

# Nine Mile Point Nuclear Station, Unit 1 TSTF-542

November 28, 2017  
Pre Submittal Briefing

# Introduction

- **Purpose**

- TSTF-542, “Reactor Pressure Vessel Water Inventory Control,” submittal.
- Application of TSTF-542 to NMP1 Custom Technical Specifications

- **Outline**

- Table of contents and format
- Operating Conditions and Mode Switch positions
- Safety Limit
- Variations

- **NMP1 is pre-GDC plant**

- The NMP1 current licensing basis incorporates the proposed GDC that are equivalent to the 10 CFR Part 50, Appendix A, GDCs 13, 14, 30 and 33.
- Criterion 13 - Instrumentation and Control
- Criterion 14 – Reactor Coolant Pressure Boundary
- Criterion 30 – Quality of Reactor Coolant Pressure Boundary
- Criterion 33- Reactor Coolant Makeup



# NMP1 TS Format

**NINE MILE POINT NUCLEAR STATION  
UNIT 1 - TECHNICAL SPECIFICATIONS  
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# NMP1 Operating Conditions and Modes

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
	Major Maintenance Condition (defueled)

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)	



## NMP1 SL 2.1.1.d and 2.1.1.e

- The NMP1 TS Safety Limit for RPV water level is to keep water above -10 inches indicated scale (74 inches above the TAF).

d. Whenever the reactor is in the shutdown condition with irradiated fuel in the reactor vessel, the water level shall not be more than 6 feet, 3 inches (-10 inches indicator scale) below minimum normal water level (Elevation 302'9") except as specified in "e" below.

e. For the purpose of performing major maintenance (not to exceed 12 weeks in duration) on the reactor vessel; the reactor water level may be lowered 9' below the minimum normal water level (Elevation 302'9"). Whenever the reactor water level is to be lowered below the low-low-low level setpoint redundant instrumentation will be provided to monitor the reactor water level.



# NMP1 ECCS Systems

- The NMP1 design includes a Core Spray System to ensure adequate core cooling.
- This water injection system is a low pressure system and requires the Automatic Depressurization System (ADS) to lower reactor vessel pressure to allow water injection.
- As described in the NMP1 Updated Final Safety Analysis Report (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.



# LCO Variations

NUREG-1433, BWR/4 ISTS Modified for TSTF-542	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) <ul style="list-style-type: none"> <li>• Table 3.6.2d/4.6.2d Instrumentation That Initiates Core Spray</li> <li>• Table 3.6.2f/4.6.2f Instrumentation that Initiates Auto Depressurization</li> </ul>
3.3.5.2 RPV WIC Instrumentation (added by TSTF-542)	3.6.2/4.6.2 Protective Instrumentation (section 2.2.5 below) <ul style="list-style-type: none"> <li>• Table 3.6.2b/4.6.2b Instrumentation that Initiates Primary Coolant System and Containment Isolation (Revised)</li> <li>• Table 3.6.2m/4.6.2m RPV WIC Instrumentation (New table added to NMP1 CTS for TSTF-542)</li> </ul>
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) <ul style="list-style-type: none"> <li>• Table 3.6.2c/4.6.2c Instrumentation That Initiates or Isolates Emergency Cooling.</li> </ul>
3.3.6.1, Primary Containment Isolation Instrumentation	3.6.2/4.6.2, Protective Instrumentation (section 2.2.7 below) <ul style="list-style-type: none"> <li>• Table 3.6.2b/4.6.2b Instrumentation that Initiates Primary Coolant System or Containment Isolation</li> <li>• Table 3.6.2c/4.6.2c Instrumentation That Initiates or Isolates Emergency Cooling.</li> </ul>



# LCO Variations

3.3.6.2, Secondary Containment Isolation	3.6.2/4.6.2, Protective Instrumentation <ul style="list-style-type: none"> <li>Table 3.6.2j/4.6.2j, Emergency Ventilation Initiation</li> </ul> 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 <ul style="list-style-type: none"> <li>Table 3.6.2l/4.6.2l, Control Room Air Treatment System Initiation</li> </ul> (section 2.2.9 below)
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)





# LCO Variations

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	

# Revised Core Spray LCO

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
<p>3.1.4 <u>CORE SPRAY SYSTEM</u></p> <p><u>Applicability:</u></p> <p>Applies to the operating status of the core spray systems when in the Power Operating Condition or Shutdown Condition - Hot.</p>	<p>4.1.4 <u>CORE SPRAY SYSTEM</u></p> <p><u>Applicability:</u></p> <p>Applies to the periodic testing requirements for the core spray systems.</p>

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

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

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 42 hours.~~ Deleted

# New LCOs – RPV WIC

## 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 above -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  $\geq$  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, that sub system shall be considered operable provided that the component is 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  $\geq$  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.

# New LCOs – RPV WIC

## LIMITING CONDITION FOR OPERATION

- d. If DRAIN TIME < 36 hours and  $\geq 8$  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.
  
- 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 > -10 inches indicator scale for  $\geq 36$  hours.  
AND
  - (2) Initiate action to establish secondary containment boundary,  
AND
  - (3) Initiate action to isolate each secondary containment penetration low 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.

## SURVEILLANCE REQUIREMENT

- 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. 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.

