Nebraska Public Power District
Nebraska's Energy Leader

NLS2002008
May 20, 2002

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

Gentlemen:

Subject: License Amendment Request to Revise the Ultimate Heat Sink and Reactor Equipment Cooling Water Temperature Requirements
Cooper Nuclear Station, Docket 50-298, DPR-46

References:

1. Letter from J. H. Swailes (Nebraska Public Power District) to U. S. Nuclear Regulatory Commission dated July 30, 2001, "Proposed License Amendment Related to Emergency Core Cooling System Pump Net Positive Suction Head Requirements."

2. Letter from David L. Wilson (Nebraska Public Power District) to U. S. Nuclear Regulatory Commission dated January 21, 2002, "Proposed License Amendment Related to Reactor Equipment Cooling (REC) Surge Tank Level Surveillance Requirement (SR) 3.7.3.1."

The purpose of this letter is for the Nebraska Public Power District (NPPD) to request an amendment to Facility Operating License DPR-46 in accordance with the provisions of 10 CFR 50.4 and 10 CFR 50.90 to revise the Cooper Nuclear Station (CNS) Technical Specifications (TS). The proposed TS change is to increase the cooling water temperature limits of TS Sections 3.7.2, "Service Water (SW) System and Ultimate Heat Sink (UHS)," and 3.7.3, "Reactor Equipment Cooling (REC) System." This change is supported by revised accident analyses using these increased initial cooling water temperatures for the SW and REC functions for mitigation of the design basis events evaluated in the Updated Safety Analysis Report.

The Missouri River is the UHS for CNS. Data from 1994 to the present indicates that the temperature of the Missouri River has been slowly trending upward. During recent summers the temperature of the river has increased to very near the current limit of 90°F.

The U.S. Army Corps of Engineers (Corps) manages the flow of the Missouri River. The Corps is considering various alternatives for managing this flow. Several of the alternatives under consideration would result in reduced river flows during the summer months. This reduced flow is expected to exacerbate the increases in river temperature. The alternatives under consideration were published for public review and comment. The Corps is expected to select the preferred alternative in May 2002, and to implement that alternative in March 2003.

Cooper Nuclear Station
P.O. Box 98 / Brownville, NE 68321-0098
Telephone: *(402) 825-3811 /* ***Fax:*** *(402) 825-5211*
http://www.nppd.com

A001

NPPD considers it possible that the river temperature could exceed 90°F at some time in the future. The CNS TS require CNS to commence a shutdown of the plant in the event that this limit is exceeded. Revised safety analyses have demonstrated that CNS can continue to adequately mitigate postulated accidents with the limit increased to 95°F. Therefore, shutdown would not be necessary to ensure continued protection of public health and safety. Generally, peak electrical loads are experienced during these periods of hot weather, with attendant need for continued operation of CNS. This requested license amendment is needed to preclude a potential, unnecessary shutdown of CNS, at a time when its continued operation is expected to be needed to meet regional demand for power.

In Reference 1, NPPD submitted for U.S. Nuclear Regulatory Commission (NRC) review a proposed license amendment request (LAR) to change the licensing basis with respect to the containment over pressure contribution to emergency core cooling system (ECCS) pump net positive suction head (NPSH) requirements. Analyses included with that LAR demonstrated that adequate ECCS pump NPSH is available with SW at the increased temperature proposed by this LAR. Because the Reference 1 LAR supports this request, it must be reviewed in conjunction with the attached request. Therefore, NPPD requests that the LAR submitted by Reference 1 be approved concurrent with the LAR submitted by this letter.

Attachment 1 provides a description of the amendment request, the basis for the amendment, the no significant hazards consideration evaluation pursuant to 10 CFR 50.91(a)(1) and 50.92, and the environmental impact evaluation pursuant to 10 CFR 51.22. Attachment 2 provides the proposed changes to the current TS and Bases pages in markup format. Attachment 3 provides the proposed changes to the TS and Bases pages in final typed format. Attachment 4 provides a discussion of the temperature limits contained in the CNS National Pollutant Discharge Elimination System permit.

NPPD requests NRC approval of the proposed TS change and issue of the requested amendment by July 10, 2002. NPPD requests a 30-day period for implementation of the amendment. The temperature of the Missouri River begins to closely approach the current limit of 90°F in July. Issue of the amendment by July 10, 2002, is needed to avoid the potential for a plant shutdown required by CNS TS as discussed above. If unseasonably hot weather occurs and the temperature of the river closely approaches the TS limits sooner than early July, NPPD would request that this amendment application be approved and issued as an emergency or exigent license amendment in accordance with the provisions of 10 CFR 50.91(a). NPPD will coordinate the timing of the amendment issuance with the NRC Project Manager.

The proposed changes have been reviewed by the necessary safety review committees (Station Operations Review Committee and Safety Review and Audit Board). Amendments to the CNS Facility Operating License through Amendment 191, issued May 9, 2002, have been incorporated into this request. This request is submitted under oath pursuant to 10 CFR 50.30(b). NPPD has concluded that the proposed changes do not involve a significant hazards consideration.

The Reference 2 letter submitted a LAR, not yet approved by the NRC, that proposed revision of TS Surveillance Requirement SR 3.7.3.1 regarding REC surge tank level monitoring. Although unrelated to the increase in UHS and REC temperature limits proposed by this LAR, that proposed revision affected the same TS page. NPPD will interface with the NRC Project Manager for CNS, as necessary, to ensure that changes to the REC TS section are properly coordinated.

By copy of this letter and attachments the appropriate State of Nebraska official is being notified in accordance with 10 CFR 50.91(b)(1). Copies are being sent to the Region IV Office and the CNS Resident Inspector in accordance with 10 CFR 50.4(b)(1).

Should you have any questions concerning this matter, please contact Paul V. Fleming at (402) 825-2774.

Sincerely,

Michael T. Coyle
Site Vice President

/rer

Attachments

cc: Regional Administrator w/ attachments
USNRC - Region IV

Senior Project Manager w/ attachments
USNRC - NRR Project Directorate IV-1

Senior Resident Inspector w/ attachments
USNRC

Nebraska Health and Human Services w/ attachments
Department of Regulation and Licensure

NPG Distribution w/o attachments

Records w/ attachments

AFFIDAVIT

STATE OF NEBRASKA)
)
NEMAHA COUNTY)

Michael T. Coyle, being first duly sworn, deposes and says that he is an authorized representative of the Nebraska Public Power District, a public corporation and political subdivision of the State of Nebraska; that he is duly authorized to submit this correspondence on behalf of Nebraska Public Power District; and that the statements contained herein are true to the best of his knowledge and belief.

Michael T. Coyle

Michael T. Coyle

Subscribed in my presence and sworn to before me this 20 day of May, 2002.

Wilma M Werner

NOTARY PUBLIC

Wilma M. Werner
General Notary
State of Nebraska
My Commission Expires Oct. 26, 2002

ATTACHMENT 1

LICENSE AMENDMENT REQUEST TO REVISE THE ULTIMATE HEAT SINK (UHS) AND REACTOR EQUIPMENT COOLING (REC) WATER TEMPERATURE REQUIREMENTS

Cooper Nuclear Station, Docket 50-298, DPR-46

<u>Revised TS Pages</u>
3.7-4
3.7-7

<u>Revised Bases Pages</u>
B 3.7-7
B 3.7-13

1.0 INTRODUCTION

The Nebraska Public Power District (NPPD) requests the U. S. Nuclear Regulatory Commission (NRC) review and approval of a proposed license amendment to Facility Operating License No. DPR-46 for Cooper Nuclear Station (CNS). The proposed changes are to revise the CNS Technical Specifications (TS) to increase the temperature limits for the Ultimate Heat Sink (UHS) and the supply side of the Reactor Equipment Cooling (REC) System by 5 degrees Fahrenheit (°F).

In recent years the UHS and REC 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 the Missouri River, the UHS for CNS. This proposed license amendment to increase the limits has been developed in anticipation that the current limits could be exceeded at some time in the future. This license amendment is needed to prevent an unnecessary plant shutdown during severe hot weather periods.

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

For essential equipment, the following areas were evaluated:

1. Containment analyses for design basis Loss of Coolant Accident (LOCA),
2. Safe Shutdown Analysis in accordance with 10 CFR Part 50 Appendix R
3. Anticipated Transient Without Scram (ATWS) analysis
4. Net Positive Suction Head (NPSH) of Emergency Core Cooling System (ECCS) pumps
5. Local Suppression Pool Temperature Limit (LSPTL)
6. Small Steam Line Break
7. Ability to provide adequate cooling of the Emergency Diesel Generators
8. Capability of SW to provide a heat sink for REC and capability of REC to provide ECCS area cooling
9. SW Backup to REC
10. Environmental Qualification
11. Net Positive Suction Head for SW and REC Pumps
12. Higher Temperature on Piping

13. Higher Temperature on Residual Heat Removal (RHR) and Core Spray (CS) Pump Seals
14. Common Mode Failure Analysis Discussion on SW Pump Room Maximum Allowed Temperature

The impacts of the 95°F SW supply on non-essential components include the following:

1. Back-up Cooling Water Supply to the SW Booster Pump Room Fan Coil Unit
2. Control Room Air Conditioning Unit Cooling
3. Turbine Equipment Cooling (TEC) Components
4. Shutdown Cooling Capability

The impacts of the 100°F REC supply on non-essential components include the following:

1. Drywell Cooling
2. Reactor Recirculation Pump Seal Water and Motor Bearing Lube Oil Coolers
3. Reactor Recirculation Motor Generator Set Oil System Heat Exchangers
4. Spent Fuel Pool Cooling
5. Instrument and Service Air Systems (Plant Air System)
6. Control Rod Drive Pump Oil and Bearing Coolers

2.0 DESCRIPTION OF PROPOSED AMENDMENT

Current TS Surveillance Requirement (SR) SR 3.7.2.2 requires the average water temperature of the UHS (supply) to be less than or equal to 90°F. Current TS SR 3.7.3.2 requires the REC supply water temperature to be less than or equal to 95°F. The requested TS amendment consists of revisions to SR 3.7.2.2 and SR 3.7.3.2 to increase the values of the SR acceptance criteria by 5°F. The proposed change to SR 3.7.2.2 will increase the UHS average water temperature limit to be less than or equal to 95°F, and the proposed change to SR 3.7.3.2 will increase the REC supply water temperature limit to be less than or equal to 100°F.

