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

Serial No.: 25-271
NRA/NDM: R0
Docket No.: 50-423
License No.: NPF-49

DOMINION ENERGY NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3
PROPOSED LICENSE AMENDMENT REQUEST FOR A ONE-TIME EXTENSION OF THE RESIDUAL HEAT REMOVAL SYSTEM ALLOWED OUTAGE TIME

Pursuant to 10 CFR 50.90, Dominion Energy Nuclear Connecticut, Inc. (DENC) is submitting a license amendment request (LAR) to the Nuclear Regulatory Commission (NRC) to revise the Technical Specifications (TS) for Millstone Power Station Unit 3 (MPS3). DENC proposes to revise MPS3 TS 3.5.2 "ECCS SUBSYSTEMS – T_{avg} GREATER THAN OR EQUAL TO 350°F" Limiting Condition for Operation (LCO) Action 'a' to extend the allowed outage time (AOT) from 72 hours to 168 hours on a one-time basis. This extension would allow DENC to repair the 'B' Residual Heat Removal (RHR) pump mechanical seal while at power, and prior to the subsequent need for RHR system operation to support cold shutdown and refueling. This one-time extension would be valid until September 30, 2026, to repair the RHR pump mechanical seal prior to the MPS3 fall 2026 refueling outage (RFO). Repairing the 'B' RHR pump mechanical seal prior to the fall 2026 RFO would resolve the 'B' RHR leakage issue prior to entering a high operational risk condition of decreased Reactor Coolant System (RCS) inventory.

The proposed one-time AOT extension is based on a risk assessment performed in accordance with Regulatory Guide (RG) 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications," which demonstrates the increase in risk associated with the one-time 168-hour AOT is acceptably small for both Incremental Conditional Core Damage Probability (ICCDP) and Incremental Conditional Large Early Release Probability (ICLERP).

The proposed amendment does not involve a Significant Hazards Consideration under the standards set forth in 10 CFR 50.92. The basis for this determination is included in Attachment 1. DENC has also determined that operation with the proposed change will not result in any significant increase in the amount of effluents that may be released offsite, or any significant increase in individual or cumulative occupational radiation exposure. Therefore, the proposed amendment is eligible for categorical exclusion from an environmental assessment as set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment is needed in connection with approval of the proposed change.

Attachment 1 provides DENC's description and assessment of the proposed change. Attachment 2 provides the marked-up TS page for the proposed change. Attachment 3

provides the marked-up TS Bases page for the proposed change. Attachment 4 provides the compensatory measures in place during the 168-hour allowed outage time. Attachment 5 provides DENC's internal events and internal flooding probabilistic risk assessment model acceptability.

The proposed amendment has been reviewed and approved by the station's Facility Safety Review Committee (FSRC).

DENC requests approval of the proposed change by June 1, 2026, with a 21-day implementation period.

In accordance with 10 CFR 50.91(b), a copy of this LAR is being provided to the State of Connecticut.

Should you have any questions or require additional information, please contact Nick Maynard at (804) 273-3910.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on January 16, 2026

Respectfully,

James E. Holloway
Vice President – Nuclear Engineering and Fleet Support

Commitments contained in this letter: None.

Attachments:
1. Description and Assessment of Proposed Change
2. Marked-up Technical Specification Page
3. Marked-up Technical Specification Bases Page – For Information Only
4. Compensatory Measures in Place During the One-Time 168-Hour Allowed Outage Time
5. Internal Events and Internal Flooding Probabilistic Risk Assessment Model Acceptability

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ATTACHMENT 1

DESCRIPTION AND ASSESSMENT OF PROPOSED CHANGE

DOMINION ENERGY NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3

1.0 SUMMARY DESCRIPTION

Pursuant to 10 CFR 50.90, Dominion Energy Nuclear Connecticut, Inc. (DENC) requests a license amendment to the Millstone Power Station Unit 3 (MPS3) in the form of a change to the technical specifications (TS). This license amendment request (LAR) proposes to revise the MPS3 Technical Specification (TS) 3.5.2 "ECCS Subsystems – T_{avg} Greater Than or Equal to 350°F", Action 'a' to extend, on a one-time basis, the allowed outage time (AOT) from 72 hours to 168 hours. This extension would allow DENC to repair or replace the 'B' Residual Heat Removal (RHR) pump mechanical seal while at power and prior to the subsequent need for RHR system operation to support cold shutdown and refueling. This one-time extension would be valid until September 30, 2026, to repair the RHR pump mechanical seal prior to the MPS3 fall 2026 refueling outage (RFO). Repairing the 'B' RHR pump mechanical seal prior to the MPS3 fall 2026 RFO would resolve the 'B' RHR leakage issue prior to entering a high operational risk condition of decreased Reactor Coolant System (RCS) inventory.

2.0 DETAILED DESCRIPTION

2.1 System Design and Operation

The emergency core cooling system (ECCS) provides borated water to cool the reactor core following a major loss of coolant accident (LOCA). This is accomplished by the automatic injection of water from the safety injection accumulators into the reactor coolant loops and by the automatic pumping of a portion of the refueling water storage tank (RWST) contents into the loops via the charging pumps, the safety injection pumps, and the residual heat removal pumps. After the injection mode of emergency core cooling, long term core cooling is maintained by recirculating the water from the containment structure sump by the containment recirculation pumps, through the containment recirculation coolers, and into the reactor coolant loops directly and via the charging and safety injection pumps.

The RHR pumps are part of the RHR system, whose primary function is to transfer heat from the RCS to the component cooling water system. During normal plant shutdown operations, the RHR system is used to remove decay heat from the reactor core and reduce the temperature of the reactor coolant to the cold shutdown temperature. This is the second phase of cooldown with the first phase of cooldown accomplished by the auxiliary feedwater system and the steam generators. Once the plant is at cold shutdown, the RHR system will maintain this temperature until the plant is started up again. Only one train of RHR is needed to reduce and maintain reactor temperature in shutdown modes. Following a postulated LOCA, the RHR system serves as the low-pressure injection portion of the ECCS. The RHR system is also used to transfer refueling water between the RWST and the refueling cavity before

and after refueling operations. When the reactor is in Mode 1 (operating), each RHR pump is in standby until it is needed by the ECCS.

The RHR system, in conjunction with the steam and power conversion system, is designed to transfer the fission product decay heat and other residual heat from the reactor core within acceptable limits. The RHR system can operate on either onsite or offsite electrical power system. Transfer to the residual heat removal system occurs when the RCS is at approximately 350°F and 375 psig.

The RHR pumps are started automatically on receipt of a Safety Injection Signal (SIS). The pumps deliver water to the RCS from the RWST during the injection phase. Each pump is a single stage, vertical position, centrifugal pump.

A minimum flow bypass line is provided downstream of the RHR heat exchangers for the pumps to recirculate and return the pump discharge fluid to the pump suction, should these pumps be started with their normal flow paths blocked. Once flow greater than approximately 1,633 gallons per minute (gpm) is established to the RCS, the bypass line is automatically closed. This line prevents dead heading of the pumps and permits pump testing during normal operation.

The pumps have a self-contained mechanical seal which is normally cooled by the component cooling water system. However, cooling water is not supplied or required after a LOCA. The RHR pumps are not utilized in the recirculation phase of the accident.

2.2 Current Technical Specification Requirements

Technical Specifications 3.5.2 - two independent ECCS subsystems shall be OPERABLE with each subsystem comprised of:

a. one OPERABLE centrifugal charging pump
b. one OPERABLE Safety Injection pump
c. one OPERABLE RHR heat exchanger*
d. one OPERABLE RHR pump*
e. one OPERABLE containment recirculation heat exchanger
f. an OPERABLE flow path and an OPERABLE flow path capable of taking suction from the refueling water storage tank on a Safety Injection signal and capable of automatically stopping the RHR pump and being manually realigned to transfer suction to the containment sump during the recirculation phase of operation.

APPLICABILITY: MODES 1, 2, and 3

ACTION:

a. With one ECCS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours* or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.
b. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date. The current value of the usage factor for each affected Safety Injection nozzle shall be provided in this Special Report whenever its value exceeds 0.70.

Footnote:

* The allowable outage time for each RHR pump/RHR heat exchanger may be extended to 120 hours for the purpose of pump modification to change mechanical seal and other related modifications. This exception may only be used one time per RHR pump/RHR heat exchanger and is not valid after April 30, 1995.

Technical Specifications 3.5.2/3.5.3 Bases – The OPERABILITY of two independent ECCS subsystems ensures that sufficient emergency core cooling capability will be available in the event of a LOCA assuming the loss of one subsystem through any single failure consideration. Either subsystem operating in conjunction with the accumulators can supply sufficient core cooling to limit the peak cladding temperatures within acceptable limits for all postulated break sizes ranging from the double ended break of the largest RCS cold leg pipe downward. In addition, each ECCS subsystem provides long-term core cooling capability in the recirculation mode during the accident recovery period.

The ECCS has several piping cross connection points for use during the post-LOCA recirculation phase of operation. These cross-connection points allow Recirculation Spray System (RSS) to supply water from the containment sump to the safety injection and charging pumps. The RSS has the capability to supply both Train A and B safety injection pumps and both Train A and B charging pumps. Operator action is required to position valves to establish flow from the containment sump through the RSS subsystems to the safety injection and charging pumps since the valves are not automatically repositioned.

2.3 Description of Proposed Change

A note will be added to TS 3.5.2 “ECCS SUBSYSTEMS – T_{avg} GREATER THAN OR EQUAL TO 350°F”, Action “a” to allow DENC to extend, the allowed

outage time from 72 hours to 168 hours to allow for repairs to the 'B' RHR pump mechanical seal while at power on a one-time basis. The proposed change is as follows (added text is shown below in **bold** type and deleted text is shown in strike-through):

Technical Specifications 3.5.2 - two independent ECCS subsystems shall be OPERABLE with each subsystem comprised of:

a. one OPERABLE centrifugal charging pump
b. one OPERABLE Safety Injection pump
c. one OPERABLE RHR heat exchanger*
d. one OPERABLE RHR pump*
e. one OPERABLE containment recirculation heat exchanger
f. an OPERABLE flow path and an OPERABLE flow path capable of taking suction from the refueling water storage tank on a Safety Injection signal and capable of automatically stopping the RHR pump and being manually realigned to transfer suction to the containment sump during the recirculation phase of operation.

ACTION:

a. With one ECCS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours* or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.
b. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date. The current value of the usage factor for each affected Safety Injection nozzle shall be provided in this Special Report whenever its value exceeds 0.70.

Footnote:

* ~~*The allowable outage time for each RHR pump/RHR heat exchanger may be extended to 120 hours for the purpose of pump modification to change mechanical seal and other related modifications. This exception may only be used one time per RHR pump/RHR heat exchanger and is not valid after April 30, 1995*~~**. The allowable outage time for RHR pump/RHR heat exchanger may be extended to 168 hours for the purpose of pump modification to change the mechanical seal. This exception may only be used one time and is contingent on meeting the compensatory measures described in MPS3 license amendment request submittal letter 25-271, Attachment 4. This footnote is not valid after September 30, 2026.**

A TS markup of the proposed change is provided in Attachment 2.

2.4 Reason for Proposed Change

On May 15, 2025, excessive seal leakage was identified from the 'B' RHR pump (3RHS*P1B) while running in shutdown cooling mode.

- With 340 psig suction pressure, leakage was measured at approximately 78,000 cc/hr.
- On May 15, 2025, leakage was reduced to 39,600 cc/hr with a suction pressure of 107 psig, following a run of the pump on recirculation while aligned in injection mode.
- On May 30, 2025, leakage was 4,500 cc/hr with a suction pressure of 35 psig.
- On June 12, 2025, leakage was 3,100 cc/hr with a suction pressure of 35 psig.

ECCS leakage greater than 10,000 cc/hr from the 'B' RHR pump seal leakage, while on sump recirculation, presents an unanalyzed condition. Leakage above this value could result in a total dose to control room operators that exceeds the maximum value driven by TS 3.7.7 "CONTROL ROOM EMERGENCY VENTILATION SYSTEM", rendering the Control Room Envelope (CRE) inoperable.

Per an operability determination (OD), the 'B' RHR pump seal leakage is being monitored on a weekly basis, and if the seal leakage in combination with Total Primary Coolant Leakage Outside Containment exceeds thresholds, contingency actions are directed to be taken. The 'B' RHR pump and Control Room Envelope are currently considered Operable.

The footnote (*) that allowed for a one-time extension of the AOT for one inoperable train of RHR Pump and Heat Exchanger 72 hours to 120 hours to provide sufficient time for replacement of the RHR pump mechanical seal and related modifications with MPS3 at-power was added in 1995 as Amendment 103. The work associated with this footnote was completed and the footnote was no longer valid after April 30, 1995. DENC is proposing that the footnote be replaced with a new footnote that considers the current condition of the 'B' RHR pump mechanical seal and expected time frame for replacement of the mechanical seal while at-power.

The work to repair the 'B' RHR mechanical seal is expected to take longer than the 72-hour allowed outage time of LCO 3.5.2 Action 'a'. In Mode 1 (power operations), there is no immediate need for the RHR pumps, as the RHR pumps are required in Modes 4 and 5 (hot and cold shutdown). Even though the capability for low head safety injection for an accident is unavailable on one train while the repairs are in progress during Modes 1 through 4, it is DENC's position that repairing the RHR pump at-power prior to the MPS3 fall RFO is preferable from an overall plant safety standpoint. Thus, DENC is proposing to revise Action 'a' of LCO 3.5.2 by increasing the allowed

outage time for an RHR pump from 72 hours to 168 hours on a one-time basis, valid until September 30, 2026.

3.0 TECHNICAL EVALUATION

In Mode 1 (power operations), there is no immediate need for the RHR pumps. In Modes 4 and 5 (hot and cold shutdown) the RHR system's main function is shutdown cooling. Even though the capability for low head safety injection for an accident is unavailable on one train while the repairs are in progress during Modes 1 through 4, it is DENC's position that repairing the RHR pump at-power is preferable from an overall plant safety standpoint. Thus, DENC is proposing to revise Action 'a' of LCO 3.5.2 by increasing the allowed outage time for an RHR pump from 72 hours to 168 hours, to repair the 'B' RHR pump on a one-time basis.

3.1 Defense In Depth

During the time the 'B' RHR pump is out of service, the 'A' RHR system will be Operable. Additionally, the charging pump, safety injection pump, and containment recirculation pump trains will be Operable. Consequently, should an event occur requiring initiation of ECCS, the system will be capable of performing its safety function of providing adequate core cooling to protect the reactor core with one train, assuming no additional failures. This is inherent in LCO 3.5.2 Action 'a', in that a combination of equipment must be maintained Operable such that 100% of the required ECCS flow remains available. One train of RHR has the capability to cool down and maintain the temperature of the RCS in shutdown cooling modes.

With the TS 3.5.2 LCO AOT for the 'B' RHR pump increased from 72 hours to a one-time period of up to 168 hours, defense-in-depth will be maintained as indicated by a configuration risk assessment using Probabilistic Risk Assessment (PRA) tools. This analysis demonstrates that the change has an acceptable impact on plant risk according to Regulatory Guide (RG) 1.177, because Incremental Conditional Core Damage Probability (ICCDP) is less than 1.0E-6 and Incremental Conditional Large Early Release Probability (ICLERP) is less than 1.0E-7 as described in section 4 of this attachment. The risk assessment identified compensatory measures that will be put in place to both decrease the likelihood of failure of a second ECCS system, as well as decreasing the likelihood of an initiating event during the time that the 'B' RHR pump is out of service.

