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Dominion®

May 3, 2013

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

Serial No.	13-228
NSSL/MAE	R0
Docket No.	50-423
License No.	NPF-49

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3
LICENSE AMENDMENT REQUEST FOR CHANGES
TO TECHNICAL SPECIFICATION 3/4.7.5, "ULTIMATE HEAT SINK"

Pursuant to 10 CFR 50.90, Dominion Nuclear Connecticut, Inc. (DNC) requests an amendment, in the form of changes to the Technical Specifications (TS) for Facility Operating License NPF-49 for Millstone Power Station Unit 3 (MPS3). The proposed amendment would modify TS 3/4.7.5, "Ultimate Heat Sink", to increase the current ultimate heat sink (UHS) water temperature limit from 75°F to 80°F and change the TS Action to state, "With the ultimate heat sink water temperature greater than 80°F, be in HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours."

Attachment 1 provides a description and evaluation of the proposed changes to TS 3/4.7.5. Attachments 2 and 3 contain the marked-up TS and TS Bases pages, respectively. The marked-up TS Bases pages are provided for information only. The changes to the affected TS Bases pages will be incorporated in accordance with the TS Bases Control Program when this amendment is approved. A list of regulatory commitments is provided in Attachment 4.

The proposed amendment does not involve a Significant Hazards Consideration pursuant to the provisions of 10 CFR 50.92. The Facility Safety Review Committee has reviewed and concurred with the determinations herein.

Issuance of this amendment is requested no later than May 5, 2014, with the amendment to be implemented within 60 days of issuance.

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

A001
NRR

If you have any questions or require additional information, please contact Wanda D. Craft at (804) 273-4687.

Sincerely,

Eugene S. Grecheck
Vice President – Nuclear Engineering and Development

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by Eugene S. Grecheck, who is Vice President – Nuclear Engineering and Development of Dominion Nuclear Connecticut, Inc. He has affirmed before me that he is duly authorized to execute and file the foregoing document in behalf of that Company, and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 3rd day of May, 2013.

My Commission Expires: 12/31/16.

CRAIG D SLY
Notary Public
Commonwealth of Virginia
Reg. # 7518653
My Commission Expires December 31, 2016

Notary Public

Attachments:

1. Description and Evaluation of Proposed License Amendment
2. Marked-Up Technical Specification Page
3. Marked-Up Technical Specification Bases Pages (For Information Only).
4. List of Regulatory Commitments

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ATTACHMENT 1

DESCRIPTION AND EVALUATION OF PROPOSED LICENSE AMENDMENT

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3

LICENSE AMENDMENT REQUEST TO REVISE THE ULTIMATE HEAT SINK (UHS) WATER TEMPERATURE REQUIREMENTS

1.0 INTRODUCTION

Pursuant to 10 CFR 50.90, Dominion Nuclear Connecticut, Inc. (DNC) requests an amendment, in the form of changes to the Technical Specifications (TS) for Facility Operating License NPF-49 for Millstone Power Station Unit 3 (MPS3). The proposed amendment would modify TS 3/4.7.5, "Ultimate Heat Sink", to increase the current ultimate heat sink (UHS) water temperature limit from 75°F to 80°F and change the TS Action to state, "With the ultimate heat sink water temperature greater than 80°F, be in HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours."

In recent years the UHS temperatures have approached the current TS limits during the hotter summer months, typically starting in late July. This is a result of increases in the temperature of Long Island Sound, the UHS for MPS3. This proposed license amendment to increase the UHS limit has been proposed to prevent an unnecessary plant shutdown during severe hot weather periods.

As part of evaluating the acceptability of the proposed increases in UHS temperature limits, DNC has analyzed the impacts of the increased temperatures on both essential (safety related) and non-essential (non-safety related) equipment and plant events.

2.0 DESCRIPTION OF PROPOSED AMENDMENT

Current TS 3/4.7.5, "Ultimate Heat Sink", requires the average UHS water temperature to be less than or equal to 75°F. The proposed amendment would modify TS 3/4.7.5 to allow an increase of the limit on UHS water temperature in the TS from 75°F to 80°F and change the TS Action to state, "With the ultimate heat sink water temperature greater than 80°F, be in HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours."

The Bases for TS 3/4.7.5 are also being modified to address the proposed changes and are provided for information only. Changes to the TS Bases are controlled in accordance with the TS Bases Control Program (TS 6.18).

3.0 BACKGROUND

The MPS3 Final Safety Analysis Report (FSAR) reflects the results of safety analyses where UHS/ Service Water (SW) System temperatures are input parameters. The design basis accident safety analyses results utilizing these systems are provided in FSAR Chapter 15, Accident Analysis. Revisions to FSAR Chapter 15 analyses of record (AOR) indicate that MPS3 can continue to safely mitigate events and accidents utilizing an initial SW temperature of 80°F.

3.1 Long Island Sound Temperature and Management

The UHS for MPS3 is Long Island Sound which supports heat removal from both safety and non-safety related cooling systems during normal operation, shutdown, and accident conditions via the SW and Circulating Water (CW) systems.

Trending of the Long Island Sound temperature in the vicinity of MPS3 using data from 2001 through 2011 shows a steady increase in the overall temperature over this time period. Heat waves experienced in recent years are considered to have exacerbated this trend.

Based on the observed trend of increasing Long Island Sound temperatures, DNC considers it likely that the temperature of the Long Island Sound will exceed the current license limit of 75°F at some time in the near future.

3.2 Ultimate Heat Sink / Service Water System

The SW system is described in FSAR section 9.2.1, "Service Water System." The SW system consists of two redundant flow loops, each consisting of two SW pumps, two SW self cleaning strainers, two booster pumps, piping, and valves. The SW pumps and strainers are located in the CW and SW pump-house. The SW system discharges into the CW discharge tunnel.

TS Surveillance Requirement (SR) 4.7.5 requires the average UHS water temperature be verified to be less than or equal to the limit of 75°F on a 24-hour frequency. In addition, the TS SR requires increasing the frequency of monitoring to once per 6 hours when average water temperature exceeds 70°F. If the 75 °F limit is exceeded, the TS Required Action is to place the plant in MODE 3 (Hot Standby) within 6 hours and in MODE 5 (Cold Shutdown) within the following 30 hours.

4.0 REGULATORY REQUIREMENTS AND GUIDANCE

The applicable requirements and guidance are discussed in Sections 4.1 through 4.3. A discussion of how these requirements are addressed is presented in Section 6.

4.1 NUREG-1431, Standard Technical Specifications-Westinghouse Plants

Section 3.7.9 "Ultimate Heat Sink (UHS)" of NUREG-1431, Revision 4, requires that the UHS be OPERABLE. The Required Action B for this condition is to verify that the UHS water temperature is less than or equal to the plant-specific limit averaged over the previous 24-hour period. (This provision of averaging the UHS temperature is based on Technical Specification Task Force (TSTF)-330, Revision 3.) SR 3.7.9.2 in NUREG-1431 requires verifying that the average water temperature of the UHS is less than or equal to the maximum allowed temperature on a frequency of 24 hours.

4.2 Technical Specification Task Force (TSTF) -330, Revision 3

TSTF-330, "Allowed Outage Time - Ultimate Heat Sink" provides a Condition and Required Action that allow the UHS water temperature to be averaged over the previous 24-hour period. The temperature is to be monitored once per hour. The TSTF specifies four conditions that form the basis for acceptance of the UHS temperature averaging approach, and requires that licensees wishing to adopt this change to the Standard Technical Specifications confirm that these four conditions are satisfied. The NRC approved Rev. 3 of TSTF-330 for use by licensees.

4.3 MPS3 was reviewed in accordance with NUREG-0800, "Standard Review Plan for Review of Safety Analysis Report for Nuclear Power Plants"

The proposed change is related to:

- General Design Criteria (GDC) 2, "Design Bases for Protection Against Natural Phenomena."
- GDC 4, "Environmental and Dynamic Effects Design Bases."
- GDC 5, "Sharing of Structures, Systems and Components."
- GDC 44, "Cooling Water."
- GDC 45, "Inspection of Cooling Water System."
- GDC 46, "Testing of Cooling Water System."
- Generic Letter (GL) 89-13, "Service Water System Problems Affecting Safety Related Equipment."
- GL 96-06, "Assurance of Equipment Operability and Containment Integrity During DBA Conditions."
- NUREG-0800, SRP Section 9.1.3, "Spent Fuel Pool Cooling & Cleanup System."
- NUREG-0800, SRP Section 9.2.1, "Station Service Water System."
- NUREG-0800, SRP Section 9.2.5, "Ultimate Heat Sink."
- NUREG-0800, SRP Section 9.5.1, "Fire Protection Program," including Branch Technical Position No. CMEB 9.5-1.
- NUREG-0800, SRP Section 10.4.1, "Main Condensers."

- NUREG-0800, SRP Section 10.4.5, "Circulating Water System."

5.0 TECHNICAL ANALYSIS

DNC has completed an engineering evaluation which concluded that the affected structures, systems and components (SSCs) are capable of performing their design basis functions with the UHS temperature up to 80°F.

5.1 Summary of Engineering Technical Evaluation:

The UHS for MPS3 is Long Island Sound; sensible and decay heat is removed from both the safety related and non-safety related cooling systems during normal operation, shutdown, and accident conditions via the safety related SW system and the non-safety related CW system.

Plant systems were evaluated based upon the impact, directly and indirectly, of an increase in the MPS3 UHS temperature from 75°F to 80°F. The following systems were identified as directly impacted:

- SW System.
- CW System.

The System indirectly impacted due to process flow temperature increase is:

- Reactor Plant Component Cooling Water (RPCCW) System.

Other systems and components indirectly impacted are:

- Turbine Bypass System.
- Condenser.

Heat Exchangers (HXs), instrumentation and control process loops and mechanical components were evaluated for impact as appropriate.

System pipe stress and support calculations evaluated for impact are:

- Quench Spray System (QSS).
- Recirculation Spray System (RSS).
- SW System.
- RPCCW System.

The Turbine Plant Component Cooling Water (TPCCW) did not require a re-evaluation of piping, pipe supports, or equipment as a result of the UHS temperature increase. This is because calculations have demonstrated that the Service Water System can maintain the TPCCW supply temperatures within the existing 95°F supply temperature design limit.

The Circulating Water System is non-safety related and there are no associated pipe stress and support calculations.

The pipe stress and support calculations associated with charging pump cooling piping did not require an evaluation since the existing calculation maximum temperatures are not affected by the change in UHS temperature. The pipe stress and support calculations for safety injection (SI) pump cooling piping did not require an evaluation based on no change to the process side temperature.

Design basis information was evaluated to determine:

- Which design basis calculations were impacted.
- Which systems were affected and the associated impacts to pipe stress calculations, system calculations and mechanical components.
- Which instrumentation and controls process loops were affected.
- Changes to electrical equipment environmental profiles and post-accident operating time for electrical equipment in containment.
- Changes to impacted equipment qualification records (EQRs).

Design basis information was revised, as necessary, to support plant operation with UHS temperatures up to and including 80°F. These revisions were used to assess engineering programs for impact.

The SW System is directly impacted by the increase in UHS temperature. Calculations associated with HXs cooled by SW have been revised to reflect an 80°F SW intake temperature. The SW thermal-hydraulic system model was revised to demonstrate adequate flow could be delivered under the limiting design basis scenarios to support cooling requirements with 80°F SW. Impacts on HX pressure drop surveillance limits were identified.

