VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

June 25, 2007 10CFR50.90

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

Serial No.	07-0401
NLOS/GDM	R1
Docket Nos.	50-280
	50-281
License Nos.	DPR-32
	DPR-37

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
PROPOSED LICENSE AMENDMENT REQUEST
INCREASED MAXIMUM SERVICE WATER TEMPERATURE LIMIT

Pursuant to 10 CFR 50.90, Virginia Electric and Power Company (Dominion) requests amendments, in the form of changes to the Technical Specifications (TS) to Facility Operating License Numbers DPR-32 and DPR-37 for Surry Power Station Units 1 and 2, respectively. The proposed change increases the maximum service water temperature limit from 95°F to 100°F. The proposed change is necessary to proactively address observed increases in service water intake temperatures during the past two summers, which have approached the existing TS limit. A discussion of the proposed change is provided in Attachment 1. The marked-up and typed proposed TS pages are provided in Attachments 2 and 3, respectively. An associated Basis change is provided for information only and will be implemented in accordance with the TS Bases Control Program and 10 CFR 50.59.

We have evaluated the proposed amendment and have determined that it does not involve a significant hazards consideration as defined in 10 CFR 50.92. The basis for our determination is included in Attachment 1. We have also determined that operation with the proposed change will not result in any significant increase in the amount of effluents that may be released offsite and no significant increase in individual or cumulative occupational radiation exposure. Therefore, the proposed amendment is eligible for categorical exclusion from an environmental assessment as set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment is needed in connection with the approval of the proposed change. The proposed TS change has been reviewed and approved by the Station Nuclear Safety and Operating Committee. NRC approval of the proposed TS change is requested by May 31, 2008.

As discussed in the attachment, this license amendment request includes a proposed revision of TS Figure 3.8-1, which provides containment operational limits associated with containment partial pressure vs. SW temperature. It should be noted that the current Surry TS include different versions of TS Figure 3.8-1 for Surry Units 1 and 2 due to the different NRC-approved schedules for the implementation of Surry License

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Amendments 250/249 for Surry Units 1 and 2, respectively, dated October 12, 2006. These license amendments also revised TS Figure 3.8-1 as part of Dominion's resolution of Generic Safety Issue (GSI)-191, *Assessment of Debris Accumulation on PWR Sump Performance*, and noted that the approved TS changes were to be implemented by the end of the fall 2007 refueling outage for Surry Unit 1 and by the end of the fall 2006 refueling outage for Surry Unit 2. Consequently, we respectfully request that the proposed TS changes discussed in the attachment not be approved prior to December 31, 2007, to ensure that the changes to TS Figure 3.8-1 that were approved by License Amendments 250/249 have been implemented for both units.

If you have any questions or require additional information, please contact Mr. Gary D. Miller at (804) 273-2771.

Sincerely,

Gerald T. Bischof
Vice President – Nuclear Engineering

Attachments

1. Discussion of Change
2. Proposed Technical Specifications Pages (Mark-Up)
3. Proposed Technical Specifications Pages (Typed)

Commitments made in this letter: None

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COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by Gerald T. Bischof, who is Vice President – Nuclear Engineering, of Virginia Electric and Power Company. 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 25th day of June, 2007.

My Commission Expires: August 31, 2008.

Margaret B. Bennett
Notary Public

MARGARET B. BENNETT
Notary Public 354302
Commonwealth of Virginia
My Commission Expires Aug 31, 2008

(SEAL)

ATTACHMENT 1

DISCUSSION OF CHANGE

**Virginia Electric and Power Company
(Dominion)
Surry Power Station Units 1 and 2**

DISCUSSION OF CHANGE

INTRODUCTION

Pursuant to 10 CFR 50.90, Virginia Electric and Power Company (Dominion) requests an amendment to Facility Operating License Numbers DPR-32 and DPR-37 for Surry Power Station Units 1 and 2. The proposed change increases the maximum Technical Specification (TS) Service Water (SW) temperature limit from 95°F to 100°F. This increase in the maximum SW temperature limit is reflected in revised TS Figure 3.8-1, which provides allowable containment air partial pressure versus SW temperature.

The maximum SW temperature limit is being increased to address the potential for isolated peaks in the seasonal peak temperature of the James River, which is the source for the Surry Circulating Water (CW) and SW systems. A related TS Basis change is also included for information. The TS Basis will be revised following NRC approval of the proposed license amendment.

The proposed change has been reviewed, and it has been determined that the change has no adverse impact on plant operation and that no significant hazards condition exists as defined in 10 CFR 50.92. In addition, it has been determined that the change qualifies for categorical exclusion from an environmental assessment as set forth in 10 CFR 51.22(c)(9); therefore, no environmental impact statement or environmental assessment is needed in connection with the approval of the proposed change.

BACKGROUND

The Ultimate Heat Sink (UHS) for Surry Power Station (Surry) Units 1 and 2 is the lower James River and the intake canal. The James River is connected through the Chesapeake Bay to the Western Atlantic Ocean. Water is pumped from the James River into an elevated intake canal. The CW system draws water from the intake canal and supplies the SW system which is used as cooling water for heat exchangers that remove heat from the Component Cooling Water (CCW) system, Bearing Cooling Water (BCW) system, Recirculation Spray (RS) system, Charging Pump Service Water (CPSW) subsystem and other station applications such as air conditioning and Chilled Water.

At full-power operation, Surry discharges approximately 11.9 x 10^9 British thermal units (Btu)/hr into the James River estuary by way of cooling water discharged into Cobham

Bay. The Surry discharge permit limits waste heat rejected to the James River from Surry to 12.6×10^9 Btu/hr, but does not require the reporting of discharge temperatures.

Unusually hot summer temperature peaks, combined with decreased river flows due to low rainfall in the upper James River basin, coupled with a seasonal increase in radiational heating of the lower Chesapeake Bay during the July to early August time period, have caused SW temperatures to approach the current TS limit of 95°F during each of the last two years. Based upon these isolated peaks in SW temperature, the potential exists for SW temperature to exceed the TS limit in the future. The proposed change will allow continued plant operation with a maximum SW temperature limit of 100°F.

LICENSING BASIS

Surry TS Section 3.8 provides the limiting conditions for operation and the associated action statements to maintain the integrity and operating pressure for the reactor containment. Containment integrity ensures that in the event of a Design Basis Accident (DBA), the release of radioactive material from containment will be restricted to those leakage paths and associated leak rates assumed in the accident analysis.

TS 3.8.D requires that whenever the reactor coolant system temperature and pressure are greater than 350°F and 450 psig, containment air partial pressure will be maintained within the acceptable operating range of TS Figure 3.8-1. As noted in TS Figure 3.8-1, containment air partial pressure is limited by SW temperature, and there are currently no containment air partial pressure limits specified for SW temperatures greater than 95°F. TS 3.8.D.1.a requires air partial pressure to be within acceptable limits within one hour or place the unit in at least Hot Shutdown within the next 6 hours and Cold Shutdown within the following 30 hours.

Section 9.9, Service Water System, of the Surry Updated Final Safety Analysis Report (UFSAR) states that the system is designed for the removal of heat resulting from the simultaneous operation of various systems and components of the two Surry units based on a maximum river water temperature of 95°F.

The SW temperature limit was changed from 92°F to 95°F in 1993 to address previously experienced extended hot weather, minimal rainfall, and low tide that caused the SW temperature to approach the 92°F limit. The increase in the SW temperature limit was incorporated into the Surry TS by Amendments 183/183 dated September 7, 1993, for

Surry Units 1 and 2, respectively. The existing temperature limit of 95°F was set 2°F warmer than the highest river water temperature on record.