As required by TS 5.5.10d, the associated TS Bases changes are also provided for NRC review and approval. These TS Bases revisions will be implemented concurrent with implementation of the approved TS amendment.

3.0 BACKGROUND

The CNS Updated Safety Analysis Report (USAR) reflects the results of safety analyses where UHS/SW System and REC System water inlet temperatures are input parameters. The SW and REC Systems are described in the CNS USAR Chapter X, Auxiliary Systems, Sections 8 and 6, respectively. TS SR 3.7.2.2 and SR 3.7.3.2, respectively, verify the cooling water supply temperatures of SW and REC are within limits, thereby ensuring that the heat removal capability of these systems is within the assumptions of the Design Basis Event (DBE) analyses. The design basis accident safety analyses results utilizing these systems are provided in USAR

Chapter XIV, Station Safety Analysis, Section 6. Revised analyses have been performed which indicate that CNS can continue to safely mitigate the DBEs utilizing initial SW temperature of 95°F and REC system water inlet temperature of 100°F.

3.1 Missouri River Temperature and Management

The Missouri River is the UHS for CNS. The SW system takes suction from the Missouri River, provides cooling water for various heat loads within the plant, and returns the water to the river after it has absorbed the heat from the various loads.

Trending of the Missouri River temperature in the vicinity of CNS using data from 1994 through 2000 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.

The flow of the Missouri River is regulated by the U.S. Army Corps of Engineers (the Corps). The Corps has proposed various alternatives for future management of the river, and has provided these alternatives for review and comment by the public. Certain of these proposed alternative management plans would result in reduced river flows during the summer, the period when the river temperature begins to approach the current license limit. NPPD considers it likely that these reduced flows could result in further increases in river temperature. The Corps has been reviewing comments received from the public and has not yet determined which alternative it will implement.

Based on the observed trend of increasing river temperatures and the potential for reduced flows with the management plans proposed by the Corps, NPPD considers it likely that the temperature of the Missouri River will exceed the current license limit of 90°F at some time in the future.

3.2 Ultimate Heat Sink / Service Water System

The SW System consists of the UHS and two independent and redundant subsystems. Each of the two SW subsystems is made up of a header, two full capacity pumps (8,000 gpm design capacity), a suction source, valves, piping and associated instrumentation. Either of the two subsystems is capable of providing sufficient cooling capacity to support the required systems with one pump operating. The two subsystems are separated from each other so failure of one subsystem will not affect the operability of the other subsystem.

The SW System also provides cooling to turbine building non-essential loads, as required, during normal operation. In the event of low header pressure, automatic valving is provided to shut off the supply to the turbine building loop, thus assuring supply to the essential REC System, Residual Heat Removal System, and Diesel Generator (DG) loads.

Cooling water is pumped from the Missouri River by the SW pumps to the essential components through the two main headers and the turbine building loads through a non-critical header. After removing heat from the components, the water is collected in discharge headers and returned to the river through the discharge canal. SW discharge from the turbine equipment cooling (TEC) heat exchangers is routed to the circulating water discharge tunnel.

The ability of the SW System to support long term cooling of the Primary Containment is assumed in evaluations of the equipment required for safe reactor shutdown presented in the USAR. These analyses include the evaluation of the long term Primary Containment response after a design basis loss of coolant accident (LOCA).

The ability of the SW System to provide adequate cooling to the identified safety equipment is also an assumption for the safety analyses evaluated in USAR. The ability to provide onsite emergency alternating current (AC) power is dependent on the ability of the SW System to cool the DGs. The long term cooling capability of the RHR, Core Spray, and RHR SW booster pumps is also dependent on the cooling provided by the SW System.

TS SR 3.7.2.2 requires the average UHS water temperature be verified to be less than or equal to the limit of 90°F on a 24-hour frequency. If this limit is exceeded, the TS Required Action is to place the plant in MODE 3 (Hot Shutdown) within 12 hours, and in MODE 4 (Cold Shutdown) within 36 hours.

3.3 Reactor Equipment Cooling System

The safety objective of the REC System is to provide cooling to the Emergency Core Cooling Systems areas.

The REC System consists of two electrically independent subsystems, each consisting of two full capacity pumps (1350 gpm design capacity), a heat exchanger, valves, piping and associated instrumentation. A 550-gallon surge tank, located at the highest point of the system, accommodates system volume changes, maintains static pressure in the subsystem loops, detects gross leaks in the REC System, and provides a means for adding makeup water to the system. Flexibility of system operation is provided with the interconnection of the two subsystems through cross-tie lines equipped with normally open valves. Either of the two subsystems is capable of providing sufficient cooling capacity to support the required systems with one REC pump operating. The two subsystems have sufficient redundancy and independence from each other such that no active component failure in one subsystem will affect the operability of the other. Additionally, each subsystem is provided with SW backup cross-tie valves to provide required component cooling directly to the essential loads in the event of a passive failure of REC essential piping. These SW backup cross-tie valves are also credited with providing direct cooling to REC essential loads if REC is not available seven days after a design basis LOCA.

The REC System is designed to provide cooling water to the room coolers for the core spray pump rooms, RHR pump rooms and high pressure coolant injection (HPCI) pump room, which are required for a safe reactor shutdown following a DBE or transient. The REC System also provides cooling to non-essential equipment located in the reactor building, drywell, control building, radwaste building and augmented radwaste building, as required, during normal operation. In the event of a loss of REC System pressure, automatic valving is provided to shut off the supply to non-essential loads, thus assuring supply to the essential loads.

Cooling water supplied by the REC pumps is delivered to the REC heat exchangers, which are cooled by the SW System, and then to the components through the system headers. After removing heat from the components, the water is then recirculated back to the REC pump suction.

SR 3.7.3.2 requires that the REC supply water temperature be verified to be less than or equal to the temperature limit of 95°F on a 24-hour frequency. If this limit is exceeded, the TS Required Action is to place the plant in MODE 3 within 12 hours, and in MODE 4 within 36 hours.

4.0 REGULATORY REQUIREMENTS AND GUIDANCE

The applicable requirements and guidance are discussed in the following Sections 4.1 through 4.3. A discussion of how these requirements are addressed is presented in Sections 6.1 through 6.3.

4.1 NUREG-1433, Standard Technical Specifications-General Electric Plants, BWR/4

Section 3.7.2 "Plant Service Water (PSW) System and Ultimate Heat Sink (UHS)" of NUREG-1433, Revision 2, requires that two Plant Service Water subsystems and the UHS be operable. This section contains a Condition D which is the UHS water temperature exceeding a plant-specific limit while being less than a maximum allowed temperature. The Required Action for this condition is to verify that the UHS water temperature is less than 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 3.7.2.3 in NUREG-1433 requires verifying that the average water temperature of the UHS is less than the maximum allowed temperature on a frequency of 24 hours.

4.2 NUREG-0783, Suppression Pool Temperature Limits for BWR Containments

NUREG-0783 presents a brief summary of the phenomenon of steam discharge from safety/relief valves (SRVs) to the suppression pool in BWR plants, the resulting hydrodynamic loads on the containment, and the NRC program established to address the concerns. The NUREG presents the results of the staff evaluation of the suppression pool temperature limits, acceptance criteria for the limits, assumptions used to analyze suppression pool temperature response, and suppression pool temperature monitoring systems. The NUREG highlights a concern associated with potential unstable steam condensation oscillation loads at higher suppression pool temperatures and specifies a Local Suppression Pool Temperature Limit.

Section 5.7 of the NUREG specifies the assumptions that should be used for analyzing suppression pool temperature transients in response to certain events. Assumption (1) is that the value of service water temperature is consistent with that used for the analysis of containment pressure and temperature response to a LOCA, as specified in the Final Safety Analysis Report (i.e., CNS USAR.)

4.3 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.

5.0 TECHNICAL ANALYSIS

This change is supported by revised accident analyses based on the increased initial temperatures for water inlet to the SW and REC functions for mitigation of the DBEs evaluated in the USAR.

USAR Section X-8.1.2 identifies one of the Safety Design Basis of the SW System, including UHS, as:

> The system shall continuously provide a supply of cooling water directly to the diesel generator and to the secondary side of the REC heat exchangers and to the RHR SW Booster Pumps adequate for the requirements under both normal operations and under transient and accident conditions.

USAR Section X-8.2.2 identifies one of the Safety Design Basis of the RHR SW Booster System as:

> The system shall provide an adequate supply of cooling water to the RHR System under all accident and transient conditions.

USAR Section X-6.2 identifies one of the Safety Design Basis of the REC System as:

> The system shall be designed to provide an adequate supply of cooling water to the ECCS areas under all accident and transient conditions.

The current UHS temperature limit of 90°F was selected based on historical data which indicated that this temperature was not expected to be exceeded during the summer months. This 90°F value was then used as an input to the accident and transient analysis. The limit is not based on UHS design capabilities, i.e., it was not established by a calculation that would identify an acceptable upper temperature limit of UHS. The UHS and SW System are used to cool the REC System and the current REC temperature limit of 95°F was similarly established, i.e., based on analysis input that also provided acceptable results.