High accuracy resistance temperature detector (RTD) transmitters at the SW inlets to the RPCCW HXs are being installed to ensure compliance with the analysis assumption of an UHS temperature of 80°F. These instruments have an uncertainty of 0.15°F or less and are required to be within this limit. This instrument uncertainty is insignificant and thus is not factored into the TS surveillance acceptance criteria. If all of these instruments are out of service, the alternative instruments' uncertainty is subtracted from the surveillance acceptance criteria.

An analysis of the TPCCW system HXs was performed in conjunction with design calculations to verify that the SW System at 80°F is capable of maintaining the TPCCW HX supply temperature at the design temperature of 95°F.

A mechanical component review was performed to determine if the design temperature of the HXs, coolers, active and manual valves, expansion joints, pumps and strainers, bound any temperature changes as a result of the change in UHS temperature.

The impact of the change in UHS temperature on the National Pollutant Discharge Elimination System (NPDES) permit was evaluated.

Containment analyses of record were performed using 80°F UHS temperature; therefore the UHS temperature change has no impact on the FSAR Chapter 6 Containment Analyses.

Since there is no impact of the UHS temperature change on the Containment Analyses, there also is no impact on the following calculations and engineering design considerations:

- Electrical Environmental Qualification (EEQ) profile.
- Containment sump temperature.
- Containment heat-up impact on isolation valves.
- Containment QSS and RSS piping and support analyses.
- GSI-191 evaluations.
- Sump pH.
- Minimum sump level calculations.
- Recirculation Spray and SI hydraulic analysis and NPSH calculations
- Radiological dose calculations (LOCA doses using the Alternate Source Term).

Water hammer analyses associated with the SW, Recirculation Spray and RPCCW Systems were evaluated for impact.

Instrumentation and controls process loops associated with the affected SW, Circulating Water, Traveling Screenwash and Disposal and RPCCW systems were evaluated for impact. Electrical equipment environmental profiles and post-accident operating time for electrical equipment in containment were evaluated and incorporated into the Equipment Qualification Records.

Engineering programs evaluated for impact due to the change in UHS temperature include:

- Coatings.
- Motor Operated Valves.
- Air Operated Valves.
- Station Blackout.
- Hazards.
- Fire Protection/Branch Technical Position 9.5-1 Compliance.
- Inservice Testing.
- Margin Management.
- Inservice Inspection (ISI).
- Flow Accelerated Corrosion (FAC).
- License Renewal.
- 10 CFR 50 Appendix J.

- Seismic & Dynamic Qualification of Mechanical and Electrical Equipment.

Other topics that were evaluated for impact due to the increase in UHS temperature include:

- NRC Generic Letter (GL) 96-06.
- GL 89-13.
- Condenser performance.
- Systems interfacing with the SW System
- Time critical operator actions

A regulatory review was performed to determine any impact on regulatory requirements and any open, working or active commitments in the Regulatory Commitment Database.

The impact of the change in UHS temperature on the CW System, Condenser, Turbine Bypass System, Traveling Screenwash and Disposal and SW System was evaluated.

Changes to Licensing Basis documents including the FSAR, Technical Requirements Manual (TRM) and the TSs and TS Bases were also evaluated for impact.

5.2 Service Water System Flow Analysis

FSAR Section 9.2.1, "Service Water System", describes the SW System as providing cooling water for heat removal from the reactor plant auxiliary systems during all modes of operation and from the turbine plant auxiliary systems during normal operation. SW System flow requirements are provided in FSAR Table 9.2-1, and SW System heat transfer requirements are provided in FSAR Table 9.2-2.

The current SW System configuration, including physical piping changes planned during refueling outage 3R15, has been analyzed to quantify the minimum available SW flow to the HXs listed in FSAR Table 9.2-1. Calculations have been performed that determined that the required flow rates for all SW components are met when the SW System inlet temperature is 80°F. These calculations also determined the allowable SW System-side pressure drop across HXs which are used to develop the surveillance curves to support GL 89-13, and calculate the maximum SW System-side HX outlet temperatures based on HX minimum flow rate and design heat load. These maximum calculated temperature values were utilized as input to assess piping, component, and support stress analyses as discussed in section 5.4.1 below.

Margin exists for required heat exchanger flow rates and for allowable heat exchanger pressure drops. Margin impacts to the Service Water System as a result of the UHS temperature change are described in Section 5.14.

Minimum required SW flow rates and minimum available SW flow rates for each HX listed in FSAR Table 9.2-1 are summarized in Table 5.2 below (with the exception of the Post Accident Sample Cooler). Some allowable service water side pressure drops for the heat exchangers have been changed and are reflected in revisions to the allowable macrofouling (debris loading curves as described in Section 5.7). No reductions were made to allowable Heat Exchanger plugging limits contained in the analyses of record in order to implement the UHS temperature increase.

Minimum available SW flow rates exceed the minimum required flow rates for all of the heat exchangers. Therefore, the Service Water System has acceptable performance with an increase in UHS temperature from 75°F to 80°F. Note that both HVR booster pumps were determined to not meet the assumptions of the analysis. These have been entered into the corrective action program and will be corrected prior to implementation of the NRC approved license amendment request.

5.3 Service Water System Performance

5.3.1 Net Positive Suction Head (NPSH)

Hydraulic calculations that demonstrate acceptable performance with respect to SW Pump NPSH requirements and cavitation limits have been revised to reflect an 80°F UHS temperature. The calculations evaluated the NPSH Available (NPSHA) to the main SW pumps (3SWP*P1A/B/C/D), the Control Building Heating Ventilation and Air Conditioning (A/C) Booster pumps (3SWP*P2A/B) and the Motor Control Center (MCC) and Rod Control Area Booster pumps (3SWP*P3A/B) when the pumps are operating at the maximum calculated total flow rate. The final results of this calculation revision determined that the NPSHA for all the SW pumps is greater than the NPSH Required (NPSHR) in all of the bounding cases analyzed.

5.3.2 Heat Exchanger Performance:

The MPS3 SW System loop contains the safety-related (SR) HXs and non-safety related (NSR) HXs listed below:

- Charging Pump Cooler (3CCE*E1A/B) – (SR).
- SI Pump Cooler (3CCI*E1A/B) – (SR).
- Control Building A/C Water Chiller Condenser (3HVK*CHL1A/B) – (SR).
- Residual Heat Removal Pump Ventilation Unit (3HVQ*ACUS1A/B) – (SR).
- Containment Recirculation Pump Ventilation Unit (3HVQ*ACUS2A/B) – (SR).
- MCC & Rod Control Area A/C Unit (3HVR*ACU1A/B) – (SR).
- TPCCW system HX (3CCS-E1A/B/C) – (NSR).
- Diesel Generator Engine Air Cooler (3EGS*E1A/B) and Jacket Cooler (3EGS*E2A/B) – (SR).
- Containment Recirculation Coolers (3RSS*E1A/B/C/D) – (SR).
- Post-Accident Liquid Sample System (PASS) Cooler (3SSP-SCL3) – (NSR).
- RPCCW HX (3CCP*E1A/B/C) – (SR).

Analyses of the capabilities of these HXs to perform their heat removal functions were reanalyzed at an 80°F UHS temperature. All HXs were demonstrated capable of performing their design basis functions at UHS temperatures up to and including 80°F. All of the individual HX calculations summarized below were performed using achievable HX plugging limits, micro-fouling and macro fouling (debris loading) limitations which will continue to be controlled by MPS3's GL 89-13 Program and implementing procedures. Changes which will be implemented to the microfouling and macrofouling (debris loading) limits in support of the UHS temperature change to 80°F are identified in Section 5.6 and 5.7. The results of the HX performance calculations are summarized below:

5.3.2.1 Charging Pump Coolers (3CCE*E1A/B)

FSAR Section 9.2.2.4 describes the Charging Pump Cooling (CCE) System which transfers heat away from the charging pumps' lubrication oil. The CCE system is a closed system which includes CCE pumps, CCE Heat exchangers, and charging pump oil coolers. The CCE system supplies cooling water to a charging pump oil cooler (one cooler per charging pump) which removes pump heat. This heat plus the heat added to the cooling water by the CCE pump is transferred to the SW System via the CCE HX. The calculation of record for these HXs has been revised to address the increase in UHS temperature to 80°F.

The revised calculation determines the minimum required SW flow rate to the CCE HXs at 80°F UHS temperature shown in Table 5.2. The revised calculation has also affirmed the settings for the travel stop limits for the system bypass valves which are set to restrict maximum flow to the CCE HXs. The valve travel limit stops ensure minimum acceptable oil temperature requirements are met during cold weather operation assuming a loss of control air.

SW system minimum available flow analysis described in section 5.2 above have demonstrated delivered flow to the CCE HXs in excess of the minimum required flow at UHS temperatures up to and including 80°F. In summary, the CCE coolers have acceptable performance considering an increase in UHS temperature from 75°F to 80°F.

5.3.2.2 Safety Injection Pump Coolers (3CCI*E1A/B)

FSAR Section 9.2.2.5 describes the Safety Injection Pump Cooling System (CCI). The CCI transfers heat load from the SI pumps lubrication oil to the SW system.

A HX performance calculation has been completed to determine the required SW flow rate to the SI pump coolers (3CCI*E1 A & B) to support all SI pump cooler operational requirements at a SW temperature of 80°F. A minimum required flow of 14.7gpm was determined necessary to support heat exchanger performance at 80°F. The previous minimum required flow requirement of 19 gpm in the current analysis of record (AOR) at 75°F was based on a downstream piping analysis temperature limitation. Reanalysis of the piping system at an increased outlet temperature has eliminated this restriction resulting in an overall reduction in required flow from 19 gpm to 14.7 gpm, as shown in Table 5.2.

SW system minimum available flow analyses described in section 5.2 above have demonstrated delivered flow to the CCI HXs in excess of the minimum required flow at UHS temperatures up to and including 80°F; therefore, the CCI coolers have acceptable performance considering an increase in UHS temperature from 75°F to 80°F.

The maximum SW outlet temperature for limiting conditions was also determined using maximum heat loads and minimum SW flow rates for the impact of 80°F UHS temperature. The support and pipe stress analyses were evaluated for the impact of 80°F UHS temperature and found to be acceptable.

5.3.2.3 Control Building Air Conditioning Water Chillers (3HVK*CHL1A/B)

FSAR Sections 9.2.1.2 and 9.4.1 describe the Control Building A/C (HVK) water chillers. The SW System provides cooling water to the Control Building chillers and can also be supplied directly as a backup to the Control Building chilled water system.

Calculations were performed to determine the minimum SW flow rate required to remove maximum calculated heat loadings for all established design conditions and associated heat loads using SW inlet temperatures up to and including 80°F.

Revisions to the required flow analyses for the HVK chillers have credited availability of the HVK booster pumps for some fire scenarios. The HVK booster pumps will be added to the list of equipment credited for Fire Protection / Branch Technical (BTP) 9.5-1 Compliance Report and the program will be revised accordingly.

Analyses have also been performed to demonstrate that the available SW flow will maintain the following acceptable temperatures in the cooled rooms of the Control Building when SW is supplying cooling to the HVK chillers:

- Control Room temperature is maintained at a maximum temperature of 95°F
- Computer Room, Instrument Rack Rooms, and Switchgear Rooms are maintained at a maximum temperature of 104°F

SW system minimum available flow analyses described in section 5.2 above have demonstrated delivered flow to the HVK chillers in excess of the minimum required flow at UHS temperatures up to 80°F; therefore, the HVK chillers have acceptable performance considering an increase in UHS temperature from 75°F to 80°F.