DESIGN BASIS

The James River, by way of the intake canal, is the source of water for the Surry SW System and is the UHS for Surry Power Station. Water is pumped from the river to the intake canal by the CW pumps. Three diesel-driven emergency service water (ESW) pumps are also provided to ensure that water can be supplied to the intake canal when power is not available to the CW pumps. Water in the intake canal gravity flows to the high-level intake structure for each unit and enters into the CW System piping. Service water then branches from the CW System piping and flows to the various heat loads and services associated with Units 1 and 2. Service water returns to the James River by way of a discharge tunnel from each unit, which empties into a common discharge canal. A SW System is provided for each unit, and portions of each unit's SW System are common to both units and are designed for the simultaneous operation of various subsystems and components of both units.

The intake canal is elevated and has an intrinsic storage capacity that provides a reservoir of water for the SW and CW Systems. Units 1 and 2 are located at the end of the intake canal approximately 1.5 miles downstream of the intake structure. Water from the intake canal is directed to Units 1 and 2 by CW System lines that originate at the high-level intake structure. SW System piping originates from branches in the 96-inch CW lines upstream of the CW motor-operated valves (MOVs) that supply water to the main condensers.

The SW System supplies cooling water through the plant by way of several supply headers, which can be isolated by hand-operated valves or MOVs. Return headers collect the SW from the cooled components and subsystems and return the water to the James River via the discharge tunnel and the discharge canal. The elevation difference between the intake canal and the discharge tunnel provides the motive force for the flow of the service water to the various loads. Various components are supplied directly by gravity flow, and other components are supplied via booster pumps.

The SW System is required to supply cooling water to safety-related (SR) heat exchangers during accident conditions and abnormal environmental conditions (e.g., hurricane conditions). The SW System provides water for cooling to the following typical components:

1. Recirculation Spray (RS) System heat exchangers (RSHX)

2. Chemical and Volume Control (CH) System charging pump intermediate seal cooler and lube oil coolers

3. Main Control Room and Emergency Switchgear Room Air Conditioning System chiller condensers

4. Component Cooling Water (CC) System heat exchangers

5. Bearing Cooling Water (BC) System heat exchangers

The MOVs that supply and isolate the RS System heat exchangers are normally closed. The MOVs open automatically in the event of a containment atmosphere high-high pressure signal (CLS hi-hi), which indicates a loss of coolant accident (LOCA) or main steam line break (MSLB). The CW System MOVs to the main condensers and the SW System MOVs to the BC system heat exchangers and CC system heat exchangers are normally open. The valves associated with the accident unit close automatically upon a CLS hi-hi signal initiated in the event of a LOCA (or MSLB) that occurs coincident with a loss of offsite power (LOOP) to both units. The SW System is shared between Unit 1 and Unit 2; therefore, it is required to support both the accident unit and the non-accident unit. Should the intake canal drop below the low level setpoint, the turbine would trip, and the CW condenser isolation valves and CC and BC heat exchangers' SW isolation valves would close.

The SW System is a Safety Related (SR) system because its main function is to transfer heat from other SR systems and equipment and reject it to the UHS (i.e., James River). The specific safety functions are:

1. Transfer heat from the RS System to ensure adequate depressurization of containment following a design basis accident.

2. Transfer heat from containment sump fluids (via the RSHXs) to ensure the Safety Injection (SI) System can provide adequate core cooling following a design basis accident.

3. Transfer heat from the Main Control Room (MCR) and Emergency Switchgear Room (ESGR) Air Conditioning System chillers such that MCR and ESGR temperatures are maintained following a design basis accident.

4. Provide cooling to the charging pumps to support their operation following a design basis accident.

5. Provide makeup flow to the Intake Canal such that required flows following a design basis accident can be maintained.

PROPOSED CHANGE

The proposed change will increase the maximum service water temperature limit by 5°F. This will allow continued operation of the station with a SW temperature up to 100°F. TS Figure 3.8-1 is revised to address operation with SW temperatures up to 100°F.

The maximum SW temperature limit in the TS 3.8 basis is also revised from 95°F to 100°F.

TECHNICAL EVALUATION

The following paragraphs provide the technical evaluation of increased SW temperature on affected systems, accident analyses and other considerations.

Component Cooling (CC) Water System

The SW system provides cooling for the CC heat exchangers (CCHX) and the charging pump intermediate seal coolers. The CCHXs were evaluated by limiting the CC outlet temperature to the original design specification limit of 120°F. For the worst-case heat load (normal shutdown of two units following a loss of offsite power) and 100°F SW temperature, three CCHXs have the capacity to support the CC system design requirements.

Equipment supported by the CC system will not be impacted by increasing the SW temperature to 100°F due to the analytical restrictions imposed by this evaluation. In this evaluation the maximum CCHX outlet temperature was constrained to the same value as in previous evaluations in which the SW temperature limit was 95°F. The CC fluid outlet temperature of the CCHXs will be no more than the 120°F currently supplied to CC system loads. As a result there will be no difference in plant response for systems supported by CC due to this proposed increase in SW temperature.

Main Control Room (MCR) and Emergency Switchgear Room (ESGR) Air Conditioning Systems (ACS)

A SW temperature of 100°F will result in a small decrease in capacity of the MCR/ESGR ACS chillers. However, the small decrease in capacity has been evaluated and it has been determined that there is no impact on the ability of the MCR/ESGR ACS to maintain space temperatures within equipment design limits under maximum heat load conditions.

Chemical and Volume Control (CH)

The SW System provides cooling for the charging pump lube oil coolers and intermediate seal coolers. The Lube Oil Coolers and the Intermediate Seal Coolers have been evaluated and shown to provide adequate margin with the SW temperature limit increased to 100°F.

Impact of Increasing SW Temperature on Accident Analyses

The Surry SW system is the heat sink following a design basis loss of coolant accident (LOCA). The SW system provides cooling water for the four containment recirculation spray (RS) heat exchangers. After the containment pressure reaches the Consequence Limiting Safeguards (CLS) setpoint and the refueling water storage tank (RWST) level decreases below 60% wide range level, the four RS pumps receive a start signal. The RS pumps take suction from the containment sump strainer assembly, pass the water through the shell side of the RS heat exchangers, and deposit the water as spray droplets in the containment atmosphere. Containment analyses in the Surry Updated Final Safety Analysis Report (UFSAR) Chapters 5 and 6 were performed to verify that containment design criteria are met and to confirm that available net positive suction head (NPSHa) is greater than required for the RS pumps and the low head safety injection (LHSI) pumps during recirculation mode for operation within the TS 3.8 limits for containment air partial pressure, SW temperature, RWST temperature and containment temperature.

Table 1 describes the effect on the Surry UFSAR containment analysis acceptance criteria from increasing SW temperature above 95°F. The proposed change to increase the SW temperature limit from 95°F to 100°F only adversely impacts the LOCA containment depressurization analyses in UFSAR Section 5.4.2. At high SW temperature, it is more difficult to depressurize the containment atmosphere and reduce sump temperature following a LOCA. To meet the LOCA containment depressurization requirements, the accident analysis requires a reduction in containment air partial pressure as SW temperature increases. This explains the downward sloping line in Fig.4 (proposed TS Figure 3.8-1) above 70°F SW temperature. The LOCA containment peak pressure, MSLB containment peak pressure, and MSLB containment peak temperature analyses are independent of SW temperature, and the NPSHa analyses for the LHSI and RS pumps do not produce limiting results at higher SW temperatures (see Table 1). Therefore, explicit analyses at 100°F SW were not required for those design criteria.

