactive materials that might result from a serious accident. The reactor building provides secondary containment during reactor operation, when the drywell is sealed and in service. The reactor building provides primary containment during periods when the reactor is shutdown, the drywell is open, and activities are ongoing that require secondary containment to be in effect.

There are two principal accidents for which credit is taken for reactor building (secondary containment) integrity. These are a loss of coolant accident (LOCA) and a refueling accident involving "recently irradiated" fuel. The reactor building performs no active function in response to each of these limiting events; however, its leak tightness is required to ensure that the release of radioactive materials is restricted to those leakage paths and associated leakage rates assumed in the accident analysis and that fission products entrapped within the reactor building structure will be treated by the Reactor Building Emergency Ventilation System (RBEVS) prior to discharge to the environment.

In addition to these limiting events, events occurring during handling of an irradiated fuel cask ~~and operations with a potential for draining the reactor vessel (OPDRVs)~~ can be postulated to cause a fission product release. During these events, the reactor building would be the only barrier to a release to the environment. Thus, reactor building integrity is required during handling of an irradiated fuel cask ~~and during OPDRVs~~.

The Refueling Accident analysis is based on an alternative source term (AST) methodology (10 CFR 50.67 and Regulatory Guide 1.183). This analysis concluded that the calculated total effective dose equivalent (TEDE) values to the control room occupants, the exclusion area boundary, and the low population zone are well below the TEDE criteria established in 10 CFR 50.67 without crediting reactor building integrity, operation of the RBEVS, or operation of the Control Room Air Treatment System (CRATS), as long as the fuel is allowed to decay for at least 24 hours following reactor shutdown. As a result, "recently irradiated" fuel is defined as fuel that has occupied part of a critical reactor core within 24 hours; i.e., reactor fuel that has decayed less than 24 hours following reactor shutdown. Therefore, reactor building integrity is not required, and RBEVS and CRATS are not required to be operable, during movement of decayed irradiated fuel that is no longer considered "recently irradiated." Conversely, reactor building integrity is required, and RBEVS and CRATS are required to be operable, during movement of recently irradiated fuel assemblies.

In the answers to Questions II-3 and IV-5 of the Second Supplement and also in the Fifth Supplement*, the relationships among wind speed, direction, pressure distribution outside the building, building internal pressure, and reactor building leakage are discussed. The curve of pressure in Figure 3.4.1 represents the wind direction which results in the least building leakage. It is assumed that when the test is performed, the wind direction is that which gives the least leakage.

*FSAR

Isolation of the reactor building occurs automatically upon high radiation of the normal building exhaust ducts or from high radiation at the refueling platform (See 3.6.2). Isolation will assure that any fission products entering the reactor building will be routed to the emergency ventilation system prior to discharge to the environment (Section VII-H.3.0 of the FSAR).

The two principal accidents for which the reactor building isolation valves must be operable are a loss of coolant accident (LOCA) and a refueling accident involving "recently irradiated" fuel. In addition to these limiting events, events occurring during handling of an irradiated fuel cask ~~and operations with a potential for draining the reactor vessel (OPDRVs)~~ can be postulated to cause a fission product release. During these events, the reactor building would be the only barrier to a release to the environment. Thus, the reactor building isolation valves are required to be operable during handling of an irradiated fuel cask ~~and during OPDRVs~~.

The Refueling Accident analysis is based on an alternative source term (AST) methodology (10 CFR 50.67 and Regulatory Guide 1.183). This analysis concluded that the calculated total effective dose equivalent (TEDE) values to the control room occupants, the exclusion area boundary, and the low population zone are well below the TEDE criteria established in 10 CFR 50.67 without crediting reactor building integrity or operation of the reactor building emergency ventilation system (RBEVS), as long as the fuel is allowed to decay for at least 24 hours following reactor shutdown. As a result, "recently irradiated" fuel is defined as fuel that has occupied part of a critical reactor core within 24 hours; i.e., reactor fuel that has decayed less than 24 hours following reactor shutdown. Therefore, reactor building integrity is not required and the reactor building isolation valves are not required to be operable during movement of decayed irradiated fuel that is no longer considered "recently irradiated." Conversely, reactor building integrity is required and the reactor building isolation valves are required to be operable during movement of recently irradiated fuel assemblies.