The maximum SW outlet temperature for limiting conditions was also determined using maximum heat loads and minimum SW flow rates. The maximum calculated outlet temperature was evaluated for the impacts on pipe stress and pipe support qualification calculations for the SW piping downstream of the HVK chiller condensers. The evaluation demonstrated that the piping and supports will continue to comply with governing design and code requirements as described in Section 5.4.

5.3.2.4 Residual Heat Removal Pump Ventilation Units (3HVQ*ACUS1A/B)

FSAR Section 9.4.5.3 describes the Residual Heat Removal (RHR) pump cubicle ventilation units. The SW system provides cooling water to the RHR pump cubicle ventilation unit condensers.

Calculations were performed to determine the minimum SW flow rate to the RHR pump ventilation units required to remove the maximum calculated heat loadings for all established design conditions and associated heat loads using SW inlet temperatures up to and including 80°F. A minimum required flow of 25.0 gpm was determined necessary to support heat exchanger performance at 80°F. The previous minimum required flow requirement was also 25 gpm in the current analysis of record (AOR) at 75°F. The AOR was based on a downstream piping analysis temperature limitation. Re-evaluation of the piping system at an increased outlet temperature has increased this limitation such that the required flow shown in Table 5.2 is unchanged from the 75°F AOR.

SW system minimum available flow analyses described in section 5.2 above have demonstrated delivered flow to the HVQ chillers in excess of the minimum required flow at UHS temperatures up to and including 80°F; therefore, the HVQ chillers have acceptable performance considering an increase in UHS temperature from 75°F to 80°F.

The maximum SW outlet temperature for limiting conditions was also determined using maximum heat loads and minimum SW flow rates. The maximum calculated outlet temperature has been analyzed for the impacts of 80°F UHS temperature. The support and pipe stress analyses of record have been re-evaluated for the most limiting temperatures calculated downstream of the HVQ chiller condensers as described in Section 5.4.

5.3.2.5 Containment Recirculation Pump Cubicle Ventilation Units (3HVQ*ACUS2A/B)

FSAR Section 9.4.5.3 describes the Containment Recirculation Pump Cubicle Ventilation (HVQ) units. The SW System provides cooling water to the HVQ ventilation unit condensers.

Calculations were performed to determine the required service water flow rate to the HVQ units required to remove maximum calculated heat loadings for all established design conditions and associated heat loads using SW inlet temperatures up to and including 80°F. A minimum required flow of 33.2 gpm was determined necessary to support heat exchanger performance at 80°F. The previous minimum required flow requirement was also 33.2 gpm in the current analysis of record (AOR) at 75°F. The AOR was based on a downstream piping analysis temperature limitation. Re-evaluation of the piping system at an increased outlet temperature has increased this limitation such that the required flow is unchanged from the 75°F AOR.

SW system minimum available flow analyses have demonstrated delivered flow to the HVQ units in excess of the minimum required flow at UHS temperatures up to and including 80°F; therefore, the HVQ units have acceptable performance considering an increase in UHS temperature from 75°F to 80°F.

The maximum SW outlet temperature for limiting conditions was also determined using maximum heat loads and minimum SW flow rates. The pipe support and pipe stress analyses of record have been re-evaluated and shown acceptable for the most limiting temperatures calculated downstream of the HVQ chiller condensers as described in Section 5.4.

5.3.2.6 MCC & Rod Control Area Ventilation Units (3HVR*ACU1A/B)

FSAR Section 9.4.3.2 describes the MCC & Rod Control Area A/C units (3HVR*ACU1A/B). The SW System provides a backup source of cooling to the A/C units in the event that the normal source of cooling (Chilled Water System) is lost or in the event of high return air temperatures.

Calculations have been performed to document the SW flow rate to the HVR*ACU1A/B units that is required to maintain the design heat removal capability of the coils at SW temperatures up to and including 80°F. The required SW flow rate is 75 gpm at a temperature up to 75°F, however for a SW temperature increase from 75°F to 80°F the Service Water flow rate will need to increase to 122 gpm and the HVR heat exchanger surveillance curves will need to be changed as described in Section 5.7.

The calculations also document the required SW flow rates to provide credited heat removal capacities of MCC and Rod Control Area (HVR) A/C units during limiting fire scenarios when the associated SW booster pumps are assumed to be unavailable due to the fire.

In support of the HX performance calculations, thermal performance testing results have been utilized to establish revised HX cleaning frequencies to ensure the required heat removal capabilities are obtained at 80°F UHS temperature. The cleaning frequency of the MCC and Rod Control Area Air Conditioning heat exchangers can remain at an annual frequency, as long as cleaning occurs within four (4) months prior to UHS temperature rising above 75°F. Revised HX surveillance curves will be implemented coupled with the above specified cleaning time frame to ensure credited heat removal is retained at the increased UHS temperature.

SW system minimum available flow analyses described in section 5.2 above have demonstrated delivered flow to the HVR Units in excess of the minimum required flow at UHS temperatures up to and including 80°F; therefore with the change in cleaning time frame and revisions to the debris loading (macrofouling) surveillance requirements, the MCC & Rod Control Area Ventilation Units have acceptable performance with an increase in UHS temperature from 75°F to 80°F.

5.3.2.7 Turbine Plant Component Cooling Water Heat Exchangers (3CCS-E1A/B/C)

FSAR Section 9.2.7 describes the TPCCW System which removes heat from various non-safety related turbine plant components to the SW System.

The components cooled by the TPCCW system were reviewed and it was determined that the components are all designed to operate with a TPCCW supply temperature up to 95°F.

HX calculations were performed to determine the minimum required SW flow rate required to maintain the TPCCW supply temperature less than 95°F. The calculations were performed assuming existing maximum tube plugging limits (10%) and a reduction in the allowable microfouling factor. The fouling factor is calculated based on thermal performance test data for the RPCCW heat exchangers since no thermal performance test data is available for the non-safety related TPCCW heat exchangers. The reason this is acceptable is because of the similarities between these two heat exchangers, i.e., tube-side velocities, tube material, and associated tube-side temperature change. Additionally, the thermal performance test data is based on a two-year fouled RPCCW heat exchanger whereas now both the RPCCW and the TPCCW heat exchangers are cleaned once a year.

SW system minimum available flow analyses described in section 5.2 above have demonstrated delivered flow in excess of the minimum required flow determined to maintain the TPCCW supply temperature less than 95°F. Therefore, the TPCCW HXs have acceptable performance with an increase in UHS temperature from 75°F to 80°F.

5.3.2.8 EDG Heat Exchangers (3EGS*E1A/B and 3EGS*E2A/B)

FSAR Section 9.5.5 describes the Emergency Diesel Generator (EDG) engine cooling water system. The EDG engine air coolers (3EGS*E1A/B) and the jacket water coolers (3EGS*E2A/B) transfer heat from the EDG to the SW System.

HX calculations were performed to determine the required SW flow rates for the EDG HXs at UHS temperatures up to and including 80°F. The calculations utilized the design basis heat load and limiting plugging and fouling limits to determine required flow rates at an UHS temperature of 80°F. The AOR at 75°F was performed using an overly conservative heat load assumption. When the calculation was revised for an UHS temperature of 80°F using the design basis heat load, the minimum required flow rate shown in Table 5.2 did not change from the calculation of record performed at 75°F.

SW system minimum available flow analyses described in section 5.2 above have demonstrated delivered flow to the EDG HXs in excess of the calculated minimum required flow rates under all required operating scenarios. Therefore, the EDG HXs have acceptable performance with an increase in UHS temperature from 75°F to 80°F.

5.3.2.9 Recirculation Spray System Heat Exchangers (3RSS*E1A/B/C/D)

FSAR Section 6.2.2 describes the RSS. The RSS HX supports emergency core cooling system (ECCS) operation in the LOCA recirculation phase as described in FSAR Section 6.3.

The RSS HX thermal performance analyses of record for containment heat removal were previously performed at an 80°F UHS temperature, therefore the required SW flow rate to the RSS HXs has not changed as a result of the UHS design temperature increase. The required SW flow rates determined in prior calculations of record were verified to remain achievable during revised SW system flow analysis at 80°F UHS.

An evaluation was performed to determine the effect of the increase in UHS temperature to 80°F on the maximum SW outlet temperature from the RSS HXs during a design basis LOCA with maximum calculated sump water temperatures. The AOR at 75°F for the calculation that determines the maximum SW outlet temperature from the RSS HXs uses a maximum containment sump temperature that is 29.8°F greater than the AOR calculation that determines the maximum containment sump temperature. The evaluation concluded that this conservatism results in the AOR SW outlet temperatures as bounding and did not require revision.

Therefore, the proposed UHS temperature change has no direct impact upon containment pressure, containment temperature, or ECCS system operation during the LOCA injection or recirculation phase.

5.3.2.10 Post-Accident Sample Cooler (3SSP-SCL3)

FSAR Section 9.3.2.6 describes the post-accident sampling system. The sample cooler is used to obtain a Reactor Coolant System (RCS) sample, containment air sample or sump liquid sample post-accident.

The increase in UHS temperature from 75°F to 80°F may result in a small increase in the process flow outlet temperature. The potential increase in the process outlet temperature change has been reviewed for potential impact on the ability to take and analyze a liquid sample. Dominion has determined that there are no prerequisites or precautions in Chemistry and Emergency Planning Department procedures or other limitations on the temperature of the liquid sample that would affect the ability to take and analyze a liquid sample.

Therefore, the change in UHS temperature has no effect on the ability to take and analyze a liquid sample.

5.3.2.11 Reactor Plant Component Cooling Water System Heat Exchangers

FSAR Section 9.2.2.1 describes the RPCCW System. The RPCCW System transfers heat load from reactor plant auxiliary systems to the SW System.

Calculations have been performed that document the RPCCW heat exchanger performance for all design basis case alignments necessary to determine required SW flow requirements for these cases. Conditions analyzed include Loss of Offsite Power (LOOP), Safety Injection (SIS), Normal Plant Shutdown, Fire Shutdown Scenarios, Refueling, and Safety Grade Cold Shutdown (SGCS). Safety Grade Cold Shutdown scenarios have been evaluated with Instrument Air (IA) available and unavailable. Shutdown times (time to mode 5) for SGCS, normal, and fire shutdown scenarios have been calculated and remain at acceptable design basis time requirements as shown in Table 5.1.

An increase in required DWST inventory from 315,385 gallons to 317,734 gallons is required to support SGCS at 80°F. The available DWST inventory required per T/S 3.7.1.3 is 334,000 gallons providing adequate margin to accommodate the required increase in available inventory. This required inventory accounts for considerations of unusable volume and level measurement uncertainties.

Calculations have determined that the RPCCW supply temperature during an LCO cooldown with Instrument Air available was increased to 109.4°F to meet the Technical Specification 36 hour limit. The 109.4°F temperature exceeds the existing operating procedure limitation of 105°F. The affected piping, supports, and equipment nozzles have been analyzed for temperatures exceeding these limits. Therefore, the operating procedure guidance will be revised to address the higher allowable temperature during normal plant cooldowns. RPCCW piping and support evaluations for the increased temperature are discussed in Section 5.5.

The increase in UHS temperature from 75°F to 80°F was shown acceptable when utilizing a (SW side) fouling factor consistent with the most limiting RPCCW HX design fouling factor currently contained in the analyses of record. Therefore no change in the allowable microfouling limits for the RPCCW HXs were required to obtain acceptable HX performance results at an 80°F UHS temperature.

SW system minimum available flow analyses described in section 5.2 above have demonstrated delivered flow to the RPCCW HX units in excess of the calculated minimum required flow rates under all required operating scenarios. A summary of the changes to required flow rates and the minimum delivered flow rates for these conditions at 80°F UHS temperatures is shown in Table 5.2 below.