LOCA Containment Depressurization Analyses

To evaluate a SW temperature maximum operating limit of 100°F, LOCA containment depressurization analyses were performed to demonstrate margin to the design requirements for containment integrity, dose consequences, and equipment qualification. The analyses were performed using the GOTHIC analysis methodology outlined in Reference 3, which was approved by the NRC in August 2006 and was applied to the Surry applications that were reviewed by the NRC in Reference 2. The "proposed configuration" analyses that were included in Attachment 1 of Reference 1 were used as the starting point for the analysis. These analyses modeled the new RS pump start logic of CLS High High containment pressure coincident with 60% RWST wide range level. The minimum SW flow rate to each RSHX was confirmed to be bounding for 101°F SW and the assumed RS heat exchanger thermal performance at 101°F was confirmed to be conservative. The objective of the analysis was to identify containment air partial pressure TS upper limits from 70°F to 100°F SW temperature that would continue to meet the containment depressurization requirements.

Separate GOTHIC analyses were performed to determine the maximum containment depressurization time (CDT) and the depressurization peak pressure (DPP). CDT represents the time when containment pressure drops below the pressure at 1 hour that is assumed in the LOCA dose consequences analysis (i.e., 1.0 psig). Maximum initial containment air temperature is generally conservative for determining CDT. When the containment spray (CS) pumps are stopped after RWST depletion, only the RS system provides spray flow to the containment and at higher temperatures than the CS system (the maximum RWST temperature is 45°F). Once CS is terminated, the containment pressure increases from subatmospheric conditions until it reaches the DPP, which is limited by the heat removal capacity of the RS system and the air mass in containment. A minimum initial containment temperature is conservative for the DPP case, because higher initial air mass makes it more difficult to maintain subatmospheric conditions after CS termination. All cases assume a maximum initial RWST volume, which produces the longest time to reach the RS pump actuation setpoint and maximum CDT and DPP.

A proposed TS Figure 3.8-1 is included as Figure 4. The proposed change revises only the TS upper limit that extends from 11.3 psia containment air pressure at 70°F SW to 10.3 psia at 95°F SW. The proposed limit extends from 11.3 psia at 70°F SW to 10.3 psia at 100°F SW. Because the remaining limits in TS Figure 3.8-1 are not modified, the scope of analyses is limited to CDT and DPP analyses between 70°F and 100°F SW. Cases 1 and 2 in Table 3.4-1 of Attachment 1 of Reference 1 documented the results for the TS statepoint of 11.3 psia and 70°F SW. Those cases are not repeated. Cases 3 and 4 in that same table documented results for the TS statepoint of 10.3 psia and 95°F SW. Cases 3 and 4 are repeated in Tables 2 and 3 herein for comparison to the new design cases for a TS limit of 100°F SW.

Table 2 documents three DPP cases that were performed at 101°F, 96°F, and 91°F SW and their corresponding containment air partial pressures along the proposed TS Figure 3.8-1 upper limit. As expected, at the same initial containment air partial pressure of 10.3 psia, a 5°F increase in SW temperature (DPP Case 1 compared to DPP Base Case) increases the containment depressurization time and the DPP from 0.45 psig to 0.58 psig. New cases at 96°F and 91°F were analyzed to demonstrate that reducing SW temperature offsets the higher air pressure from the new limit line. All three DPP cases show little difference in the initial depressurization time to reach 0.0 psig and the DPP value, but they show a clear trend in the final subatmospheric time, with the 101°F case providing the maximum depressurization time of 11,490 seconds. The pressure profiles from the DPP cases remain less than the limit of 1.0 psig during the period of 1 to 4 hours after a LOCA that is assumed in the LOCA Alternate Source Term (AST) analysis that was approved by the NRC in Reference 2.

Table 3 documents three CDT cases that were performed at 101°F, 96°F, and 91°F SW and their corresponding containment air partial pressures along the proposed TS Figure 3.8-1 upper limit. The CDT cases are all subatmospheric before one hour and the DPP is less than 1.0 psig during the period of 1 to 4 hours after a LOCA that is assumed in the LOCA AST analysis that was approved by the NRC in Reference 2.

Figures 1 (containment pressure), 2 (containment vapor and liquid temperature), and 3 (total RS heat exchanger duty) show the behavior of key variables from DPP Case 1 (TS limits of 10.3 psia, 75°F air, 100°F SW), which takes the longest to reach a final subatmospheric state. Table 4 compares the time sequence of events for DPP Case 1 and CDT Case 1 to illustrate the difference in accident response from assuming maximum versus minimum initial containment temperature.

For all cases, the GOTHIC containment pressures are less than the assumed pressures in the LOCA AST analysis in Reference 2. Specifically, the GOTHIC containment pressure is less than 1.0 psig during the period of 1-4 hours after a LOCA and is less than 0.0 psig after 4 hours. In addition, the GOTHIC containment pressure and temperatures increased slightly due to the higher SW temperature, which reduced the heat removal capability of the RS heat exchangers and created slightly higher RS spray temperatures. The GOTHIC containment pressures and temperatures for the LOCA depressurization analyses were confirmed to be bounded by the analyzed limits for environmentally qualified equipment inside containment.

Emergency Service Water Pumps (ESWP)

SW is used to cool the heat exchanger for the water jacket of the diesel engines that power these pumps. Emergency Service Water Pump diesels were evaluated and found to have no significant effects from an increase in the SW temperature limits. Additionally, there were no changes in the requirements for alarms or controls resulting from an increase in the SW temperature limit to 100°F.

Emergency Diesel Generator Cooling

The Emergency Diesel Generator units are air-cooled; therefore there is no impact on their performance due to the increase in the maximum SW temperature limits.

Service Water Related NPSH Pump Requirements

Calculations were reviewed with respect to the NPSH requirements of pumps that are supplied with Service Water. With the increase in the SW temperature limit to 100°F, the vapor pressure of the water being supplied to these pumps decreases slightly. However, the small decrease in vapor pressure has been evaluated and it has been determined that the small decrease in NPSH which results from the proposed SW temperature limit increase remains within the NPSH margins available.

Environmental Qualification

The temperature effect of the increase in the SW temperature limit to 100°F has no significant impact on the rooms where the SW and CW lines are located. These rooms are already evaluated for room temperatures at 100°F or above. Therefore, the increase in SW and CW line temperatures resulting from the increase in the maximum SW temperature limit to 100°F will have no impact on these environments or their equipment. During the anticipated brief periods of operation at the elevated SW and CW operating temperature, the increase in normal ambient temperatures in various areas of the plant should be less than 1 to 2°F. This 1 to 2°F short term increase has an insignificant effect on the aging calculations performed on the associated EQ equipment and is bounded in the ambient temperature margin used in the calculations.

The Surry containment analysis for a maximum SW limit of 100°F shows that the containment depressurization analysis requirements are met for operation in accordance with the proposed TS Figure 3.8-1 with a maximum SW temperature of 100°F at a maximum containment air partial pressure of 10.3 psia. The GOTHIC containment pressure and temperature profiles were also shown to be bounded by the containment equipment qualification (EQ) limits.