The purposes of TS SR 3.7.2.2 and SR 3.7.3.2 are to ensure that the supply temperatures of SW and REC, respectively, are maintained within limits such that the heat removal capability of these systems is within the assumptions of the Design Basis Accident analyses. The requested changes would allow operation as long as the water temperature remains at or below an upper limit of 95°F for UHS and 100°F for REC. If the UHS and REC water temperatures exceed their proposed respective limits of 95°F and 100°F, the appropriate TS Actions will be taken to place the plant in MODE 3 within 12 hours and in MODE 4 within 36 hours.

Sections 5.1 through 5.3 summarize the results of analyses and evaluations performed to address the following effects of these increased temperatures:

1) impacts of an increase in SW and REC temperature on the Station Safety Analysis,
2) impacts of increased SW temperature on non-essential components, and,
3) impacts of increased REC temperature on non-essential components.

Section 5.4 discusses conclusions and a summary of the analyses results and impacts on the safety margins.

5.1 Impacts of an Increase in SW and REC Temperature on the Station Safety Analysis

The SW and REC systems provide area and equipment cooling to ensure that equipment credited in the Station Safety Analysis will perform their intended functions. The proposed increase in SW temperature affects the SW System safety objective of providing a heat sink for the REC and DG cooling systems under accident and transient conditions. Since emergency AC power supplied by the DGs and quad area cooling supplied by REC are required to mitigate accidents and transients, this proposed change has a potential to impact the Station Safety Analysis. Additionally, the SW System is credited with providing back-up cooling to the ECCS quad areas (the rooms in the Reactor Building in which the low pressure ECCS pumps are located) after seven days following a design basis LOCA (Amendment 185). The increase in the temperature of the containment and suppression pool resulting from the proposed 5°F increase in SW temperature was considered to have a potential impact on the Station Safety Analysis in the areas of (a) the environmental qualification of electrical equipment important to safety as required by 10 CFR 50.49, (b) piping stress analyses for ECCS piping, and (c) ECCS pump seals. Evaluations have been performed to determine these impacts, as discussed in the following subsections. The evaluations demonstrated that there were no impacts that resulted in limits being exceeded.

The UHS/SW maximum supply temperature has a direct impact on heat removal capability of the RHR system when operating in the containment cooling mode. This results in a direct impact on the design bases LOCA barrier performance evaluation, the Appendix R station shutdown from outside the control room event, the ATWS special event discussed in the Station Safety Analysis. Additionally, the ECCS pumps net positive suction head evaluation contained in USAR Chapter VI, Section VI-5.3, is directly impacted by the UHS/SW temperature.

The proposed increase in REC temperature has the potential to affect the REC safety objective of providing cooling to the ECCS areas. Because the ECCS pumps are required for mitigation of accidents and transients, the operating environments of these pumps could affect the pump performance, with a consequent impact on the Station Safety Analysis.

Increases in the maximum SW and REC temperatures may impact the available NPSH of the SW and REC pumps.

The SW and REC pumps are not available during a station blackout (SBO) special event, and no other methods are credited in the SBO analysis which utilize SW or REC to provide cooling. Based on that NPPD concludes that the SBO special event is not impacted by this proposed increase in SW and REC maximum allowable temperatures.

The potential impacts on the Station Safety Analysis of the increased SW and REC maximum supply temperatures have been evaluated. These impacts are described in more detail in the following discussions. No adverse effects were identified. The evaluations performed demonstrate that the SW and REC systems can still perform their safety objectives.

5.1.1 Containment Analysis for Design Basis Loss of Coolant Accident

NPPD has evaluated the impact of the proposed increased UHS and REC temperature limits, and the resulting decrease in the cooling ability of the RHR containment cooling functions, on the long term (greater than 10 minutes) containment analysis. RHR containment cooling is effected through the manual initiation of RHR Suppression Pool Cooling and RHR Containment Spray, both of which rely on Service Water cooling. The peak primary containment pressure occurs during the first 10 minutes of the accident with the initial blowdown phase. The peak pressure is limited by Suppression Pool pressure suppression, and no credit is assumed for RHR containment cooling during this time period. As a consequence the peak primary containment pressure is unaffected by the proposed increase in SW maximum supply temperature.

The long-term containment response has been reanalyzed for the most degraded condition of heat removal while operating in containment cooling mode. The USAR describes the two limiting cases with regard to RHR containment cooling capability. "Case E" assumes that one RHR subsystem is operating in the containment spray mode with only one RHR heat exchanger, one RHR pump, one RHR SW Booster pump, and one Service Water pump. "Case F" utilizes the same minimum pump combination, but with RHR operating in suppression pool cooling mode instead of containment spray mode.

The input parameters used for the long-term containment reanalysis were either consistent with or conservative relative to the parameters used in the containment analysis for 90°F SW. Table 1 summarizes the differences between the 90°F SW long-term containment analysis parameters and those used in the reanalysis at 95°F SW.

Table 1 reflects that the values of RHR flow rate and decay heat used in the reanalysis are more conservative than the values used in the containment analysis for 90°F SW. These more conservative values were used in a calculation to demonstrate that adequate containment cooling would be achieved with the containment spray flow rate conservatively reduced from 7700 gpm to 6500 gpm. This reduced flow rate was based on a calculation to determine the minimum containment spray flow rate, including assumptions for maximum containment spray nozzle plugging. The core average exposure for decay heat utilized in the containment response analysis has been increased from 25,700 MWD/ST to 31,752 MWD/ST for consistency with assumptions used in the decay heat evaluation for GE-14 fuel type. As part of evaluating use of GE-14 fuel, the long-term containment response for NPSH analysis was performed using the average exposure of 31, 752 MWD/ST. This analysis showed that the increased decay heat has a negligible effect on the analytical results (i.e., less than a 1°F increase in suppression pool peak temperature). This is based on a typical increase in decay heat of less than 1% for every 10,000 MWD/ST increase in the average exposure.

Table 1
Differences in Input Parameters for
Long-term Containment Response for a Design Basis LOCA

Parameter	Containment Analysis With 90°F SW	Containment Analysis With 95°F SW
UHS/SW Temperature (°F)	90	95
Initial Suppression Pool Temperature (°F)	95	100
Containment Spray Flow Rate (gpm)	7700	6500
Decay Heat	ANS 5.1 at 25,700 MWD/ST	ANS 5.1 with two-sigma adder at 31,752 MWD/ST

The results of reanalysis of the long-term containment pressure response to a design basis LOCA indicate an approximate 2.5 psi increase in the secondary (long-term) peak wetwell pressure for the containment spray case (Case E) from 12.4 psig to 14.9 psig. The suppression pool cooling case (Case F) resulted in a secondary (long-term) peak wetwell pressure of 22.7 psig. These pressures are significantly less than the containment design pressure of 56 psig.

With 95°F SW the maximum suppression pool temperatures are 208.7°F and 208.2°F for the containment spray (Case E) and suppression pool cooling (Case F) cases, respectively. This is an increase of 12.7°F from the Case E previous analysis value of 196°F. These temperatures are significantly less than the wetwell design temperature of 281°F. From this NPPD concludes that this temperature increase will have no impact on the wetwell structure. The effect of suppression pool temperature on ECCS pump NPSH performance is analyzed in a separate containment response analysis which is designed to minimize the available containment pressure. This analysis was discussed in a license amendment request submitted to the NRC by NPPD letter dated July 30, 2001 (Reference 10.1).

The results of the reanalysis of the long-term containment temperature response to a design basis LOCA also indicate an increase in the drywell airspace temperature. The long-term peak drywell temperatures predicted for Cases E and F are approximately 204°F and 250°F, respectively. These long term drywell temperatures are less than the drywell design temperature of 281°F.

5.1.2 Appendix R Safe Shutdown Analysis

The increase in the UHS temperature has a direct impact on ECCS systems that are credited within the Appendix R safe shutdown analysis. Therefore, the containment response (with the modified initial conditions) was also analyzed for the most limiting Appendix R event (this event being a shutdown from outside the control room or alternative shutdown as defined by 10 CFR 50 Appendix R). This analysis of the alternate shutdown scenario ensured that the requirements and performance goals identified within Section III.L of 10 CFR 50 Appendix R will continue to be met given the revised initial conditions.

This Appendix R safe shutdown scenario involves use of the steam driven HPCI turbine to reduce reactor pressure to the point where the Low Pressure Coolant Injection System (LPCI) may be used to flood the reactor vessel. A cooling path is then established through an open safety relief valve (SRV) back to the suppression pool. This scenario has been re-analyzed assuming a 95°F SW temperature for the entire duration. The reanalysis shows that cold shutdown is achieved in less than 20 hours for this most limiting case. Thus, substantial margin exists relative to the 10 CFR 50 Appendix R alternative shutdown requirements for achieving cold shutdown within 72 hours.

It should be noted that the highest suppression pool temperature results from the Appendix R safe shutdown analysis. The reanalysis for the alternative shutdown scenario using SW temperature of 95°F shows that the suppression pool temperature may reach a maximum value of approximately 218°F. Due to these higher suppression pool temperatures, equipment credited in the Appendix R safe shutdown scenario has been evaluated at these higher temperatures to ensure that the analytical assumptions are met. The analysis specifically included consideration of the following:

- NPSH margins for RHR and HPCI pumps

- HPCI turbine operation at elevated temperatures; including bearing, reduction gear and governor operability

- HPCI pump operation at elevated temperatures; including mechanical seal and stability of pump bearings,

- Torus area equipment functionality, as required, during this Appendix R safe shutdown event; including electrical cables and valves credited in this scenario, and,

- HPCI room heat-up.

The results of these evaluations demonstrate that the required equipment will function for Appendix R safe shutdown events at the elevated suppression pool temperatures predicted based on the proposed increased SW temperature. Therefore, the requirements for Appendix R safe shutdown are met for the proposed maximum SW temperature of 95°F.