Defense-in-depth is maintained for the following reasons:

- Prior to removing the RHR pump from service for the purpose of the seal replacement, any assumptions made (e.g., plant equipment

configurations) in the risk analysis will be verified to ensure the conclusions of acceptable risk remain valid.

- Every effort will be made to ensure that the 'B' RHR pump is not removed from service for the seal replacement during a period of impending severe weather.
- Should an event occur with the 'B' RHR pump out of service and an accompanying failure of either a centrifugal charging pump or a safety injection pump, the minimum amount of ECCS flow assumed in the safety analysis during the injection phase could still be delivered to the reactor, due to the interconnected ECCS systems. During this evolution, there is no impact to the long-term recirculation function. The 'A' ECCS train will remain Operable.

3.2 Safety Margins

Section 2.2 of RG 1.177 (Ref. 7.5) describes the considerations of the Deterministic Engineering portion of a risk informed Technical Specification change request.

For TS AOT changes, the effect on the final safety analysis report acceptance criteria should be assessed assuming the plant is in the conditions addressed by the proposed AOT (i.e., the subject equipment is inoperable) and there are no additional failures.

Therefore, in considering the response of the ECCS to a system transient, the typical single failure associated with the safety analysis beyond the affected equipment need not be considered. With the 'B' RHR pump out of service, the remaining ECCS pumps (the protected 'A' train and the operable 'B' train charging and safety injection pumps) will provide more than the minimum amount of ECCS flow assumed in the safety analysis. Thus, more mitigating system response can be credited over the base line safety analysis that considers the total failure of an entire train.

No change is necessary to the Chapter 15 safety analysis to support this proposed TS change. The current analysis has demonstrated acceptable consequences with a single train of ECCS responding to mitigate the design basis transients. The RHR pumps do not participate in sump recirculation. The results of the safety analysis during the proposed allowed outage time therefore remain bounded by the results currently in the Final Safety Analysis Report (FSAR).

3.3 Repair Activity

It is estimated that 88 hours are required to repair the 'B' RHR pump mechanical seal and perform associated post maintenance activities.

This estimate assumes no failures or delays are encountered and assumes that all the pre-staging and engineering work related to the replacement of the mechanical seal is complete prior to entering Action 'a' of TS LCO 3.5.2. DENC is presently scheduling this repair activity for the 'B' RHR pump during the last week of the month of June. A breakdown of the work tasks to be performed includes the following:

TIME	ACTIVITY
0 hours	• Declare 'B' RHR pump inoperable. • Enter RHR Technical Specification LCO Action 3.5.2.a.
0-16 hours	• Tag and drain the 'B' RHR system for work. • Prepare for 'B' RHR pump seal repair.
16 hours	• Enter Enclosure Building Technical Specification LCO Action 3.6.6.2, which allows 24 hours for Secondary Containment to be Inoperable. • Remove roof plugs.
16-37 hours	• Perform 'B' RHR pump seal replacement.
37 hours	• Replace roof plugs. • Perform retest for secondary containment supplementary leak collection and release system (SLCRS) boundary. • Exit Enclosure Building Technical Specification LCO Action 3.6.6.2 for Secondary Containment.
37-63 hours	• Complete 'B' RHR pump replacement. • Refill and restore RHR system.
63-88 hours	• Perform 'B' RHR pump retests.
88 hours	• Declare 'B' RHR pump operable. • Exit 'B' RHR Technical Specification LCO Action 3.5.2.a.

To account for potential failures or delays, 80 hours is being added to the schedule to bring the requested AOT to 168 hours. Given the nature of the work not commonly being performed and precedence for similar one-time TS changes, DENC considers the proposed increase in the allowed outage time to 168 hours to be reasonable.

4.0 RISK ASSESSMENT

4.1 Analysis

4.1.1 Risk Impact Evaluation

The risk analysis is performed in accordance with the RG 1.177 (Ref. 7.5) risk-informed approach for evaluating TS changes. RG 1.177 identifies a three-tiered approach as described below:

RG 1.177, Tier 1: Probabilistic Risk Assessment Capability and Insights

Tier 1 assesses the impact of the proposed TS change on Core Damage Frequency (CDF), ICCDP, Large Early Release Frequency (LERF), and ICLERP. To support this assessment, two aspects need to be considered: (1) the acceptability of the PRA and (2) the PRA insights and results.

PRA insights and results are generated by determining the impact of the TS change on plant risk. The scope of the PRA model used to assess the risk impact should include all hazard groups (i.e., internal events, internal flood, internal fires, seismic events, high winds, transportation events, and other external hazards) unless it can be shown that the contribution from specific hazard groups does not affect the decision.

4.1.2 Probabilistic Risk Assessment Insights and Results

Model Scope

The proposed one-time TS change increases the AOT for the 'B' RHR pump from 72 hours to 168 hours. The determination of hazard groups affected by the proposed TS change and thus, the PRA model scope used for this application is provided below.

The PRA model credits two functions performed by the RHR pumps: LPSI and shutdown cooling. The first, Low Pressure Safety Injection (LPSI), provides RCS makeup from the Refueling Water Storage Tank (RWST) following a large break LOCA. Shutdown cooling provides RCS decay heat removal (DHR) following several accident scenarios including Steam Generator Tube Rupture (SGTR) and nominal plant transients

For both PRA-modeled functions, one of the two RHR pumps is required for success. If the LPSI function fails, core damage is presumed. If the shutdown cooling function fails, there are two other redundant methods capable of providing RCS DHR. The other methods are via the Auxiliary Feedwater System (AFW) or RCS feed and bleed cooling which requires one of two CHS pumps, one of two

Safety Injection (SIH) pumps, and one of two Power Operator Relief Valves (PORVs) for success. If all three RCS DHR methods fail, core damage is presumed.

Internal Events and Internal Flood

As stated above, the 'B' RHR pump is credited with providing the LPSI and RCS DHR functions. The MPS3-R09 model (Ref. 7.7) was used to calculate the risk impact to internal events and internal floods with the pump removed from service. The truncation limits were established in accordance with ASME PRA Standard RA-Sa-2009 (Ref. 7.9). The truncation value used to calculate CDF is 1E-12, whereas the value used for LERF is 1E-13.

The quantitative results and conclusion are presented in a later section.

Shutdown/Refueling

The proposed one-time TS change is not applicable to shutdown modes (i.e., 5, 6, and defueled) since the repair activity will be performed during power operation.

Seismic

MPS3 does not have a seismic PRA model, and the risk impact for this hazard group will therefore be assessed qualitatively. As stated previously, the 'B' RHR pump is credited with providing the LPSI and shutdown cooling functions.

With respect to the LPSI function, large break LOCA scenarios contribute 7% to the total Seismic CDF per the individual plant examination for external events (IPEEE) (Ref. 7.10). However, the Probabilistic Safety Study (PSS) (Ref. 7.11) concluded the RWST will collapse at ground acceleration values that cause a large break LOCA. The RWST is the RHR pump suction source needed to mitigate a large break LOCA.

With respect to the shutdown cooling function, the PSS concluded the control building will collapse at lower ground acceleration values than that of the RHR pumps. The control building houses the electrical equipment that provides power to the RHR pumps.

In conclusion, having the 'B' RHR pump removed from service does not increase seismic risk, since the equipment/structures needed to support the credited RHR functions are postulated to fail both trains prior to failing the 'A' RHR pump. Therefore, the configuration seismic risk introduced by having only one RHR pump operable is negligible.

Internal Fires

MPS3 does not have a peer-reviewed fire PRA model, but the capability exists to determine the individual components postulated to fail in each modeled fire scenario using fire PRA model information (Ref. 7.8). As stated previously, the 'B' RHR pump is credited with providing the LPSI and shutdown cooling functions. Since fire scenarios are not postulated to cause a large break LOCA, the LPSI function is not credited. Therefore, only the shutdown cooling function is credited with mitigating fire scenarios. The method used to estimate the fire risk impact was as follows:

1. Develop a simplified core damage logic model of the RCS DHR function in which failure is loss of the three credited functions: AFW, RCS feed and bleed cooling, and shutdown cooling.
2. Generate a list of fire scenarios postulated to fail each individual RCS DHR function component (e.g., AFW pumps, RHR pumps, PORVs, etc.).
3. Solve the model with the 'B' RHR pump out of service to determine the combinations of fires and equipment failures resulting in loss of the remaining credited RCS DHR equipment.

The following insights were obtained after solving the simplified model:

- There are no fire scenarios that result in loss of all remaining credited RCS DHR equipment
- There are two low frequency control room fire scenarios (i.e., < 1E- 09/yr) that result in failure of all remaining credited RCS DHR equipment except for the 'A' RHR pump and associated support systems which would have to randomly fail.
- There are five moderate frequency east switchgear room fires (i.e., ~1E-06/yr) that result in failure of all remaining credited RCS DHR equipment except for two 'B' train components (e.g., 'B' AFW pump and 'B' CHS pump) that would have to randomly fail.
- There are moderate frequency control room and instrument rack room fires (i.e., ~1E-06/yr) that result in failure of all remaining credited RCS DHR equipment except for one 'A' train and one 'B' train component (e.g., 'B' SIH pump and 'A' SW pump) that would have to randomly fail.
- The remaining fire scenarios require three or more random failures to occur and are therefore, considered a subset of the scenarios listed above.

In conclusion, having the 'B' RHR pump removed from service results in a negligible increase to fire risk due to the level of RCS DHR function redundancy which requires multiple random failures coincident with a fire scenario for core damage to occur. Therefore, the configuration fire risk introduced by having only one RHR pump operable is negligible.

Other External Events

MPS3 does not have an external events PRA model that includes high winds, transportation events, and other external hazards. Therefore, the risk impact for this hazard group will be assessed qualitatively. As stated previously, the 'B' RHR pump is credited with providing the LPSI and shutdown cooling functions.

Since a large break LOCA is not postulated for this hazard group, the LPSI function is not credited for mitigating the other external events hazard group. Therefore, only the shutdown cooling function needs to be assessed.

Having the 'B' RHR pump removed from service does not increase risk for the other external event hazards group due to the level of RCS DHR function redundancy. The most likely cause of the three RCS DHR methods failing is an external event collapsing the buildings that house the credited equipment. Therefore, the configuration risk from other external event hazards introduced by having only one RHR pump operable is negligible.

Acceptance Criteria

The acceptance criteria for the one-time TS changes are as follows (RG 1.177):

- ICCDP less than 1E-06 and ICLERP less than 1E-07.

OR

- ICCDP less than 1E-05 and ICLERP less than 1E-06 with effective compensatory measures implemented to reduce the sources of increased risk.

Quantitative Risk Assessment

Based on the model scope section, the quantitative risk assessment will only include internal events and internal flood since external events are qualitatively assessed to be negligible risk contributors.

The 'B' RHR pump is explicitly modeled in the MPS3-R09 internal events model, therefore, the ICCDP and ICLERP can be directly calculated. Presuming nominal expected equipment unavailabilities for other equipment permitted to be out of service by the TS, the ICCDP and ICLERP for a 7-day period is provided in the table below:

Tier 1 Criteria				
	ICCDP	RG 1.177 ICCDP Criteria	ICLERP	RG 1.177 ICLERP Criteria
7-day AOT	1.09E-08	1.00E-06	1.73E-09	1.00E-07

As evidenced in the Tier 1 Criteria table above, substantial margin exists to the RG 1.177 acceptance criteria. Dominant sequences for this configuration were reviewed and are discussed below.

The dominant risk scenario with the 'B' RHR pump out of service is a loss of the RCS DHR function consisting of the following failures:

- 'A' train support system initiators (e.g., 'A' Reactor Plant Component Cooling Water pump fails leading to a reactor trip) resulting in loss of the 'A' RHR pump as a decay heat removal option.
- Loss of all Auxiliary Feedwater due to failure to align an alternate suction source following Demineralized Water Storage Tank depletion.
- Failure to establish RCS feed and bleed cooling or failure to establish RCS cold leg recirculation if feed and bleed cooling is successful.

Overall, scenarios resulting in RCS DHR function failure are the dominant risk contributors, whereas scenarios resulting in LPSI function failure are minor contributors.

RG 1.177, Tier 2: Avoidance of Risk-Significant Plant Configurations

Tier 2 provides reasonable assurance that risk-significant plant equipment outage configurations will not occur when specific plant equipment is out of service consistent with the proposed TS change. Since MPS3 TS restrict many of the credited 'A' train components from being removed from service, these cases will not be analyzed. Instead, a Tier 2 restriction will be established to protect the 'A' train, which is consistent with the MPS3 procedure for protected equipment (Ref. 7.13).

An additional analysis for potential Tier 2 restrictions was performed per RG 1.177. The Tier 1 sequences were reviewed to identify other equipment that could result in a significant CDF/LERF increase if removed from service, coincident with the 'B' RHR pump. ICCDP/ICLERP values were calculated and compared with the Tier 1 acceptance criteria for each configuration. The table below lists the components evaluated and associated ICCDP/ICLERP values:

Component	Description	ICCDP	ICLERP
3CHS*P2B	B Boric Acid Transfer Pump	1.28E-08	3.61E-09
3SIH*P1B	B Safety Injection Pump	8.40E-08	1.28E-08
3CHS*P3B/C	B Charging Header	6.00E-08	9.36E-09
M2-P82	MPS2 motor-driven Fire Water pump	1.90E-08	2.92E-09
3HVR*FN6B	B Auxiliary Building Filter Fan	2.17E-08	3.41E-09
3RPS*PNLESCB	B Emergency Diesel Generator (EDG) Sequencer	1.09E-07	1.46E-08
3IAS-C1C	Diesel Driven Instrument Air Compressor	6.83E-08	1.02E-08
B train SSPS	B Solid State Protection System train	6.33E-08	8.13E-09
3RSS*P1B/D	B Recirculation Spray System Header	1.49E-07	1.30E-08
3EGS*EGB	B EDG	1.15E-07	1.63E-08

The calculated values are well below the Tier 1 acceptance criteria, and therefore no additional Tier 2 restrictions are recommended.

In conclusion, the only Tier 2 restriction is to protect 'A' train equipment in accordance with Dominion Energy Fleet procedure for protected equipment.

RG 1.177, Tier 3: Risk-Informed Configuration Risk Management

Tier 3 confirms compliance with 10 CFR 50.65(a)(4), which ensures that the risk impact of out of service equipment is appropriately assessed and managed.

When entered into the proposed extended TS action statement, configuration risk will be assessed and managed in accordance with the requirements of 10 CFR 50.65(a)(4). MPS3 has implemented real-time risk assessment technology utilizing Electric Power Research Institute (EPRI) developed software. The software is run continuously with a unit at-power by the on-shift Shift Technical Advisor, to ensure that risk is appropriately managed prior to entering any plant configuration or when emergent equipment failures occur. Configurations that approach or exceed the limits defined in NUMARC 93-01 are identified and risk management actions are implemented as required. Emergent equipment failures are promptly analyzed in accordance with program requirements by the on-shift staff.