The required SW flow rates for the LOOP and SI cases shown in Table 5.2, are lower at 80°F than previously calculated in the current analysis of record (AOR) for 75°F. This is due to overly conservative assumptions that existed in the heat loads used as input for the 75°F UHS AOR and relaxation of a constraint to the Service Water return temperature because the support and pipe stress analysis was re-analyzed at a higher temperature. The use of more accurate maximum heat load assumptions in the 80°F calculation revision more than offset the increased flow requirements that result from the increase in UHS temperature.

Therefore, the RPCCW HXs have acceptable performance with an increase in UHS temperature from 75°F to 80°F.

Table 5.1
Calculated Plant Shutdown Times

Alignment	**75°F UHS AOR Time to Shutdown**	**80°F UHS Time to Shutdown**	**Time Limit**
SGCS, Instrument Air available, single failure	31.25 hours	39.75 hours	72 hours
SGCS, Instrument Air unavailable, single failure	49.25 hours	52 hours	72 hours
SGCS, Instrument Air unavailable, no single failure	64 hours	68.5 hours	72 hours
Normal Shutdown initiated by TS limiting condition of operation (LCO)	29 hours	36 hours	36 hours

Table 5.2
Acceptance Criteria: HX Minimum Required and Available Flow-rates

Heat Exchanger	75°F UHS AOR Minimum Required Flow (gpm)	80°F UHS Minimum Required Flow (gpm) [1]	Current Calculated Minimum Available Flow (gpm)
3CCE*E1A, B	31.2	31.2	40.8
3CCI*E1A, B	19 (@77°F UHS)	14.7	22.7
3HVK*CHIL1A, B	303.0	302.7	314.9
3HVQ*ACUS1A, B	25.0	25.0	25.2
3HVQ*ACUS2A, B	33.2	33.2	35.5
3HVR*ACU1A, B	75.0	122 (accident) 75 (fire case)	129.3 (accident) 81.6 (fire case)
3RSS*E1A, B,C,D	5400	5400	5481
3CCP*E1A, B, C	7,388 [2](LOOP) 5,654 (SIS) 7,388 (SGCS)	3,634(LOOP) 2,139 (SIS) 7,388 (SGCS)	7,642.8 (LOOP) 6,213.3 (SIS) 7,417 (SGCS)
3EGS*E1A, B	1,444	1,444	1713.8
3EGS*E2A, B	1,444	1,444	1713.8
3CCS-E1A, B, C	4,790	4,891	4,924.2

Note 1: Changes to inputs that result in new required flow rates are described in the respective sections for each system.
Note 2: LOOP conservatively uses the SGCS acceptance criteria of 7,388 gpm.

5.4 Service Water System Operating Condition Evaluations

5.4.1 Temperature Conditions

The SW and RPCCW Systems piping, supports, and equipment nozzles have been evaluated for the 5°F UHS temperature increase. The evaluation concluded that:

- Increased thermal expansion stress levels are within applicable allowable stress limits.
- Increased thermal expansion loads on pipe supports are within the MPS3 acceptance criteria.
- Increased thermal expansion loads on equipment nozzles are within the acceptance criteria.

The structural evaluation for piping and pipe supports initially considered a temperature increase of 5°F (above the existing evaluated temperatures) because these evaluations were performed in parallel with the heat exchanger performance and available flow calculations. Thus, a reconciliation was performed to determine if the actual temperature evaluated (i.e., the existing structural evaluated temperature) plus the 5°F (for the increase in UHS effects) was bounded for the predicted heat exchanger and cooler performance temperatures. In all cases, the evaluated structural temperatures (including the 5°F increase) bounded the resulting piping operating temperature, except for the Safety Injection Pump Coolers 3CCI*E1A,B where the analyzed temperature was within 1°F of the calculated performance temperature. Relative to the case where the operating temperature was greater than the evaluated structural temperature, documented results demonstrate adequate margin to accommodate this minor temperature increase (i.e., less than 1°F).

The evaluation utilized quantitative scaling criteria to verify that the piping, supports, and nozzles are acceptable for the increased thermal expansion stress range and resulting support and nozzle loadings.

The affected calculations of record will be revised to reflect the temperature changes prior to the implementation of the requested License Amendment Request.

5.4.2 Potential Cavitation/Choked Flow in Service Water Heat Exchanger Return Lines

Analyses have been performed to determine whether any changes in SW conditions in the HX return lines has adversely impacted the degree of cavitation and the potential for choked flow due to the UHS temperature increase. These calculations include the return piping from the RSS HXs following a LOCA when the SW System inlet temperature is 80°F. These calculations have determined that there is no increase in the potential for adverse impacts of cavitation or the potential for choked flow in any of the service water lines due to the UHS temperature increase.

5.4.3 Potential Changes in Service Water System Transient (Water Hammer) loadings

The existing Analyses of Record were evaluated for the potential impact of the UHS temperature increase on the existing SW System water hammer loadings. The specific cases that were reviewed for potential impact included: 1) calculated fluid transient loads on the SW System pump discharge line due to pump start-up with an empty column, 2) water hammer loads on the SW System piping after a postulated LOCA or a LOOP, and 3) fluid transient loads and support reactions on the SW System piping due to check valve slam following a pump trip. The 5°F increase in UHS temperature was determined to result in a negligible decrease in fluid density and minor increase in sonic wave speed, which collectively have an insignificant effect on the results and conclusions of the analysis of record calculations. The calculations of record have been revised to incorporate the evaluation and conclusions.

5.5 Reactor Plant Component Cooling Water (RPCCW) System Operating Condition Evaluations

5.5.1 RPCCW Temperature Conditions - Normal Cooldown with Instrument Air Available / Not Available

For normal cooldown conditions with instrument air available, the maximum calculated RPCCW supply temperature is 109.4°F at a UHS temperature of 80°F. The current AOR at 75°F UHS was performed for normal cooldown conditions with an RPCCW design supply temperature of 105°F. The 4.4°F increase in the RPCCW supply temperature for an 80°F UHS has been conservatively evaluated by an assessment performed of the effects of a 5°F temperature increase on the RPCCW supply piping, supports, and equipment nozzles.

The assessment concluded that the 5°F increase will not result in exceeding any design acceptance criteria for the affected piping, supports, or equipment nozzles.

This increase in allowable temperature conditions will be addressed by revising normal cooldown procedures to accommodate the higher RPCCW supply temperature as described in section 5.3.2.11.

5.5.2 RPCCW Temperature Conditions - Safety Grade Cold Shutdown and Fire Safe Shutdown Conditions

The AOR for the RPCCW system piping, supports, and equipment at 75°F UHS was performed with available margins that accommodate increases in system temperatures calculated for the SGCS and fire shutdown scenarios at 80°F UHS temperature. The maximum RPCCW supply temperatures that have been calculated (113°F) are bounded by the analyzed temperature values in the Analyses of Record. Therefore, the conclusions of the AOR are not changed by the change in UHS temperature from 75°F to 80°F, nor are any margins impacted.

5.5.3 RPCCW System Transient Analysis (Water Hammer)

NRC Generic Letter (GL) 96-06 addresses issues related to the potential for formation of two-phase flow and water hammer in cooling water systems serving the containment coolers. The GL also addresses piping systems penetrating containment and the susceptibility to over-pressurization from thermal expansion of the contained fluid. These considerations were evaluated to determine whether the UHS temperature increase could impact the AOR calculations performed to address the concerns of GL 96-06.

Existing AOR were reviewed to verify the ability of the Containment Air Recirculation (CAR) coils and RPCCW piping to maintain structural integrity with respect to potential water-hammer conditions developed during a bounding containment LOCA or main steam line break (MSLB) transient. The design of potentially susceptible systems at MPS3 minimizes the potential for GL 96-06 issues, as the automatic switchover of the CAR Coils from chilled water cooling to RPCCW limits the timeframe in which there is a potential for a water hammer event to challenge the design integrity of the RPCCW and chilled water cooling piping. Analyses have been performed which have concluded that the static fluid pressure in the RPCCW piping will exceed the maximum saturation pressure throughout the accident conditions, therefore there is no potential for void formation that would create water hammer or other problems identified by GL 96-06.

In summary, the bounding LOCA/LOOP and MSLB containment transient events will not result in void formation within the CAR coils or within the RPCCW piping, which eliminates the initiating event for condensation induced water hammer. For this reason, the CAR coils and RPCCW piping within containment will maintain their structural integrity and continue to satisfy the requirements of and commitments to GL 96-06 at a UHS temperature of 80°F.

5.6 Generic Letter 89-13 Thermal Performance Test and Program Impacts

GL 89-13 commitments are described in FSAR Section 19.2.1.20. Generic Letter (GL) 89-13, "Service Water System Problems Affecting Safety Related Equipment," was issued to ensure the general design and quality assurance requirements were being met for service water systems.

The MPS3 SW System (Open-Cycle Cooling) program corresponds to NUREG-1801, Section XI.M20, "Open Cycle Cooling Water System." The program manages the aging effects of loss of material and buildup of deposits.

The MPS3 program documents the HX maintenance and monitoring performed to ensure the SW HXs are able to perform their design basis functions. The Program documents the inspection frequency, cleaning frequency, and eddy current frequency of the safety related HXs which are cooled by SW. Cleaning frequency is dependent in part on allowable microfouling and allowable macrofouling (debris loading) of the HXs. The change in UHS temperature to 80°F has resulted in changes to the following design inputs for the GL 89-13 program:

- New limits will be established on the allowable microfouling of the MCC and Rod Control Area A/C HXs.
- New HX allowable SW side pressure differentials were established based on new minimum allowable SW flow rates.

The changes in the design input to the GL 89-13 program have resulted in changes to the program implementation requirements:

- Annual cleaning of the MCC and Rod Control Area A/C HXs will be required within four (4) months of UHS temperature excursions above 75°F.
- Changes to the allowable macrofouling, i.e., HX pressure drop surveillance limits, are summarized in Section 5.7.

The change in UHS temperature to 80°F has not resulted in changes to the approach of the GL 89-13 program, including the analytical tools and method of analysis. The change in UHS temperature to 80°F does not affect any of the GL 89-13 commitments as detailed in FSAR Section 19.2.1.20.

Therefore, GL 89-13 commitments described in FSAR Section 19.2.1.20 are still met with a UHS temperature increase to 80°F.

The GL 89-13 Program will be revised to provide new HVR heat exchanger cleaning requirements and revised heat exchanger pressure drop and flow surveillance limits as described in section 5.7.

5.7 Heat Exchanger Pressure Drop Surveillance Limits

Nominal, Alert, and Required Action Surveillance Monitoring Curves have been developed in support of the UHS increase to 80°F. Three surveillance curves were generated for each component. As in previous revisions of the supporting calculations, these curves were meant to define three different degrees of debris loading/macrofouling providing flow resistance across the HXs as described below:

- The Nominal Clean Curve defines the pressure drop (DP) versus flow relationship that is representative of a clean component/HX. The nominal curve is based on surveillance data obtained during a SW Flow Test, other past surveillance data, or engineering calculations.
- The Alert Curve is used as a guide to ensure there is margin between the observed component DP and the maximum DP allowed for any given flow rate. A DP/Flow point above the Alert Curve and below that Action Curve indicates that the heat exchanger can still perform its design function but a cleaning should be scheduled.
- The Action Curve defines the limiting pressure drop versus flow relationship. Any additional debris loading could result in a delivered flow rate below the required flow rate during postulated accident conditions.

Allowable pressure drop and flow data taken from the system flow calculations have been used to produce Action curves calculated in the Analysis of Record at 75°F and the current revision to the supporting calculation for 80°F. The calculation is performed using an allowable pressure drop at a reference flow rate to determine a flow coefficient (Cv) which is used to define the surveillance curve.