5.1.3 Anticipated Transients Without Scram

The ATWS analyses demonstrate the acceptable response of the plant to ATWS conditions relative to criteria of (1) fuel integrity, (2) containment integrity, (3) reactor coolant boundary integrity, (4) long-term shutdown cooling, and (5) radiological consequences. Of these criteria, the only one impacted by an increase in the maximum SW temperature is the containment integrity evaluation.

The main turbine Digital Electro-Hydraulic pressure regulator failure to maximum demand ATWS special event produces the highest peak bulk pool temperature and the peak containment pressure. This special event has been re-analyzed assuming a maximum SW temperature of 95°F. This analysis shows that the increased SW temperature results in a peak bulk suppression pool temperature of 185.6°F and a peak containment pressure of 9.65 psig. These represent increases of 4.5°F in peak suppression pool temperature and 0.65 psi in peak containment pressure from the analysis at 90°F SW temperature. The analyzed peak suppression pool temperature and containment pressure are significantly less than the Primary Containment design limits of 281°F and 56 psig. Therefore, the results of the limiting ATWS scenario, analyzed using the proposed maximum SW temperature of 95°F, have been found to be within design limits.

5.1.4 Available Net Positive Suction Head for Emergency Core Cooling System Pumps

The proposed increase in the maximum allowable SW temperature will result in an increase in the maximum post accident suppression pool temperature, resulting in a decrease in the NPSH available for the ECCS pumps. The current technical specification limit on Suppression Pool temperature is 95°F. The containment system response for the ECCS pumps NPSH has been re-analyzed assuming a SW temperature of 95°F and a suppression pool temperature of 100°F. These analyses show that an increased reliance on containment overpressure is required to ensure adequate ECCS pump NPSH. However, sufficient margins still exist to ensure the ECCS pumps will perform their safety functions.

The effects of the suppression pool temperature increase on ECCS pump NPSH and the reliance on containment over pressure have been addressed in detail in a separate license amendment request submitted to the NRC by NPPD letter dated July 30, 2001 (Reference 10.1). That amendment request proposed an increased reliance on containment over pressure to resolve a condition of CNS being outside its licensing basis with respect to containment over pressure. Because the July 30, 2001 license amendment request contained analyses that demonstrate sufficient NPSH at the increased SW temperature of 95°F, review and approval of it is needed in conjunction with NRC review and approval of this request for increased SW temperature limit. Approval of the proposed increased SW temperature is dependent on approval of the July 30, 2001 submittal because of the change in NPSH margin and the need for increased credit for containment over pressure as a result of the increased SW temperature described in that submittal.

The July 30, 2001 submittal and the supporting analyses are based on SW at 95°F and the suppression pool temperature at 100°F, and reflect that this is acceptable, given the pressure that has been demonstrated to exist in the torus under post-LOCA conditions. Although the initial temperature of the suppression pool used in the analyses was assumed to be 100°F, NPPD is not requesting an increase of the suppression pool temperature limit in TS 3.6.2.1 to 100°F at this time.

5.1.5 Local Suppression Pool Temperature Limit (NUREG-0783)

The maximum UHS temperature is used as an input parameter in the evaluation of events requiring analysis to meet the requirements of NUREG-0783, Suppression Pool Temperature Limits for BWR Containments. NUREG-0783 highlights a concern associated with potential unstable steam condensation oscillation loads at higher suppression pool temperatures. The NUREG specifies an LSPTL.

Subsequent to NUREG-0783 the NRC issued a safety evaluation associated with acceptance of the General Electric document NEDO–30832, "Elimination of Limit on BWR Suppression Pool Temperature for SRV Discharge with Quenchers." (Reference 10.2). In the safety evaluation the NRC concluded that if a plant has installed T-quenchers on SRV discharge lines, the LSPTL specified in NUREG-0783 can be eliminated from the licensing basis provided that the ECCS suction strainers are located below the elevation of the T-quenchers. This restriction on the elevation of the ECCS suction strainer relative to that of the T-quenchers was based on a newly identified concern of possible steam bubble ingestion into ECCS pump suctions. The SRV discharge lines at CNS have T-quenchers installed. However, installation of larger strainers has resulted in the top of the ECCS suction strainers extending slightly above the T-quencher elevation. Thus, the CNS design does not directly satisfy the NRC requirements for eliminating the LSPTL based upon the generic acceptance of NEDO-30832.

To address this situation NPPD evaluated the possibility of steam bubble ingestion into the ECCS suction strainers via SRV blowdown. This evaluation demonstrates that steam bubbles will not be ingested by the ECCS pumps, even under worst case saturated conditions. Therefore, ECCS suction piping and pumps are not affected by steam bubble ingestion. Based on this NPPD concluded that there is no need to perform a local suppression pool temperature analysis due to higher UHS temperatures.

This evaluation was included as part of a license amendment request submitted by an NPPD letter to the NRC dated July 30, 2001 (Reference 10.1). That amendment request proposed elimination of the LSPTL based on the evaluation of steam bubble ingestion and the generically accepted results contained in NEDO-30832. Because the increased SW temperature limit proposed by this license amendment request will result in an increase in the post-LOCA suppression pool temperature, the NRC review and approval of the request to eliminate the LSPTL is needed in conjunction with the review and approval of this license amendment request.

5.1.6 Small Steam Line Breaks

The steam line break analysis considered the containment response to various small steam line break (SSLB) sizes (0.01 to 1 square foot), using containment spray to mitigate the effects. The peak pressure for this analysis remains well below the containment design pressure of 56 psig.

The steam line breaks are the most limiting events for drywell temperature. The key results reflect that the highest drywell airspace temperature is approximately 332°F, and the highest suppression pool temperature is approximately 211°F. The results also reflect that the highest temperature for the drywell structural shell is 274°F. The highest drywell airspace temperature occurs in the short term and drops as soon as drywell spray is initiated, with drywell shell temperature dropping as it follows the airspace temperature. Since the drywell temperature excursion immediately terminates with the initiation of containment spray, the peak temperature is insensitive to the proposed increase in SW and REC temperatures. These highest temperatures remain below their respective design limits.

5.1.7 Diesel Generator Cooling

The SW System provides the cooling water supply for the DG jacket water coolers, lube oil coolers and the turbo charger intercoolers, all of which support operation of the DGs. Thus, the proposed SW temperature increase could potentially affect DG operation.

Calculations were performed to determine whether the DGs have adequate cooling with the maximum SW supply temperature increased to 95°F. These calculations verified that the DGs will be adequately cooled with the increased SW temperature at specified minimum flow rates to prevent exceeding the required shutdown temperature. Therefore, the safety objective of the SW System to provide a heat sink to the DG cooling systems remains satisfied at the proposed 95°F SW supply temperature.

5.1.8 SW System Capability to Provide a Heat Sink for REC and REC Capability to Provide ECCS Area Cooling

The SW System provides the heat sink for the REC heat exchangers. The REC system in turn provides area cooling to the ECCS areas. Calculations have been performed to determine the impact of 95°F SW temperature on the ability to provide a sufficient heat sink to the REC system to ensure REC will still provide adequate cooling to the ECCS areas. These calculations evaluated the potential impact on REC safety function following a LOCA with or without off-site power available and show that the temperatures in the quad areas will be maintained less than the equipment qualification limits with an SW System supply temperature of 95°F. Therefore, both of the safety objectives are met at the proposed SW supply temperature of 95°F.

5.1.9 Service Water Backup to Reactor Equipment Cooling

USAR Sections X-6.5.3, X-6.6.1, and X-8.1.7, indicate that the SW System provides a backup cooling water source to the REC system critical cooling loads in the event of a passive failure in the REC system, and after seven days following a design basis LOCA. A calculation which determines the minimum required SW flow to the ECCS area coolers to ensure that the function of SW backup to REC is met was completed assuming 95°F SW. The flow required at the higher SW supply temperature of 95°F is increased slightly from the flow required at 90°F SW. The most recent surveillance data indicates that the actual SW flow exceeds the minimum required at 95°F SW. Accordingly, the effects of the proposed increase in SW temperature are acceptable with respect to providing the REC backup function.

5.1.10 Environmental Qualification

The containment analysis with the proposed increased SW supply temperature indicates a slightly higher containment temperature in the long term accident temperature profile. NPPD has evaluated the equipment inside containment under the scope of 10 CFR 50.49 based on this higher containment temperature.

The containment response was evaluated assuming a constant SW supply temperature of 95°F for the entire duration of the accident. Two separate containment analyses were performed at the higher SW supply temperature to determine the bounding drywell temperature Environmental Qualification (EQ) profile. The first analysis considered the containment response to various

SSLB sizes using containment spray to mitigate the effects. The second analysis considered the containment response to a design basis LOCA using the minimum containment heat removal pump combination operating in suppression pool cooling mode. The peak pressure for both of these analyses is well below the containment design pressure of 56 psig.

From these evaluations, an upper limit drywell temperature EQ curve which bounds peak drywell temperature conditions due to LOCA and steam line breaks has been developed. This bounding EQ curve was used to evaluate the components within the containment drywell to determine whether they would meet EQ requirements. This evaluation concludes that the environmental qualification of safety related equipment inside containment is not affected by the proposed increase in SW supply temperature to 95°F.

5.1.11 Net Positive Suction Head for Service Water and Reactor Equipment Cooling Pumps

The SW System pumps are designed to operate with the proposed 95°F maximum allowable water temperature and a minimum required suction pipe submergence of 3.5 feet. The minimum river level required by TS SR 3.7.2.1 is 865 feet above mean sea level. Meeting this TS SR ensures that there will be more than 3.5 feet of suction pipe submergence for the SW pumps. Providing this submergence assures that adequate NPSH is available at the suction of the SW pumps with the proposed SW temperature of 95°F.