4.1.3 Probabilistic Risk Assessment Acceptability

The MPS3-R09 PRA model is used to analyze the risk of this application. A focused scope peer review and open finding closeout is planned for January 2026, during which unreviewed PRA model upgrades will be peer reviewed and existing open peer review findings will be assessed for closure. This effort is in support of the risk-informed completion time (RICT) LAR to adopt TSTF-505 submittal which is planned for the second half of 2026.

MPS3 PRA model acceptability was previously addressed in Enclosure A of the MPS3 LAR to revise Integrated Leak Rate Test (Type A) and Type C Test Intervals, dated July 30, 2019 (Ref. 7.12). As stated in the LAR, there are 106 open peer review findings against the MPS3 PRA model. These findings have been resolved within the MPS3-R09 model and supporting documentation. The open peer review finding resolutions are provided in Attachment 5.

Unreviewed model upgrades, pending model changes, assumptions, and sources of uncertainty were assessed for impact to this application. The assessment concluded that no additional model changes were necessary beyond those made during development of MPS3-R09. In addition, no assumptions or sources of model uncertainty were considered key to this application. The unreviewed model upgrades and dispositions for this application are provided below. In addition, a table listing relevant model assumptions and sources of uncertainty for this application and associated dispositions is also provided.

4.1.4 Unreviewed Model Upgrades

Date / Model	Summary of Change	Disposition
2016 / MPS3-M310Aa	Revised RCP seal failure model as a result of design change (DC) implementing FLOWSERV low-leakage seals	Negligible impact on this application. Reactor coolant pump (RCP) seal LOCA frequency has a negligible impact on configuration risk assessments.
2019 / MPS3-R08a	Incorporate Convolution Factor method	Negligible impact on this application. Convolution factors have a negligible impact on configuration risk assessments.
2019 / MPS3-R08a	Revised station blackout (SBO) event tree to incorporate FLEX strategy.	No impact on this application. The RHR system is not credited in the SBO scenario.

Date / Model	Summary of Change	Disposition
2020 / MPS3-R08b	Screened ventilation system HVR as a support to the reactor plant component cooling water (RPCCW) system using new screening methodology PWROG-18027 "Loss of Room Cooling in PRA Modeling".	No impact on this current application. The RHR system ventilation system was screened by performing a loss of ventilation analysis and verifying the room temperature does not exceed the allowable limit.
2021 / MPS3-R09	Anticipated transient without SCRAM (ATWS) event tree revised in accordance with industry approach	No impact on this application. The RHR system is not credited in the ATWS scenario.
2021 / MPS3-R09	Adopted WCAP-17154 interfacing system loss of cooling accident (ISLOCA) Methodology	No impact on this application. The RHR system is not credited in the ISLOCA scenario.
2021 / MPS3-R09	Change to pipe length methodology. Using latest data from TR-3002024904 Rev 5 Final Report, August 2023	Negligible impact on this application. An internal flood is not postulated to result in large break LOCA and no internal flood is postulated to disable any one of the three RCS DHR methods. Therefore, the configuration risk introduced by having only one RHR pump operable is negligible.
2021 / MPS3-R09	Adopting new HEP-A Screening TR 3002008094, KBA 2021-001, and ML22014A084 Conclusion 13.	Negligible impact on this application. Latent human errors are not major contributors in configuration risk assessments.

4.1.5 Relevant Model Assumptions and Sources of Uncertainty

Model Assumptions and Sources of Uncertainty	Disposition
Failure of the RHR pumps due to inadequate seal cooling via RPCCW is not considered to be a credible event for a large break loss of coolant accident (LLOCA). due to the short mission time required of the RHR system in a LLOCA.	No impact on this current application. Assumption is reasonable based on plant-specific design/response.
Cooling from RPCCW to the RHR Heat Exchangers is not necessary for the injection phase because cool water is supplied by the RWST.	No impact on this current application. Assumption is reasonable based on plant-specific design/response.
It is difficult to establish values for events that have never occurred or have rarely occurred with a high level of confidence. The choice of available data	No impact on this current application. Not a key source of model uncertainty, since the large break LOCA frequency

sets or use of specific methodologies in the determination of LOCA frequencies could impact base model results and some applications.	value represents a slight conservative bias treatment and is consistent with the most recent information available in the industry.
PWR EOPs direct opening of all PORVs to reduce RCS pressure for initiation of bleed and feed cooling. Some plants have performed plant-specific analysis that demonstrate that less than all PORVs may be sufficient, depending on ECCS characteristics and initiation timing.	No impact on this current application. Plant-specific analysis determined the required number of PORVs, as well as the time windows available to initiate RCS feed and bleed cooling. Using best-estimate analysis is not considered a source of uncertainty.

In conclusion, the MPS3-R09 model is deemed acceptable for this application.

4.1.6 Sensitivity and Uncertainty Analysis

Although no key assumptions or sources of uncertainty were identified for this application, a sensitivity study was conducted based on the calculated ICCDP/ICLERP to account for failure probability uncertainty. This involved increasing the ICCDP/ICLERP by a factor of three which is considered representative of the change in reliability between a mean value and an upper bound (95th percentile) for typical basic event failure distributions. The results of the sensitivity study are provided in the table below:

Sensitivity Study Results				
	ICCDP	RG 1.177 ICCDP Criteria	ICLERP	RG 1.177 ICLERP Criteria
168-hour AOT	3.27E-08	1.00E-06	5.19E-09	1.00E-07

The results remain well below the RG 1.177 acceptance criteria and reflect the negligible risk impact due to removing the ‘B’ RHR pump from service.

4.2 Results

The risk assessment results for the one-time TS change are provided below. These values are well below the RG 1.177 acceptance criteria.

168 Hour One-Time AOT Extension		
Risk Metric	**Value**	**Acceptance Criteria**
ICCDP	1.09E-08	< 1.0E-06
ICLERP	1.73E-09	< 1.0E-07

4.3 Compensatory Measures and Conclusions

The risk assessment concludes the following:

- The proposed one-time AOT extension to TS 3.5.2 LCO Action ‘a’ results in a very small risk increase that satisfies the acceptance criteria of RG 1.177. The risk increase is very small due to:
  - LPSI is a minor risk contributor since the large break LOCA frequency value is relatively low.
  - Shutdown cooling is a minor risk contributor since it provides only one of the three redundant methods of RCS DHR function.
- The quantitative risk assessment does not include removal of credited ‘A’ train components from service.
- The Tier 2 restriction is as follows:
  - No elective maintenance of ‘A’ train equipment in accordance with MPS3 protected equipment procedure.
- The ‘A’ RHR system and its support systems, closed cooling water, service water, and emergency diesel generator will be protected prior to entering the one-time TS Action ‘a’ of LCO 3.5.2.
- The one-time TS Action ‘a’ of LCO 3.5.2 will not be entered if severe weather conditions exist in accordance with the MPS3 procedure for severe weather conditions.
- Operations will develop and follow a risk plan prior to entering the one-time TS Action ‘a’ of LCO 3.5.2.
- Verify the 'A' RHR pump quarterly Operability test is current and will remain current while in the one-time TS Action 'a' of LCO 3.5.2.
- No discretionary switch yard work to take place while in the one-time TS Action 'a' of LCO 3.5.2.

5.0 REGULATORY EVALUATION

5.1 Applicable Regulatory Requirements/Criteria

Technical Specifications - Section 50.36 of Title 10 of the *Code of Federal Regulations* (CFR), establishes the regulatory requirements related to the

content of the TS. Pursuant to 10 CFR 50.36, TS are required to include items in the following five specific categories related to station operation: (1) safety limits, limiting safety system settings, and limiting control settings; (2) limiting conditions for operation (LCOs); (3) surveillance requirements; (4) design features; and (5) administrative controls. In 10 CFR 50.36(c)(5), administrative controls are stated to be, "the provisions relating to organization and management, procedures, recordkeeping, review and audit, and reporting necessary to assure the operation of the facility in a safe manner." This also includes the programs established by the licensee and listed in the administrative controls section of the TS for the licensee to operate the facility in a safe manner.

The regulatory requirements in 10 CFR 50.36 are not specific regarding the actions to be followed when TS requirements are not met other than a plant shut down. The proposed change does not revise the actions required if one train of RHR is out of service as it is only requesting an extended allowed outage time before that action is required. Therefore, the proposed change is consistent with the requirements of 10 CFR 50.36.

10 CFR Requirements/General Design Criteria (GDC) - 10 CFR 50, Appendix A, "General Design Criteria for Nuclear Power Plants," Criteria 34, 35, 36, 37, and 38 define the requirements for the emergency core cooling and containment heat removal:

- 10 CFR Part 50 Appendix A, GDC 34 - Residual Heat Removal states, "A system to remove residual heat shall be provided. The system safety function shall be to transfer fission product decay heat and other residual heat from the reactor core at a rate such that specified acceptable fuel design limits and the design conditions of the reactor coolant pressure boundary are not exceeded."

  "Suitable redundancy in components and features, and suitable interconnections, leak detection, and isolation capabilities shall be provided to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) the system safety function can be accomplished, assuming a single failure."

- 10 CFR Part 50 Appendix A, GDC 35 - Emergency Core Cooling states, "A system to provide abundant emergency core cooling shall be provided. The system safety function shall be to transfer heat from the reactor core following any loss of reactor coolant at a rate such that (1) fuel and clad damage that could interfere with continued effective core cooling is prevented and (2) clad metal-water reaction is limited to negligible amounts."

"Suitable redundancy in components and features, and suitable interconnections, leak detection, isolation, and containment capabilities shall be provided to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) the system safety function can be accomplished, assuming a single failure."

- 10 CFR Part 50 Appendix A, GDC 36 - Inspection of Emergency Core Cooling System states, "The emergency core cooling system shall be designed to permit appropriate periodic inspection of important components, such as spray rings in the reactor pressure vessel, water injection nozzles, and piping, to assure the integrity and capability of the system."

- 10 CFR Part 50 Appendix A, GDC 37 - Testing of Emergency Core Cooling System states, "The emergency core cooling system shall be designed to permit appropriate periodic pressure and functional testing to assure (1) the structural and leaktight integrity of its components, (2) the operability and performance of the active components of the system, and (3) the operability of the system as a whole and, under conditions as close to design as practical, the performance of the full operational sequence that brings the system into operation, including operation of applicable portions of the protection system, the transfer between normal and emergency power sources, and the operation of the associated cooling water system."

- 10 CFR Part 50 Appendix A, GDC 38 – Containment Heat Removal states, "A system to remove heat from the reactor containment shall be provided. The system safety function shall be to reduce rapidly, consistent with the functioning of other associated systems, the containment pressure and temperature following any loss-of-coolant accident and maintain them at acceptably low levels."

5.2 Precedents

Similar LARs to extend the allowed outage time for an ECCS system have been reviewed and approved by the NRC as indicated below:

- Vogtle Unit 1 and Unit 2 (1994) – Amendment 72 and 51 to allow a one-time extension from 72 hours to 7 days allowed outage time for RHR to convert RHR motor to a coupled design (ADAMS Accession No. ML20069J374).
- Millstone Unit 3 (1995) – Amendment 103 approved the revision to the MPS3 TS 3.5.2 Action 'a' to extend the allowable RHR pump outage time

for RHR for mechanical seal replacement and related modifications from 72 hours to 120 hours as a one-time extension (ADAMS Accession No. ML011780572).

- Vogtle Unit 1 (2015) – Amendment 176 issued to allow a one-time only change of the Completion Time to 7 days is to replace an RHR pump motor (ADAMS Accession No. ML15209A874).
- McGuire Unit 1 (2016) – Amendment 281 issued to allow a one-time extension from 72 hours to 240 hours allowed outage time to replace an RHR Air Handling Unit (ADAMS Accession No. ML16004A352).

5.3 No Significant Hazards Considerations

Pursuant to 10 CFR 50.90, Dominion Energy Nuclear Connecticut, Inc. (DENC) requests an amendment to the Millstone Power Station Unit 3 (MPS3) Facility Operating License Number NPF-49, in the form of a change to the technical specifications (TS). This license amendment request (LAR) proposes to revise the MPS3 TS 3.5.2 "ECCS Subsystems – T_{avg} Greater Than or Equal to 350°F", Action 'a' to extend the allowed outage time (AOT) of 72 hours to 168 hours on a one-time basis. This extension would allow DENC to repair or replace the 'B' Residual Heat Removal (RHR) pump mechanical seal while at power and prior to the subsequent need of the RHR system during cold shutdown and refueling. This one-time extension would be valid until September 30, 2026.

DENC has evaluated whether 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 change involve a significant increase in the probability or consequences of an accident previously evaluated?*

Response: No.

The proposed change revises TS 3.5.2 LCO Action 'a' for one inoperable ECCS subsystem, on a one-time basis to extend the AOT from 72 hours to 168 hours, specifically for the RHR pumps/RHR heat exchangers. Operation of MPS3 in accordance with the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated. The proposed revision replaces the current note approved in 1995 to provide MPS3, a one-time extension to the AOT for each RHR pump/RHR heat exchanger to 120 hours. The one-time AOT extension will provide additional time to repair the 'B' RHR pump mechanical seal while MPS3 is at-power. This is a preferable safe alternative rather than repairing the RHR pump while in cold shutdown, and will allow repair when the primary safety function of the RHR pump is not required. The risk assessment concluded the increase in risk associated with

the proposed one-time AOT extension to TS 3.5.2 LCO Action 'a' is consistent with RG 1.177 acceptance guidelines for a one-time TS AOT change and is acceptably small.

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

(2) *Does the proposed change create the possibility of a new or different accident from any accident previously evaluated?*

Response: No.

The proposed change revises the TS 3.5.2 LCO Action 'a' (AOT) for one inoperable ECCS subsystem to extend the AOT from 72 hours to 168 hours, specifically for the RHR pumps/RHR heat exchangers on a one-time basis. The proposed change does not alter the design function or operation of the MPS3 RHR system or ECCS. In the event that the RHR system is needed during a plant shutdown, there is redundant train that can perform the required functions.

No plant physical changes are being implemented that would result in plant operation in a configuration outside the plant safety analyses or design basis. The proposed change does not introduce any changes or mechanisms that create the possibility of a new or different kind of accident.

Therefore, based on the above evaluation, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

(3) *Does the proposed change involve a significant reduction in a margin of safety?*

Response: No.

The proposed change does not adversely affect any current plant safety margins, or the reliability of the equipment assumed in the safety analysis. There are no changes being made to any safety analysis assumptions, safety limits, or limiting safety system settings that would adversely affect plant safety as a result of the proposed change. Furthermore, a supporting risk assessment was performed for the proposed one-time 168-hour AOT. The risk assessment concluded the increase in risk associated with the proposed one-time AOT extension to TS 3.5.2 LCO Action 'a' is consistent with RG 1.177 acceptance guidelines for a one-time TS AOT change and is acceptably small. The risk evaluation demonstrates that defense-in-depth will not be significantly impacted by permitting a 168-hour AOT. The proposed change does not alter the manner in which safety limits, limiting safety system settings, or limiting

conditions for operation are determined. The safety analysis acceptance criteria are not impacted by this change. The proposed change will not result in plant operation in a configuration outside the design basis, since the RHR and ECCS Systems will still be capable of performing their design functions of providing cooling flow to the reactor in the event of a LOCA.