These revised surveillance curves will be utilized to implement the approved License Amendment for 80°F UHS.

5.7.1 Heat Exchanger Flow Surveillance Limits

Because the Charging Pump Cooler (3CCE*E1A/B) DP is not monitored on site due to a lack of available instrumentation available to monitor differential pressure, the component surveillance limits are defined by nominal, alert, and action flow requirements. The Action Flow is the minimum allowable flow at normal operating conditions that will provide sufficient heat removal for all design basis conditions. The Action Flow is determined by applying a correction factor to the 3CCE*E1A/B minimum required flow by accounting for differences between the Normal Operation alignment and the most limiting accident alignment for the Charging Pump Coolers. The Alert Flow is established as the mean value between the nominal flow and the Action Flow value that was calculated.

The revised surveillance flow limits for the CCE heat exchangers will be utilized to implement the approved LAR for 80°F UHS.

5.8 National Pollutant Discharge Elimination System (NPDES) Permit Impact

The effect of the increase in UHS temperature limit to 80°F on the NPDES permit has been evaluated. NPDES permit CT0003263 governs cooling water intake flow for MPS2, MPS3, and all the wastewater discharges from MPS1, MPS2, and MPS3, including surface runoff to Long Island Sound. The NPDES permit was reviewed for the impact of an increased UHS temperature. This evaluation showed that the maximum discharge temperature for MPS3 will stay within the permit limits for MPS2 and MPS3 and the maximum temperature at the plume mixing zone will stay within the permit limits for MPS2 and MPS3. Continual temperature monitoring, and operational controls as needed, ensures that the NPDES permit requirements are met, which is no change from current practice.

5.9 Condenser Performance Review

FSAR Section 10.4.1 describes the main condenser which condenses steam from the three low-pressure turbine exhausts, the two main feedwater pump turbine exhausts, the turbine bypass control valves, and from various equipment vents and drains.

An evaluation of the effect of the increase in UHS temperature to 80°F on condenser performance was performed to demonstrate that the condenser backpressure at an 80°F UHS temperature does not challenge any low condenser vacuum alarm/trip points.

The setpoint range for the turbine bypass control system interlock (C-9) is 5" HgA ± 2%, the high condenser pressure alarm nominal setpoint is 5.1" HgA, and the reactor trip setpoint is greater than 7.5" HgA. A correlation of historical operating data from Plant Process Computer (PPC) points of summertime UHS temperatures and condenser backpressures was used to perform this evaluation for normal operation and a review was performed of the calculation of record for the condition of turbine bypass operation during a 50% load rejection transient.

Using historical operating data, it was determined that condenser backpressure during normal operation would be approximately 3.8" HgA at a CW condenser inlet temperature of 80°F. With conservatism applied, a worse case 4.0" HgA backpressure at 80°F can be assumed. A 4.0" HgA backpressure would reduce the margin between the backpressure at 80°F and the condenser low vacuum alarm which occurs at 5.1" HgA, but there is still sufficient margin so as not to challenge the condenser low vacuum alarm and the turbine trip condenser backpressure of greater than 7.5" HgA.

For the condition of turbine bypass operation during a 50% load rejection transient, a condenser backpressure of 2.91" HgA was determined. This is below the setpoint range for the turbine bypass control system interlock and is less than the condenser pressure alarm setpoint of 5.1" HgA. Therefore, turbine bypass operation during a 50% load rejection transient concurrent with an UHS temperature of 80°F has no impact.

5.10 Instrumentation Evaluation

Instrumentation and controls process loops for the SW System, RPCCW, CW System, and Traveling Screen Wash and Disposal were evaluated for the effect of the increase in UHS temperature to 80°F. The assessment concluded that all of the new operating points for the instruments are within 90% of their calibrated range. Additionally, a Regulatory Guide (RG) 1.97 compliance review was performed to determine that instrumentation credited for RG 1.97 post-accident monitoring still meets the acceptance criterion discussed above. The increase in UHS temperature from 75°F to 80°F had minimal to no effect on the operating temperatures of the identified instruments. The assessment of the instruments credited for RG 1.97 concluded that the instruments still meet their acceptance criteria.

5.11 Containment Loss of Coolant Analysis

The FSAR Chapter 6 LOCA containment analyses assume a SW temperature of 80°F. This temperature assumption was approved by the NRC for the MPS3 Stretch Power Uprate with License Amendment 242 (Reference 1). A recent revision has been performed to the containment LOCA pressure and temperature analyses using revised Westinghouse Mass and Energy (M&E) release rate data that corrects errors that were identified in NSAL 11-5 and another error that is specific to the MPS3 analysis of record. The revised calculations continue to assume a SW temperature of at least 80°F.

The containment reanalysis resulted in an increase in the peak containment pressure and has resulted in a separate License Amendment Request to change the Pa value in TS 6.8.4.f. The LAR submittal to change Pa has been submitted for NRC approval via Dominion letter serial number 13-225 dated April 25, 2013. The containment peak pressure occurs during the LOCA blowdown phase before engineering safety features are effective and is thus unaffected by the UHS temperature. The reconciliation of other aspects of the revised containment pressure and temperature analyses has been implemented under 10CFR50.59.

5.12 Electrical Equipment Environmental Qualification Program Update

The UHS temperature change does not increase the peak containment pressure or peak temperature. The containment temperature envelope used for electrical equipment qualification is driven by the long term response of specific large break LOCA scenarios.

Since the FSAR containment analyses already assume 80°F, there is no impact on the in-containment EEQ program. All EQ equipment in containment remains qualified for the increase in UHS temperature to 80°F.

5.13 Quench Spray (QSS) and Recirculation Spray System (RSS) Piping & Supports

The QSS and RSS piping and supports have been analyzed for the effects of the limiting Containment LOCA cases performed at 80°F SW temperature. Therefore, the UHS temperature increase to 80°F has no impact on the piping and pipe support analyses.

Calculations of record also consider the occasional loading on the Recirculation Spray System due to water hammer phenomena. The calculations were evaluated to determine the impact of the change in UHS temperature on the results of the analysis of record. The change in UHS temperature from 75°F to 80°F results in a small decrease in the fluid density and a small increase in the fluid vapor pressure. The negligible decrease in fluid density and negligible increase sonic wave speed resulted in a negligible change in water hammer pressure and transient loads. The enveloping transient is pump startup into an empty ring header, so the slight increase in vapor pressure did not affect the loadings from this design transient.

5.14 Margin Management

The impact on margins resulting from the change in UHS Temperature will be implemented utilizing the Dominion Margin Management Program Guidelines. This Margin Management assessment includes HXs and pumps associated with the SW system as well as other plant equipment impacted by the proposed UHS temperature increase. No significant margin issues have been identified as a result of the increase in UHS temperature to 80°F.

5.15 Motor Operated Valve (MOV) Program Impact

The technical requirements for implementation of the MOV Program at MPS3 are contained in the MPS3 MOV Program Manual. The MPS3 MOV Program implements the recommendations and requirements of GL 89-10, GL 96-05, and GL 95-07. The impact on the increase in UHS temperature to 80°F on affected MOVs was evaluated and the impact is summarized below.

A system and functional design basis review calculation is performed for each MOV in the MOV Program. For the SW System MOVs and the RPCCW System MOVs, small changes to fluid temperature and flow rates will require revision to the system and functional calculations for the MOVs in these systems. These changes have been evaluated and will not impact the conclusions of the reference calculations.

The calculation which documents MPS3's implementation plan for compliance with the requirements of GL 96-05 and related NRC commitments were reviewed for potential impact of the UHS temperature change. This calculation identifies the safety-related MOVs included in the GL 96-05 program, and also identifies the risk category (i.e., high, medium, low) of the MOVs in the program. SW and RPCCW MOVs are covered by this calculation. The change in UHS temperature does not result in the addition of any new valves to the MOV Program and does not change the risk ranking of the SW and RPCCW MOVs.

The calculation that provides the basis for concluding that MPS3 valves are not susceptible to pressure locking and thermal binding concerns documented in GL95-07 was reviewed for the potential impact of the change in UHS temperature. It was determined that the change in UHS temperature does not impact the evaluation results in the supporting calculation.

5.16 Air Operated Valve (AOV) Program Impact

The only SW AOVs are 3SWP*AOV39A, B (SW EDG HX outlet valves). These are categorized as Category 1 valves, AOVs that are Active Safety Related Valves with High Safety Significance. The RPCCW has a number of AOVs that are categorized as Category 2 valves that are active safety related valves with medium or low safety significance, or Safety Related valves important for safe and reliable operation of the plant. The impact of the increase in UHS temperature up to and including 80°F on the affected AOVs was evaluated. The UHS temperature change was determined to have no impact on the RPCCW AOVs.

The system level design basis review calculation for the SW AOVs which documents the bounding operating scenarios for the valves and the system alignments and conditions (e.g., pressure, temperature, flow rate) requires revision. However, the impact of the change has been assessed and the revision is considered administrative since the bounding line and differential pressure calculated for all the operating scenarios has changed by a negligible amount (less than 0.1%) for the most limiting cases.

5.17 Coatings Program Impact

The coating materials utilized at MPS3 for Service Level I (Containment) and Service Level III (SW and CW Immersion Service) were reviewed for the potential impact of the UHS temperature increase.

The change in UHS temperature does not affect the pH of the containment sump and does not affect the boron concentration of any injected boron (i.e., SI accumulators). The containment temperature remains within the qualified temperature for the coating system. Therefore, the Service Level I containment coatings are not affected.

Coating materials utilized in Service Level III limits were reviewed for the impact of the UHS temperature increase. Qualification temperatures including allowable excursion temperature limits are not exceeded by the service conditions that the immersed coating will be subjected to during normal, transient, and accident design conditions.

Therefore, the UHS temperature increase was determined to have no adverse impact on the MPS3 Coatings Program.

5.18 Hazards / Internal Flooding Impact

The impact of the change in UHS temperature on internal flooding due to moderate energy line breaks in the SW and RPCCW Systems, on internal flooding due to failure of non-seismic Category I tanks and vessels, on internal flooding due to leakage or breaks in the CW System, on equipment and floor drains systems, and on cross-cubicle/building flooding via the Equipment & Floor Drains Systems was evaluated.

The change in UHS temperature does result in an impact on the calculated line pressures that provide input to the Engineered Safety Features Building flooding analysis performed for the RPCCW piping. This change does not impact the flooding analysis conclusions. Therefore the calculated leakage rates from postulated SW or RPCCW piping cracks do not change the existing AORs Internal Flooding analyses conclusions.

The affected calculations of record will be revised to reflect the line pressure changes prior to the implementation of the requested License Amendment Request.

5.19 In Service Testing (IST) Program Impact

The impact of the change in the UHS temperature on IST Program requirements for valves and pumps tested in the program associated with the SW, RPCCW and Chemical Feed Chlorination Systems was evaluated. The CW System has no valves or pumps in the IST Program.

IST program implementing calculations which define the maximum allowable stroke times for active valves were reviewed for potential impact. For the SW System and RPCCW

Systems, the UHS temperature does not affect the maximum allowable stroke times for power operated active valves in the systems.

The IST program implementing calculation which documents the minimum required accident mitigation flow rates for check valves in the SW pump discharge piping, and system branches to the Safety Injection Pump Coolers (CCI HXs), MCC and Rod Control Area A/C units (HVR) are affected. The minimum required accident mitigation flow rates for the RPCCW Pump discharge check valves are also affected. Flow rates shown in FSAR Table 9.2-1 and the implementing IST program calculations will be revised to reflect these changes.