Fire Protection/Appendix "R"

The Licensing Basis for the Surry Power Station is to achieve cold shutdown conditions within 72 hours following an Appendix R event. This requirement will continue to be met with an increased service water temperature limit of 100°F. Section 5 of the Appendix R report describes four limiting fires:

1. Inside the reactor containment (unit specific).
2. Outside the reactor containment (common to both units). This includes portions of the Auxiliary Building and Turbine Building.
3. Outside the reactor containment (unit specific) such as the Cable Vault and Tunnel, Emergency Switchgear Rooms, and Main Steam Valve House.
4. Control Room (common to both units).

None of the analyses for these postulated fires are affected by the increased maximum SW temperature limit. Therefore, Appendix R requirements will continue to be met with an increase in the maximum SW temperature limit to 100°F.

Piping Stress Analysis

The stress analysis for all piping influenced by SW has been reviewed with particular focus on the safety related fiberglass piping. The safety related fiberglass piping has the most limiting stress margins of any of the piping at Surry related to the increase in the maximum SW temperature limit to 100°F. The fiberglass piping has been evaluated for the increase in the maximum SW temperature limit and has been determined to be acceptable.

Impact on GL 96-06 Evaluations of the Component Cooling System

The CC system head tank elevation and piping arrangement provides adequate head to ensure that there is no potential voiding in the CC system inside of containment. CC system fluid temperature will not increase over the existing evaluated temperature values; therefore, piping penetrations supplied by the CC system will not be impacted.

Impact on Station Blackout

The Emergency Diesel Generators (EDG) and the Station Blackout (SBO) Diesel Generators are air-cooled and are not affected by increased SW temperature. Increasing the maximum SW temperature limit to 100°F does not impose any additional requirements on the assumptions pertaining to the station black out requirements. Therefore, no adjustments to plant-specific assumptions related to station blackout were found to be necessary during the evaluation of the plant response to a rise in the maximum SW temperature limit to 100°F.

Impact on Spent Fuel Pool Cooling

Spent Fuel Pool cooling is supported by the CC system and will not be impacted by an increase in the maximum SW temperature limit to 100°F. In the evaluation of the CC system, the maximum CC fluid temperature was constrained to the same value as in the previous evaluations based upon a SW temperature limit of 95°F. The CCHX outlet side temperature will be no more than 120°F as currently supplied to the CC system loads. As a result, there is no difference in how the Spent Fuel Pool Cooling system responds due to the increase in the maximum SW temperature limit to 100°F.

Impact on Shutdown Cooling

The Component Cooling System when supplied with Service Water at 100°F can continue to cool down Surry Units 1 and 2 within the existing Technical Specification requirements. The CC system was evaluated to demonstrate that the CC system remains capable of cooling down the units within TS limits given the restrictions imposed on this evaluation (i.e., CCHX maximum CC outlet temperature was not allowed to increase beyond 120°F as SW inlet increased to the proposed maximum temperature limit of 100°F).

Environmental Considerations

There are no changes in the plant thermal discharge limits as a result of a change in the SW temperature limit to 100°F. Plant discharge limits are a function of the quantity of heat rejected into the UHS during plant operations and are not temperature limited. The Surry discharge permit limits waste heat rejected to the James River from Surry to 12.6×10^9 Btu/hr, but does not require the reporting of discharge temperatures. The quantity of heat being rejected into the UHS will not change due to the increase in allowable SW temperature limits. Studies show that elevated temperatures in the James River due to the thermal discharge dissipate from 1 to 2°F for every 1000 feet from the discharge point. Although the thermal plume is shown to remain close to the shore extending around Hog Island on an ebb tide, with approximately six miles between the discharge and intake, little if any thermal effects at the intake are expected from the discharge.

NUREG-1431 CONSIDERATIONS

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: Surry does not propose to use a time-weighted temperature averaging approach for verifying TS compliance. Instead, the proposed TS limit of 100°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 101°F, which includes 1°F instrument uncertainty above the proposed TS limit of 100°F, for the duration of the analyses. The current instrument uncertainty is 0.96°F for each of four SW temperature indicators on each unit. The operators can average the four indicators to reduce the uncertainty to 0.48°F (0.96°F divided by the square root of 4 channels). Thus, the engineering analysis assumption of 1°F is conservative compared to the uncertainty for a single indicator and for the average of all four indicators.

Consideration: When the UHS is at the proposed maximum allowed value of 100°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: All equipment and systems that interface with the SW system have been evaluated for the increase in service temperature to 100°F. The evaluation determined that the systems supported by the SW system can support plant operations at the increased temperature. The LOCA containment analysis (previously discussed) confirmed the accident response at an increased SW temperature is bounded by the LOCA AST analysis approved by the NRC in Reference 2. There are no changes in expected alarms or limiting conditions that result from increasing in the maximum SW temperature limit to 100°F. Equipment supported by the Component Cooling System will not be impacted due to the restrictions imposed upon the CC system during the evaluation of the increase in the maximum SW temperature limit to 100°F.

Consideration: Plant-specific assumptions, such as those that were credited in addressing station blackout and Generic Letter 96-06, have been adjusted (as necessary) to be consistent with the maximum allowed SW temperature of 100°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 100°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 as specified in the Surry Power Station discharge permit in response to an increase in the maximum SW temperature limit to 100°F. Plant discharge limits are a function of the quantity of heat rejected into the UHS during plant operations and are not temperature limited. The quantity of heat being rejected into the UHS will not change due to the increase in allowable SW temperature. Studies show that elevated temperatures in the James River due to the thermal discharge dissipate from 1 to 2°F for every 1000 feet from the discharge point. Although the thermal plume is shown to remain close to the shore extending around Hog Island on an ebb tide, with approximately six miles between the discharge and intake, little if any thermal effects at the intake are expected from the discharge.

Technical Evaluation Conclusions

The TS 3.8 containment air partial pressure limits of 10.1-10.3 psia at 95°F SW that were approved in Reference 2 can be shifted to 100°F with a small reduction in LOCA containment depressurization margin. Figure 4 documents the proposed TS Figure 3.8-1 with changes to the maximum containment air partial pressure limits from 70°F to 100°F SW and the minimum limit of 10.1 psia from 95°F to 100°F SW. GOTHIC containment analyses demonstrate that containment design criteria continue to be satisfied for these changes. The LOCA containment pressure profile is less than 1.0 psig from 1-4 hours and is subatmospheric after 4 hours, so the LOCA AST analysis in Reference 2 remains bounding. Further, the GOTHIC containment pressure and temperature profiles are within the analyzed limits for environmentally qualified equipment inside containment.

Based on the evaluation of the effect on station systems and components, operation with a maximum SW temperature limit of 100°F is acceptable.

REGULATORY SAFETY ANALYSIS

Significant Hazards Consideration (SHC)

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

   Operating with increased maximum service water temperature limits does not affect the frequency of accident initiating events. Therefore, the probability of an accident previously analyzed is not increased. Plant systems supported by SW have been evaluated for operation with a service water temperature limit of 100°F, and it determined that there is no operational impact when operating at the higher SW temperature.

Although the service water temperature limit is being increased, the containment will continue to meet its design basis acceptance criteria following a large-break loss of coolant accident as identified in the UFSAR. Therefore, there is no increase in the consequences of any accident previously evaluated resulting from operation of Surry Units 1 and 2 with an increased service water temperature limit.

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

   There are no new failure modes or mechanisms associated with operating Surry Units 1 and 2 with an increased service water temperature limit of 100°F. As noted above, the increased service water temperature limit does not affect plant operation, since plant systems supported by SW have been evaluated for operation with a SW temperature limit of 100°F and no operational impact was identified. Therefore, there are no new or different kinds of accidents created by operation of Surry Units 1 and 2 with increased service water temperature limits.