Therefore, operation of the facility in accordance with the proposed change will not involve a significant reduction in a margin of safety.

Based on the above information, DENC concludes the proposed amendment presents no 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.

5.4 Conclusion

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

6.0 ENVIRONMENTAL CONSIDERATIONS

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 a significant increase in the amounts of any effluents 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.

7.0 REFERENCES

7.1 Letter from Louis L. Wheeler (NRC) to Mr. C. K. McCoy (Vogtle), dated May 31, 1994, Issuance of Amendments – Vogtle Electric Generating Plant, Units 1 and 2 (TAC Nos. M88481 and M88482), ADAMS Accession No. ML012340114.

7.2 Letter from Vernon L. Rooney (NRC) to John F. Opeka (NNECO), dated February 9, 1995, Issuance of Amendment (TAC NO. M90240), ADAMS Accession No. ML011780572.

7.3 Letter from Bob Martin (NRC) to Mr. C. R. Pierce (Vogtle), dated August 19, 2015, Vogtle Electric Generating Plant, Unit 1 – Issuance of Amendment for Residual Heat Removal System Pump Motor (TAC No. MF6323), ADAMS Accession No. ML15209A874.

7.4 Letter from G. Edward Miller (NRC) to Steven D. Capps (McGuire), dated February 3, 2016, McGuire Nuclear Station, Unit 1: Issuance of Amendment RE: Request to Revise Technical Specifications for Residual Heat Removal System Air Handler Unit 1 (CAC No. MF6666), ADAMS Accession No. ML16004A352.

7.5 Regulatory Guide 1.177, “An Approach for Plant Specific Risk-Informed Decisionmaking: Technical Specifications,” Revision 2

7.6 Regulatory Guide 1.174, “Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis,” Revision 3

7.7 NOTEBK-PRA-MPS3-QU.2 Rev. 8, “Model Quantification Results”

7.8 NOTEBK-PRA-MPS3-FA.2 Rev. 1, “Fire Ignition Frequencies”

7.9 ASME/ANS RA-S-2008, “Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications” and its 2009 addendum (ASME/ANS RA-Sa-2009)

7.10 Individual Plant Examination of External Events, Millstone Power Station Unit 3, Northeast Utilities Service Company, December 1991

7.11 MPS3 PSS, “Millstone Unit 3 Probabilistic Safety Study”, August 1983

7.12 License Amendment Request for MPS3, “Millstone Power Station Unit 3 Proposed License Amendment Request to Revise Integrated Leak Rate Test (Type A) and Type C Test Intervals”, ADAMS Accession No. ML19217A208

7.13 MPS3 procedure for protected equipment

7.14 MPS3 Procedure for severe weather conditions

ATTACHMENT 2

MARKED-UP TECHNICAL SPECIFICATION PAGE

DOMINION ENERGY NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3

~~February 9, 1995~~

EMERGENCY CORE COOLING SYSTEMS

3/4.5.2 ECCS SUBSYSTEMS - T_{avg} GREATER THAN OR EQUAL TO 350°F

LIMITING CONDITION FOR OPERATION

3.5.2 Two independent Emergency Core Cooling System (ECCS) subsystems shall be OPERABLE with each subsystem comprised of:

a. One OPERABLE centrifugal charging pump,

b. One OPERABLE Safety Injection pump,

c. One OPERABLE RHR heat exchanger,*

d. One OPERABLE RHR pump,*

e. One OPERABLE containment recirculation heat exchanger,

f. One OPERABLE containment recirculation pump, and

g. An OPERABLE flow path capable of taking suction from the refueling water storage tank on a Safety Injection signal and capable of automatically stopping the RHR pump and being manually realigned to transfer suction to the containment sump during the recirculation phase of operation.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

a. With one ECCS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours* or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

b. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date. The current value of the usage factor for each affected Safety Injection nozzle shall be provided in this Special Report whenever its value exceeds 0.70.

* ~~The allowable outage time for each RHR pump/RHR heat exchanger may be extended to 120 hours for the purpose of pump modification to change mechanical seal and other related modifications. This exception may only be used one time per RHR pump/RHR heat exchanger and is not valid after April 30, 1995.~~

The allowable outage time for RHR pump/RHR heat exchanger may be extended to 168 hours for the purpose of pump modification to change the mechanical seal. This exception may only be used one time and is contingent on meeting the compensatory measures described in MPS3 license amendment request submittal letter 25-271, Attachment 4. This footnote is not valid after September 30, 2026.

ATTACHMENT 3

MARKED-UP TECHNICAL SPECIFICATION BASES PAGE – FOR INFORMATION ONLY

DOMINION ENERGY NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3

- FOR INFORMATION ONLY -

LBDCR No. 14-MP3-011
January 8, 2015

EMERGENCY CORE COOLING SYSTEMS

BASES

ECCS SUBSYSTEMS (Continued)

When performing the quarterly stroke test of 3SIH*MV8807A or 3SIH*MV8807B, 3SIH*MV8924 is closed first to prevent the potential injection of RWST water into the RCS through the operating charging pump. When 3SIH*MV8924 is closed, it is not necessary to declare either ECCS subsystem inoperable. Although expected to be open for post-LOCA recirculation, sufficient time is expected to be available post-LOCA to identify and open 3SIH*MV8924 either from the Control Room or locally at valve. The EOPs and the ESF status panels will identify this abnormal plant configuration, if not corrected following the termination of the surveillance testing, to the plant operators to allow restoration of the normal post-LOCA recirculation flowpath. Even if system restoration is not accomplished, sufficient equipment will be available to perform all ECCS and RSS injection and recirculation functions, provided no additional ECCS or RSS equipment is inoperable, even if a single failure is postulated. The failure to open 3SIH*MV8924 due to mechanical binding or the loss of power to ECCS Train A could be the single failure. If a different single failure is postulated, restoration of 3SIH*MV8924 can be accomplished. The closure of 3SIH*MV8924 has no affect on the injection phase. During the recirculation phase, assuming 3SIH*MV8924 remains closed (i.e., the single failure), the Train A RSS subsystem can supply water from the containment sump to the Train A and B charging pumps, and the Train B RSS subsystem can supply water from the containment sump to the Train A and B safety injection pumps. If power is lost to ECCS Train A and 3SIH*MV8924 is not opened locally (i.e., the single failure), cold leg recirculation can be accomplished by using RSS Train B to supply containment sump water via 3SIH*PlB to the RCS cold legs and 3SIL*MV8809B can be opened to supply containment sump water via RSS Train B to the RCS cold legs. Hot leg recirculation can be accomplished by using RSS Train B to supply containment sump water via 3SIH*PlB to the RCS hot legs and maintaining 3SIL*MV8809B open to supply containment sump water via RSS Train B to the RCS cold legs.

Insert 1

ECCS Subsystems: Auxiliary Building RPCCW Ventilation Area Temperature Maintenance:

In MODES 1, 2, 3 and 4, two trains of 4 heaters each, powered from class 1E power supplies, are required to support charging pump OPERABILITY during cold weather conditions. These heaters are required whenever outside temperature is less than or equal to 17°F.

When outside air temperature is below 17°F, if both trains of heaters in the RPCCW Ventilation Area are available to maintain at least 65°F in the Charging Pump and Reactor Component Cooling Water Pump areas of the Auxiliary Building, both charging pumps are OPERABLE for MODES 1, 2 and 3.

When outside air temperature is below 17°F, if one train of heaters in the RPCCW Ventilation Area is available to maintain at least 32°F in the Charging Pump and Reactor Component Cooling Water Pump areas of the Auxiliary Building, the operating charging pump is OPERABLE, for MODE 4.

Insert 1

As part of the replacement of the 'B' RHR pump (3RHS*P1B) mechanical seal, the allowable outage time for the RHR pump/RHR heat exchanger may be extended to 168 hours for the purpose of pump modification to change the mechanical seal. This exception may only be used one time and is contingent on meeting the compensatory measures described in MPS3 license amendment request submittal letter 25-271, Attachment 4. This footnote is not valid after September 30, 2026. The 168-hour allowed outage time is supported by a risk assessment that demonstrates the increase in risk associated with the one-time 168-hour allowed outage time is acceptably small for both incremental conditional core damage probability and incremental conditional large early release probability. Prior to entering the 168-hour allowed outage time for the specific purpose of replacing the 'B' RHR mechanical seal, the following compensatory measures must be in place:

- The 'A' RHR system and its support systems, closed cooling water, service water, and emergency diesel generator will be protected prior to entering the one-time TS Action 'a' of LCO 3.5.2.

- The one-time TS Action 'a' of LCO 3.5.2 will not be entered if severe weather conditions exist in accordance with the MPS3 procedure for severe weather conditions.

- Operations will develop and follow a risk plan prior to entering the one-time TS Action 'a' of LCO 3.5.2.

- Verify the 'A' RHR pump quarterly Operability test is current and will remain current while in the one-time TS Action 'a' of LCO 3.5.2.

- No elective maintenance of 'A' train equipment in accordance with MPS3 protected equipment procedure.

- No discretionary switch yard work to take place while in the one-time TS Action 'a' of LCO 3.5.2.

ATTACHMENT 4

COMPENSATORY MEASURES IN PLACE DURING THE ONE-TIME 168-HOUR ALLOWED OUTAGE TIME

DOMINION ENERGY NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3

No.	Compensatory Measures	Due Date/Event
1	The 'A' RHR system and its support systems, closed cooling water, service water, and emergency diesel generator will be protected.	Prior to entering the one-time TS 3.5.2 Action 'a' AOT.
2	The one-time TS Action 'a' of LCO 3.5.2 will not be entered if severe weather conditions exist in accordance with the MPS3 procedure for severe weather conditions.	Prior to entering the one-time TS 3.5.2 Action 'a' AOT.
3	Operations will develop and follow a risk plan.	Prior to entering the one-time TS 3.5.2 Action 'a' AOT.
4	Verify the 'A' RHR pump quarterly Operability test is current and will remain current while in the one-time TS Action 'a' of LCO 3.5.2	Prior to entering the one-time TS 3.5.2 Action 'a' AOT.
5	No elective maintenance of 'A' train equipment in accordance with MPS3 protected equipment procedure will be performed.	While in the one-time TS 3.5.2 Action 'a' AOT.
6	No discretionary switch yard work to take place.	While in the one-time TS 3.5.2 Action 'a' AOT.

