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NLS2008002
March 24, 2008

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

Subject: License Amendment Request to Revise Technical Specification 3.7.3, Reactor Equipment Cooling System
Cooper Nuclear Station, Docket No. 50-298, DPR-46

Dear Sir or Madam:

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 license amendment request proposes to revise TS Section 3.7.3, "Reactor Equipment Cooling (REC) System."

The safety related function of the REC System used in accident mitigation is to provide cooling water to the coolers for the rooms in the Reactor Building in which the Emergency Core Cooling System (ECCS) pumps are located. The proposed revisions to the REC System TS are based on the ability to align the Service Water (SW) System to the REC System when the REC System is degraded in order to provide the required cooling water to the ECCS pump room coolers. The ability of the SW System to provide the additional required cooling has been verified by calculation.

Attachment 1 provides a description of the TS changes, the basis for the amendment, the no significant hazards consideration evaluation pursuant to 10 CFR 50.91(a)(1), and the environmental impact evaluation pursuant to 10 CFR 51.22. Attachment 2 provides the proposed changes to the current CNS TS in marked up format. Attachment 3 provides the final typed TS pages to be issued with the amendment. Attachment 4 provides conforming changes to the TS Bases for NRC information.

NPPD requests NRC approval of the proposed TS changes and issuance of the requested license amendment by March 24, 2009. The amendment will be implemented within 60 days following issuance.

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These proposed TS 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 229, issued February 14, 2008, have been incorporated into this request. This request is submitted under oath or affirmation pursuant to 10 CFR 50.30(b).

By copy of this letter and its attachments, the appropriate State of Nebraska official is notified in accordance with 10 CFR 50.91(b)(1). Copies are also being provided to the NRC 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 David Van Der Kamp, Licensing Manager, at (402) 825-2904.

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

Executed on 24MAR 08
(Date)

Sincerely,

Stewart B. Minahan
Vice President - Nuclear and
Chief Nuclear Officer

/rr

Attachments

cc: Regional Administrator w/attachments
USNRC - Region IV

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

Senior Resident Inspector w/attachments
USNRC - CNS

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

NPG Distribution w/o attachments

CNS Records w/attachments

Attachment 1

NPPD Evaluation

License Amendment Request to Revise Technical Specification 3.7.3, Reactor Equipment Cooling System

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

Revised Technical Specification Page

3.7-6
3.7-7

1.0 Description

This license amendment request (LAR) proposes to revise Cooper Nuclear Station (CNS) Technical Specification (TS) Section 3.7.3, "Reactor Equipment Cooling (REC) System." The proposed revisions are both addition of new and revision of existing Conditions and Required Actions to allow credit for the ability to align the Service Water (SW) System to the REC System in order to provide required cooling to the essential loads of the REC System during mitigation of the design basis loss-of-coolant accident (LOCA). These changes will add flexibility and allow safe continued plant operation in the event that leakage from the REC System exceeds limits.

2.0 Proposed Changes

The following are the proposed revisions to TS Section 3.7.3.

1. The following is added as new Condition A.

   "REC leakage exceeds limits AND one SW backup subsystem is inoperable."

   The following are the proposed Required Actions and Completion Times.

   A.1 "Verify by administrative means one SW backup subsystem OPERABLE." The Completion Time is 1 hour.

   AND

   A.2.1 "Restore the inoperable SW backup subsystem to OPERABLE status." The Completion Time is 14 days.

   OR

   A.2.2 "Restore REC leakage to within limits." The Completion Time is 14 days.

2. Renumber existing Condition A as Condition B and add "for reasons other than Condition A." Condition B will therefore read:

   "One REC subsystem inoperable for reasons other than Condition A."

   Renumber existing Required Action A.1 to B.1. Required Action B.1 will then read:

   "Restore the REC subsystem to OPERABLE status." Completion Time is 30 days.

3. Renumber existing Condition B as Condition C, revise the existing provisions, and add a new provision. The new Condition C will read:

"Required Actions and associated Completion Times of Conditions A or B not met.

OR

Leakage exceeds limits with both SW backup subsystems inoperable.

OR

Both REC subsystems inoperable for reasons other than Condition A."

Renumber existing Required Actions B.1, "Be in MODE 3," and B.2, "Be in MODE 4," as Required Actions C.1 and C.2.

4. Revise Surveillance Requirement (SR) 3.7.3.1 from "Verify the REC surge tank water level is within limits" to "Verify the REC System leakage is within limits."

   Add the following two new notes:

   1. "SR 3.0.1 is not applicable."

   2. "REC System leakage beyond limits by itself is only a degradation of the REC System and does not result in the REC System inoperable."