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

   The containment analysis acceptance criteria continue to be met when operating with the proposed increased maximum service water temperature limit. Containment integrity will not be challenged and will continue to meet its design basis acceptance criteria following a large break loss of coolant accident. Therefore, the existing margin of safety is not significantly reduced by operation of Surry Units 1 and 2 with increased service water temperature limits.

ENVIRONMENTAL ASSESSMENT

This amendment request meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) as follows:

(i) The amendment involves no significant hazards consideration.

    As described above, the proposed change involves no significant hazards consideration.

(ii) There is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite.

The proposed change does not involve the installation of any new equipment, or the modification of any equipment that may affect the types or amounts of effluents that may be released offsite. Therefore, there is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite.

(iii) There is no significant increase in individual or cumulative occupation radiation exposure.

The proposed change does not involve plant physical changes, or introduce any new mode of plant operation. Therefore, there is no significant increase in individual or cumulative occupational radiation exposure.

Based on the above, Dominion concludes that the proposed changes meet the criteria specified in 10 CFR 51.22 for a categorical exclusion from the requirements of 10 CFR 51.22 relative to requiring a specific environmental assessment by the Commission.

Conclusion

The proposed increase in the maximum SW temperature limit is required due to the potential for isolated peaks in the intake temperature from the James River, which is the UHS and the source for the Surry CW and SW systems. The Surry containment response analysis was re-performed and it was determined that Surry will continue to meet the applicable acceptance criteria while accommodating a maximum operating SW temperature limit of 100°F. Plant systems that could potentially be affected by the increased maximum SW temperature limit were also evaluated for integrity and performance at a SW temperature of 100°F during operation for both full power and accident conditions and were determined to be acceptable.

REFERENCES

1. Letter from Leslie N. Hartz (Dominion) to USNRC, "Virginia Electric and Power Company, Surry Power Station Units 1 and 2, Proposed Technical Specification Change and Supporting Safety Analyses Revisions to Address Generic Safety Issue 191, "Serial No. 06-014, January 31, 2006.

2. Letter from Siva P. Lingam (USNRC) to David A. Christian (Dominion), "Surry Power Station, Unit Nos. 1 and 2 – Issuance of Amendments Regarding Implementation of Generic Safety Issue 191 (TAC Nos. MC9724 and MC9725)," October 12, 2006.

3. Dominion Topical Report DOM-NAF-3-0.0-P-A, "GOTHIC Methodology for Analyzing the Response to Postulated Pipe Ruptures Inside Containment," September 2006.

4. Letter from Bart C. Buckley of the USNRC to W. L. Stewart of Virginia Electric and Power Company dated September 7, 1993, "Subject: Surry Units 1 and 2 – Issuance of Amendments Re: Service Water Temperature Limit (TAC NOS. M86944 and M86945)."

Table 1: Impact of SW Temperature > 95°F on Containment Design Analyses

Acceptance Criterion	UFSAR Section	Impact of SW Temperature > 95°F
LOCA peak containment pressure and temperature	5.4.2	Peak pressure and temperature occur before RS system actuation and are independent of SW temperature
LOCA containment depressurization	5.4.2	Increasing SW temperature will reduce effectiveness of RS heat exchangers, increase containment pressures and temperatures, and increase final containment depressurization time to subatmospheric
MSLB peak containment pressure and temperature	5.4.3	MSLB analyses do not credit the RS system, so SW changes do not change the analysis
NPSHa for the LHSI pumps	6.2.3.11.1	NPSHa is limiting for 45°F -70°F SW and increases for SW temperature above 70°F due to higher containment backpressure from warmer RS spray; 100°F is non-limiting
NPSHa for the RS pumps	6.2.3.11.3	NPSHa is limiting at minimum (25°F) SW temperature

Table 2: GOTHIC Results for LOCA Depressurization Peak Pressure Analysis

	Case 4 from Table 3.4-1 in Reference 1*	DPP Case 1	DPP Case 2	DPP Case 3
TS Initial Air Partial Pressure, psia	10.3	10.3	10.467**	10.633**
TS Initial Air Temperature, °F	75.0	75.0	75.0	75.0
Relative Humidity	100%	100%	100%	100%
Initial Total Pressure in GOTHIC, psia (includes 0.25 psi uncertainty)	10.97	10.97	11.137	11.303
TS SW Temperature, °F	95.0	100.0	95.0**	90.0**
GOTHIC SW Temperature, °F	96.0	101.0	96.0	91.0
Results				
Containment Pressure < 1.0 psig	3024 sec	3080 sec	3079 sec	3076 sec
Containment Pressure < 0.0 psig	3358 sec	3432 sec	3431 sec	3438 sec
Containment Pressure at 1 hour	-0.69 psig#	-0.51 psig	-0.50 psig	-0.50 psig
Depressurization Peak Pressure (DPP)	0.45 psig	0.58 psig	0.63 psig	0.55 psig
Time of DPP	5121 sec	5425 sec	5047 sec	4988 sec
Time < 0.0 psig permanently	8268 sec	11,490 sec	9479 sec	8613 sec

* This case provided the limiting depressurization peak pressure and final depressurization time to subatmospheric conditions for operation within the TS Figure 3.8-1 that was submitted to the NRC in Reference 1 and approved in Reference 2.

** For these cases along the proposed TS limit line that runs from 11.3 psia at 70°F to 10.3 psia at 100°F, the air partial pressure limit is derived by linear interpolation. The case at 96°F produces a more limiting DPP than the case at 101°F, because the increase in initial air mass is not fully offset by the 5°F reduction in SW temperature.

\# This data point was not provided in Reference 1 but is included here for comparison to the containment pressures from the new analyses.

Table 3: GOTHIC Results for LOCA Containment Depressurization Time (CDT) Analysis

TS SW Limit →	Case 3 from Table 3.4-1 in Reference 1*	CDT Case 1	CDT Case 2	CDT Case 3
TS Initial Air Partial Pressure, psia	10.3	10.3	10.467**	10.633**
TS Initial Air Temperature, °F	125.0	125.0	125.0	125.0
Relative Humidity	100%	100%	100%	100%
Initial Total Pressure in GOTHIC, psia (includes 0.25 psi uncertainty)	12.52	12.52	12.687	12.853
TS SW Temperature, °F	95.0	100.0	95.0**	90.0**
GOTHIC SW Temperature, °F	96.0	101.0	96.0	91.0
Results				
Containment Pressure < 1.0 psig	3099 sec	3149 sec	3138 sec	3148 sec
Containment Pressure < 0.0 psig	3362 sec	3420 sec	3409 sec	3424 sec
Containment Pressure at 1 hour	-0.78 psig#	-0.63 psig	-0.67 psig	-0.52 psig
Depressurization Peak Pressure (DPP)	-0.10 psig	0.20 psig	0.06 psig	-0.05 psig
Time of DPP	5145 sec	5215 sec	5207 sec	5084 sec
Time < 0.0 psig permanently	3376 sec	6843 sec	5872 sec	3424 sec

* This case provided the limiting containment depressurization time for operation within the TS Figure 3.8-1 that was submitted to the NRC in Reference 1 and approved in Reference 2.

** For these cases along the proposed TS limit line that runs from 11.3 psia at 70°F to 10.3 psia at 100°F, the air partial pressure is derived by linear interpolation.

This data point was not provided in Reference 1 but is included here for comparison to the containment pressures from the new analyses.