ATTACHMENT 5

INTERNAL EVENTS AND INTERNAL FLOODING PROBABLISTIC RISK ASSESSMENT MODEL ACCEPTABILITY

DOMINION ENERGY NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
AS-A9-01 (2012)	AS-A9	CC II	Notebook AS-2 is not complete. Supporting analysis for several of the items identified as to be addressed in this Notebook have not been incorporated. Possible Resolution No possible resolution was provided by the 2012 peer review team.	Resolved in the MPS3-R09 model supporting documentation. Documentation completed.
AS-B6-01 (2012)	AS-B6	Met	No dependencies among various systems due to plant configuration and maintenance practices have been identified. Include a discussion in the accident sequence notebook AS.1 to state that no such dependencies are applicable. Possible Resolution No possible resolution was provided by the 2012 peer review team.	Resolved in the MPS3-R09 model supporting documentation. Dependency documentation enhanced.
4-5 (2018)	DA-C10	NOT MET	While the guidance in NF-AA-PRA-101-2061 states that these procedures should be reviewed to ensure the demands/number of demands are accurate (Section 3.2.4.i), there is no documentation that such a review was conducted. For instance the example in the standard of not crediting each emergency diesel generator (EDG) test as a test of the sequencer was reviewed and the conclusion was that the sequencer demands in the Millstone Power Station Unit 3 (MSP3) probabilistic risk assessment (PRA) are indeed based on the number of demands on the EDG. (This F&O originated from SR DA-C10)	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category II. Documentation enhanced.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			Possible Resolution Review cited surveillance procedures to determine that all counts are accurate. Pay close attention on components that reference another component as the basis for the counts. Document this review in a manner that supports independent review and future updates.	
23-4 (2018)	DA-C13	CC I	Assumption 7 in Notebook DA.6 states that Maintenance Rule (MR) unavailability during shutdown was included which is inconsistent with the supporting requirements (SR) as well as the PRA procedures. (This F&O originated from SR DA-C13) Possible Resolution Review unavailability events and remove any data from periods of plant shutdown.	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category II/III. Documentation enhanced.
23-7 (2018)	DA-C13	CC I	Plant staff has not been interviewed to confirm estimates of unavailability where data does not exist. (This F&O originated from SR DA-C13) Possible Resolution Interview plant staff to confirm estimated unavailability for components for which data is not available or justify that these events are not significant.	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category II/III. Documentation enhanced.
23-3 (2018)	DA-D1	CC III	Table 1 of Notebook SY.2 (systems assumptions) indicates that the conditional probability of a PORV being challenged (3PROB-RC-PORV-CHALLENGED) is 0.077 and references NotebookDA.4 for the development of this plant-specific value. No	Resolved in the MPS3-R09 model and supporting documentation. Basic event 3PROB-RC-PORV-CHALLENGED was removed from the model.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			documentation of this calculation could be found in NotebookDA.4. (This F&O originated from SR DA-D1) Possible Resolution Document a basis for this conditional probability. If applicable, consider this as a source of model uncertainty given the importance of this basic event.	
23-1 (2018)	DA-E1	Met	Clarifications were required to interpret the plant specific failure screening assessment to support SR DA-C4 during the peer review. It was not clear that a simple 'No' in the data spreadsheet meant that the failure was not related to a PRA component rather than it had been dispositioned as not a PRA failure. Sometimes this detail was included and other times it was not. (This F&O originated from SR DA-E1) Possible Resolution Add a new column to the assessment that indicates that a component is not modeled in the PRA or include that conclusion in the description so that it is clear.	Resolved in the MPS3-R09 model supporting documentation. Documentation enhanced.
23-2 (2018)	DA-E1	Met	The unavailability data from the station logs was determined to be "manually collected by trained staff" but the site stated that manual data collection has not been retained for review. Although the guidance in NF-AA-PRA-101-2063 for reviewing data is considered sufficient, there is no documentation of the review to confirm it was correctly followed.	Resolved in the MPS3-R09 model supporting documentation. Documentation enhanced.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			(This F&O originated from SR DA-E1) Possible Resolution Document the application of the criteria for inclusion/exclusion outlined in the Dominion guidance to all activities identified requiring manual assessment over the data period. Confirm that the collected data complies with the referenced Dominion guidance.	
23-6 (2018)	DA-E1	Met	MPS3-DA.2 does not document that no instances of repeated failures over a short time occurred to confirm that this was indeed addressed at the site level instead of being not applicable to MPS3. (This F&O originated from SR DA-E1) Possible Resolution Add a statement in MPS3-DA.2 that the data was reviewed and that the count was zero.	Resolved in the MPS3-R09 model supporting documentation. Documentation enhanced.
3-1 (2018)	HR-A1	NOT MET	A comprehensive review of procedures and practices to identify realignment of PRA equipment outside its normal status was not performed. (This F&O originated from SR HR-A1) Possible Resolution Review procedures and practices that may cause misalignment to PRA equipment. Document this review, which may then be further screened at a procedure/component individual level. Consider using Electric Power Research Institute	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category I/II/III. Procedure review documented.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			(EPRI) 3002008094, "Data and Modeling of Pre-Initiator Human Failure Events in Probabilistic Risk Assessment."	
3-2 (2018)	HR-A2	Met	A systematic review of procedures and practices to identify calibration activities that if performed incorrectly that can have an adverse impact on the automatic initiation of standby safety equipment is not performed. (This F&O originated from SR HR-A2) <u>Possible Resolution</u> Perform a systematic review of procedures and practices that could introduce miscalibration of standby safety equipment. Document this review, which may then be further screened at a procedure/component individual level.	Resolved in the MPS3-R09 model and supporting documentation. Systematic review documented.
3-7 (2018)	HR-A3	NOT MET	Attachment 4 of Notebook HR.1 identifies some work practices that involve a mechanism simultaneously affecting equipment in different trains of a redundant system. However, this list may be incomplete due to the premature screening of components before procedures are reviewed. (This F&O originated from SR HR-A3) <u>Possible Resolution</u> Perform the review of work practices affecting multiple trains on the list of procedures documented in order to meet SRs HR-A1 and HR-A2. Ensure the criteria for screening in includes	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category I/II/III. Systematic review documented.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			calibrations that are performed by the same crew on the same shift using the same equipment.	
3-3 (2018)	HR-B1	CC I	Rules for screening were performed on classes of activities and not individual activities. (This F&O originated from SR HR-B1) Possible Resolution Review individual procedures/activities that may cause misalignment and miscalibration to PRA equipment. Apply screening rules to these individual procedures/activities.	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category II/III. Systematic review of activities documented.
3-4 (2018)	HR-B2	NOT MET	Screening rules were applied first with no verification that these activities would not simultaneously have an impact on multiple trains of a redundant system or diverse systems. (This F&O originated from SR HR-B2) Possible Resolution First review each activity/procedure for simultaneously having an impact on multiple trains of a redundant system or diverse systems. After this review is completed and documented, then activities/procedures may be screened out that do not impact multiple trains of redundant systems.	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category I/II/III. Systematic review of activities documented.
3-10 (2018)	HR-D4	Met	Recovery is non-conservatively credited for periodic checks of manual valves after the initial preinitiator error is made. (This F&O originated from SR HR-D4) Possible Resolution	Resolved in the MPS3-R09 model and supporting documentation. Recovery credit removed.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			Recalculate the recovery credited from periodic surveillances (performed separately from the original procedure) as suggested in the basis section.	
3-11 (2018)	HR-D4	Met	No justification is provided for using lower bound miscalibration recovery factor. (This F&O originated from SR HR-D4) <u>Possible Resolution</u> Provide justification to use a recovery error of commission of 1.60E-02 (THERP Table 20-22, Item 4) such as the use of independent verification that goes beyond concurrent verification.	Resolved in the MPS3-R09 model and supporting documentation. The lower bound recovery factor is no longer utilized.
3-13 (2018)	HR-D5	Met	An error was found for the HEP-A-EGF-V006-12 dependency. (This F&O originated from SR HR-D5) <u>Possible Resolution</u> Change the HEP override for EGF-V006 to 9.31E-06.	Resolved in the MPS3-R09 model and supporting documentation. HEP-A-EGF-V006-12 dependencies were reexamined and corrected.
21-4 (2018)	HR-F1	CC I/II	The operator actions to align the Auxiliary Feed Water (AFW) pumps to the condensate storage tank (CST) or to refill the demineralized water storage tank (DWST) with firewater is combined in one human failure event (HFE). (This F&O originated from SR HR-F1) <u>Possible Resolution</u> Define two individual HFEs, one for the operator action	Resolved in the MPS3-R09 model and supporting documentation. The HFE was split into three, one for the operator action to align the AFW pumps to the CST, one for the operator action to refill the DWST with firewater, and a common cognitive HFE.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			to align the AFW pumps to the CST and one for the action to refill the DWST with firewater.	
19-1 (2018)	HR-G1	CC II	The use of the automatic assignments of cognitive recovery probability in the human reliability analysis (HRA) Calculator can result in extremely low probability of cognitive human error (HEPcog) for actions with large time margins. For post-initiator operator actions, cognitive recovery is modeled via the HRA Calculator by crediting actions such as self-review. Those recovery actions have a probability of either 0.5 or 0.1. For some actions, multiple recoveries may be appropriate. However, if the Dependency Factor (DF) is chosen to be anything except 'N/A', the non-recovery probability is the original HEP x DF. Thus, for actions with large time margin, the default Dependency Factor is zero dependence (ZD) and the non-recovery probability is equal to the original HEP. (This F&O originated from SR HR-G1) <u>Possible Resolution</u> Check operator actions evaluated in the HRA Calculator where the total HEPcog is extremely low (E-5 to E-6). If this is due to the use of ZD or low dependence (LD), consider replacing the Dependency Factor with N/A (i.e. do not use the dependency model)	Resolved in the MPS3-R09 model and supporting documentation. HFEs with Pcog in the E-5 to E-6 range were reviewed with the lowest value being 9E-06. These HFEs were deemed to have appropriate contributions to the cognitive failure probability.
21-1 (2018)	HR-G1	CC II	Execution errors in HRA Calculator are not evaluated for each critical step in the procedures. (This F&O originated from SR HR-G1)	Resolved in the MPS3-R09 model and supporting documentation. Assessed the execution error for all HEPs at the individual procedure step level for each critical execution step.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			Possible Resolution Assess the execution error for HEPs at the individual procedure step level. For example, this would include separate steps where individual valves need to be opened or pumps started.	
21-2 (2018)	HR-G4	CC II	There is an inconsistency in what is defined as the delay time and cognitive time in HRA Calculator. (This F&O originated from SR HR-G4) Possible Resolution Evaluate delay times as the time is cue received when it is based on thermal hydraulic analysis.	Resolved in the MPS3-R09 model and supporting documentation. All operator actions were updated to account for the correct delay times based on thermal hydraulic analysis or operator interview.
HR-G5-01 (2012)	HR-G5 HR-E3	CC III CC II/III	The HR.2 Notebook states in Attachment 1, Revision 5 that MPS3 "Updated the HRA for some of the HEPs based on new timing and review of the procedures." but does not identify which ones. The Operator Surveys are all dated 2006 and refer to the old HFE naming scheme so it does not appear that these relate to the updated HFEs. Even the new HFEs added as part of Revision 5 (HEP-C-MANMSI, HEP-C-RHR, HEP-C-TRIPRCP-LODC, and HEP-C-FTSEDG) do not have documentation of talkthroughs, only stating "T1/2 and Tm based on procedure talkthrough" in the HRA Calculator file Time Window screen. Possible Resolution According to Dominion Memorandum MEMO-PRA-2011-0002 Rev 0, "PRA Plan for Validation of Human Error Probabilities," operator interviews are scheduled to be performed and simulator exercises will be	Resolved in the MPS3-R09 model supporting documentation. Operator interviews were conducted for each HFE.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			observed to validate times assumed in the HRA/PRA. For this reason, the assessment for this HR was changed from "Not Met" to "Met". However, since the original schedule was that MPS3 interviews would be performed by June 2012, the finding is retained as a reminder to PRA staff to complete this task.	
3-9 (2018)	HR-G6	NOT MET	No documentation is provided in Notebook HR.2 that checks the consistency of the HFEs and final HEPs relative to each other to check their reasonableness. (This F&O originated from SR HR-G6) <u>Possible Resolution</u> Check (and document) the consistency of the HFEs and final HEPs relative to each other to check their reasonableness. One option is check the final HEPs for any outliers. Verify that those HEPs that are much higher and lower than average are reasonable given the scenario context, plant history, procedures, operational practices, and experience	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category I/II/III. Consistency check performed.
HR-G7-01 (2012)	HR-G7	Met	The dependency HEPs in Column D of the "New HEP Dep" worksheet do not consistently match the New Prob values in Column V of the "Output from HRA Calculator" worksheet. For example, Combination 67 looks like it should be 5E-05 according to row 291, Column V of the "Output from HRA Calculator" worksheet, but 3E-04 is used. It looks as if the individual probability for HEP-C-FTSAFW was mistakenly used as the dependency HEP for this combination. <u>Possible Resolution</u>	Resolved in the MPS3-R09 model and supporting documentation. The dependency analysis now uses the standard industry software.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			Conduct an internal review of the dependency analysis spreadsheet and correct as necessary.	
3-8 (2018)	HR-I2	Met	Documentation for operator interviews is not detailed enough to justify that interpretation of the procedures was consistent with plant observations and training procedures and confirm the response models for scenarios modeled. (This F&O originated from SR HR-I2) <u>Possible Resolution</u> Provide more detailed documentation for the process that was used in conducting the operator interviews to assure the interviews address the interpretation of procedures and confirmation of the response model.	Resolved in the MPS3-R09 model supporting documentation. Documentation detail enhanced.
21-5 (2018)	HR-I3	NOT MET	Documentation of plant-specific assumptions and sources of uncertainty are missing from the notebooks. (This F&O originated from SR HR-I3) <u>Possible Resolution</u> Systematically review each of the human reliability analysis notebooks for assumptions and sources of model uncertainty.	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category I/II/III. Assumptions and sources of uncertainty documented.
3-14 (2018)	IE-A1 IE-A5	Met CC II	There are potential initiating events identified in the system screening process, however no further evaluation was performed to determine if these should be added to the model. (This F&O originated from SR IE-A1) <u>Possible Resolution</u>	Resolved in the MPS3-R09 model and supporting documentation. Detailed analysis was performed for systems that screen in.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			Expand the scope of Attachment 6 in IE.1 to include possible initiating events identified in Table 2-2b or provide justification that no further review is required.	
3-19 (2018)	IE-A3	Met	A spurious safety injection (SI) initiating event is identified in the plant specific operating experience review, however the spurious safety injection was removed from the model. (This F&O originated from SR IE-A3) <u>Possible Resolution</u> Add the spurious safety injection initiating event to the PRA model or provide additional technical justification for exclusion of spurious SI. If justified, consider the potential of a lower initiating event frequency based on the design change.	Resolved in the MPS3-R09 model and supporting documentation. The spurious SI initiating event was added to the model.
3-20 (2018)	IE-A5	CC II	Loss of Control Building heating, ventilation and air conditioning (HVAC) screened out as an initiating event without sufficient justification. (This F&O originated from SR IE-A5) <u>Possible Resolution</u> Provide justification in Notebook IE.1 that loss of Control Building HVAC would not result in an initiating event or include it in the model as an initiating event.	Resolved in the MPS3-R09 model supporting documentation. Screening justification documented.
3-34 (2018)	IE-A6	CC II	Electrical busses and panels have not been evaluated as a potential initiating event for common cause failures and during system alignments.	Resolved in the MPS3-R09 model and supporting documentation. Evaluation of electrical busses/panels documented.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			(This F&O originated from SR IE-A6) Possible Resolution Evaluate the loss of electrical busses and panels due to common cause failures or system alignment and the potential as an initiating event.	
3-16 (2018)	IE-A7	Met	Shutdown events were not reviewed to determine if the event could also occur during at power conditions. (This F&O originated from SR IE-A7) Possible Resolution Include review of events from shutdown conditions to determine if the event could also occur during at power conditions and cause a different type of initiator.	Resolved in the MPS3-R09 model supporting documentation. Shutdown events review documented.
3-18 (2018)	IE-A9	CC I	No evidence could be found that plant-specific operating experience was reviewed for initiating event precursors. (This F&O originated from SR IE-A9) Possible Resolution Review plant-specific operating experience for initiating event precursors and document this review. Include the events that were reviewed along with any corresponding dispositions.	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category II. Operating experience review documented.
3-24 (2018)	IE-B3	NOT MET	Grouping of initiating events do not appear to be bounded by the worst-case impact for all the initiating events within that group.	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category II. Subsuming is no longer performed for loss of equipment initiating events.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			(This F&O originated from SR IE-B3) Possible Resolution Re-evaluate the subsuming of initiating events in Notebook IE.1. Verify that the initiating event that is used to bound really contains all of the impacts of the initiating events that are subsumed within it. Revise the grouping if needed to assure the modeled initiator is bounding.	
3-22 (2018)	IE-C1	Met	General plant transients and loss of main feedwater initiating events do not account for generic industry data. There is no justification why the plant specific-data alone is adequate. (This F&O originated from SR IE-C1) Possible Resolution Provide justification that there is adequate plant-specific data for general plant transients and loss of main feedwater so that it is not necessary to account for generic data in order to characterize the parameter value and its uncertainty. If it cannot be justified, then incorporate the generic data for these initiators.	Resolved in the MPS3-R09 model and supporting documentation. General plant transients and loss of MFW initiating event frequencies now incorporate generic data.
3-33 (2018)	IE-C1	Met	Several loss of equipment initiating events have been subsumed, however the increase in initiating event frequency has not been accounted for. (This F&O originated from SR IE-C1) Possible Resolution In cases where an initiator has been subsumed to	Resolved in the MPS3-R09 model and supporting documentation. Subsuming is no longer performed for loss of equipment initiating events.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			another initiator, verify that the initiator frequency is properly modified to account for the subsuming.	
3-27 (2018)	IE-C15	Met	Uncertainty in the initiating event frequencies is not well characterized. Error factors, median values and mean values are provided, however there is no further discussion. (This F&O originated from SR IE-C15) <u>Possible Resolution</u> Characterize the uncertainty in the initiating event frequencies by, for example, comparing the distributions with the generic data distributions.	Resolved in the MPS3-R09 model supporting documentation. For the Bayesian updated events, the calculated values were verified to fall within the generic industry 5th and 95th percentiles for the given initiating event.
3-23 (2018)	IE-C2	Met	The data used for the plant-specific initiating events is not current. (This F&O originated from SR IE-C2) <u>Possible Resolution</u> Update the plant specific data used for initiating events to reflect recent plant operating experience.	Resolved in the MPS3-R09 model and supporting documentation. Updated the plant-specific data to reflect recent plant operating experience.
3-15 (2018)	IE-D1	Met	There is a statement in Notebook IE.1 that the evaluation of initiating events resulting from common cause failures and routine system alignments has not been performed. (This F&O originated from SR IE-D1) <u>Possible Resolution</u> Update Notebook IE.1 to remove the statement that	Resolved in the MPS3-R09 model supporting documentation. Removed statements that are no longer applicable.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			this systematic evaluation of initiating events has not been performed, since it has been performed.	
3-29 (2018)	IE-D1	Met	The documentation contains historical information that conflicts with the current model version. (This F&O originated from SR IE-D1) <u>Possible Resolution</u> Review the documentation and remove historical statements that are no longer applicable.	Resolved in the MPS3-R09 model supporting documentation. Removed statements that are no longer applicable.
3-17 (2018)	IE-D2	NOT MET	Documentation of operator interviews for verifying initiating event completeness is insufficient. (This F&O originated from SR IE-D2) <u>Possible Resolution</u> Document the Senior Reactor Operator (SRO) interview in formal interview sheets documenting the specific questions asked and corresponding responses.	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category I/II/III. Operator interviews documented.
3-26 (2018)	IE-D2 IE-C6	NOT MET NOT MET	There are many examples where there is not sufficient basis for screening out initiating events based on reactor shutdown not being an immediate occurrence. (This F&O originated from SR IE-D2) <u>Possible Resolution</u> Provide further justification for screening based on supporting evaluations that the resulting reactor shutdown is not an immediate occurrence.	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category I/II/III. Only screening controlled plant shutdown events.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
3-30 (2018)	IE-D3	CC II/III	Documentation of plant specific assumptions and sources of uncertainty are missing from the notebooks. (This F&O originated from SR IE-D3) Possible Resolution Systematically review each of the initiating event notebooks for assumptions and sources of model uncertainty.	Resolved in the MPS3-R09 model supporting documentation. Assumptions and sources of uncertainty documented.
IF-IFEV-A5-01 (2012)	IFEV-A5	NOT MET	It is not clear that the flood-initiating event frequency for each flood scenario group is calculated using the applicable requirements in 2-2.1. Modify flood-initiating event frequencies to calculate frequencies on a per-reactor year basis and provide clarification in the IF PRA documentation (spreadsheet(s) and notebook text) that clearly indicates the initiating event frequency calculations in units of per-reactor-year. Document the basis for the availability factor used to convert initiating event frequencies to events per reactor year or provide a cross reference. Possible Resolution See F&O description.	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category I/II/III. Enhanced internal flood initiating event frequency documentation.
IF-IFEV-A7-01 (2012)	IFEV-A7 IFSO-A4 IFSO-B2	NOT MET NOT MET Met	The analytical process used to identify potential flood scenarios appears to be incomplete. It is not clear how the four human-induced flood scenarios, and only those four scenarios, were identified. For example, there is no discussion to indicate that tanks were systematically reviewed to evaluate the potential for human-induced flooding (e.g., inadvertent opening of valves, overfilling). Although it is recognized that certain human induced modes may not be significant contributors to MPS3 flooding, the analytical process	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category I/II/III. A comprehensive internal flooding model update was completed, including screening of human-induced scenarios. Internal flooding model updated, and documentation enhanced.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			used to identify potential flood scenarios needs to be described in order to assess whether all potential human-induced flood modes were adequately considered. Possible Resolution Revise the flooding analysis to define the process used to identify human-induced flood scenarios, apply the process to all applicable flood areas, and document the development of the identified scenario frequencies.	
IF-IFPP-B2-01 (2012)	IFPP-B2 IFPP-A1	NOT MET Met	Most floor areas are based on the Fire Hazards Analysis; however, some fire areas are partitioned into a number of flood areas, or split between multiple flood areas. The basis for this partitioning is not provided in the documentation. The documentation requires enhancement to provide in Table 1 or elsewhere, (1) for partitioning where fire areas are followed, the basis for deciding that the Fire Area Partitioning was applicable to flood, and (2) for partitioning where fire areas are not followed, the basis for defining flood areas different than the fire areas. Possible Resolution No possible resolution was provided by the 2012 peer review team.	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category I/II/III. Enhanced internal flooding plant partitioning documentation detail.
IF-IFPP-B2-02 (2012)	IFPP-B2 IFPP-A3 IFSO-A2 IFEV-A4 IFSN-A11	NOT MET Met Met Met Met	The reason for eliminating Millstone Power Station Unit 2 (MPS2) areas and multi-unit areas from further analysis is not included in the documentation. The documentation requires enhancement to identify Unit 2/Multi-unit areas that were considered for flood analysis and the rationale for exclusion. Possible Resolution	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category I/II/III. Enhanced documentation detail.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			Update IF notebooks to include discussion on evaluation of MPS2 and multi-unit areas (See discussion in self-assessment for SR IF-A1b)	
IF-IFSN-A3-01 (2012)	IFSN-A3	Met	As noted in the text of the accompanying SR discussion, the documentation of HEPs in IF.2 and HR.10 needs to be made consistent. Possible Resolution No possible resolution was provided by the 2012 peer review team.	Resolved in the MPS3-R09 model and supporting documentation. Enhanced documentation detail and improved notebook alignment.
IF-IFSN-A8-01 (2012)	IFSN-A8	NOT MET	The IF.2 notebook provides adequate discussion of barrier failure, but there is no discussion of barrier unavailability due to maintenance. In addition, there is no discussion of drain check valves. If drain check valves exist, performance of drain check valves during a flooding event needs to be addressed. If there are no drain check valves, the documentation should be revised to state that fact. Possible Resolution Include in analysis evaluation of barrier unavailability due to maintenance and performance of drain check valves during a flooding event. If there are no drain check valves, document this fact.	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category II. Enhanced documentation detail.
IF-IFSO-A4-01 (2012)	IFSO-A4 IFSO-B2 IFEV-A7 IFEV-B2	NOT MET Met NOT MET Met	According to the self-assessment, non-piping (e.g., expansion joints, bellows, etc.) and inadvertent sprinkler actuation are currently not addressed or modeled. The IF.3 Notebook section on Maintenance Related Flooding Frequencies doesn't correctly capture what was done in the MPS3_IF.2_R4_Flood_Scenarios.xls, Table 7 worksheet. In addition, this is appropriate for flow diversion events, but it does not address overfilling and	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category II. Pipes, tanks, expansion joints, gaskets, inadvertent actuation of the fire suppression system, and human induced mechanisms are considered.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			inadvertent fire suppression system actuation modes. Possible Resolution MPS3 should plan to address failure of gaskets, expansion joints, fittings, seals or other such non-piping components in order to comply with the standard. Although it is recognized that certain human induced modes may not be significant contributors to MPS3 flooding, the rationale should be documented nevertheless, such as "Because the tanks are located in the yard, overfilling is not considered to be a relevant flooding scenario."	
LE-D2-01 (2012)	LE-D2	NOT MET	The penetration failure analysis in the probabilistic safety study (PSS) is likely outdated as the impact of elevated temperatures on the performance of penetrations and seals apparently wasn't addressed. The containment capacity analysis should consider degradation of seal performance at elevated temperatures. This analysis is based on research conducted after the 1983 publication date of the PSS. The seal/penetration analysis should review the conditions experienced by the seals/penetrations and determine, based on current information, whether the seals would fail. Possible Resolution No possible resolution was provided by the 2012 peer review team.	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category II. Documentation detail enhanced.
LE-D5-01 (2012)	LE-D5	CC II	There was insufficient documentation of the secondary side isolation logic in the large early release frequency (LERF) documentation. The LERF analysis (LE) documents should provide a detailed discussion of the isolation logic, referencing other documents (e.g., the HRA notebook) as needed.	Resolved in the MPS3-R09 model supporting documentation. Documentation detail enhanced.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			Possible Resolution No possible resolution was provided by the 2012 peer review team.	
5-1 (2018)	QU-A3	CC I	The state-of-knowledge-correlation (SOKC) is not adequately evaluated for several type codes. For example basis event type codes (TCs) CCSMOV—FC, BA-MOV—FC, CH-MOV—FC, FW-MOV—FC, QS-MOV—FC, RC-MOV—FC, RH-MOV—FC, RS-MOV—FC, SIHMOV—FC, SILMOV—FC, and SW-MOV—FC all have the same distribution based on the same prior and on the same plant-specific data. (This F&O originated from SR QU-A3) Possible Resolution Link all parameters which use the same data source to a single parameter so that uncertainty (UNCERT) is able to properly calculate the distributions. It is recommended that the use of the EQUATION field in the TC table be used to link TCs that are based on the same data back to one single TC for the data source. -OR- Apply an adjustment factor using recovery rules for significant events. -OR- Demonstrate that the events affected are NOT significant (CC-II only requires SOKC to be accounted for significant events).	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category II. Uncertainty analysis revised. Masking techniques were used on type codes to account for the state-of-knowledge-correlation (SOKC).