Conforming revisions to the Bases are provided in Attachment 4 for NRC information. These revisions to the Bases will be made as an implementing action following issuance of the amendment pursuant to TS 5.5.10, TS Bases Control Program.

3.0 Background

CNS is a boiling water reactor (BWR) of General Electric design BWR4, with a Mark 1 containment. The Emergency Core Cooling System (ECCS) at CNS consists of the High Pressure Coolant Injection (HPCI) System, the low-pressure Core Spray (CS) System, the Low Pressure Coolant Injection (LPCI) mode of the Residual Heat Removal (RHR) System, and the Automatic Depressurization System. Although not considered as part of the ECCS, the high-pressure Reactor Core Isolation Cooling (RCIC) System can also supply water to the reactor pressure vessel (RPV). The pumps in the high-pressure HPCI and RCIC Systems are steam turbine-driven, while the pumps in the CS and RHR systems are motor-driven.

During the postulated design basis LOCA, reactor coolant is initially discharged from the recirculation system piping to the air space in primary containment (drywell). From there the discharged reactor coolant flows to the suppression pool through the drywell-to-torus vent pipes. Following depressurization of the reactor pressure vessel, the ECCS systems

take suction from the suppression pool, thereby allowing the reactor coolant to be pumped back to the RPV for long-term cooling of the nuclear core.

The pumps for these ECCS subsystems are located in four rooms in the basement of the Reactor Building (RB). Each of these four rooms is in a corner of the RB on elevation 859 feet Mean Sea Level. (Because these rooms are located in the four corners or "quadrants" of the RB, they are referred to as the "quad" rooms). CS motor-driven pump A and RCIC steam turbine-pump are located in the northeast quad. CS motor-driven pump B is located by itself in the southeast quad. RHR motor-driven pumps A and C are located in the northwest quad. RHR motor-driven pumps B and D are located in the southwest quad. The HPCI steam turbine-pump is located in a separate room adjacent to the southwest quad.

The operation of these motors and steam turbines, along with recirculation of the hot reactor coolant in the piping, adds heat to the ECCS pump rooms, resulting in an increase in the temperature of the rooms. The rooms are cooled by fan coil units with cooling water supplied by the REC System, or the SW System through cross-connections between the two systems.

Reactor Equipment Cooling (REC) System

The REC System provides cooling for the non-essential (non-safety related) and essential (safety related) heat loads during normal operation, and cooling for the essential heat loads during accidents and transients (Reference 7.1). The non-essential heat loads include equipment located in the drywell (primary containment), the Reactor Building (secondary containment), the Control Building, Radwaste Building, and Augmented Radwaste Building. The REC System provides cooling water for the essential function of removing heat from equipment required for a safe shutdown following a design basis accident (DBA) or a transient. These essential heat loads are the room coolers in the rooms in which the ECCS pumps are located.

The REC System consists of a non-critical loop and two critical loops, designated as North and South. The non-essential heat loads are cooled by water supplied by the non-critical loop. The essential heat loads are cooled by water supplied by the critical loops. After removing heat from the components the water is recirculated back to the suction of the REC pumps. The REC heat exchangers are cooled by the SW System.

The following are the safety design basis provisions of the REC System:

(1) The system shall be designed with sufficient redundancy so that no single, active system component failure can prevent the system from achieving its safety objective.

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

(3) The system shall receive power from a critical AC power source.

The REC System consists of two subsystems. Each subsystem has two pumps, a heat exchanger, valves, piping, and associated instrumentation. Each pump has a capacity of 1,350 gpm. Either of the two subsystems is capable of providing the required cooling with one REC pump running and the two REC subsystems cross-connected. The REC subsystems are designed with electrical division independence, such that with the loss of one electrical division, essential loads will receive adequate cooling with the available equipment.

A 550-gallon surge tank is located at the highest point of the REC system. The purpose of this tank is to (1) accommodate system volume changes, (2) maintain static pressure in the system, (3) provide a point to monitor system inventory, thereby detecting gross leaks in the system, and (4) provide a means of adding makeup water to the system.

After a 40 second delay following a loss of pressure in the REC System, the supply of REC to the non-essential heat loads is automatically isolated. Isolating the non-essential loads helps assure that adequate cooling water is available and supplied to the essential REC loads.

Service Water (SW) System

The safety objective of the SW System is to provide a heat sink for REC, RHR, and diesel generator (DG) cooling systems under transient and accident conditions (Reference 7.2).

The safety design basis of the SW System currently includes the following provisions:

(1) The ability to continuously provide a supply of cooling water directly to the DGs and the secondary side of the REC heat exchangers and to the RHR Service Water Booster (SWB) pumps adequate for both normal and transient and accident conditions, and

(2) The capability to provide direct cooling to essential REC heat loads following a seven-day post accident time period or after a passive REC failure.