Table 4: Accident Chronology for LOCA Depressurization Analyses with 100°F SW Limit

	CDT Case 1	DPP Case 1
Initial Conditions*		
TS Containment Air Partial Pressure, psia	10.3	10.3
Initial Containment Total Pressure, psia	12.52	10.97
TS Containment Air Temperature, °F	125.0	75.0
TS Service Water Temperature, °F	100.0	100.0
Event	**Time (seconds)**	
Accident Start	0.0	0.0
CLS High High Pressure	2.1	2.3
Start SI	22.6	22.6
CS flow reaches containment	99.1	99.3
IRS pump starts at 57.5% level + 10 sec	1792	1758
IRS spray delivered to containment	1867	1832
ORS pump starts at 57.5% level + 142 seconds	1924	1890
ORS spray delivered to containment	2007	1978
Containment pressure reaches 14.7 psia	3420	3432
Switchover to SI recirculation	3776	3735
Containment spray pumps stopped	4343	4304
Depressurization peak pressure occurs	5215	5425
Containment pressure < 14.7 psia permanently	6843	11,490

* Analyses include uncertainties of 0.25 psi air pressure, 0.5°F air temperature, and 1.0°F SW temperature. Vapor pressure is 1.97 psia at 125.5°F and 0.42 psia at 74.5°F.

Figure 1: Containment Pressure from DPP Case 1 (10.3 psia, 100°F SW, 75°F air)

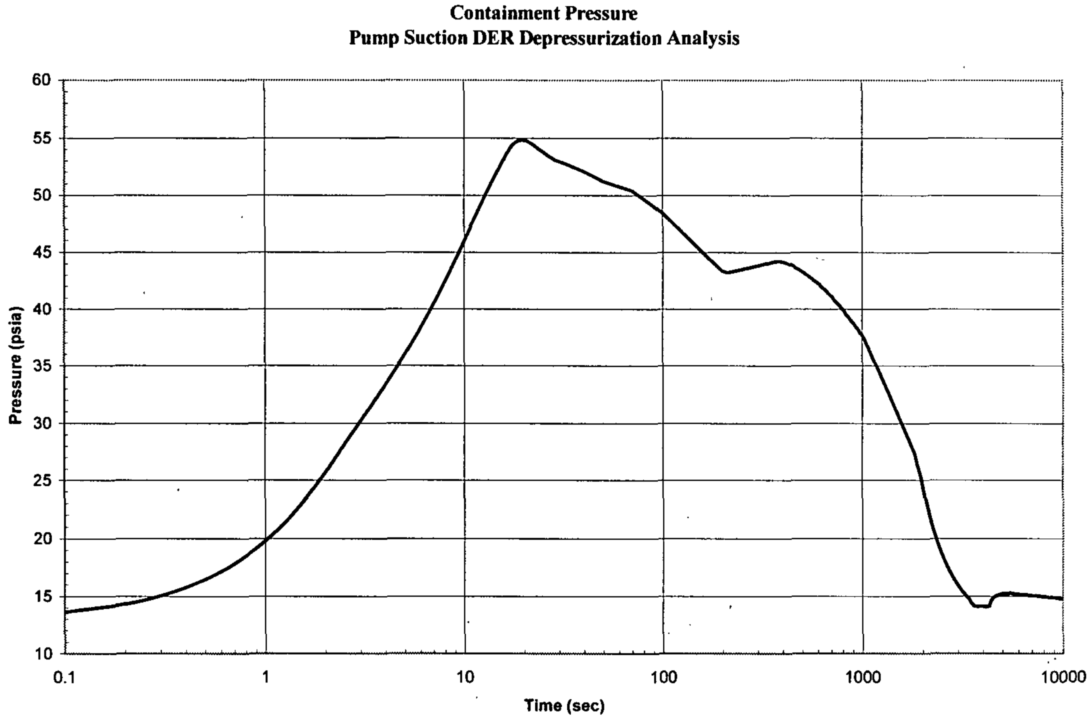


Figure 2: Containment Temperatures from DPP Case 1 (10.3 psia, 100°F SW, 75°F air)

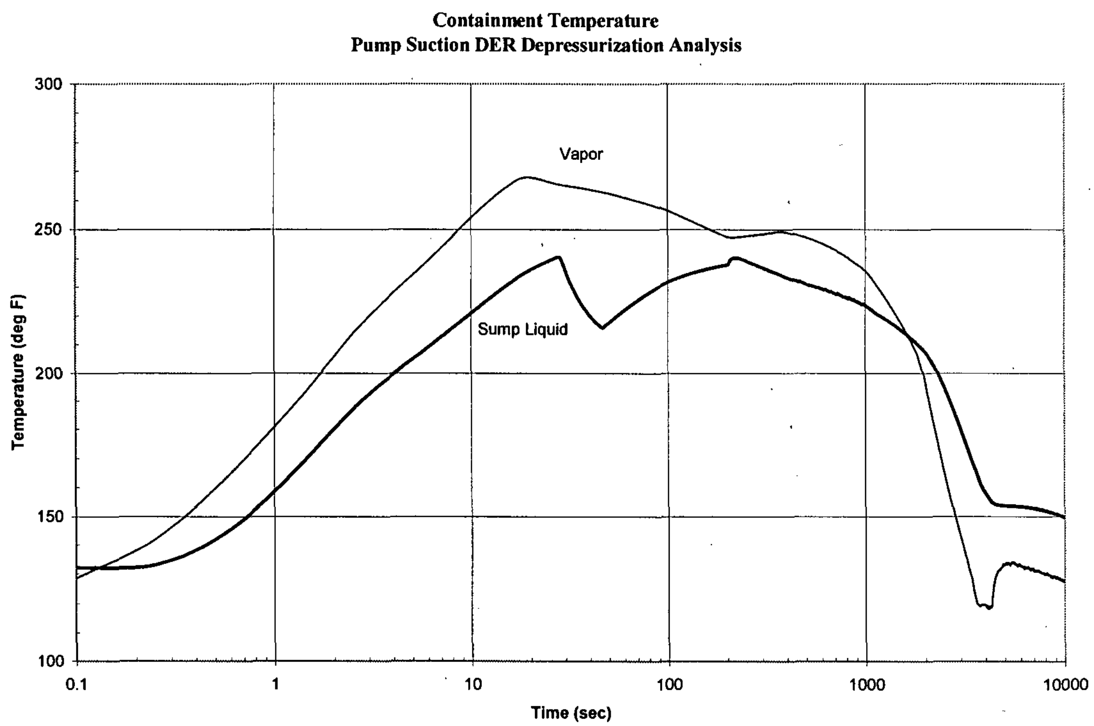


Figure 3: RS Heat Exchanger Heat Rate from DPP Case 1 (10.3 psia, 100°F SW, 75°F air)