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
22-13 (2018)	QU-A3 IE-C14	CC I CC I/II	The modeling for valve leakage supporting interfacing system loss of coolant accident (ISLOCA) seems to be simplified (single event). (This F&O originated from SR QU-A3) <u>Possible Resolution</u> Evaluate the need to address state-of-knowledge-correlations for specific failure modes of components included in the ISLOCA model. Include SOKC in the ISLOCA model based on its significance to LERF.	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category II. The ISLOCA model and uncertainty analysis revised.
5-4 (2018)	QU-B1	Met	Known limitations of the codes used in the MPS3 PRA are not addressed. The following code versions are used in the MPS3 PRA: • Computer-Assisted Fault Tree Analysis (CAFTA) Version 5.4 • PRAQuant Version 5.1 • Qrecover Version 2.5 • Fault Tree Reliability Evaluation Expert (FTREX) Version 1.5 • Equipment Out-Of-Service (EOOS) Version 3.5 • System Importance (SYSIMP) Version 2.0 All versions of software listed above have more current versions. While most software has been updated to add new features and/or efficiencies, some software updates have been made to correct errors in the code. Specifically, Qrecover has had multiple corrections to the code such as: • Version 2.6 – Fixed a problem in supporting commas in the rule header line • Version 2.9 – Corrected a problem when using	Resolved in the MPS3-R09 model supporting documentation. Documentation detail enhanced.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			Qrecover from a .NET applications (e.g., PRAQuant or Fire Risk Modeling Software (FRANX)) when on a 64-bit operating system. (This F&O originated from SR QU-B1) Possible Resolution Provide a basis for the code versions used. An adequate basis will include disposition of each known problem/issue/limitation as included in the update history for each code. This could be simplified by using the latest published code versions. All codes used in the MPS3 PRA must be reviewed to ensure adequate characterization and disposition of limitations.	
5-8 (2018)	QU-B6	Met	Complementary logic is included in the fault tree, but is not implemented at this time. The XCOM gates are modules set to 0, which results in a 1.0 event in the cutset due to the NOT gate above each XCOM module. In effect, this makes the XCOM modules act as sequence flags. (This F&O originated from SR QU-B6) Possible Resolution Replace XCOM modules with flag events, or remove them altogether. Also update associated documentation (Notebook quantification (QU).1 Section 2.3.1).	Resolved in the MPS3-R09 model and supporting documentation. Replaced XCOM modules with flag events.
22-1 (2018)	QU-B7	Met	The process used to IDENTIFY mutually exclusive events in cutset results is not provided. Existing documentation is fragmented (contained in various	Resolved in the MPS3-R09 model and supporting documentation. Documentation detail enhanced.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			locations, such as individual system notebooks). (This F&O originated from SR QU-B7) Possible Resolution Develop a comprehensive process for IDENTIFYING logic for mutually exclusive combinations. Ensure that significant cutsets are reviewed for mutually exclusive combinations.	
22-2 (2018)	QU-B8	Met	The process used to CORRECT mutually exclusive events in cutset results is not provided. Existing documentation is fragmented (contained in various locations, such as individual system notebooks) and outdated in some cases (e.g., MUTTOP is referenced in Notebook SY.3, but does not exist in the model). (This F&O originated from SR QU-B8) Possible Resolution A comprehensive process for CORRECTING mutually exclusive combinations must be produced. System-specific discussion can remain in the individual notebooks, but must be updated to reflect the current model.	Resolved in the MPS3-R09 model and supporting documentation. Documentation detail enhanced.
2-4 (2018)	QU-B8	Met	Cutsets such as the following were identified as mutually exclusive: 3RS-PSB--FS-1A and 3RS-PSB--FS-1C on the basis that the configuration is impossible because the common cause failure (CCF) basic event covers the listed events.	Resolved in the MPS3-R09 model and supporting documentation. The identified combination was removed.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			(This F&O originated from SR QU-B8) Possible Resolution Mutually exclusive logic created based on the assumption that the common cause failure covers the independent failures must be reviewed and updated. For example, to make this mutually exclusive logic applicable, the logic could be ANDed with the appropriate common cause failure of both events, or otherwise this logic can be removed from the mutually exclusive events. Note that a CCF events should be treated as minimal over the independent failures.	
2-5 (2018)	QU-B9	NOT MET	A review of basic events shows that '3-FLAG-*' events are not set to TRUE or FALSE prior to generating cutsets. (This F&O originated from SR QU-B9) Possible Resolution Ensure that non-minimal cutsets are not being generated because of flag events. Possible resolutions are to identify logic flags so that FTREX will treat flags as TRUE (or FALSE) and thus not create non-minimal cutsets OR remove non-minimal cutsets via post-processing OR otherwise demonstrate that non-minimal cutsets are not being generated due to the presence of flag events.	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category I/II/III. Flag events are set to True during quantification.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
22-10 (2018)	QU-C1	Met	The following type C HFEs are excluded from the dependency analysis. HEP-C-COND, HEP-C-FTSSW, HEP-C-OCD-SLOCA, HEP-C-SBOREALIGN, HEP-C-SWSTRAIN (This F&O originated from SR QU-C1) <u>Possible Resolution</u> Ensure that the impact of all HFEs is considered in the development of joint HFEs or provide a basis for excluding specific HFEs.	Resolved in the MPS3-R09 model and supporting documentation. Model revised and documentation detail enhanced.
2-8 (2018)	QU-D1 QU-D5	Met NOT MET	In their cutset review, Dominion determined that some of the cutsets were logically incorrect, but modeling issues causing the incorrect cutsets were not addressed (resolved or dispositioned). This can be found in QU.2, Attachment 2 core damage frequency (CDF) and Attachment 4 large early release frequency (LERF), for example, non-significant CDF cutset #14855 and LERF cutset #1026. In some cases, modeling issues appear to have been logged in Dominion's PRACC (issue tracking) database but remain open. Many of these cutsets with open issues are top contributors to risk including cutset # 31, 32, 60, 62, 63, 65, 70, 71, 72, 74, 75, 76, 77, 84, 85, 87, 88, 89, 90, 92, 93, 94, 95, and 97. (This F&O originated from SR QU-D1) <u>Possible Resolution</u> Any cutsets (significant or non-significant) that were	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category I/II/III. Documentation detail enhanced.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			identified as illogical should result in model corrections. After such corrections, all cutsets included in the cutset review must be valid (iterate until true).	
22-5 (2018)	QU-D5	NOT MET	Only a small number of non-significant cutsets were reviewed for CDF and LERF. (This F&O originated from SR QU-D5) <u>Possible Resolution</u> Review an adequate sampling to determine they are reasonable and have physical meaning. For example, review non-significant cutsets in a manner consistent with the white paper on the Nuclear Energy Institute (NEI) Peer Review Task Force web board ('Non-Significant Cutsets, January 2015'): review 10 cutsets per decade (order of magnitude) starting at the significant cutset limit down to the truncation limit. Significant cutsets are as defined in QU-F6. Selection of the specific cutsets to review should avoid selecting similar cutsets. The review should be documented. For example, include: • A description of the process used to select the non-significant cutsets • The results of the review, that is, discuss any model changes required (what was found to be flawed and what was done to addressed the flaw)	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category I/II/III. Documentation detail enhanced.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
22-7 (2018)	QU-D6	CC II/III	From Notebook QU.2 section 2.7.3: '"The SGTR contribution to CDF for MPS3 is relatively low compared with Seabrook and South Texas Project (STP). Having a more complete System model for Steam Generator Tube Rupture (SGTR) would likely increase SGTR CDF." When questioned, Dominion produced a PRACC report (ID 16235, 3/28/2012) which indicates that this is a known open item. (This F&O originated from SR QU-D6) <u>Possible Resolution</u> Develop the SGTR model as needed to bound or realistically characterize the risk contribution. Also consider the potential impact of undeveloped modeling for other initiators.	Resolved in the MPS3-R09 model and supporting documentation. Model revised and documentation detail enhanced.
22-6 (2018)	QU-D7	NOT MET	Insufficient discussion of the component important results is provided. For example, the turbine driven (TD) AFW pump and both DGs appear as the top contributors. High-level explanation should be provided, such as an explanation that loss of both DGs leads to SBO sequences, such as SBO-2 and SBO-15 which are identified as top sequence contributors. (This F&O originated from SR QU-D7) <u>Possible Resolution</u> Provide more detailed discussion of component and basic events importances. This does not need to be a line-by-line explanation of component and basic event importance, but the discussion must at least cover all	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category I/II/III. Documentation detail enhanced.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			significant components and basic events identified for CDF (Section 2.2.4) and LERF (Section 2.5.6) at a high level. For example, 3DG-EDG--TM-A and 3DG-EDG--FR-A are both related to DG A failures, and can be discussed together (as long as the different failure modes are not significant in the context of accident sequences).	
2-9 (2018)	QU-E2	NOT MET	The identification of important assumptions summarized in the Notebook QU.4 notebook is incomplete. For example, only one assumption is identified as a key assumption from the System (SY) analysis. Notebook HR.4 states: "Assumptions used in the Post-initiator Human Failure Event Analysis are noted in various sections of this notebook. Consensus models and approaches have been used for this HRA and no significant (non-trivial) assumptions were necessary to apply the methodologies and to perform the analyses. Therefore, no sensitivity evaluations were necessary to examine analysis assumptions." Similar statements are used in other individual notebooks throughout the MPS3 PRA. (This F&O originated from SR QU-E2) <u>Possible Resolution</u> Ensure that assumptions are comprehensively identified. Discussion within individual notebooks should include assumptions which are judged to be insignificant.	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category I/II/III. Assumptions and sources of uncertainty documented.
22-8 (2018)	QU-E3	NOT MET	1. The MPS3 UNCERT model does not converge without removing events (initiators, HEPs, and CCF).	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category II.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			2. When these events are removed, the UNCERT model does not converge to the point estimate. The MPS3 Uncertainty Analysis results show that the mean estimate is >20% different than the point estimate result. Based on an independent review of the uncertainty analysis it is noted that UNCERT provides errors when processing the model files. These errors are related to the data distributions used that will potentially generate a number greater than 1.0 during the MC sampling. This issue can explain slight differences between the point estimate and mean but are not expected to cause large differences. Based on discussion with Dominion staff, the UNCERT study does not converge because of LOCA initiators specifically. These initiators erroneously use an error factor instead of a variance, which results in an unreasonably high degree of uncertainty. This is documented in configuration control document PRACC 18957. (This F&O originated from SR QU-E3) <u>Possible Resolution</u> 1. Correct the LOCA initiator uncertainty distributions as per PRACC 18957 2. Re-perform UNCERT parametric uncertainty study IF the LOCA update to LOCA initiator uncertainty distributions corrects the convergence issue and results in a mean value close to the point estimate value (e.g., within 10% the point estimate), then no further action is necessary. ELSE (if UNCERT still does not converge), perform	Uncertainty analysis converged without removal of events.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			further updates and corrections as necessary to the other initiators, HEPs, and CCFs as needed to achieve UNCERT results that converge to a value close to the point estimate (e.g., within 10% of the point estimate).	
2-10 (2018)	QU-E4	NOT MET	The impact of assumptions made throughout the various notebooks is not adequately assessed in Notebook QU.4. Section 2.1 of Notebook QU.4 includes qualitative assessment of the impact for selected assumptions. Common language used to assess the PRA impact of many of the listed assumptions is as follows: "This assumption introduces a slight conservative bias and therefore should be retained as a source of uncertainty for MPS3." For other assumptions, the conclusion is simply, "This assumption should be retained as a source of uncertainty for MPS3." Either conclusion represents an inadequate level of assessment. The only quantitative sensitivity studies performed assess the impact of HEP and CCF data (95th/5th percentile values). Hundreds of assumptions are identified in Notebook SY.2, but the PRA impact of only one single SY assumption is addressed in Notebook QU.4 (Section 2.1). The discussion for this single item states 'This assumption might result in a non-conservatism in the model if the equipment does require ventilation.' This is not an adequate assessment. (This F&O originated from SR QU-E4) (See also the F&O on QU-E2 related to the inadequate identification of assumptions.) <u>Possible Resolution</u>	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category I/II/III. Sensitivity studies performed for key assumptions and sources of uncertainty.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			Perform assessments of all assumptions which could impact the PRA result, commensurate with potential impact to the model. That is, assumptions with the potential for significant impact to the model must be included in a quantitative sensitivity study, while assumptions which will have a negligible impact to the PRA model (with a high degree of certainty) can be addressed in a qualitative manner.	
22-11 (2018)	QU-F1	NOT MET	Although each item noted below is, by itself, a relatively minor issue, the cumulative impact is difficulty in assessing various aspects of the model. For example, it is difficult to confirm that the models used to assess accident sequences and uncertainties are the same model as used to assess mean risk. 1. Model file names (and perhaps the structure?) are slightly different than documented in QU.1 (Section 2.1) and QU.2. Documentation refers to a '310Aa' model, while the file naming structure indicates a 'R08' model (which is also inconsistent with the document revisions, R6 and R7 respectively). 2. The parametric uncertainty study QU.3 includes a copy of the basic event (RR) database, though the controlled copy is attached to the QU.2 model. This could create a configuration control problem when updating the database. 3. The model files include 'MPS3-R08.qnt' and 'MPS3-R08_Master.qnt'. It appears that _Master is the more complete file, but the documentation is not clear. Discussion with the utility indicated that the _Master file is used for all quantifications. 4. Most of the tables in QU.2 Section 2 do not have numeric table titles. As a result, it is difficult to navigate	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category I/II/III. Documentation detail enhanced.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			and refer to the individual tables. 5. QU.3 does not have a table of contents or a numeric identifiers for sections. As a result, it is difficult to navigate and refer to the parts of the parametric uncertainty study. 6. QU.4 Section 6 Compliance references to 5.20 and 5.25, but should be referencing to 5.21 and 5.26. (This F&O originated from SR QU-F1) <u>Possible Resolution</u> Update the documentation to correct the identified items.	
5-5 (2018)	QU-F1	NOT MET	Various settings used in the quantification codes, such as Quantifier Settings initialization (INI) file, are not documented or explained. (This F&O originated from SR QU-F1) <u>Possible Resolution</u> The selection of key parameters used in the various settings for each code should be explained, whether the settings are left at the default values or customized.	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category I/II/III. Documentation detail enhanced.
5-2 (2018)	QU-F5	NOT MET	Validation and Verification for QRECOVERY was not performed. (This F&O originated from SR QU-F5) <u>Possible Resolution</u> Perform a validation and verification for QRECOVERY	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category I/II/III. Documentation detail enhanced.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			to assess the capability of QRECOVERY to produce appropriate results as part of the CAFTA software QA (CO-SQA-000-SQA-CAFTA-20150826, Aug. 2015 revision).	
5-3 (2018)	QU-F5	NOT MET	PRA model documentation does not reference to the software Quality Assurance (QA) studies for the various codes used in the MPS3 PRA that would identify limitations in the quantification process that would impact applications. (This F&O originated from SR QU-F5) <u>Possible Resolution</u> Clearly document limitations in the quantification process that would impact applications. For example, add appropriate cross-references in the applicable PRA documentation for the various software QA documentation. The following is a partial listing: CO-SQA-000-SQA-CAFTA-20150826.pdf CO-SQA-000-SQA-CAFTA-20170727.pdf CO-SQA-000-SQA-HRACALCULATOR-20151102.pdf CO-SQA-000-SQA-HRACALCULATOR-20170424.pdf CO-SQA-000-SQA-PRACC-20170706.pdf CO-SQA-000-SQA-PRAQUANT-20130816.pdf CO-SQA-000-SQA-PRAQUANT-20170726.pdf CO-SQA-000-SQA-UNCERT-20180328.pdf	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category I/II/III. Documentation detail enhanced.
1-3 (2018)	SC-A3	Met	Reactor coolant system (RCS) depressurization is one of the important functions credited to support several initiators (e.g. SGTR, ISLOCA). However, the Success Criteria notebooks (SC.1, SC.2) do not provide specific documentation of the success criteria used for depressurization.	Resolved in the MPS3-R09 model supporting documentation. Success criteria documentation enhanced.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			In particular, it appears that Steam Dump Valves are credited for steam relief. For example, Notebook SC.1 for Secondary Heat Removal for Transients, says, "… in addition to feedwater flow, steam relief is also required. Due to redundancy, success of this function is assumed." Presumably, the redundancy includes Steam Dump Valves. Another example is in SC.1 (p. 12), where the success criteria for small break loss of coolant accident (SLOCA) injection includes, " 1 of 2 low-pressure safety injection (LPSI) pumps (following depressurization via 1 of 13 atmospheric dump valve (ADV) or main steam dump valve (SDV))." While it is understood that this is not credited in the current model, it is not clear how SDVs can be used to cooldown and depressurize the secondary side. SDVs typically isolate for safety injection signal (SIS) and certainly require condenser cooling with Circ Water to function as a heat removal path. (This F&O originated from SR SC-A3) <u>Possible Resolution</u> Provide a clear and complete definition of the success criteria for RCS depressurization. In particular, where SDVs are credited, verify that the condenser cooling function is modeled to support steam relief through SDVs.	
19-2 (2018)	SC-A4	Met	Section 3.0 of Notebook SC.1 identifies the only shared system between Unit 2 and Unit 3 as the SBO DG. However, the Fire Protection system is apparently a shared system, but is not documented in the SC notebook. Two Firewater storage tanks, each with a	Resolved in the MPS3-R09 model supporting documentation. Documentation detail enhanced.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			capacity of 250,000 gal, supply both MPS2 and 3. (This F&O originated from SR SC-A4) <u>Possible Resolution</u> Document the Fire Protection system as a shared system and verify that it is appropriately modeled for a multi-unit scenario.	
1-1 (2018)	SC-A6	NOT MET	In Section 5.2.3 and Table 5-6 of Notebook SC.1, small-small break loss of coolant accident (SSLOCA) is defined as less than 1" break, with injection success criteria of 1 of 4 high-pressure safety injection (HPSI)/charging (CHG) pumps. There are several issues with this initiator: 1. No lower limit break size is defined. 2. No basis provided for the upper limit break size. 3. No T/H cases were run that demonstrated a HPSI pump can mitigate the lowest break size in SSLOCA. This concern is whether HPSI pumps provide makeup to the smallest of SSLOCAs without depressurizing the RCS, which may be an additional requirement for success. (This F&O originated from SR SC-A6) <u>Possible Resolution</u> Provide the complete definition for SSLOCA tied to specific success criteria. For the smallest SSLOCA, verify that the HPSI pumps can provide makeup without operator depressurizing the RCS.	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category I/II/III. SSLOCA removed from model since does not meet definition of initiating event.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
1-7 (2018)	SC-A6	NOT MET	Notebook SC.2 Section 1 states, "As a result of a recent power uprate, reactor excursion and leak analysis program (RELAP) calculations were performed to confirm that the modular accident analysis program (MAAP) analyses performed in several of the above attachments remain valid." However, MAAP cases that are used to support success criteria should be based on the current as-built, as-operated plant, including design power level. (This F&O originated from SR SC-A6) <u>Possible Resolution</u> Update MAAP runs with the current power level and verify success criteria and timing windows are unchanged or revise as needed.	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category I/II/III. MAAP parameter file revised, success criteria and timing windows reassessed.
1-8 (2018)	SC-A6	NOT MET	The basis for the anticipated transient without SCRAM (ATWS) success criteria is a series of RELAP runs. However, based on SC.2, "The RELAP5 files from the ATWS success criteria calculations could not be found, and a PRACC item" has been issued. (This F&O originated from SR SC-A6) <u>Possible Resolution</u> Provide a documented basis for the ATWS success criteria. If the RELAP analysis is not recoverable, one possible approach is the use of the WCAP-15831-P-A.	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category I/II/III. ATWS model revised, now based on WCAP-15831-P-A.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
20-7 (2018)	SC-A6	NOT MET	The documentation of the reactor coolant pump (RCP) seal leakage model provided in Notebook AS.1 did not provide sufficient detail to allow the reviewer to understand the bases and assumptions used to support the model. (This F&O originated from SR SC-A6) <u>Possible Resolution</u> It is stated that the RCP seal leakage model is based on WCAP-16175-P-A. However, MPS3 uses Flowserve seals installed in Westinghouse pumps and WCAP-16175-P is specific for Combustion Engineering (CE) NSSS plants. If the WCAP is used as the basis for the seal leakage model, the applicability of the WCAP for MPS3 needs to be justified since the MPS3 RCP seal configuration differs from that described in the WCAP. Additionally the development of the seal leakage model and any event tree modifications required need to be justified specifically regarding any assumptions or changes made to make the model applicable to MPS3.	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category I/II/III. Documentation detail enhanced.
1-10 (2018)	SC-A6 HR-G4	NOT MET CC II	The bases for the system window timing (Tsw) are not well documented for several operator actions. As a result, the peer reviewer was not able to verify the system time windows were appropriate.	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category I/II/III. Documentation detail enhanced.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			(This F&O originated from SR SC-A6) Possible Resolution For the operator actions listed, identify the specific T/H case and parameter that is used as the basis for the time window. If required, explain why a specific parameter is appropriate as the basis for the time window. Review the bases for the time windows for the other operator actions to assure they reference specific cases and parameters or add those specific references.	
1-14 (2018)	SC-A6 HR-G4	NOT MET CC II	The bases for success criteria are identified in Notebook SC.2, in Section 5.1 Mitigating Function Success Criteria and Section 5.2 Event Timing. However, the bases are provided in text form without referring to specific MAAP runs and results. (This F&O originated from SR SC-A6) Possible Resolution For each functional success criteria and operator time window calculation, document the specific code case and specific result from the code case that is used as the basis. Verify that the identified time windows (e.g., 42 min) are indeed supported by appropriate cases and parameters.	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category I/II/III. Documentation detail enhanced.
1-5 (2018)	SC-B1	CC II	SC.1 (p. 11) lists the success criteria for large break loss of coolant accident (LLOCA) injection and	