# New LCOs – RPV WIC

## LIMITING CONDITION FOR OPERATION

- f. Specifications d and e not met, or DRAIN TIME is < 1 hour, immediately initiate action to restore DRAIN TIME to  $\geq 36$  hours.

## SURVEILLANCE REQUIREMENT

# Revision to Existing Instrumentation Tables

TABLE 3.6.2b  
**INSTRUMENTATION THAT INITIATES  
 PRIMARY COOLANT SYSTEM OR CONTAINMENT ISOLATION**

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
<b>PRIMARY COOLANT ISOLATION</b>							
(Main Steam, Cleanup, and Shutdown Cooling)							
(1) Low-Low Reactor Water Level							
(a) Main Steam and Cleanup	2	2(f)	≥ 5 inches (Indicator Scale)	<del>(k)</del>	x	x	
(b) Shutdown Cooling	<del>2</del>	2(f) <del>(k)</del>	≥ 5 inches (Indicator Scale)	<del>x</del> (k)	*	x	x
(2) Manual	2	1	—	<del>x</del> (k)	*	x	x
<b>MAIN-STEAM-LINE ISOLATION</b>							
(3) High Steam Flow Main-Steam Line	2	2(f)	≤ 105 psid			x	x

(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.

# Revision to Existing Instrumentation Tables

**TABLE 3.6.2d**

**INSTRUMENTATION THAT INITIATES CORE SPRAY<sup>(g)</sup>**

Limiting Condition for Operation

<u>Parameter</u>	<u>Minimum No. of Tripped or Operable Trip Systems</u>	<u>Minimum No. of Operable Instrument Channels per Operable Trip System (f)</u>	<u>Set Point</u>	<u>Reactor Mode Switch Position in Which Function Must Be Operable</u>			
				<u>Shutdown</u>	<u>Refuel</u>	<u>Startup</u>	<u>Run</u>
<u>START CORE SPRAY PUMPS</u>							
(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
<u>OPEN CORE SPRAY DISCHARGE VALVES</u>							
(3) Reactor Pressure and either (1) or (2) above.	2	2	≥ 365 psig	✗(g)	x	x	x

(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.

# New LCOs – RPV WIC Instrumentation

TABLE 3.6.2m

RPV WATER INVENTORY CONTROL INSTRUMENTATION

Limiting Condition for Operation

<u>Parameter</u>	<u>Minimum No. of Tripped or Operable Trip Systems</u>	<u>Minimum No. of Operable Instrument Channels per Operable Trip System</u>	<u>Set Point</u>	<u>Reactor Mode Switch Position in Which Function Must Be Operable</u>			
				<u>Shutdown</u>	<u>Refuel</u>	<u>Startup</u>	<u>Run</u>
<u>START CORE SPRAY PUMPS (c)</u>							
(1) Manual Initiation	1	1 (d)	≥ 5 inches (Indicator Scale)	(a)(b)	(a)		
<u>OPEN CORE SPRAY DISCHARGE VALVES (c)</u>							
(2) Reactor Pressure and (1) above.	1 per pump	1 per pump (d)	≥ 365 psig	(a)	(a)		



# New LCOs – RPV WIC Instrumentation

TABLE 3.6.2m

## RPV WATER INVENTORY CONTROL INSTRUMENTATION

### Limiting Condition for Operation

<u>Parameter</u>	<u>Minimum No. of Tripped or Operable Trip Systems</u>	<u>Minimum No. of Operable Instrument Channels per Operable Trip System</u>	<u>Set Point</u>	<u>Reactor Mode Switch Position in Which Function Must Be Operable</u>			
				<u>Shutdown</u>	<u>Refuel</u>	<u>Startup</u>	<u>Run</u>
<u>PRIMARY COOLANT ISOLATION</u>							
(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)		

# New LCOs – RPV WIC Instrumentation

## NOTES FOR TABLES 3.6.2m and 4.6.2m

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- (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, either:
  - 1. Immediately initiate action to restore the channel to operable status.
  - or
  - 2. Immediately initiate action to isolate the shutdown cooling system.

# New LCOs – RPV WIC Instrumentation

## NOTES FOR TABLES 3.6.2m and 4.6.2m

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- (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) 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.

# New RPV WIC Instrumentation SRs

TABLE 4.6.2m

## RPV WATER INVENTORY CONTROL INSTRUMENTATION

### Surveillance Requirement

<u>Parameter</u>	<u>Sensor Check</u>	<u>Instrument Channel Test</u>	<u>Instrument Channel Calibration</u>
<u>START CORE SPRAY PUMPS</u>			
(1) Manual Initiation	Note 1	Note 1 <sup>(g)</sup>	Note 1 <sup>(g)</sup>
<u>OPEN CORE SPRAY DISCHARGE VALVES</u>			
(2) Reactor Pressure and (1) above	Note 1	Note 1 <sup>(g)</sup>	Note 1 <sup>(g)</sup>

<u>Parameter</u>	<u>Sensor Check</u>	<u>Instrument Channel Test</u>	<u>Instrument Channel Calibration</u>
<u>PRIMARY COOLANT ISOLATION</u> (Cleanup and Shutdown Cooling)			
(1) Low-Low Reactor Water Level	Note 1	Note 1 <sup>(g)</sup>	Note 1 <sup>(g)</sup>
(2) Manual	---	Note 1	---

# Conclusion

- The variations proposed are consistent with TSTF-542.
- Questions?