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The secondary containment is designed to minimize any ground level release of radioactive materials that might result from a serious accident. The reactor building provides secondary containment during reactor operation, when the drywell is sealed and in service. The reactor building provides primary containment during periods when the reactor is shutdown, the drywell is open, and activities are ongoing that require secondary containment to be in effect.

There are two principal accidents for which credit is taken for reactor building (secondary containment) integrity. These are a loss of coolant accident (LOCA) and a refueling accident involving "recently irradiated" fuel. The reactor building performs no active function in response to each of these limiting events; however, its leak tightness is required to ensure that the release of radioactive materials is restricted to those leakage paths and associated leakage rates assumed in the accident analysis and that fission products entrapped within the reactor building structure will be treated by the Reactor Building Emergency Ventilation System (RBEVS) prior to discharge to the environment.

In addition to these limiting events, events occurring during handling of an irradiated fuel cask ~~and operations with a potential for draining the reactor vessel (OPDRVs)~~ can be postulated to cause a fission product release. During these events, the reactor building would be the only barrier to a release to the environment. Thus, reactor building integrity is required during handling of an irradiated fuel cask~~ and during OPDRVs~~.

The Refueling Accident analysis is based on an alternative source term (AST) methodology (10 CFR 50.67 and Regulatory Guide 1.183). This analysis concluded that the calculated total effective dose equivalent (TEDE) values to the control room occupants, the exclusion area boundary, and the low population zone are well below the TEDE criteria established in 10 CFR 50.67 without crediting reactor building integrity, operation of the RBEVS, or operation of the Control Room Air Treatment System (CRATS), as long as the fuel is allowed to decay for at least 24 hours following reactor shutdown. As a result, "recently irradiated" fuel is defined as fuel that has occupied part of a critical reactor core within 24 hours; i.e., reactor fuel that has decayed less than 24 hours following reactor shutdown. Therefore, reactor building integrity is not required during movement of decayed irradiated fuel that is no longer considered "recently irradiated." Conversely, reactor building integrity is required during movement of recently irradiated fuel assemblies.

As discussed in Section VI-F* all access openings of the reactor building have as a minimum two doors in series. Appropriate local alarms and control room indicators are provided to always insure that reactor building integrity is maintained. Surveillance of the reactor building access doors provides additional assurance that reactor building integrity is maintained. The intent is to not breach the secondary containment, which is achieved by maintaining the inner or outer portion of the barrier closed. An exception is provided to allow brief, unintentional, simultaneous opening of the inner and outer secondary containment doors for personnel entry and exit.

Maintaining closed doors on the pump compartments ensures that suction to the core and containment spray pumps is not lost in case of a gross leak from the suppression chamber. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

*FSAR

The two principal accidents for which the Reactor Building Emergency Ventilation System (RBEVS) must be operable are a loss of coolant accident (LOCA) and a refueling accident involving "recently irradiated" fuel. In addition to these limiting events, events occurring during handling of an irradiated fuel cask ~~and operations with a potential for draining the reactor vessel (OPDRVs)~~ can be postulated to cause a fission product release. During these events, the reactor building would be the only barrier to a release to the environment. Thus, the RBEVS is required to be operable during handling of an irradiated fuel cask ~~and during OPDRVs~~.

The Refueling Accident analysis is based on an alternative source term (AST) methodology (10 CFR 50.67 and Regulatory Guide 1.183). This analysis concluded that the calculated total effective dose equivalent (TEDE) values to the control room occupants, the exclusion area boundary, and the low population zone are well below the TEDE criteria established in 10 CFR 50.67 without crediting reactor building integrity or operation of the RBEVS, as long as the fuel is allowed to decay for at least 24 hours following reactor shutdown. As a result, "recently irradiated" fuel is defined as fuel that has occupied part of a critical reactor core within 24 hours; i.e., reactor fuel that has decayed less than 24 hours following reactor shutdown. Therefore, reactor building integrity is not required and the RBEVS is not required to be operable during movement of decayed irradiated fuel that is no longer considered "recently irradiated." Conversely, reactor building integrity is required and the RBEVS is required to be operable during movement of recently irradiated fuel assemblies.