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			includes, "2 of 4 HPSI or charging pumps). SC.2 (p. 7) identifies the basis for this success criteria as the 1983 PSS (Ref 7.2). However, the analysis that supports this success criteria was not available for review. (This F&O originated from SR SC-B1) <u>Possible Resolution</u> Remove this success criteria for LLOCA or provide an analysis that justifies it.	Resolved in the MPS3-R09 model and supporting documentation. LLOCA success criteria revised.
1-11 (2018)	SC-B5	NOT MET	The SC Notebooks do not provide any plant-specific comparison of the results of different codes or sources (e.g., MAAP, RELAP, Final Safety Analysis Report (FSAR)) applied to the same MPS3 scenarios to support success criteria and operator time window calculations. Also, the SC Notebooks do not provide any comparison of the results of comparison with results of the same analyses performed for similar plants, accounting for differences in unique plant feature. (This F&O originated from SR SC-B5) <u>Possible Resolution</u> Provide comparisons of available results from different plant-specific sources (codes, references) or with results of the same analyses performed for similar plants (accounting for differences in unique plant feature) for scenario timing or other success criteria. Where the comparisons show significant differences,	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category I/II/III. Results comparison documented.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			evaluate the basis for the differences as a check on the primary success criteria sources.	
1-13 (2018)	SC-C1	NOT MET	Success criteria were generally based on thermal/hydraulic codes including MAAP4 and RELAP5 and GOTHIC. These codes were used with plant-specific input files that produced generally realistic, plant-specific results. Other referenced sources include FSAR, Safety Functions Requirements Manual (SFRM), and Operator training material. However, the bases of the functional success criteria and operator time windows are a hodge-podge of different analyses with different modeling assumptions. Success criteria supported by multiple codes and sources require documentation of the code applicable, limitations, V&V, maintenance of code updates, etc. (This F&O originated from SR SC-C1) <u>Possible Resolution</u> Either provide full documented bases of all the primary source of success criteria bases OR use MAAP and GOTHIC as primary sources of success criteria. Then other codes and references become good sources of comparative analyses that provide a check on the MAAP and GOTHIC analyses.	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category I/II/III. Documentation detail enhanced.
1-2 (2018)	SC-C1	NOT MET	Notebook SC.1 says that the SBO DG is preferentially aligned to Unit 3 but does not identify what controls that alignment. In response to a Peer Review question, Dominion explained that Unit 3 operates the SBO DG (i.e., it has an MPS3 location ID, 3BGS-EG1 and the component auto starts on under-voltage of MPS3 buses 34A and 34B). This provides sufficient basis that	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category I/II/III. Documentation detail enhanced.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			Unit 3 would use the SBO diesel in the event of a multi-unit SBO scenario. (This F&O originated from SR SC-C1) Possible Resolution Document the basis for the assumption that the SBO DG is preferentially aligned to Unit 3.	
1-6 (2018)	SC-C1	NOT MET	The Notebooks SC.1 and SC.2 identify that MAAP4 is used to support a number of success criteria cases. However, these notebooks lack documentation of a number of issues related to the use of MAAP for Level 1 success criteria. (This F&O originated from SR SC-C1) Possible Resolution Provide a clearly documented basis for the MAAP version used to support the current success criteria. This should include: 1. The specific version of MAAP; 2. The V&V of the parameter file with basis that tracks from MAAP 403 to the current version; and 3. A listing of the limitations of the MAAP code currently used and how these limitations are addressed in the use of MAAP.	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category I/II/III. Documentation detail enhanced.
1-9 (2018)	SC-C1	NOT MET	The success criteria analysis is documented in two notebooks (SC.1, SC.2) and in a number of MAAP cases, with input and output files. These notebooks also refer to RELAP cases and point to other	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category I/II/III. Documentation detail enhanced.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			references for thermal/hydraulic analyses that provide the bases for some success criteria. However, several issues make the success criteria difficult to use and review. 1. The high-level requirement HLR-B provides a broad definition of success criteria analyses: "thermal/hydraulic, structural, and other supporting engineering bases" that support success criteria and event timing. It is difficult to other analyses (beyond T/H code analyses) such as room heatup calculations that may be scattered throughout other notebooks and supporting files. 2. The current Notebook SC.2 is a partial update, with some results included in the notebook superseded by new results that are provided only in an Attachment to the notebook. The user/reviewer is left to figure out which cases are current and which have been replaced. 3. Notebook SC.2 provides the bases for success criteria and timing but primarily in the form of paragraphs of text without referencing the specific case and parameter used. (This F&O originated from SR SC-C1) <u>Possible Resolution</u> 1. In the Success Criteria notebooks, provide the documentation of all analyses used to support success criteria and event timing. This could be in the form of detailed analyses (e.g., MAAP cases) or summaries of analyses with references to other notebooks where the details are contained (e.g., room heatup calculations). 2. Provide a complete update of the SC.2 notebook. 3. Provide explicit references to analysis cases (e.g.,	