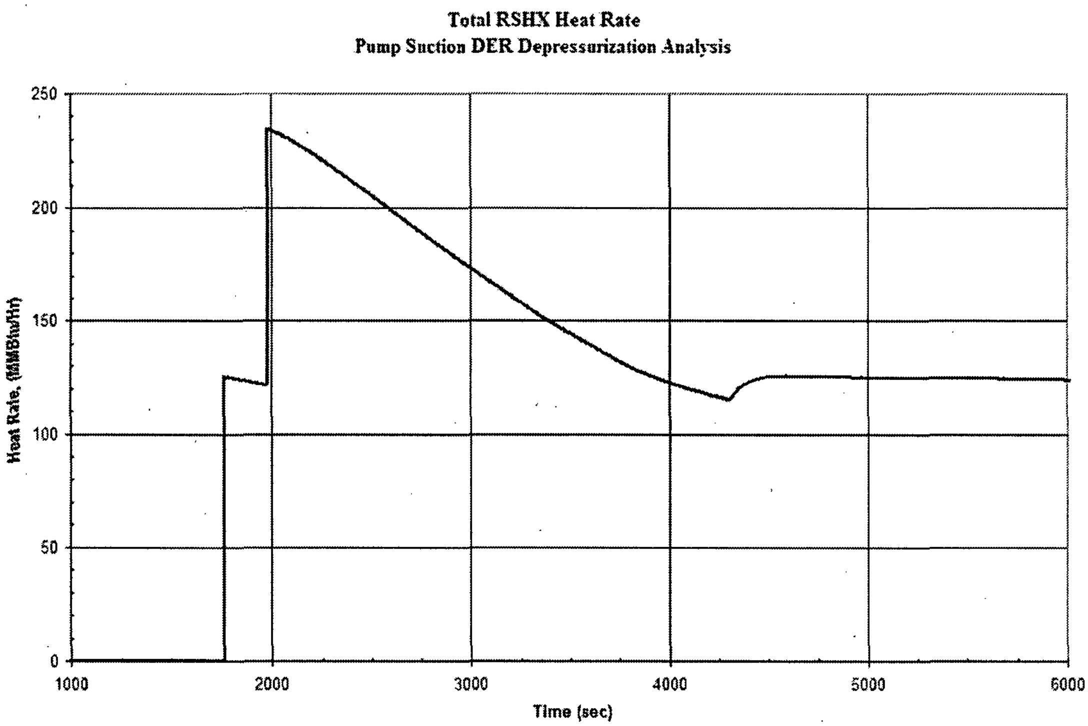
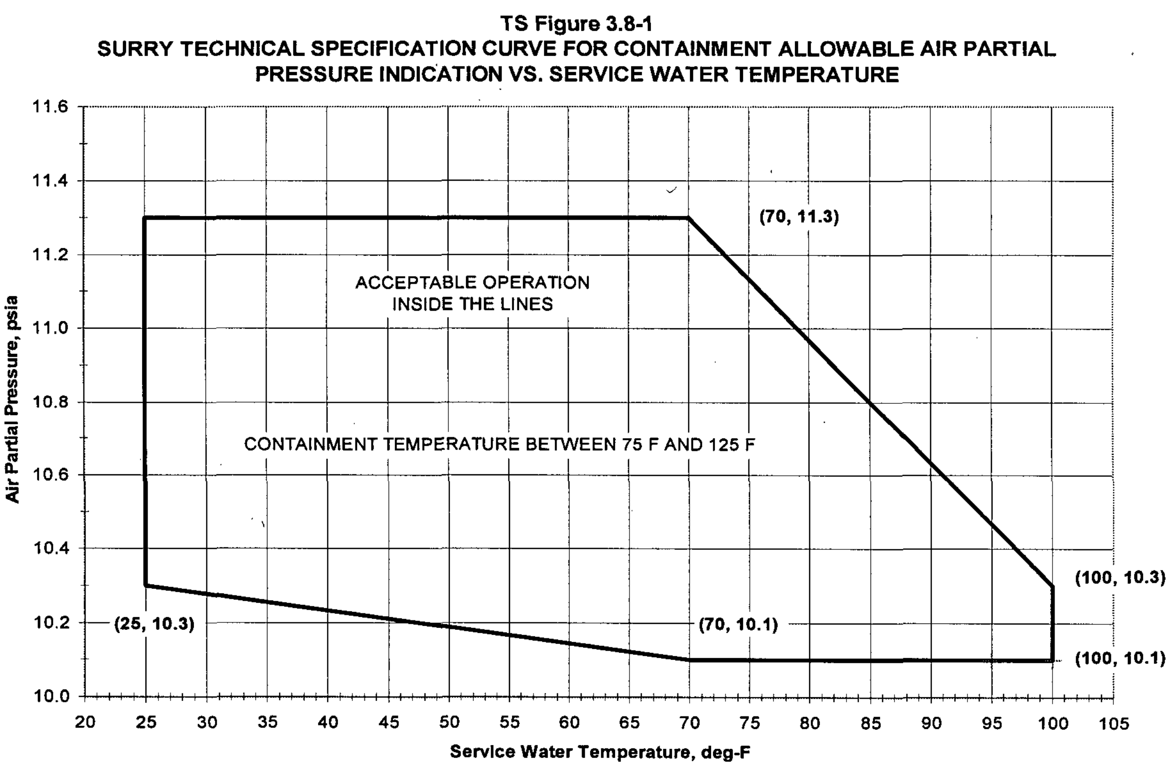


Figure 4: Proposed TS Figure 3.8-1 with Revised Containment Air Partial Pressure Upper Limits from 70°F to 100°F



ATTACHMENT 2

PROPOSED TECHNICAL SPECIFICATIONS PAGES (MARK-UP)

Virginia Electric and Power Company
(Dominion)
Surry Power Station Units 1 and 2

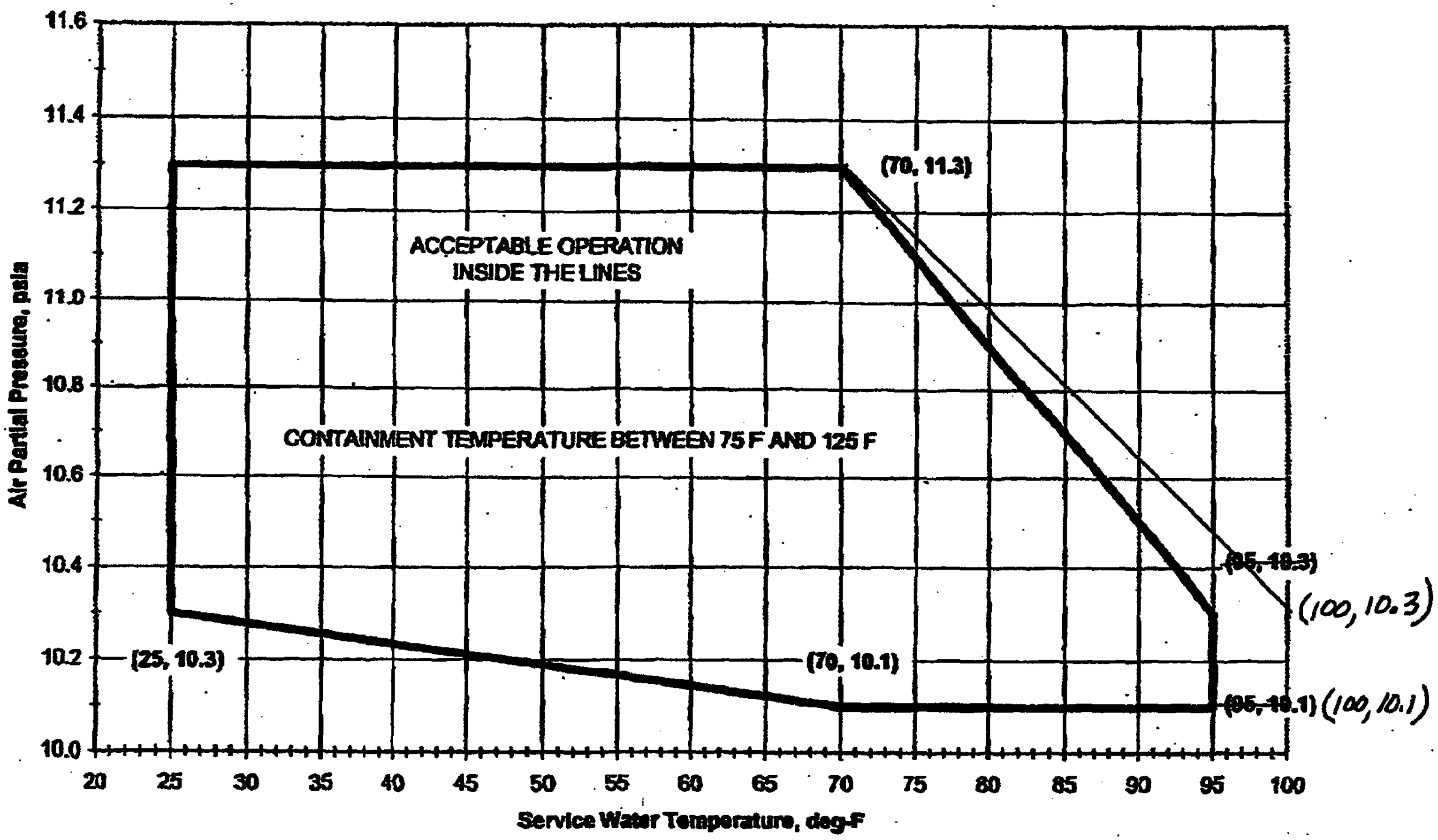
(3) assuring that environmental conditions will not preclude access to close the valves and 4) that this administrative or manual action will prevent the release of radioactivity outside the containment.