Adequate NPSH at the suction of the REC system pumps is assured by the REC surge tank and the limits on system leakage. The surge tank contributes to ensuring adequate NPSH by virtue of its elevation and by storing excess inventory. The limits on system leakage contribute to ensuring adequate NPSH by virtue of limiting loss of REC inventory. An evaluation of available NPSH was performed using the increased temperature at the REC pump suction expected with an SW supply temperature of 95°F and an REC heat exchanger outlet temperature of 100°F. This evaluation demonstrated that adequate NPSH was available.

5.1.12 Piping Impacts

The effect on the piping of a higher maximum suppression pool water temperature as a result of the proposed increase in SW temperature has been investigated. This included assessing the potential impact on pipe stress for ECCS piping that takes suction from the suppression pool and large-bore ECCS piping system flow paths. This investigation identified that, in most cases, the temperature used in the pipe stress analysis was greater than the maximum suppression pool temperature. However, some RHR and Core Spray suction piping were not evaluated to this temperature. Assessments made for these piping runs has determined that sufficient margin exists to ensure that the relatively small proposed increase in temperature will not result in exceeding code requirements.

5.1.13 Residual Heat Removal and Core Spray Pump Seals

The RHR pump seals are rated at up to 350°F for up to five hours of operation and 212°F for six to seven months. Since the suppression pool temperature never exceeds 212°F for the design basis accidents, the RHR pump seals are unaffected by the proposed increase in the maximum SW and REC temperature limits. REC normally supplies cooling water to the RHR pump seal coolers even though supplying such cooling water is not required for RHR to perform its safety functions. Thus, the RHR pump seals are expected to be maintained at a temperature much lower than 212°F.

For the Appendix R safe shutdown from outside the control room event the suppression pool temperature may exceed 212°F for a duration of less than 15 hours. This will not impact the RHR pump seal performance, since the peak temperature is less than 220°F and the seals are rated for a temperature of 350°F.

The CS pump seals are rated at 211°F for continuous service. For a 0.01 square foot Small Steam Line Break the peak suppression pool temperature reaches 211.4°F. The suppression pool temperature remains at or slightly above 211°F for less than 2 hours. Given this short duration and small increase above 211°F the impact on CS pump operation is considered insignificant. For all other accidents and transients for which CS is required, the suppression pool temperature does not exceed 211°F. Thus, the CS pump seals are considered adequate for the proposed increase in the maximum SW and REC temperature limits.

5.1.14 Common Mode Failure Analysis Discussion on SW Pump Room Maximum Allowed Temperature

The common mode failure analysis discussed in USAR Section X-8.1.6 states that normal ventilation supply to the SW pump room is not powered from critical buses, and is therefore not credited with supporting the safety functions of the SW pumps. This analysis concludes that there is sufficient time for operator action to block open the SW pump room door and secure 2 of the 4 SW pumps assumed to be operating in order to prevent exceeding the limiting component maximum allowed temperature. The engineering calculation in support of this evaluation has been revised to reflect a SW temperature of 95°F and continues to support the conclusions documented in USAR Section X-8.1.6. The time for operator action to establish a natural ventilation flow path has been reduced from the six hours at 90°F SW to approximately four hours at 95°F SW with four SW pumps in operation. This reduced time is still sufficient for the operators to take the actions noted in the USAR. Procedural guidance is in place to establish natural ventilation flow paths. Therefore, the impact of the proposed increase in SW temperature on the common mode failure analysis discussed in USAR Section X-8.1.6 is minimal and is considered acceptable.

5.2 Impacts of Proposed 95°F SW Temperature on Non-Essential Components

SW and REC supply cooling water to loads during normal operations and fulfill non-essential functions that may be affected by this proposed increase in temperature. The proposed increase in SW temperature may impact some of the non-essential functions discussed in USAR Section X-8. These include:

- Back-up cooling water supply to the SW Booster pump room fan coil unit,
- Control room air conditioning unit cooling,
- SW power generation design basis of providing the UHS for systems cooled by TEC.

Additionally, the impact of the proposed SW supply temperature increase on the RHR system power generation design basis was evaluated, considering the potential impact on the ability of RHR to remove residual heat from the nuclear system so that refueling and nuclear system servicing can be performed (i.e, shutdown cooling mode).

5.2.1 Back-up Cooling Water Supply to the SW Booster Pump Room Fan Coil Unit

USAR Section X-10.3.5.4 states that acceptable SW booster pump room temperatures can be maintained for a single RHR SW booster pump without forced ventilation through operator action to reduce the room heat load and establishment of a natural ventilation flow path. The engineering calculations, which support the fact that no forced ventilation is required for the SW booster pump room, credit piping in the room and SW flow to the REC heat exchanger as heat sinks. Revising these calculations with SW temperature increased from 90°F to 95°F does not affect the conclusions and continues to support the USAR statement that no forced ventilation cooling is required to support operation of a single RHR SW booster pump. Sufficient time exists for operator action to establish natural ventilation flow paths. (The time available with two SW booster pumps operating is approximately five hours from entry into the alarm condition for high temperature in the RHR SW booster pump room.) Procedural guidance is in place to establish natural ventilation flow paths and reduce heat loads in the SW booster pump room. Therefore, the proposed increase in SW temperature to 95°F has no impact on the ability of SW to maintain acceptable temperatures in the SW Booster pump room fan coil unit.

5.2.2 Control Room Air Conditioning Unit Cooling

The non-essential Control Room air conditioning unit cooling requirements are normally provided by TEC. SW provides a manual backup cooling water supply to the unit when TEC is unavailable. The unit is non-essential, and is therefore not credited in the accident analysis. Accordingly, the proposed increase in SW temperature will not adversely impact Control Room habitability during a DBE.

5.2.3 Turbine Equipment Cooling (TEC) Components

The TEC system provides cooling to the equipment located in the turbine building, to the station air conditioning systems, and to certain equipment in the control building, radwaste building, heating boiler room, and intake structure. The equipment cooled by TEC is non-essential. Procedural guidance is in place to allow performance of actions such as increasing TEC flow, reducing plant power, securing equipment, and transferring loads to ensure that increased TEC supply temperature does not affect equipment. High temperature alarms on equipment cooled by TEC and procedural guidance to respond to these high temperature conditions are sufficient to ensure that the proposed 5°F increase in SW temperature will not severely impact the ability of this non-essential equipment to support power plant operation.

5.2.4 Shutdown Cooling Capability

SW provides cooling to the RHR heat exchangers. Therefore, an increase in SW temperature may affect the Shutdown Cooling (SDC) mode of RHR. The Required Action of Technical Specification 3.7.2 Condition B is to place the plant in Mode 4 (cold shutdown, ≤212°F) within 36 hours.

The calculation performed to verify this assumed minimum heat removal capabilities, 2 hours for flushing and warm-up, and ANS 5.1-1979 decay heat with a two-sigma uncertainty adder. This calculation demonstrates that the SDC mode of RHR is capable of bringing the plant to Mode 4 in significantly less time than 36 hours with SW 95°F temperature.

5.3 Impacts of Proposed 100°F REC Temperature on Non-Essential Components

The proposed 5°F increase in REC temperature may impact some of the non-essential functions discussed in USAR Section X-6. (Only certain non-essential REC loads are considered, since some functions such as sample coolers, reactor water cleanup, and augmented radwaste are supporting equipment and do not impact the probability of transients). The functions evaluated were:

1. Drywell cooling
2. Reactor recirculation pump seal water and motor bearing lube oil coolers
3. Reactor recirculation motor generator (RRMG) set oil system heat exchangers,
4. Spent fuel pool cooling.
5. Instrument and Service Air Systems (Plant Air System), and
6. Control Rod Drive Pump Oil and Bearing Coolers

5.3.1 Drywell Cooling

REC supplies cooling water to the four drywell fan coil units. These drywell fan coil units are used to maintain the drywell air temperature within the limits of Technical Specification (TS) Section 3.6.1.5 during normal operations. These units are not relied upon for cooling in any accidents or transients and are non-essential.

The proposed 5°F increase in REC temperature may result in higher drywell temperatures during normal operations due to reduced heat removal capacity. This would increase the potential for approaching the limit of TS 3.6.1.5 which is that drywell average air temperature shall be less than or equal to 150°F. Condition A of TS 3.6.1.5 is entered if the drywell average air temperature is not within this limit. Required Action A.1 is to restore drywell average air temperature to within this limit with a Completion Time of 8 hours. Operating procedures to maintain the drywell air temperature within these limits are in place. Therefore, the increased REC temperature will have a minor impact on drywell cooling which will be within the operational control of the plant.

5.3.2 Reactor Recirculation Pump Seal Water and Motor Bearing Lube Oil Coolers

REC supplies cooling water to the two reactor recirculation pump seal coolers and motor bearing coolers. Vendor specifications indicate that the design cooling water inlet temperature of 105°F will provide adequate cooling at the design flow rates. These design flow rates are maintained by current operating procedures. Additionally, reactor recirculation pump seal trouble is alarmed in the control room. The proposed increased REC supply temperature of 100°F remains less than the design limit of 105°F. Therefore, the proposed increase in REC temperature will have no adverse impact on reactor recirculation pump operation and does not increase the probability of occurrence of a transient.

5.3.3 Reactor Recirculation Motor Generator Set Oil System Heat Exchangers

REC supplies cooling water to the two RRMG sets oil system heat exchangers. The proposed 5°F increase in REC temperature will not directly result in an RRMG trip due to high fluid drive oil temperature.

REC could supply an increased flow of cooling water to offset increased water temperatures. High temperature alarm indication of the RRMG drive oil temperature (20°F below the trip set-point) is available in the control room. Operator actions specified in the alarm procedure are to adjust the cooling water flow and reduce RRMG speed if necessary to clear the alarm. The proposed 5°F increase in the maximum allowed REC temperature will not result in a rapid increase in RRMG temperature. Therefore, the operational procedures currently in place are adequate.