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			MAAP runs) and parameters that support specific success criteria and/or event timing. Tables of success criteria and timing vs specific cases and parameters would be a more efficient way of documenting much of the information in Notebook SC.2.	
4-10 (2018)	SY-A11	NOT MET	There are several cases where passive failure modes have been screened from the model without a quantitative basis as required by SY-A15. For example, manual valves 3SIL*V002 and 3RHS*V006 are shown in the simplified diagrams but are not modeled in the system fault tree. Also, normally open MOVs and manual valves in the RHR system are shown in the simplified diagrams but are not modeled in the system fault tree. (This F&O originated from SR SY-A11) <u>Possible Resolution</u> Quantitatively review all screened components and failure modes. Ensure that the screening process used is in compliance with the requirements of SY-A15 and SY-B13.	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category I/II/III. Quantitative screening performed.
20-1 (2018)	SY-A14	Met	In general, failure modes are modeled in the systems analysis consistent with the level of detail of the model. A few instances were identified where data is available for certain failure modes that were not modeled. (This F&O originated from SR SY-A14) <u>Possible Resolution</u> Ensure all appropriate failure modes are modeled. For example, review available data in the most recent version of NUREG/CR-6928 and ensure consideration	Resolved in the MPS3-R09 model and supporting documentation. Quantitative screening performed.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			of failure modes are assessed in the system models that impact system operability (SY-A11). If certain failure modes are excluded from the system models, provide justification for the exclusion.	
2-11 (2018)	SY-A15	NOT MET	Component failure modes are excluded from the system models based on qualitative considerations and not quantitative considerations as specified by the supporting requirement. (This F&O originated from SR SY-A15) Possible Resolution Provide quantitative screening criteria for failure modes that have the ability to impact system operability.	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category I/II/III. Quantitative screening performed.
20-16 (2018)	SY-A19 DA-C13	Met CC I	Review of SY.3 EP shows that unavailability of electrical components is not consistently modeled with the level of detail in which the component failures are modeled. (This F&O originated from SR SY-A19) Possible Resolution Provide justification for excluding unavailability of the major electrical components, or model unavailability of the components in the system model.	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category II/III. Unavailability terms were added for major electrical components.
20-2 (2018)	SY-A20	N/A	Events representing the simultaneous unavailability of redundant equipment is included in the PRA model. Specifically, for the boric acid pumps. (This F&O originated from SR SY-A20) Possible Resolution	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category I/II/III. Documentation detail enhanced.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			Provide justification that the boric acid pumps will not be taken out of service simultaneously due to a planned activity, and remove the documentation about the simultaneous maintenance events. Otherwise, calculate probabilities for the coincidental maintenance and include in the model.	
20-4 (2018)	SY-A22	CC II	Situations in which component design capabilities may be exceeded have not been explicitly documented, and therefore it is unclear if the components are credited in conditions in which their design capabilities are exceeded. (This F&O originated from SR SY-A22) <u>Possible Resolution</u> For adverse conditions identified per SY-A21, document any cases where components are being credited in conditions which their design capabilities are exceeded. If design conditions are exceeded, document supporting analyses to show that the component can be credited, or remove credit for the component.	Resolved in the MPS3-R09 model supporting documentation. Documentation detail enhanced.
4-3 (2018)	SY-A4	NOT MET	Although there is some interaction with plant staff via plant programs (e.g. MR, mitigating system performance index (MSPI), significance determination process (SDPs)) the system notebooks acknowledge that there have been no formal interviews or walkdowns to ensure the validity and accuracy of the PRA model. Without interviews and walkdowns it cannot be certain that components, pre-initiators, flow diversion paths (etc.) have not been overlooked or that the assumptions and modeling choices made are indeed valid.	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category II/III. Documentation detail enhanced.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			(This F&O originated from SR SY-A4) Possible Resolution Conduct and document formal walkdowns and interviews with knowledgeable plant staff to confirm that the system analysis correctly reflects the as-built as-operated plant.	
20-6 (2018)	SY-B11	Met	In general, it appears that the available inventories of air, power, and cooling are modeled appropriately to support the mission time. Instances of questionable mission time use were identified for battery lifetime. (This F&O originated from SR SY-B11) Possible Resolution Clarify the mission time of the batteries used in the PRA to support the design life of the batteries. Verify that it has a technical basis. Check to see if operator actions to load shed are required to support the modeled lifetime. If the battery lifetime that can be supported with a technical basis is different that modeled, evaluate the impact of this change in the mission time on the PRA model.	Resolved in the MPS3-R09 model and supporting documentation. Model revised to account for battery capacity.
2-14 (2018)	SY-B13	NOT MET	Components that are required for operation of multiple systems have been screened from the system analysis. SR SY-B13 specifically instructs analysts to not screen components that are required for operation of multiple	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category I/II/III. Model revised to include passive components supporting multiple systems.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			systems. (This F&O originated from SR SY-B13) <u>Possible Resolution</u> Perform an extent of condition to determine if passive components that support multiple systems have been screened from the analysis (based on an assumption, or based on SY-A15 criteria). Model any valves that support multiple systems that may have been improperly screened.	
20-10 (2018)	SY-B3	Met	Common cause failures are incorporated into the system models in a manner consistent with the common cause model used for the data analysis. Instances of erroneous common cause groups were identified. (This F&O originated from SR SY-B3) <u>Possible Resolution</u> Determine if the common cause failures of battery chargers and inverters is applicable and model common cause failures of the battery chargers and the inverters if applicable.	Resolved in the MPS3-R09 model and supporting documentation. Model revised to include common cause failure of battery chargers and inverters.
20-13 (2018)	SY-B3	Met	Common cause failures are incorporated into the system models in a manner consistent with the common cause model used for the data analysis. Instances of erroneous common cause groups were identified. (This F&O originated from SR SY-B3)	Resolved in the MPS3-R09 model and supporting documentation. Model revised to include common cause failure of EDG ventilation components.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			Possible Resolution Model EDG ventilation CCF or justify why the common cause failures are not applicable.	
20-5 (2018)	SY-B3	Met	Common cause failures are incorporated into the system models in a manner consistent with the common cause model used for the data analysis. Instances of erroneous common cause groups were identified. (This F&O originated from SR SY-B3) Possible Resolution Provide justification that this group is not applicable and, if appropriate, remove this common cause group.	Resolved in the MPS3-R09 model supporting documentation. The identified common cause group was removed from the model.
22-12 (2018)	SY-B5	Met	As noted in Notebook QU.2 Section 2.7.4, "The internal events system model remains incomplete in some areas. In some instances, mitigating equipment as well as hardware dependencies are considered implicitly. This should be considered by the analyst when generating applications." (This F&O originated from SR SY-B5) Possible Resolution Identify the instances of incomplete, undeveloped, or implicit system modeling. Characterize the impact of each such event and evaluate whether the related system model needs to be revised to address these issues. Alternately, replace these areas with appropriate system modeling.	Resolved in the MPS3-R09 model and supporting documentation. Model revised to address gaps identified.

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22-9 (2018)	SY-B5	Met	Service water (SW) does not show up as an important initiating event. Discussion with Dominion staff indicates that this is the result of incorrect fault tree modeling of system dependencies. Specifically, none of the LOSW initiators (see gate: LOSW) have a modeled consequence of SW unavailability. They simply propagate to the gate representing transient initiators. (This F&O originated from SR SY-B5) <u>Possible Resolution</u> Update the modeling for SW dependencies. Once model is updated, ensure that the importance of the SW initiator is appropriately documented in QU.4. Ensure that modeling and characterization of initiator importance is correct for the other support system initiators.	Resolved in the MPS3-R09 model and supporting documentation. Model revised to address gap identified. Documentation detail enhanced.
20-8 (2018)	SY-B6	Met	In general, various engineering analyses are used as reference to determine the need for support systems. However, several instances of screening of support systems without further justification were identified. (This F&O originated from SR SY-B6) <u>Possible Resolution</u> Perform additional analyses to show that justification for including support system is not needed or explicitly model the support system in the fault tree model.	Resolved in the MPS3-R09 model and supporting documentation. Documentation detail enhanced. Model revised as appropriate.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
SY-B6-01 (2012)	SY-B6	Met	Existing F&O TH-4 notes that review of "borderline" cases for room heat-up calculations to support HVAC system dependencies has not been completed. Review of current "borderline" cases needs to be completed to confirm the engineering analyses that determine the inclusion or exclusion of HVAC systems in those rooms. Possible Resolution Complete and document the review of "borderline" room heat-up calculations and close out F&O TH-4.	Resolved in the MPS3-R09 model supporting documentation. Documentation detail enhanced.
20-14 (2018)	SY-C1	NOT MET	The SY.1 Dependency matrix does not include the EDG 'A' or 'B' enclosure ventilation dampers even though these dampers are required to change state in the PRA which requires power (e.g., 3HVP*MOD20A). (This F&O originated from SR SY-C1) Possible Resolution Ensure that all modeled components are included in the SY.1 Dependency matrix and all supports are identified for those components.	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category I/II/III. Documentation detail enhanced.
20-15 (2018)	SY-C1	NOT MET	MPS3 has multiple tags for the same component which creates confusion. There needs to be a clear mapping between the documentation, the modeling, and the tag used in the PRA, and these should be consistent. For example the intake on the 'A' RHR pump train contains a check valve. Discussion with the site determined that this valve is referred to as both 3SIL*V002 and also as 8959A. The confusion is compounded by the fact that the BE in the model uses both names: The BE name is 3SILCKV--FC-3, the BE	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category I/II/III. Documentation detail enhanced.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
			description says 8959A. (This F&O originated from SR SY-C1) Possible Resolution In cases where multiple tags are used at the site, define the specific tag that will be used in the PRA and ensure that all documentation and modeling uses only this tag.	
4-8 (2018)	SY-C1	NOT MET	Section 2.8 of the system notebooks points to the MPS2 and 3 TSs but doesn't list them or state how this information was used (e.g. to define MUX events). This does not allow the reviewer to determine how operating limitations imposed by TSs were accounted for in the model. (This F&O originated from SR SY-C1) Possible Resolution Review of the specific limiting condition for operation (LCO) for Mode 1 for each system in Section 2.8 of the notebooks. State what, if any, impact these LCO have on the system model to document the review.	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category I/II/III. Documentation detail enhanced. Model revised as appropriate.
2-16 (2018)	SY-C1 SY-A13	NOT MET Met	Documentation needs to be improved to ensure flow diversion modeling assumptions across the system notebooks are thoroughly described. (This F&O originated from SR SY-C1). Possible Resolution Review system notebooks to ensure flow diversion modeling assumptions are appropriately documented.	Resolved in the MPS3-R09 model and supporting documentation to meet Capability Category I/II/III. Documentation detail enhanced. Model revised as appropriate.

Finding Number	Supporting Requirement (s)	Capability Category (CC)	Description	Disposition for LAR
20-3 (2018)	SY-C1 SY-A21	NOT MET Met	System conditions that can cause a loss of desired system function are identified but documentation of conditions for each modeled system needs to be improved. (This F&O originated from SR SY-C1). <u>Possible Resolution</u> Equipment operability considerations are considered and identified for a subset of systems. Revise the documentation to specifically identify conditions for each modeled system.	Resolved in the MPS3-R09 model supporting documentation to meet Capability Category I/II/III. Documentation detail enhanced.