The replacement charcoal for the adsorber tray removed for the test should meet the same adsorbent quality. Any HEPA filters found defective shall be replaced with filters qualified pursuant to ANSI 509-1980.

With doors closed and fan in operation, DOP aerosol shall be sprayed externally along the full linear periphery of each respective door to check the gasket seal. Any detection of DOP in the fan exhaust shall be considered an unacceptable test result and the gaskets repairs and test repeated.

If significant painting, fire or chemical release occurs such that the HEPA filter or charcoal adsorber could become contaminated from the fumes, chemicals or foreign material, the same tests and sample analysis shall be performed as required for operational use. The determination of significant shall be made by the operator on duty at the time of the incident. Knowledgeable staff members should be consulted prior to making this determination.

Demonstration of the automatic initiation capability and operability of filter cooling is necessary to assure system performance capability. If one emergency ventilation system is inoperable, the other system must be verified to be operable daily. This substantiates the availability of the operable system and thus reactor operation or refueling operation may continue during this period.

If the control room air treatment system is found to be inoperable for any reason other than an inoperable CRE during the power operating condition, there is no immediate threat to the CRE occupants and reactor operation may continue for a limited period of time while repairs are being made. If the system cannot be repaired within seven days, the reactor is shutdown and brought to a cold shutdown within 36 hours.

If the control room air treatment system is found to be inoperable for any reason whenever recently irradiated fuel or an irradiated fuel cask is being handled in the reactor building~~, or during operations with a potential for draining the reactor vessel (OPDRVs),~~ there is no immediate threat to the CRE occupants and these activities may continue for a limited period of time while repairs are being made. If the system cannot be repaired within seven days, these activities must be immediately suspended.

If the unfiltered inleakage of potentially contaminated air past the CRE boundary and into the CRE can result in CRE occupant radiological dose greater than the calculated dose of the licensing basis analyses of DBA consequences (allowed to be up to 5 rem total effective dose equivalent TEDE)), or inadequate protection of CRE occupants from hazardous chemicals or smoke, the CRE boundary is inoperable. If in the power operating condition, actions must be taken to restore an operable CRE boundary within 90 days. During the period that the CRE boundary is considered inoperable, action must be initiated to implement mitigating actions to lessen the effect on CRE occupants from the potential hazards of a radiological or chemical event or a challenge from smoke. Actions must be taken within 24 hours to verify that in the event of a DBA, the mitigating actions will ensure that CRE occupant radiological exposures will not exceed the calculated dose of the licensing basis analyses of DBA consequences, and that CRE occupants are protected from hazardous chemicals and smoke. These mitigating actions (i.e., actions that are taken to offset the consequences of the inoperable CRE boundary) should be preplanned for implementation upon entry into the condition, regardless of whether entry is intentional or unintentional. The 24 hour period allowed is reasonable based on the low probability of a DBA occurring during this time period, and the use of mitigating actions. The 90 day period is reasonable based on the determination that the mitigating actions will ensure protection of CRE occupants within analyzed limits while limiting the probability that CRE occupants will have to implement protective measures that may adversely affect their ability to control the reactor and maintain it in a safe shutdown condition in the event of a DBA. In addition, the 90 day period is a reasonable time to diagnose, plan and possibly repair, and test most problems with the CRE boundary.

The testing performed for TS 4.4.5.g verifies the operability of the CRE boundary by testing for unfiltered air inleakage past the CRE boundary and into the CRE. The details of the testing are specified in the Control Room Envelope Habitability Program. The CRE is considered habitable when the radiological dose to CRE occupants calculated in the licensing basis analyses of DBA consequences is no more than 5 rem TEDE and the CRE occupants are protected from hazardous chemicals and smoke. This surveillance requirement verifies that the unfiltered air inleakage into the CRE is no greater than the flow rate assumed in the licensing basis analyses of DBA consequences. When unfiltered air inleakage is greater than the assumed flow rate during the power operating condition, TS 3.4.5.f must be entered. The actions allow time to restore the CRE boundary to operable status provided mitigating actions can ensure that the CRE remains within the licensing basis habitability limits for the occupants following an accident. Compensatory measures are discussed in Regulatory Guide 1.196, Section C.2.7.3, (Ref. 2) which endorses, with exceptions, NEI 99-03, Section 8.4 and Appendix F (Ref. 3). These compensatory measures may also be used as mitigating actions as required by TS 3.4.5.f. Temporary analytical methods may also be used as compensatory measures to restore operability

The two principal accidents for which the Control Room Air Treatment System (CRATS) must be operable are a loss of coolant accident (LOCA) and a refueling accident involving "recently irradiated" fuel. In addition to these limiting events, events occurring during handling of an irradiated fuel cask ~~and operations with a potential for draining the reactor vessel (OPDRVs)~~ can be postulated to cause a fission product release. Thus, the CRATS is required to be operable during handling of an irradiated fuel cask ~~and during OPDRVs~~.