IST Program documents list the SW and RPCCW System relief valves under the IST program plan. The change to the UHS temperature has been reviewed and does not affect the SW and RPCCW System relief valve setpoints for the valves in the IST Program.

The SW, CW, TPCCW and Screenwash Systems do not have any containment isolation valves.

The RPCCW System supply and return headers have containment isolation valves. The small increase in RPCCW HX discharge temperature does not affect the test pressures used for the performance of the 10 CFR 50, Appendix J Type B and C tests, since test pressure is based on containment accident peak pressure (Pa), which remains unchanged.

The SW Pumps (3SWP*P1A, B, C, D), Control Building A/C Booster Pumps (3SWP*P2A, B) and MCC, Rod Control Area A/C Booster Pumps (3SWP*P3A, B), and RPCCW Pumps (3CCP*P1A, B, C) are included in the IST Program. The IST program calculations which document the required hydraulic acceptance criteria for the pump operational readiness tests required by TS 4.0.5 have been evaluated for any required changes. The calculated minimum required flows for these pumps are all within the allowable 20 percent of their current comprehensive test flow rates. The IST implementing program calculations for these pumps will be revised to specify that the comprehensive flow tests will be performed within 20 percent of the actual calculated minimum required flows.

The current maximum SW operating pressures are not affected by the change to the UHS temperature since no physical changes are being made to the SW System and the pumps continue to operate at current discharge pressure.

The change to the UHS temperature does have an impact on the minimum allowable IST pump curve for the MCC and Rod Control Area Air Conditioning Booster Pumps (3SWP*P3A/B). The affected IST program implementation documents will be revised to incorporate these changes.

5.20 Service Water Pump Cubicle Ventilation

A calculation was performed which verifies that the Service Water cubicles will remain below the current 104°F normal and 119°F post LOCA design limits considering the increased UHS temperature of 80°F using the same calculation assumptions as currently included in the AOR per FSAR Section 9.4.8.1.1.

5.21 Other Engineering Program Reviews

In addition to Engineering Program evaluations that were performed as described above, a number of other engineering programs were evaluated and determined to be unaffected by the UHS temperature change for the reasons described below:

- The ISI program is not affected because the change in UHS temperature does not affect the system classifications or boundaries for ASME Class 1, 2, and 3 systems and does not affect the inspection requirements for ASME Class 1, 2, and 3 components. In addition, their supports as described in the ISI Program Manual and the augmented examination of High Energy Piping Systems are not affected because the systems evaluated for impact are classified as moderate energy systems.
- The FAC program is not affected because the systems evaluated for impact are not susceptible to wall loss due to FAC.
- The License Renewal program is not impacted by the change in UHS temperature because it does not add any new components/structures nor introduce any new functions for existing components/structures that would change the license renewal evaluation boundaries, it does not add any new or previously unevaluated materials to these components/structures, the component/structure internal and external environments remain within the parameters previously evaluated, it does not affect the aging management programs and the aging effects requiring management are not affected.
- The 10 CFR 50 Appendix J program is not impacted by the change in UHS temperature because the Type A, B and C test pressures are not affected.
- The Seismic & Dynamic Qualification of Mechanical and Electrical Equipment are not impacted by the change in UHS temperature because seismic requirements remain unchanged, there is no change to seismic loads and the seismic qualification of equipment is not affected.
- Conformance to the Station Blackout (SBO) Rule is not affected because the change in UHS temperature does not affect the SBO coping duration, does not change any plant equipment required to cope with a SBO, does not affect the loading on the SBO diesel generator, does not affect the SBO event coping assessment, does not affect the Auxiliary Feedwater System flow rate requirements and does not affect procedures associated with SBO operator actions.
- The regulatory requirements and associated commitments in the Regulatory Commitment Database for the Service Water System, Ultimate

Heat Sink, Fire Protection System, Circulating Water System and Main Condensers are not affected by the in UHS temperature.

- Time Critical Operator Actions are not affected or changed and no additional operator actions are added as a result of the change in UHS temperature to 80°F.
- The GL 96-06 evaluation of the susceptibility of piping systems penetrating the containment building to over-pressurization from thermal expansion of contained fluid was not affected by the change in UHS temperature.
- The Fire Protection Program and Branch Technical Position 9.5-1 Compliance Report were not affected by the change in UHS temperature except as discussed in Section 5.3.2.3.

5.22 Component Reviews

Mechanical components (pumps, valves, strainers, tanks, heat exchangers, expansion joints, and piping) in the Service Water, Circulating Water, Reactor Plant Component Cooling, and Turbine Plant Component Cooling Systems were reviewed for acceptability due to UHS temperature increase from 75°F to 80°F and subsequent increase in heat exchanger outlet temperatures. Non-metallic components were also evaluated for the maximum service temperatures in affected systems.

The majority of components have design temperatures that exceed the increased UHS and heat exchanger outlet temperatures. A number of components have a design temperature below the revised temperatures. These components were reviewed and determined acceptable based on the slight temperature increase, system location, and component function.

6.0 REGULATORY ANALYSIS

DNC has evaluated this proposed amendment with respect to the safety design basis identified for the systems and the analyses affected by the change. The evaluation indicates that the critical systems and equipment cooled by SW are capable of performing their safety related design functions at the proposed UHS temperature limit. Further, the regulatory requirements and the safety design basis continue to be met with the increased maximum initial UHS temperatures.

6.1 MPS3 Technical Specifications

MPS3 TSs are custom TSs. The TSs were submitted to the NRC for review and were issued by the NRC as part of the full power license on January 31, 1986.

6.2 NUREG-1431, Standard Technical Specifications-Westinghouse Plants

Although this request is not based on the averaging methodology of Technical Specification Task Force (TSTF) change traveler TSTF-330-A, Rev. 3, the following information is provided to ensure this license amendment request more completely addresses possible concerns.

Consideration: The UHS is not relied upon for immediate heat removal (such as to prevent containment over-pressurization), but is relied upon for longer-term cooling such that the temperature averaging approach continues to satisfy the accident assumptions for heat removal over time.

Response: DNC does not propose to use a time-weighted temperature averaging approach for verifying TS compliance. Instead, the proposed TS limit of 80°F will be verified as an instantaneous value in the same manner as it is currently verified. The engineering analyses assume a maximum SW temperature of 80°F for the duration of the analyses. While any supply side SW temperature measurement location is adequate to ensure compliance with the analysis assumptions, precision instruments installed at the inlet to the RPCCW (CCP) HXs will normally be used. These instruments have an uncertainty of 0.15°F or less. Therefore, instrument uncertainty need not be factored into the surveillance acceptance criteria. All in-service instruments must be within the limit. If these instruments are out of service, alternative instruments that measure SW supply side temperature will be used. In this case, an appropriate instrument uncertainty will be subtracted from the acceptance criteria.

Consideration: When the UHS is at the proposed maximum allowed value of 80°F, equipment that is relied upon for accident mitigation, anticipated operational occurrences, or for safe shutdown, will not be adversely affected and are not placed in alarm condition or limited in any way at this higher temperature.

Response: The equipment and systems that interface with the SW system have been evaluated for the increase in service temperature to 80°F. The evaluation determined that the systems supported by the SW system can support plant operations at the increased temperature. The existing FSAR Chapter 6 containment analyses assume 80°F. There are no changes in expected alarms or limiting conditions that result from increasing the maximum SW temperature limit to 80°F.

Consideration: Plant-specific assumptions, such as those that were credited in addressing station blackout and GL 96-06, have been adjusted (as necessary) to be consistent with the maximum allowed SW temperature of 80°F that is proposed.

Response: As discussed above, no adjustments to plant-specific assumptions related to station blackout or GL 96-06 were determined to be necessary during the evaluation of the plant response to an increase in the SW temperature limit to 80°F.

Consideration: Cooling water that is being discharged from the plant (either during normal plant operations, or during accident conditions), does not affect the UHS intake water temperature (typical of an infinite heat sink) but location of the intake and discharge connections, and characteristics of the UHS can have an impact.

Response: There are no changes in the plant discharge limits or pathways as specified in the MPS NPDES in response to an increase in the maximum SW temperature limit to 80°F. Plant discharge limits are a function of the quantity of heat rejected into the UHS during plant operations and are not intake temperature limited. The quantity of heat being rejected into the UHS will not change due to the increase in allowable SW temperature. Because the temperature of the water being discharged from the plant will remain within the current discharge temperature limit there will be no change of the effect on the UHS intake water temperature.

6.3 Technical Specification Task Force (TSTF) -330, Revision 3

DNC has reviewed TSTF-330 and has considered possible adoption of the UHS temperature averaging approach. However, DNC considers the temperature averaging approach of TSTF-330 as not suitable for use at MPS3 based on the small daily variation in the temperature of the UHS. The temperature of the Long Island Sound typically fluctuates only approximately 3°F over a 24 hour period in the summer. DNC does not expect that averaging with this small variation would provide adequate relief. Furthermore, based on the trend of increasing Long Island Sound temperatures, DNC considers it possible that the 24-hour average temperature of the Long Island Sound might exceed the current limit of 75°F.

DNC has performed sufficient analyses to confirm the long term cooling capabilities, and that the temperature limitations are met, for equipment required for accident mitigation and safe shutdown of the unit at the proposed UHS temperature of 80°F.

Based on the above, DNC considers that an increase in the UHS temperature limit of TS 3/4.7.5 is the most practical solution at MPS3.

6.4 MPS3 Licensing Bases

The MPS3 design was reviewed in accordance with the July 1981 edition of the Standard Review Plan for the Review of Safety Analysis Report for Nuclear Power Plants, July 1981,(NUREG-0800), Section 5.3.1, Rev. 1.

As noted in FSAR Section 3.1 the design bases of MPS3 are measured against the NRC General Design Criteria (GDC) for Nuclear Power Plants, 10 CFR 50, Appendix A, as amended through October 27, 1978. The adequacy of the MPS3 design relative to the general design criteria is discussed in FSAR Sections 3.1.1 and 3.1.2.

FSAR sections 1.8 and 1.8N discuss general and nuclear steam supply system conformance to NRC regulatory guides. Tables 1.8-1 and 1.8N-1 list NRC Division 1 Regulatory Guides. The tables identify applicable FSAR sections, and indicate the degree of MPS3 compliance with the regulatory guides.

7.0 NO SIGNIFICANT HAZARDS CONSIDERATION EVALUATION

10 CFR 50.91(a)(1) requires that licensee requests for operating license amendments be accompanied by an evaluation of significant hazards posed by the issuance of the amendment. Dominion Nuclear Connecticut (DNC) has evaluated this proposed amendment with respect to the criteria given in 10 CFR 50.92(c).

A necessary element of plant operation is the removal of the heat generated by the power generation process. This includes both the removal of heat during routine operation and removal of heat as part of mitigating accidents and transients that are postulated to occur. There are numerous systems with the purpose of removing the generated heat during various phases of plant operation. Some systems have a safety function, related to accident and transient mitigation. Other systems have a power generation function, related to a routine power generation plant operation. Some systems have a combination of safety and power generation functions.

One system that is designed to remove heat is the Service Water (SW) System. This system has a safety function to remove heat from various other systems. The SW system draws water from the Long Island Sound, and discharges the heated water back to the Long Island Sound after it has removed heat from the various systems that it cools. The Long Island Sound is referred to as the Ultimate Heat Sink (UHS).

This license amendment request proposes to increase the temperature limit for the SW system from its current limit of 75°F to 80°F.

A 80°F UHS limiting condition of operation provides reasonable assurance that public health and safety will not be endangered as discussed below.