The Reactor Coolant System temperature and pressure being below 350°F and 450 psig, respectively, ensures that no significant amount of flashing steam will be formed and hence that there would be no significant pressure buildup in the containment if there is a loss-of-coolant accident. Therefore, the containment internal pressure is not required to be subatmospheric prior to exceeding 350°F and 450 psig.

The allowable value for the containment air partial pressure is presented in TS Figure 3.8-1 for service water temperatures from 25 to ~~95~~ 100°F. The RWST water shall have a maximum temperature of 45°F.

The horizontal upper limit line in TS Figure 3.8-1 is based on MSLB peak calculated pressure criteria, and the sloped line from 70°F to ~~95~~ 100°F service water temperatures is based on LOCA depressurization criteria.

SURRY TECHNICAL SPECIFICATION CURVE FOR CONTAINMENT ALLOWABLE AIR PARTIAL PRESSURE INDICATION VS. SERVICE WATER TEMPERATURE



NOTE: OPERATION ON OR OUTSIDE THE LINE REQUIRES ENTRY INTO TS 3.8.D.1.a

Amendment Nos. 250, 249

ATTACHMENT 3

PROPOSED TECHNICAL SPECIFICATIONS PAGES (TYPED)

Virginia Electric and Power Company
(Dominion)
Surry Power Station Units 1 and 2

(3) assuring that environmental conditions will not preclude access to close the valves and 4) that this administrative or manual action will prevent the release of radioactivity outside the containment.

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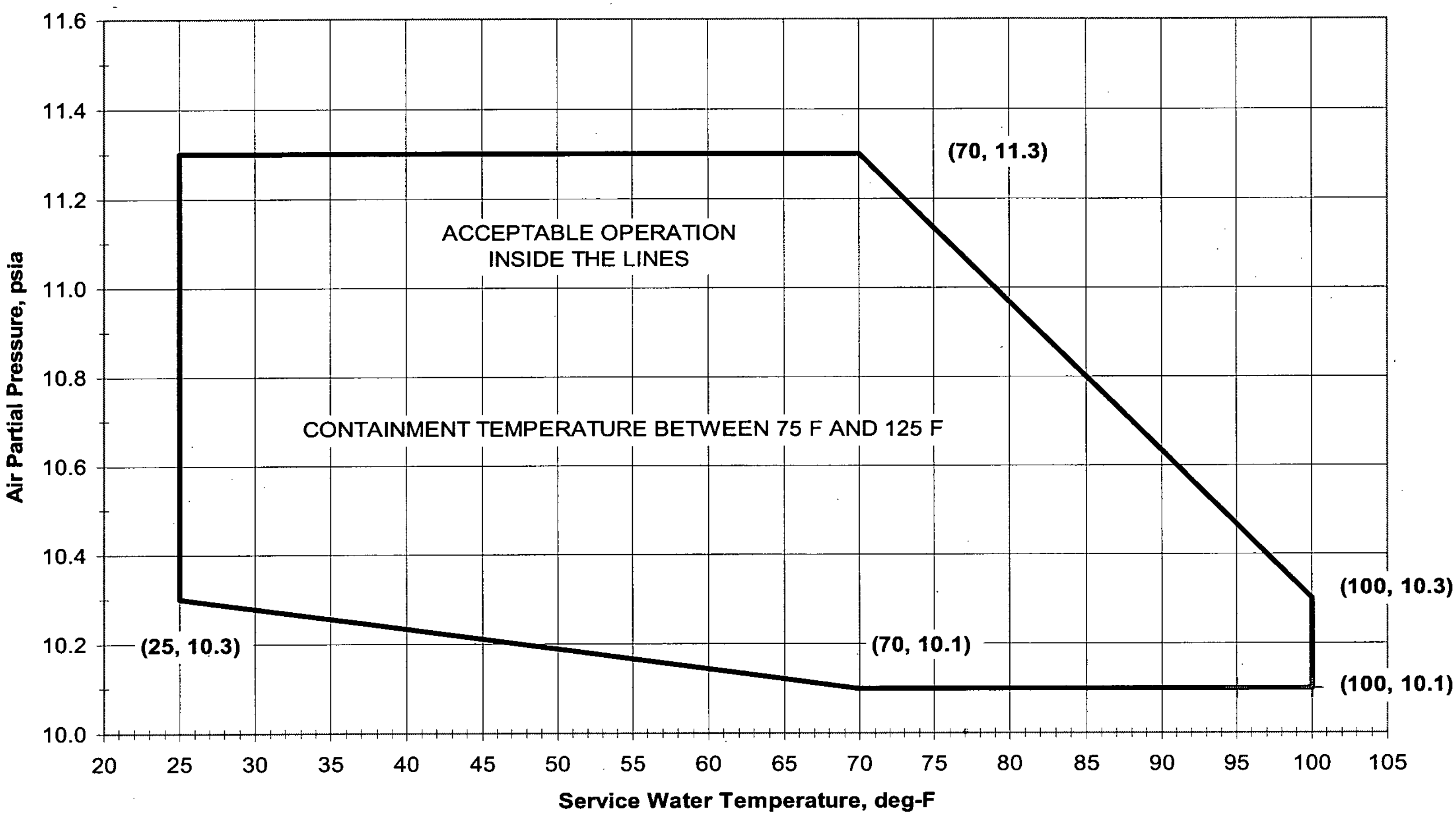
The horizontal upper limit line in TS Figure 3.8-1 is based on MSLB peak calculated pressure criteria, and the sloped line from 70°F to 100°F service water temperatures is based on LOCA depressurization criteria.

SURRY TECHNICAL SPECIFICATION CURVE FOR CONTAINMENT
ALLOWABLE AIR PARTIAL PRESSURE INDICATION VS. SERVICE WATER TEMPERATURE



Note: Operation on or outside the line requires entry into TS 3.8.D.1.a