The Refueling Accident analysis is based on an alternative source term (AST) methodology (10 CFR 50.67 and Regulatory Guide 1.183). This analysis concluded that the calculated total effective dose equivalent (TEDE) values to the control room occupants, the exclusion area boundary, and the low population zone are well below the TEDE criteria established in 10 CFR 50.67 without crediting operation of the CRATS, as long as the fuel is allowed to decay for at least 24 hours following reactor shutdown. As a result, "recently irradiated" fuel is defined as fuel that has occupied part of a critical reactor core within 24 hours; i.e., reactor fuel that has decayed less than 24 hours following reactor shutdown. Therefore, the CRATS is not required to be operable during movement of decayed irradiated fuel that is no longer considered "recently irradiated." Conversely, the CRATS is required to be operable during movement of recently irradiated fuel assemblies.

Operation of the system for 15 minutes in accordance with the Surveillance Frequency Control Program will demonstrate operability of the filters and adsorber system.

If significant painting, fire or chemical release occurs such that the HEPA filter or charcoal adsorber could become contaminated from the fumes, chemicals or foreign materials, the same tests and sample analysis shall be performed as required for operational use. The determination of significant shall be made by the operator on duty at the time of the incident. Knowledgeable staff members should be consulted prior to making this determination. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

References:

1. UFSAR, Section III.B.

2. Regulatory Guide 1.196, Revision 0, May 2001.

3. NEI 99-03, “Control Room Habitability Assessment.” June 2001.

4. Letter from Eric J. Leeds (NRC) to James W. Davis (NEI) dated January 30, 2004, “NEI Draft White Paper, Use of the Generic Letter 91-18 Process and Alternative Source Terms in the Context of Control Room Habitability. “ (ADAMS Accession No. ML040160868).

Each reactor operating condition has a related reactor mode switch position for the safety system. The instrumentation system operability for each mode switch position is based on the requirements of the related safety system. For example, the specific high drywell pressure trip systems must be tripped or operable ~~any time~~in the applicable Operating Condition for core spray, containment spray, automatic depressurization or containment isolation functions~~ are required~~.

In instrumentation systems where two trip systems are required to initiate action, either both trip systems are operable or one is tripped. Having one trip system already tripped does not decrease the reliability in terms of initiating the desired action. However, the probability of spurious actuation is increased. Certain instrument channels or sensor inputs to instrument channels may be bypassed without affecting safe operation. The basis for allowing bypassing of the specified SRM's, IRM's, LPRM's and APRM's is discussed in Volume I (Section VII-C.1.2)*. The high area temperature isolation function for the cleanup system has one trip system. There are three instrument channels; each has four sensor inputs. Only two instrument channels are required since the area covered by any one sensor is also covered by a sensor in one of the other two instrument channels. The shutdown cooling system also has one trip system for high area temperature isolation. However, since the area of concern is much smaller, only one instrument channel is provided. Four sensors provide input to the channel. Since the area covered is relatively small only three of the four sensors are required to be operable in order to assure isolation when needed.

The RPV contains penetrations below -10 inches indicator scale that have the potential to drain the reactor coolant inventory to below the TAF. If the water level should drop below -10 inches indicator scale, the ability to remove decay heat is reduced, which could lead to elevated cladding temperatures and clad perforation. Safety Limit 2.1.1.d and 2.1.1.e contain the requirements for the RPV water level to prevent such elevated cladding temperatures.