5.3.4 Spent Fuel Pool Cooling

The REC system supplies cooling water to the two fuel pool cooling system heat exchangers. The design and licensing basis maximum temperature for the spent fuel pool is 150°F. This temperature is based on establishing initial conditions that will provide sufficient time to establish adequate make-up to the spent fuel pool prior to the onset of bulk boiling, after a safe shutdown earthquake (SSE) following a complete core off-load. The spent fuel pool is usually maintained less than the normal operating temperature of 125°F. USAR Section X-4.5.2.1 indicates that a cycle-specific determination of the time delay before moving fuel into the spent fuel pool is performed, taking into account the following factors:

1. The number of fuel assemblies transferred from the reactor to the spent fuel pool,
2. The REC system supply temperature,
3. The fuel pool cooling pump and heat exchanger combinations, and
4. The highest spent fuel pool temperature that is desired.

This cycle specific calculation is completed prior to moving fuel and provides input into station procedures to ensure defense in depth requirements are met and that the fuel pool temperature is maintained less than 150°F.

Since the spent fuel pool temperature following normal reloads is usually maintained less than 125°F, an increase in REC to 100°F will not result in a concern of exceeding the 150°F design limit. Additionally, during refueling operations, fuel movement time limitations are in place to ensure the 150°F design limit is not exceeded. These fuel movement time limitations are calculated to bound the configuration of the spent fuel pool at the time and allow operational flexibility based upon the REC temperature and various other parameters. The increased REC temperature could result in a slight delay in starting core offloads. Procedures are in place to assure that the design limit of 150°F will not be exceeded.

5.3.5 Instrument and Service Air Systems (Plant Air System)

The Plant Air System provides the source of compressed air for pneumatic operated equipment and instruments required to operate the power plant and compressed air for general station services. The power generation objective of the Plant Air System is to provide the station with a continuous supply of oil-free compressed air. This air is directed to station instrumentation and general station services.

The air supply is developed by three air compressors operating in parallel. One of the three compressors will be available on a demand basis with the other two in standby ready to operate as required. Compressor operation is controlled by a control system that brings additional units on-line as operating units reach a fully loaded condition and there is a further increase in demand. The capability exists to sequence the base-loaded compressor. Normally, one air compressor will maintain sufficient pressure in the air receivers to provide the desired instrument air header pressure. The second and third compressors serve as standby units. Actuation of standby units is automatic.

Cooling water for two of the compressors is supplied by the TEC System and by the REC System for the third. An alternate supply of cooling water is available from the REC system for two compressors and from the TEC system for the third compressor.

A complete loss of non-essential Instrument Air header pressure will not adversely affect plant safety. In accordance with CNS commitments to Draft General Design Criteria 26, the plant protection systems are capable of performing their credited safety functions following the loss of non-essential Instrument Air (see USAR Appendix F).

The air compressor outlet temperatures are procedurally maintained below the alarm and trip setpoints. Raising the REC temperature will increase the operating temperature, but it will still be below the alarm and trip setpoints.

5.3.6 Control Rod Drive Pump Oil and Bearing Coolers

REC supplies cooling water to the two Control Rod Drive (CRD) pump oil and bearing coolers. High temperature alarm indication of the CRD pump oil and bearing cooler temperatures is available in the control room. Operator actions specified in the alarm procedure include raising REC flow to the CRD pump and monitoring temperatures closely. The proposed 5°F increase in the maximum allowed REC temperature will not result in a rapid increase in CRD pump oil or bearing cooler temperatures. Therefore, the operational procedures currently in place are adequate.

5.4 Conclusions and Summary of Analyses Results and Impact on Safety Margins

The SW/UHS average water temperature and the REC supply water temperature are used as inputs to the Design Basis Event transient and accident analyses contained in USAR Chapter XIV. TS limits on water temperatures for UHS (TS 3.7.2) and REC (TS 3.7.3) ensure that the water temperatures are maintained within the assumed initial conditions of these DBE analyses. Evaluations of the effects of UHS supply water temperature up to 95°F and REC supply water temperature up to 100°F have been performed utilizing the current specific system capabilities. The UHS and REC system supply water temperatures are also input assumptions for evaluations of certain safety related and non-safety related systems. Components that rely upon UHS and REC water to maintain the temperature within operating limits were evaluated. The evaluation demonstrated that these components could withstand the proposed higher UHS and REC water temperatures without any new compensatory measures. The various analyses discussed above ensure that a UHS water temperature of 95°F will provide sufficient cooling. The analyses performed have demonstrated that the heat removal capability of SW at the proposed increased supply temperature of 95°F, and the heat removal capability of REC at the proposed increased supply temperature of 100°F are adequate to support the assumptions of the DBE analyses. The proposed increased temperatures do not result in new failure mechanisms, malfunctions, or accident initiators.

The proposed increase in maximum SW and REC supply temperatures will result in slightly higher equipment operating temperatures for non-essential (i.e., non-safety related) equipment. However, these slight increases will have no adverse effects which would result in a plant shutdown. Current procedures are sufficient to cope with the resulting higher temperatures on non-essential plant equipment.

The increased temperatures of SW/UHS and REC have been determined to have a minimal impact on the plant's safety margins. The following discusses the applicable safety margins that are affected by the proposed increased temperatures.

1. Containment Pressure

The peak containment pressure (both drywell and wetwell) resulting from a DBA LOCA event occurs in the short term. These pressures are unaffected by the proposed increased SW and REC temperatures since they are determined without any assumed credit for containment cooling during this time period.

In summary, the long term impacts on containment pressure are based on the following:

The Case E long-term secondary peak pressure of 12.4 psig in the wetwell, with the use of containment spray and 90°F SW, results in a margin of 43.6 psig to the design pressure of 56 psig. The Case E long term secondary peak pressure is 14.9 with 95°F SW, resulting in a margin of 41.1 psig to the design pressure. This is a reduction in margin of 2.5 psig.

The Case F with 95°F SW and only suppression pool cooling, and no containment spray, has a long term secondary peak pressure of 22.7 psig in the wetwell, resulting in a margin of 33.3 psig from the design pressure of 56 psig. NPPD considers this margin to be sufficient.

The magnitude of the long term secondary peak pressure in the drywell closely approximates that of the long term peak pressure in the wetwell. The margin between peak drywell pressure and design pressure is approximately 33 psig.

2. Containment Temperature

The Case E reanalysis of the long-term secondary peak suppression pool temperature, using the containment spray configuration and the proposed 95°F SW temperature, resulted in a suppression pool temperature increase of 12.7°F (from 196°F to 208.7°F.) This in turn results in an acceptable margin of 72.3°F to the Suppression Chamber design temperature limit.

The Case F long term secondary peak suppression pool temperature is 208.2°F with only suppression pool cooling mode. This case has a margin of 72.8°F to the design temperature.

Section 5.1.6 reflects that the peak drywell and peak suppression pool temperature occurs from a steam line break, and that this temperature does not exceed the drywell design temperature. The peak occurs early in the accident and drops quickly as drywell spray is initiated. Since these responses occur in the short term, and prior to initiation of cooling, the increase in SW and REC temperatures have no impact.

6.0 REGULATORY ANALYSIS

NPPD 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 and REC 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/SW and REC supply water temperatures.

The following Sections 6.1 through 6.3 discuss how the documents identified in Sections 4.1 through 4.3 are addressed.

6.1 NUREG-1433, Standard Technical Specifications-General Electric Plants, BWR/4

The Standard Technical Specifications (STS) were issued to CNS by Amendment No. 178, dated July 31, 1998. The CNS TS were based on Revision 1 of NUREG-1433. With the proposed increase in UHS temperature in SR 3.7.2.2, the UHS requirements of the CNS TS remain consistent with NUREG-1433, Revision 1, and consistent with Revision 2 of NUREG-1433 except that UHS temperature averaging is not being implemented.

NUREG-1433 does not contain a section for REC. CNS TS Section 3.7.3 for REC was adapted from Section 3.7.2 of NUREG-1433, Revision 1.

6.2 NUREG-0783, Suppression Pool Temperature Limits for BWR Containments

A discussion of how the provisions of NUREG-0783 are addressed by the analysis of the proposed increase in UHS and REC temperatures is presented in Section 5.1.5 of the report. This includes the use of the maximum UHS temperature as an input parameter in the events analysis.

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

NPPD has reviewed TSTF-330 and has considered possible adoption of the UHS temperature averaging approach. However, NPPD considers the temperature averaging approach of TSTF-330 as not suitable for use at CNS based on the small daily variation in the temperature of the UHS. The temperature of the Missouri River typically fluctuates only approximately 2°F over a day in the summer. NPPD does not expect that averaging with this small variation would provide adequate relief. Furthermore, based on the trend of increasing river temperatures, NPPD considers it possible that the 24-hour average temperature of the river might exceed the current limit of 90°F. To address this possibility, NPPD would propose an increase in the Surveillance Requirement (SR) 3.7.2.2 temperature limit, in addition to adding the new Condition and the associated Required Action.

NPPD 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 SW/UHS temperature of 95°F.

Based on the above NPPD considers that an increase in the UHS temperature limit of SR 3.7.2.2 is the most practical solution at CNS.

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. NPPD 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, those being the Residual Heat Removal (RHR) system, the diesel generators, and the Reactor Equipment Cooling (REC) system. The SW system also has a power generation purpose which is to remove heat from the Turbine Equipment Cooling system. The SW system draws water from the Missouri River, and discharges the heated water back to the river after it has removed heat from the various systems that it cools. The Missouri River is referred to as the Ultimate Heat Sink (UHS).

The REC system, cooled by the SW system, also has both safety and power generation functions. The safety function of REC is to provide cooling of the areas and rooms in which the safety related Emergency Core Cooling System (ECCS) pumps are located. The power generation function of REC is to provide cooling to numerous components and equipment located in the containment (drywell), Reactor Building, Control Building, and Radwaste Building.