1. Do the proposed changes involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No

Previously evaluated accident consequences are not impacted because credited mitigating equipment continues to perform its design function. The proposed change does not significantly impact the probability of an accident previously evaluated because those SSCs that can initiate an accident are not significantly impacted.

Based on the above, DNC concludes that the proposed increased temperature limits do not involve a significant increase in the probability or consequences of an accident or transient previously evaluated in the safety analysis report.

2. Do the proposed changes create the possibility for a new or different kind of accident from any accident previously evaluated?

Response: No

A new or different accident from any accident previously evaluated isn't created because previously credited SSCs are not impacted; there is no new reliance upon equipment not previously credited; there is no new equipment installed (except for monitoring equipment); there is no impact upon the existing failure modes and effects analysis; and conformance to the single failure criterion is maintained.

The increased limits do not introduce any new mode of plant operation and will not result in a change to the design function or the operation of any SSC that is used for mitigating accidents.

Based on the above, DNC concludes that the proposed changes do not create the possibility of a new or different kind of accident or transient from any previously evaluated.

3. Do the proposed changes involve a significant reduction in the margin of safety?

Response: No

This change doesn't involve a significant reduction in margin of safety because containment structure fission product barrier design margin is unaffected because peak pressure/temperature occurs early in the accident before UHS temperature can influence the containment response. The proposed change has no impact upon fuel cladding or RCS fission product barrier margin because credited SSCs continue to perform their design functions with an 80°F UHS temperature.

Based on the above DNC concludes that the proposed changes do not involve a significant reduction in the margin of safety.

From the above discussions, DNC has concluded that 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.

8.0 ENVIRONMENTAL IMPACT EVALUATION

10 CFR 51.22(c) provides criteria for, and identification of, licensing and regulatory actions eligible for categorical exclusion from performing an environmental assessment. 10 CFR 51.22(c)(9) identifies a proposed amendment to an operating license for a facility as a categorical exclusion not requiring an environmental assessment if operation of the facility in accordance with the proposed amendment would not: (1) involve a significant hazards consideration, (2) result in a significant change in the types or significant increase in the amount of any effluents that may be released off-site, or (3) result in an increase in individual or cumulative occupational radiation exposure.

DNC has reviewed the proposed license amendment and concludes that it meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). The following is the basis for this determination.

1. The proposed license amendment does not involve a significant hazards consideration as described previously in the No Significant Hazards Consideration Evaluation.

2. This proposed change is to increase the temperature limits for the Ultimate Heat Sink. This proposed change will not result in a significant increase in radiological doses for any design basis accident. This proposed change does not result in a significant change in the types or significant increase in the amounts of effluents that may be released off-site. (There will be a slight increase in the temperature of the plant cooling water effluent, but the effect is small and manageable, has no effect on radiological releases, and the effluent is limited by the National Pollutant Discharge Elimination System permit.) DNC has concluded that there will not be a significant increase in the types or amounts of effluents that may be released off-site and these changes do not involve irreversible environmental consequences beyond those already associated with normal operation.

3. The increased cooling water inlet temperatures that would be allowed under the proposed changes will not result in any increase in individual or cumulative occupational radiation exposure.

Therefore, pursuant to 10 CFR 51.22(c), no environmental impact statement or environmental assessment needs to be prepared in connection with issuance of the proposed license changes.

9.0 PRECEDENTS

A number of licensees have requested and received amendment of their operating licensees authorizing increases in the temperature limit of their UHS. As a result of the different formats of the TSs that are part of the operating license for these various licensees, there have been wide variations in the approach proposed by the licensees and the format of the increased UHS temperature.

Based on the various factors involved in the design of a facility some of the following licensing activities and license amendments are considered to be closer in nature to the proposed MPS3 license amendment than are others. These precedents involve increases in the UHS temperature limit.

<u>H. B. Robinson</u>

- Type of Plant -Pressurized Water Reactor.
- UHS -Lake Robinson (an onsite lake formed by damming of a river)
- Scope -UHS temperature limit increased from 97°F to 99°F. No temperature averaging. TS affected- Two new Required Actions: (1) on a 12-hour frequency,

confirm required cooling capacity is maintained; (2) hourly, confirm temperature is less than or equal to 99°F.

- Licensee Submittals dated -June 5, and August 4, 2000, and July 6, 2001.
- License Amendment -No. 191, issued August 9, 2001.

Hope Creek

- Type of Plant -Boiling Water Reactor.
- UHS -Delaware River.
- Scope -UHS temperature limit increased from 87°F to 89°F. No temperature averaging.
- TS affected -Limiting Condition for Operation (LCO) 3.7.1.3.
- Licensee Submittals dated -June 12, July 23, and September 8, 1998.
- License Amendment -No. 120, issued April 19, 1999.

Davis-Besse

- Type of Plant -Pressurized Water Reactor.
- UHS -Lake Erie.
- Scope -UHS temperature limit increased from 85°F to 90°F. No temperature averaging.
- TS affected -Limiting Condition for Operation (LCO) 3.7.5.1.
- Licensee Submittals dated -July 28, 1999, and June 6, 2000.
- License Amendment -No. 242, issued September 12, 2000.

Palisades

- Type of Plant -Pressurized Water Reactor.
- UHS -Lake Michigan.
- Scope -UHS temperature limit increased from 81.5°F to 85°F. No temperature averaging.
- TS affected -Surveillance Requirement SR 3.7.9.2.
- Licensee Submittals dated -January 26, and March 13, 2001.
- License Amendment -No. 202, issued June 4, 2001.

Indian Point Unit 2

- Type of Plant -Pressurized Water Reactor.
- UHS -Hudson River.
- Scope -UHS temperature limit increased from 85°F to 95°F. No temperature averaging.
- TS affected -Limiting Conditions for Operation (LCO) 3.3.F.4 and 3.3.F.5.
- Licensee Submittal dated -July 13, 1989.
- License Amendment -No. 149, issued March 27, 1990.

Braidwood Station

- Type of Plant -Pressurized Water Reactor.
- UHS -onsite pond.

- Scope -UHS temperature limit increased from 98°F to 100°F. No temperature averaging.
- TS affected -Surveillance Requirement SR 3.7.9.2.
- Licensee Submittal dated -March 15, 2000.
- License Amendment -No. 107 for Unit 1 and No. 107 for Unit 2, issued June 13, 2000.

Surry Power Station Units 1 and 2

- Type of Plant -Pressurized Water Reactor.
- UHS – James River.
- Scope -UHS temperature limit increased from 95°F to 100°F. No temperature averaging.
- TS affected –TS 3.8.4.
- Licensee Submittal dated –June 25, 2007.
- License Amendment -No. 259 for Units 1 and 2, issued June 17, 2008.

10.0 REFERENCES

1. From J. G. Lamb, NRC to D. A. Christian, DNC, "Millstone Power Station, Unit No. 3 – Issuance of Amendment RE: Stretch Power Uprate (TAC No. MD6070), Dated August 12, 2008.
2. TS Task Force, TSTF-330-A Rev. 3, "Allowed Outage Time - Ultimate Heat Sink."
3. Standard TSs, Combustion Engineering Plants, Rev. 4.

ATTACHMENT 2

MARKED-UP TECHNICAL SPECIFICATIONS PAGE

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3

3/4.7.5 ULTIMATE HEAT SINK

LIMITING CONDITION FOR OPERATION

a

3.7.5 The ultimate heat sink (UHS) shall be OPERABLE with ~~an average~~ water temperature of less than or equal to ~~75~~°F. 80

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

With the UHS water temperature greater than 80°F, be in HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

~~If the UHS temperature is above 75°F, monitor the UHS temperature once per hour for 12 hours. If the UHS temperature does not drop below 75°F during this period, place the plant in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. During this period, if the UHS temperature increases above 77°F, place the plant in HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.~~

SURVEILLANCE REQUIREMENTS

4.7.5 The UHS shall be determined OPERABLE:

a. At least once per 24 hours by verifying the ~~average~~ water temperature to be within limits.

b. At least once per 6 hours by verifying the ~~average~~ water temperature to be within limits when the ~~average~~ water temperature exceeds ~~70~~°F. 75

ATTACHMENT 3

MARKED-UP TECHNICAL SPECIFICATIONS BASES PAGES

(FOR INFORMATION ONLY)

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3

3/4.7.5 ULTIMATE HEAT SINK

Insert A

~~BACKGROUND~~

~~The ultimate heat sink (UHS) for Millstone Unit No. 3 is Long Island Sound. It serves as a heat sink for both safety and nonsafety related cooling systems. Sensible heat is discharged to the UHS via the service water and circulating water systems.~~

~~LIMITING CONDITION FOR OPERATION~~

~~The UHS is required to be OPERABLE and is considered OPERABLE if the average water temperature is less than or equal to 75°F. The limitation on the UHS temperature ensures that cooling water at or less than the design temperature (75°F) is available to either (1) provide normal cooldown of the facility or (2) mitigate the effects of accident conditions within acceptable limits. It is based on providing a 30-day cooling water supply to safety-related equipment without exceeding its design basis temperature and is consistent with the recommendations of Regulatory Guide 1.27, "Ultimate Heat Sink for Nuclear Plants," March 1974.~~

~~The Circulating Water System has six condenser inlet waterboxes, each contains a temperature measurement device. The average UHS temperature is normally obtained from the plant process computer by averaging the six Circulating Water System condenser inlet waterbox temperature measurements. Given potential condenser waterbox temperature instrumentation failure(s), or that a waterbox is not operating or a process computer failure, other methods may be used to determine the average UHS temperature. For example, if one condenser waterbox instrument has failed, the average UHS temperature may be based on five condenser inlet waterbox temperature measurements. For the purposes of determining average UHS temperature, if condenser waterbox inlet temperature is used, the average should be based on no less than 3 measurements. If the process computer condenser waterbox inlet temperature average is based on less than three measurements, the average is automatically flagged to users as potentially in error. Using local Service Water System temperature instruments (two or more) is an acceptable alternative for determining average UHS temperature.~~

~~It has been concluded that using the average of multiple condenser waterbox inlet temperature measurements is sufficiently representative of the UHS temperature to assure OPERABILITY of the UHS. The only exception to this conclusion is when a condenser thermal backwash evolution is being conducted. During this evolution, there is a potential for significant intake structure temperature stratification. Therefore, during condenser thermal backwashing evolutions, the average UHS temperature shall be monitored by temperature instruments in the service water system to assure OPERABILITY of the UHS.~~

~~APPLICABILITY~~

~~In MODES 1, 2, 3, AND 4, the UHS is required to support the OPERABILITY of the equipment serviced by the UHS and required to be OPERABLE in these MODES.~~

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~~ACTION STATEMENT~~

~~When the UHS temperature is above 75°F, the ACTION Statement for the LCO requires that the UHS temperature be monitored for 12 hours, and the plant be placed in at least HOT STANDBY within the next six hours and in COLD SHUTDOWN within the following 30 hours in the event the UHS temperature does not drop below 75°F during the 12-hour monitoring period.~~

~~The 12-hour interval is based on operating experience related to trending of the parameter variations during the applicable MODES. During this period, the UHS temperature will be monitored on an increased frequency. If the trend shows improvement, and if the trend of the UHS temperature gives reasonable expectations that the temperature will decrease below 75°F during the 12-hour monitoring period, the UHS temperature will be continued to be monitored during the remaining portion of the 12-hour period. However, if it becomes apparent that the UHS temperature will remain above 75°F throughout the 12-hour monitoring period, conservative action regarding compliance with the ACTION Statement should be taken.~~