With the unit in the Shutdown Condition – Cold or Refuel Condition, RPV water inventory control is not required to mitigate any events or accidents evaluated in the safety analyses. RPV water inventory control is required in these conditions to protect Safety Limit 2.1.1.d, 2.1.1.e and the fuel cladding barrier to prevent the release of radioactive material should a draining event occur. Under the definition of drain time, some penetration flow paths may be excluded from the drain time calculation if they will be isolated by valves that will close automatically without offsite power prior to the RPV water level being equal to -10 inches indicator scale when actuated by RPV water level isolation instrumentation.

The purpose of the RPV Water Inventory Control Instrumentation, Table 3.6.2m, is to support the requirements of LCO 3.1.9 and SR 4.1.9, “Reactor Pressure Vessel (RPV) Water Inventory Control,” and the definition of drain time. There are functions that are required for manual initiation or operation of the Core Spray system required to be Operable by LCO 3.1.4 and other functions that support automatic isolation of Shutdown Cooling and Cleanup system penetration flow path(s) on low RPV water level.

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*FSAR; Letter, R.R. Schneider to A. Giambusso, dated November 15, 1973

A double-ended guillotine break of the Reactor Coolant System (RCS) is not postulated in Shutdown Condition – Cold or Refuel Condition due to the reduced RCS pressure, reduced piping stresses, and ductile piping systems. Instead, an event is postulated in which a single operator error or initiating event allows draining of the RPV water inventory 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). It is assumed, based on engineering judgment, that while in Shutdown Condition – Cold or Refuel Condition, one low pressure ECCS injection/spray subsystem can be manually initiated to maintain adequate reactor vessel water level.

Table 3.6.2b requires that the low-low reactor vessel water level instrumentation that initiates isolation of the Main Steam, Cleanup and Shutdown Cooling system be operable with the reactor mode switch in the Shutdown ~~and Refuel~~ position~~s~~. Two trip systems must be operable or in the tripped condition in the hot shutdown condition. ~~However, in the cold shutdown and refueling conditions, only one trip system (with two instrument channels) must be operable so long as shutdown cooling system integrity is maintained provided the piping is intact and no maintenance is being performed that has the potential for draining the reactor vessel through the system.~~ If one low-low water level instrument channel in a required Trip System becomes inoperable and cannot be restored or placed in the tripped condition within the allowed time, the associated shutdown cooling line should be isolated. However, if the shutdown cooling function is needed to provide core cooling, isolating the shutdown cooling line is not desirable.

Table 3.6.2d requires that the high drywell pressure and low-low reactor water level instrumentation Parameters for Start Core Spray Pumps and the reactor pressure instrumentation Parameter for Open Core Spray Discharge Valves be operable with the reactor mode switch in the shutdown or refuel positions. This is modified with a note clarifying applicability is only in the Shutdown Condition – Hot.

Table 3.6.2m requires that the low-low reactor vessel water level instrumentation that initiates isolation of the ~~main steam and~~ Cleanup and Shutdown Cooling system be operable with the reactor mode switch in the Shutdown or Refuel position. In the Shutdown Condition-Cold and Refuel Condition, only one trip system (with two instrument channels) must be operable so long as shutdown cooling system integrity is maintained. System integrity is maintained provided the piping is intact and no maintenance is being performed that has the potential for draining the reactor vessel through the system.

Table 3.6.~~2b~~2m, Note (~~j~~e), allows the shutdown cooling line to remain unisolated and the system to remain in service provided action is immediately initiated to restore the channel to operable status. The alternative action is to immediately initiate action to isolate the shutdown cooling system, which may require that alternate decay heat removal capabilities be provided. The term “immediately” means that the action should be pursued without delay and in a controlled manner. Either of these actions must continue until the channel is restored to operable status or the shutdown cooling system is isolated.

Table 3.6.2.m, Notes (e) and (f) actions 1 and 2 reflect the drain time requirements that penetration flow paths capable of being isolated by valves will close automatically when actuated by RPV water level isolation instrumentation. In the event that the associated instrumentation channels for Cleanup and/or Shutdown Cooling become inoperable, the requirements of Technical Specification 3.1.9.d thru 3.1.9.f are applicable to verify that RPV water level is maintained above -10 inches indicator scale.

Manual initiation is available for scram, reactor isolation and containment isolation. In order to manually initiate other systems, each pump and each valve is independently initiated from the control room. Containment spray raw water cooling is not automatically initiated. Manual initiation of each pump is required as discussed in 3.3.7 above.