This license amendment request proposes to increase the temperature limit for the SW system from its current limit of 90°F to 95°F, and to increase the temperature limit for the REC system from its current limit of 95°F to 100°F.

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

   No. The effects of the proposed increase in the SW and REC temperatures on the likelihood of postulated accidents have been considered. These temperature parameters are not precursors or initiators of any analyzed Design Basis Events. Furthermore, there are no plant hardware changes or new operator actions associated with this proposed change that could serve to initiate a DBE. Accordingly, there is no increase in the probability of an accident previously evaluated.

   The potential impact of the proposed increase in the SW and REC temperatures on the ability of the plant to mitigate postulated accidents has been analyzed. This includes analysis of the following fourteen (14) areas: (1) the ability of the containment to provide adequate long term (greater than 10 minutes) cooling following a design basis loss-of-coolant accident (LOCA); (2) the ability to safely shutdown the plant from outside the control room after a fire; (3) the ability of the plant to mitigate an Anticipated Transient Without Scram (ATWS) event; (4) the adequacy of the water source at the suction of the Emergency Core Cooling System (ECCS) pumps [i.e. the availability of adequate Net Positive Suction Head (NPSH)]; (5) the ability of the suppression pool to provide a source of water for the ECCS pumps without allowing ingestion of steam bubbles by the pumps; (6) small steam line break; (7) Diesel Generator cooling; (8) ability of SW to remove heat from REC and ability of REC to provide ECCS area cooling; (9) SW as a source of backup water to REC; (10) ability to meet requirements of environmental qualification of electrical equipment; (11) the adequacy of the water source (i.e. availability of adequate NPSH) at the suction of the SW and REC pumps; (12) impact on ECCS piping; (13) impact on the seals in the Residual Heat Removal and Core Spray pumps; and (14) common mode failure analysis on SW pump room maximum allowed temperature.

These analyses demonstrate that adequate cooling can be achieved and postulated accidents can be properly mitigated with the SW and REC systems at the proposed increased temperatures. In some analyzed accidents the proposed increased SW and REC temperature limits result in a minimal increase in the temperature of the suppression pool. However, the resulting temperature is less than the containment design temperature specified in the USAR.

The calculated dose consequences reflected in the USAR do not utilize SW or REC temperature as inputs. Therefore, these dose consequences are not impacted by the increased SW and REC temperature limits.

Based on the above, NPPD 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?*

No. 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 structure, system, or component (SSC) that is used for mitigating accidents. The proposed increases in the temperature limits do not result in any credible new failure mechanisms, malfunctions, or accident initiators not considered in the design and licensing bases. An increase in the maximum allowable cooling water temperature does not introduce new failure mechanisms for any SSC evaluated in the safety analysis report.

Based on the above, NPPD 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?*

No. The UHS/SW System and the REC System temperatures are input assumptions for analyzing mitigation of the design basis accidents, and are utilized to verify adequate cooling capability without quantifying system design capability limits. The ability of the SW and the REC systems to provide adequate cooling and proper mitigation of accident consequences at the proposed increased temperature have been evaluated. These evaluations have demonstrated that the proposed increased cooling water temperatures do not have a significant impact on the capability of the affected systems to perform their safety-related post-accident cooling functions and to mitigate accident consequences.

The safety margins related to containment pressure and temperature later than 10 minutes following a LOCA were shown to experience reductions with the increased SW and REC temperatures. However, both of these parameters continue to have sufficient resulting margin to the design pressure and temperature.

The operating license specifies safety limits involving reactor power level with pressure and flow below specified values, critical power ratio, water level in the reactor pressure vessel, and reactor coolant system (RCS) pressure. The SW and REC systems have safety functions that are related to cooling of various essential (safety related) components for accident mitigation. The proposed increases in the license limits for UHS and REC temperature will not have any impact on reactor power, critical power ratio, reactor vessel water level, or RCS pressure.

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

From the above discussions, NPPD 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.

NPPD 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 considerations 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 and the Reactor Equipment Cooling System. 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.) NPPD 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 technical specifications 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 CNS 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.
Technical Specification 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.
Technical Specification affected – Limiting Condition for Operation (LCO) 3.7.1.3
Licensee Submittals dated – June 12, July 23, 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.
Technical Specification affected – Limiting Condition for Operation (LCO) 3.7.5.1
Licensee Submittals dated – July 28, 1999, 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
Technical Specification 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.
Technical Specification affected - Limiting Conditions for Operation (LCO) 3.3.F.4 and 3.3.F.5
Licensee Submittals 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.
Technical Specification affected – Surveillance Requirement SR 3.7.9.2
Licensee Submittals dated – March 15, 2000
License Amendment – No. 107 for Unit 1 and No. 107 for Unit 2, issued June 13, 2000

10.0 REFERENCES

10.1 Letter (NLS2001064) from J. H. Swailes (NPPD) to USNRC dated July 30, 2001, "Proposed License Amendment Related to Emergency Core Cooling System Pump Net Positive Suction Head Requirements."

10.2 NRC Safety Evaluation for NEDO-30832, "Elimination of Limit on BWR Suppression Pool Temperature for SRV Discharge with Quenchers," dated August 29, 1994.

ATTACHMENT 2

PROPOSED TECHNICAL SPECIFICATIONS AND ASSOCIATED BASES REVISIONS MARKUP FORMAT

COOPER NUCLEAR STATION DOCKET NO. 50-298, LICENSE DPR-46

Listing of Revised Pages

<u>Technical Specifications</u>
3.7-4
3.7-7

<u>Associated Technical Specification Bases</u>*
B 3.7-7
B 3.7-13

*Bases will be implemented following approval of the proposed Technical Specification changes in accordance with TS 5.5.10, Technical Specification (TS) Bases Control Program.

3.7 PLANT SYSTEMS

3.7.2 Service Water (SW) System and Ultimate Heat Sink (UHS)

LCO 3.7.2 Two SW subsystems and UHS shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One SW subsystem inoperable.	A.1	--------NOTES-------- 1. Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources — Operating," for diesel generator made inoperable by SW. 2. Enter applicable Conditions and Required Actions of LCO 3.4.7, "Residual Heat Removal (RHR) Shutdown Cooling System — Hot Shutdown," for RHR shutdown cooling made inoperable by SW. -------------------- Restore the SW subsystem to OPERABLE status.	30 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met. OR Both SW subsystems inoperable. OR UHS inoperable.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	12 hours 36 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.7.2.1	Verify the river water level is ≥ 865 ft mean sea level.	24 hours
SR 3.7.2.2	Verify the average water temperature of UHS is ≤ ~~90~~ **95** °F.	24 hours

(continued)

3.7 PLANT SYSTEMS

3.7.3 Reactor Equipment Cooling (REC) System

LCO 3.7.3 Two REC subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One REC subsystem inoperable.	A.1 Restore the REC subsystem to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met. OR Both REC subsystems inoperable.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	12 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.3.1	Verify the water level in the REC surge tank is visible above the bottom of the gauge glass.	24 hours
SR 3.7.3.2	Verify the temperature of the REC supply water is $\leq$ ~~95~~ **100**°F.	24 hours
SR 3.7.3.3	-------------------NOTE-------------------- Isolation of flow to individual components does not render REC System inoperable. --- Verify each REC subsystem manual, power operated, and automatic valve in the flow paths servicing safety related cooling loads, that is not locked, sealed, or otherwise secured in position, is in the correct position.	31 days
SR 3.7.3.4	Verify each REC subsystem actuates on an actual or simulated initiation signal.	18 months

BASES

APPLICABLE SAFETY ANALYSES (continued)

level equates to a level of at least 863.2 ft mean sea level in the SW pump bay under postulated worst case conditions. This level exceeds the 862.8 ft mean sea level submergence requirements for necessary long term SW cooling. The ability of the SW System to support long term cooling of the reactor containment is assumed in evaluations of the equipment required for safe reactor shutdown presented in the USAR, Chapters V and XIV (Refs. 2 and 3, respectively). These analyses include the evaluation of the long term primary containment response after a design basis LOCA.

The ability of the SW System to provide adequate cooling to the identified safety equipment is an implicit assumption for the safety analyses evaluated in References 2 and 3. The ability to provide onsite emergency AC power is dependent on the ability of the SW System to cool the DGs. The long term cooling capability of the RHR, core spray, and RHRSWB pumps is also dependent on the cooling provided by the SW System.

The SW System, together with the UHS, satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii) (Ref. 4).

LCO

The SW subsystems are independent of each other to the degree that each has separate controls, power supplies, and the operation of one does not depend on the other. In the event of a DBA, one subsystem of SW is required to provide the minimum heat removal capability assumed in the safety analysis for the system to which it supplies cooling water. To ensure this requirement is met, two subsystems of SW must be OPERABLE. At least one subsystem will operate, if the worst single active failure occurs coincident with the loss of offsite power.

A subsystem is considered OPERABLE when it has an OPERABLE UHS, two OPERABLE pumps, and an OPERABLE flow path capable of taking suction from the intake structure and transferring the water to the appropriate equipment.

The OPERABILITY of the UHS is based on having a minimum river water level of 865 ft mean sea level and a maximum water temperature of ~~90~~ 95 °F.

BASES

APPLICABLE SAFETY ANALYSIS (continued)

pumps per loop are required to be OPERABLE to satisfy the requirements of the LCO.

The ability of the REC System to provide adequate cooling to the identified safety equipment is an implicit assumption for the safety analyses evaluated in Reference 1.

The REC System satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii) (Ref. 2).