~~An evaluation was conducted to qualify the risk significance of various Chapter 15 initiating events and earthquakes during periods of elevated UHS temperature. It concluded that a seismic event was not credible for the time periods with elevated UHS temperature.~~

~~With respect to the service water loads, the limiting Condition II and III Chapter 15 event initiators are those that add additional heat loads to the service water system. A loss of offsite power event is limiting because of the added loads due to the diesel generator and the residual heat removal heat exchanger. A steam generator tube rupture event is limiting because of the addition of the safety injection and diesel generator loads without isolation of the turbine plant component cooling water loads (no loss of offsite power or containment depressurization actuation signal). Although the risk significance of a Condition IV accident occurring during the period of elevated UHS temperature is considered to be negligibly small compared to that of Condition II and III events, a Loss of Coolant Accident with or without a LOP was also evaluated. These scenarios have been evaluated with the additional consideration of a single failure. The evaluation investigated whether or not these events could be resolved with an elevated UHS temperature. It was determined that Millstone Unit No. 3 could recover from these events, even with an elevated temperature of 77°F.~~

~~This evaluation provides the basis for the ACTION statement requirement to place the plant in HOT STANDBY within six hours and in COLD SHUTDOWN within the next 30 hours, if the UHS temperature goes above 77°F during the 12-hour monitoring period.~~

~~SURVEILLANCE REQUIREMENTS~~

~~For the surveillance requirements, the UHS temperature is measured at the locations described in the LCO write-up provided in this section.~~

~~Surveillance Requirement 4.7.5.a verifies that the UHS is capable of providing a 30-day cooling water supply to safety-related equipment without exceeding its design basis temperature. The 24-hour frequency is based on operating experience related to trending of the parameter variations during the applicable MODES. This surveillance requirement verifies that the average water temperature of the UHS is less than or equal to 75°F.~~

~~Surveillance Requirement 4.7.5.b requires that the UHS temperature be monitored on an increased frequency whenever the UHS temperature is greater than 70°F during the applicable MODES. The intent of this Surveillance Requirement is to increase the awareness of plant personnel regarding UHS temperature trends above 70°F. The frequency is based on operating experience related to trending of the parameter variations during the applicable MODES.~~

3/4.7.6 DELETED

3/4.7.7 CONTROL ROOM EMERGENCY VENTILATION SYSTEM

BACKGROUND

The control room emergency ventilation system provides a protected environment from which operators can control the unit following an uncontrolled release of radioactivity, hazardous chemicals, or smoke. Additionally, the system provides temperature control for the control room envelope (CRE) during normal and post-accident operations.

The control room emergency ventilation system is comprised of the CRE emergency air filtration system and a temperature control system.

The control room emergency air filtration system consists of two redundant systems that recirculate and filter the air in the CRE and a CRE boundary that limits the inleakage of unfiltered air. Each control room emergency air filtration system consists of a moisture separator, electric heater, prefilter, upstream high efficiency particulate air (HEPA) filter, charcoal adsorber, downstream HEPA filter, and fan. Additionally, ductwork, valves or dampers, and instrumentation form part of the system.

The CRE is the area within the confines of the CRE boundary that contains the spaces that control room occupants inhabit to control the unit during normal and accident conditions. This area encompasses the control room, and other non-critical areas including adjacent support offices, Insert A

BACKGROUND

The ultimate heat sink (UHS) for Millstone Unit No. 3 is Long Island Sound. The Long Island Sound is connected to the Atlantic Ocean and provides the required 30 day supply of water. It serves as a heat sink for both safety and nonsafety-related cooling systems. Sensible heat is discharged to the UHS via the service water (SW) and circulating water (CW) systems.

The basic performance requirement is that a 30 day supply of water be available, and that the design basis temperatures of safety related equipment not be exceeded.

Additional information on the design and operation of the system, along with a list of components served, can be found in References 1, 2, and 3.

APPLICABLE SAFETY ANALYSES

The UHS is the sink for heat removed from the reactor core following all accidents and anticipated operational occurrences in which the unit is cooled down and placed on residual heat removal (RHR) operation. With UHS as the normal heat sink for condenser cooling via the CW System, unit operation at full power is its maximum heat load. Its maximum post accident heat load occurs < 1 hour after a design basis loss of coolant accident (LOCA). Near this time, the unit switches from injection to recirculation and the containment recirculation system removes the core decay heat.

The operating limits are based on conservative heat transfer analyses for the worst case LOCA. References 1, 2, and 3 provide the details of the assumptions used in the analysis, which include worst expected meteorological conditions, conservative uncertainties when calculating decay heat, and worst case single active failure (e.g., single failure of a man-made structure).

The limitations on the temperature of the UHS ensure that the assumption for temperature used in the analyses for cooling of safety related components by the SW system are satisfied. These analyses ensure that under normal operation, plant cooldown, or accident conditions, all components cooled directly or indirectly by SW will receive adequate cooling to perform their design basis functions.

The UHS satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The UHS is required to be OPERABLE and is considered OPERABLE if it contains a sufficient volume of water at or below the maximum temperature that would allow the

SW System to operate for at least 30 days following the design basis LOCA without the loss of net positive suction head (NPSH), and without exceeding the maximum design temperature of the equipment served by the SW System. To meet this condition, the UHS temperature should not exceed 80°F during normal unit operation.

While the use of any supply side SW temperature indication is adequate to ensure compliance with the analysis assumptions, precision instruments installed at the inlet to the reactor plant closed cooling water (RPCCW) (CCP) heat exchangers will normally be used. Therefore, instrument uncertainty need not be factored into the surveillance acceptance criteria. All in-service instruments must be within the limit. If all of the precision instruments are out of service, alternative instruments that measure SW supply side temperature will be used. In this case, an appropriate instrument uncertainty will be subtracted from the acceptance criteria.

Since Long Island Sound temperature changes relatively slowly and in a predictable fashion according to the tides, it is acceptable to monitor this temperature daily when there is ample (>5°F) margin to the limit. When within 5°F of the limit, the temperature shall be monitored every 6 hours to ensure that tidal variations are appropriately captured.

APPLICABILITY

In MODES 1, 2, 3, and 4, the UHS is required to support the OPERABILITY of the equipment serviced by the UHS and required to be OPERABLE in these MODES.

In MODE 5 or 6, the OPERABILITY requirements of the UHS are determined by the systems it supports.

ACTION

If the UHS is inoperable, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

The allowed outage times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

This surveillance requirement verifies that the UHS is capable of providing a 30 day cooling water supply to safety related equipment without exceeding its design basis temperature. This surveillance requirement verifies that the water temperature of the UHS is ≤ 80°F.

REFERENCES
1. FSAR, Section 6.2, Containment Systems.
2. FSAR, Section 9.2, Water Systems.
3. FSAR, Section 15.6, Decrease in Reactor Coolant Inventory.

ATTACHMENT 4

LIST OF REGULATORY COMMITMENTS

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3

List of Regulatory Commitments

The following table identifies those actions committed to by Dominion Nuclear Connecticut (DNC) for the Millstone Power Station Unit 3 (MPS3) as part of the License Amendment Request. Any other statements in this submittal are provided for information purposes and are not regulatory commitments.

Number	Commitment	Committed Date	One-Time Action (Yes/No)
1	Section 5.3.2.3, control building air conditioning water chillers: Revisions to the required flow analyses for the HVK chillers have credited availability of the HVK booster pumps for some fire scenarios. The HVK booster pumps will be added to the list of equipment credited for Fire Protection / Branch Technical (BTP) 9.5-1 Compliance Report and the program will be revised accordingly.	Upon implementation of the NRC approved license amendment request.	Yes
2	Section 5.3.2.6, MCC & rod control area ventilation units: The cleaning frequency of the MCC and Rod Control Area Air Conditioning heat exchangers can remain at an annual frequency, as long as cleaning occurs within four (4) months prior to UHS temperature rising above 75°F. Revised HX surveillance curves will be implemented coupled with the above specified cleaning time frame to ensure credited heat removal is retained at the increased UHS temperature.	Upon implementation of the NRC approved license amendment request.	Yes
3	Section 5.3.2.11, reactor plant component cooling water system heat exchangers: The affected piping, supports, and equipment nozzles have been analyzed for temperatures exceeding these limits. Therefore, the operating procedure guidance will be revised to address the higher allowable temperature during normal plant cooldowns.	Upon implementation of the NRC approved license amendment request.	Yes

Number	Commitment	Committed Date	One-Time Action (Yes/No)
4	Section 5.4.1, service water system operating condition evaluation, temperature conditions: The SW and RPCCW Systems piping, supports, and equipment nozzles have been evaluated for the 5°F UHS temperature increase. The evaluation utilized quantitative scaling criteria to verify that the piping, supports, and nozzles are acceptable for the increased thermal expansion stress range and resulting support and nozzle loadings. The affected calculations of record will be revised to reflect the temperature changes prior to the implementation of the requested License Amendment Request.	Upon implementation of the NRC approved license amendment request.	Yes
5	Section 5.5.1, RPCCW temperature conditions - normal cooldown with instrument air available / not available: The assessment concluded that the 5°F increase will not result in exceeding any design acceptance criteria for the affected piping, supports, or equipment nozzles. This increase in allowable temperature conditions will be addressed by revising normal cooldown procedures to accommodate the higher RPCCW supply temperature.	Upon implementation of the NRC approved license amendment request.	Yes
6	Section 5.6, GL 89-13 thermal performance test and program impacts: New limits will be established on the allowable microfouling of the MCC and Rod Control Area A/C HXs. The GL 89-13 Program will be revised to provide new HVR heat exchanger cleaning requirements and revised heat exchanger pressure drop and flow surveillance limits as described in section 5.7.	Upon implementation of the NRC approved license amendment request.	Yes

Number	Commitment	Committed Date	One-Time Action (Yes/No)
7	Section 5.15, motor operated valve program impact: For the SW System MOVs and the RPCCW System MOVs, small changes to fluid temperature and flow rates will require revision to the system and functional calculations for the MOVs in these systems.	Upon implementation of the NRC approved license amendment request.	Yes
8	Section 5.16, air operated valve (AOV) program impact: The system level design basis review calculation for the SW AOVs which documents the bounding operating scenarios for the valves and the system alignments and conditions (e.g., pressure, temperature, flow rate) requires revision.	Upon implementation of the NRC approved license amendment request.	Yes
9	Section 5.18, hazards / internal flooding impact: The affected calculations of record will be revised to reflect the line pressure changes prior to the implementation of the requested License Amendment Request.	Upon implementation of the NRC approved license amendment request.	Yes
10	Section 5.19, the in service testing program (IST) impact: Flow rates shown in FSAR Table 9.2-1 and the implementing IST program calculation will be revised to reflect these changes.	Upon implementation of the NRC approved license amendment request.	Yes
11	Section 5.19, the in service testing program (IST) impact: The IST implementing program calculations will be revised to specify that the comprehensive flow tests will be performed within 20 percent of calculated minimum required flows.	Upon implementation of the NRC approved license amendment request.	Yes

Number	Commitment	Committed Date	One-Time Action (Yes/No)
12	Section 5.19, the in service testing program (IST) impact: The change to the UHS temperature does have an impact on the minimum allowable IST pump curve for the MCC and Rod Control Area Air Conditioning Booster Pumps (3SWP*P3A/B). The affected IST program implementation documents will be revised to incorporate these changes.	Upon implementation of the NRC approved license amendment request.	Yes
13	The performance of both HVR booster pumps was determined to not meet the assumptions of the analysis. These have been entered into the corrective action program (CR513088 and CR514029) and will be corrected.	Prior to implementation of the NRC approved license amendment request.	Yes