LCO

The REC subsystems are independent of each other to the degree that each has separate controls, power supplies, and the operation of one does not depend on the other. In the event of a DBA, one subsystem of REC is required to provide the minimum heat removal capability assumed in the safety analysis for the system to which it supplies cooling water. To ensure this requirement is met, two subsystems of REC must be OPERABLE. At least one subsystem will operate, if the worst single active failure occurs coincident with the loss of offsite power.

A subsystem is considered OPERABLE when it has two OPERABLE pumps, one OPERABLE heat exchanger, and an OPERABLE flow path capable of transferring the water to the appropriate equipment. Each REC subsystem's OPERABILITY requires that its service water backup cross tie valves be OPERABLE.

The OPERABILITY of the REC System is also based on having a visible water level in the surge tank gauge glass and a maximum supply water temperature of ~~95~~ 100 °F.

The isolation of the REC System to components or systems may render those components or systems inoperable, but does not affect the OPERABILITY of the REC System.

APPLICABILITY

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

ATTACHMENT 3

**PROPOSED TECHNICAL SPECIFICATIONS
AND ASSOCIATED BASES REVISIONS
FINAL TYPED FORMAT**

**COOPER NUCLEAR STATION
DOCKET NO. 50-298, LICENSE DPR-46**

Listing of Revised Pages

Technical Specifications
3.7-4
3.7-7

Associated Technical Specification Bases*
B 3.7-7
B 3.7-13

*Bases will be implemented following approval
of the proposed Technical Specification changes in accordance with
TS 5.5.10, Technical Specification (TS) Bases Control Program.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met. <u>OR</u> Both SW subsystems inoperable. <u>OR</u> UHS inoperable.	B.1 Be in MODE 3. <u>AND</u> B.2 Be in MODE 4.	12 hours 36 hours

<u>SURVEILLANCE REQUIREMENTS</u>

SURVEILLANCE		FREQUENCY
SR 3.7.2.1	Verify the river water level is $\geq$ 865 ft mean sea level.	24 hours
SR 3.7.2.2	Verify the average water temperature of UHS is $\leq$ 95°F.	24 hours

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.3.1	Verify the water level in the REC surge tank is visible above the bottom of the gauge glass.	24 hours
SR 3.7.3.2	Verify the temperature of the REC supply water is $\leq$ 100°F.	24 hours
SR 3.7.3.3	-------------------NOTE------------------- Isolation of flow to individual components does not render REC System inoperable. -- Verify each REC subsystem manual, power operated, and automatic valve in the flow paths servicing safety related cooling loads, that is not locked, sealed, or otherwise secured in position, is in the correct position.	31 days
SR 3.7.3.4	Verify each REC subsystem actuates on an actual or simulated initiation signal.	18 months

BASES

APPLICABLE SAFETY ANALYSES (continued)

level equates to a level of at least 863.2 ft mean sea level in the SW pump bay under postulated worst case conditions. This level exceeds the 862.8 ft mean sea level submergence requirements for necessary long term SW cooling. The ability of the SW System to support long term cooling of the reactor containment is assumed in evaluations of the equipment required for safe reactor shutdown presented in the USAR, Chapters V and XIV (Refs. 2 and 3, respectively). These analyses include the evaluation of the long term primary containment response after a design basis LOCA.

The ability of the SW System to provide adequate cooling to the identified safety equipment is an implicit assumption for the safety analyses evaluated in References 2 and 3. The ability to provide onsite emergency AC power is dependent on the ability of the SW System to cool the DGs. The long term cooling capability of the RHR, core spray, and RHRSWB pumps is also dependent on the cooling provided by the SW System.

The SW System, together with the UHS, satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii) (Ref. 4).

LCO

The SW subsystems are independent of each other to the degree that each has separate controls, power supplies, and the operation of one does not depend on the other. In the event of a DBA, one subsystem of SW is required to provide the minimum heat removal capability assumed in the safety analysis for the system to which it supplies cooling water. To ensure this requirement is met, two subsystems of SW must be OPERABLE. At least one subsystem will operate, if the worst single active failure occurs coincident with the loss of offsite power.

A subsystem is considered OPERABLE when it has an OPERABLE UHS, two OPERABLE pumps, and an OPERABLE flow path capable of taking suction from the intake structure and transferring the water to the appropriate equipment.

The OPERABILITY of the UHS is based on having a minimum river water level of 865 ft mean sea level and a maximum water temperature of 95°F.

BASES

APPLICABLE SAFETY ANALYSIS (continued)	pumps per loop are required to be OPERABLE to satisfy the requirements of the LCO. The ability of the REC System to provide adequate cooling to the identified safety equipment is an implicit assumption for the safety analyses evaluated in Reference 1. The REC System satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii) (Ref. 2).
LCO	The REC subsystems are independent of each other to the degree that each has separate controls, power supplies, and the operation of one does not depend on the other. In the event of a DBA, one subsystem of REC is required to provide the minimum heat removal capability assumed in the safety analysis for the system to which it supplies cooling water. To ensure this requirement is met, two subsystems of REC must be OPERABLE. At least one subsystem will operate, if the worst single active failure occurs coincident with the loss of offsite power. A subsystem is considered OPERABLE when it has two OPERABLE pumps, one OPERABLE heat exchanger, and an OPERABLE flow path capable of transferring the water to the appropriate equipment. Each REC subsystem's OPERABILITY requires that its service water backup cross tie valves be OPERABLE. The OPERABILITY of the REC System is also based on having a visible water level in the surge tank gauge glass and a maximum supply water temperature of 100 °F. The isolation of the REC System to components or systems may render those components or systems inoperable, but does not affect the OPERABILITY of the REC System.
APPLICABILITY	In MODES 1, 2, and 3, the REC System is required to be OPERABLE to support OPERABILITY of the equipment serviced by the REC System. Therefore, the REC System is required to be OPERABLE in these MODES.

Attachment 4

Regulatory Limits on Missouri River Temperature Associated with Cooper Nuclear Station

Purpose

This attachment provides a summary discussion of the regulatory limits on the temperature of the Missouri River that the Nebraska Public Power District (NPPD) Cooper Nuclear Station (CNS) must comply within its operation. These limits include the temperature limits for both the intake from the river and the return to the river. The intent of this information is to ensure that the U.S. Nuclear Regulatory Commission (NRC) staff is aware of these controls and understands the relationship between the increased temperature limit for the CNS Service Water (SW) System proposed by the operating license amendment request and the controls on the temperature of the water that is returned to the Missouri River.

Background

The Missouri River is the source of cooling water for CNS, both for normal operation and for mitigation of postulated accidents. This source of cooling water is referred to as the Ultimate Heat Sink (UHS).

Plants that generate electricity by using steam to rotate a turbine add heat to the environment through the discharge of cooling water that has been used to condense the steam that has exited the turbine. Other power generation facilities along the Missouri River add heat to the river through the discharge of warmed cooling water as does CNS.

CNS Operating License DPR-46, issued by the NRC to NPPD, imposes an upper limit on the temperature of the river water that is supplied to the plant. The current limit is 90°F. By this license amendment request NPPD proposes increasing this limit to 95°F.

The National Pollutant Discharge Elimination System (NPDES) Permit No. NE0001244, issued by the Nebraska Department of Environmental Quality (NDEQ) to NPPD, imposes an upper limit on the temperature of the water that is discharged from CNS and returned to the Missouri River. The NPDES Permit designates the point of discharge from the CNS condenser as "Outfall 001." Part I, "Effluent Limitations and Monitoring Requirements," of NPDES Permit NE0001244, specifies the original daily maximum temperature limitation of Outfall 001 as 103°F. This was modified to 108°F by Case No. 2249 Consent Order. NPPD letter from Joe Citta dated July 9, 2001, to Steven J. Moeller, Attorney, NDEQ, provided an amended Consent Order for NPDES Permit No. 0001244, indicating that the order with the 108°F limit shall remain in effect until June 30, 2006.

NPPD is currently engaged in an effort to model thermal mixing downstream of the CNS discharge to the Missouri River. This effort is contracted with the University of Iowa. This modeling study will help explain relationships in the mixing zone under various flow and temperature scenarios and may generally identify modifications to the CNS discharge that might be useful in justifying an increase in the NPDES permit discharge temperature limit.

Discussion

With the inlet SW water from the Missouri River at the current license limit of 90°F, the temperature of Outfall 001 could approach the 108°F limit of the NPDES Permit, as modified by Case No. 2249 Amended Consent Order, discussed above in "Background."

With the inlet SW/UHS temperature limit increased to 95°F, CNS operation will remain constrained by the NPDES permit to not exceed the current maximum daily temperature limitation of 108°F for the water released to the Missouri River. Thus, increasing the technical specification limit of ~~inlet~~ average UHS water temperature to 95°F would allow CNS to continue to operate at river temperatures above 90°F, but possibly with power reduced as necessary to prevent exceeding the NPDES permit limit.

In the event that the ambient temperature of the Missouri River is the cause of the CNS discharge temperature exceeding the 108°F limit, NPPD has the option to contact the Director of the NDEQ and request regulatory discretion. The Director may grant a variance allowing continued operation of CNS with the discharge temperatures above 108°F.

Conclusion

CNS must comply with both the temperature limitation of 90°F for the SW/UHS intake, in accordance with Operating License No. DPR-46, and the temperature limitation of 108°F for Outfall 001, in accordance with NPDES Permit No. 0001244. With the operating license limit increased to 95°F as requested CNS will be able to continue operation with Missouri River water temperatures exceeding 90°F while continuing to comply with NPDES requirements.

Correspondence Number: NLS2002008

The following table identifies those actions committed to by the District in this document. Any other actions discussed in the submittal represent intended or planned actions by the District. They are described for information only and are not regulatory commitments. Please notify the NL&S Manager at Cooper Nuclear Station of any questions regarding this document or any associated regulatory commitments.

COMMITMENT	COMMITTED DATE OR OUTAGE
None	