The SW System consists of four vertical pumps and two strainers, piping, valves, and instrumentation. The two SW pumps in each division discharge to a common header, from which independent piping supplies two seismic Class 1S cooling water loops and one Turbine Building loop. Each seismic Class 1S loop supplies cooling water to one DG, one REC heat exchanger, and one RHR heat exchanger through two RHR SW Booster pumps. Either loop can supply cooling water to the REC critical loops, the RHR SW Booster pump room fan coil unit, and control room air conditioning units.

Service Water Backup to Reactor Equipment Cooling Cross-Connection

The CNS design has a cross-connection between the SW System and the REC System which allows water from the SW System to be supplied directly to the critical loops of the REC System in the event that the REC System cannot provide the required cooling water. Two separate subsystems of this SW cross-connection (backup) are available, either one of which is capable of supplying cooling water to both of the two REC critical loops. Each of the two SW backup subsystems has one valve that admits water from the SW System to the REC critical loops, and another valve that returns the water to the SW System. A cross-tie between the two REC critical loops allows the components on either or both of the loops to be supplied with cooling water from the SW System.

During the review of the application for the CNS operating license, the U. S. Atomic Energy Commission (AEC) documented a concern that REC cooling could not be assured for either a seismic event with a concurrent single failure, or for a passive failure in the REC essential cooling loops. In response to this concern Nebraska Public Power District (NPPD) added the SW connection to REC to provide a source of back-up cooling water in the event of a passive REC system failure. As a result the provision of being able to supply cooling water from the SW System to the REC critical loops was part of the original CNS licensing basis. This original licensing basis required that the surge tank in the REC System have sufficient inventory to allow 30 days of REC operation following a LOCA. No credit was taken for operator action to restore water level in the REC surge tank as a result of postulated radiation levels in the reactor building following a LOCA.

Cooling to the essential heat loads cooled by REC must be provided for 30 days following a LOCA. The post-LOCA mission time for REC was originally 30 days. In order to provide operational flexibility in the event of leakage from the REC system, NPPD requested that the inventory of REC required to be available following a LOCA be reduced from 30 days of system operation to seven days, with the SW System providing this cooling from day eight out to the required accident mitigation period of 30 days. This was approved by Amendment No. 185 dated March 13, 2001 (Reference 7.3). Thus, the current licensing basis for the REC System is that it must operate for at least seven days following a LOCA, with the SW System capable of supplying water to cool the essential REC heat loads from day eight out to 30 days.

Schematics of the REC and SW Systems showing the cross-connection between the two systems are provided as Figures 1 and 2.

Need for the Requested Amendment

The amendment is needed to avoid an unnecessary shutdown of the plant. Leakage from the REC System results in loss of inventory from the surge tank. Based on the requirements of the current TS, both subsystems of REC must be declared inoperable if the level in the REC surge tank cannot be maintained within limits. Under this condition the REC System would be unable to perform its safety function for the mission time of seven days following a LOCA as required by the current licensing basis. When such a leak

occurs, efforts are made to locate and repair the leak, and thereby restore the REC System to operable status. Condition B of TS 3.7.3 is entered when both REC subsystems are inoperable. Required Action B.1 is to be in MODE 3 (hot shutdown) in 12 hours, and Required Action B.2 is to be in MODE 4 (cold shutdown) in 36 hours.

The information presented in the following Technical Analysis supports the conclusion that the SW System can be aligned to the REC System at any time following a LOCA, thereby providing the cooling required for both the essential REC loads and the SW System loads. Based on this the REC System is not required for the mitigation of a LOCA. Because the SW System can provide cooling to the essential loads of the REC System, the shutdown of CNS as required by the current TS 3.7.3 is unnecessary.

4.0 Technical Analysis

Calculations have been performed in support of this LAR. The calculations evaluated both the Arrhenius equivalent thermal aging temperatures and the peak temperatures in the ECCS pump rooms resulting from loss of cooling to the Fan Coil Unit (FCU) in each of the rooms. The calculations determined that the worst case scenario, in terms of resulting temperature in the ECCS pump rooms, was when the loss of REC occurs at 20 hours following the occurrence of the LOCA.

Five different scenarios were evaluated in the calculations, with each addressing the resulting temperature in the five ECCS pump rooms. Each scenario assumed that (a) no cooling was provided to one of the five ECCS pump rooms for the entire period of LOCA mitigation, (b) cooling from the REC System to the other four ECCS pump rooms was lost at 20 hours following the occurrence of a LOCA, and (c) one hour is needed to align SW to the REC critical loops, during which time no cooling is provided to the pump rooms.

The resulting Arrhenius equivalent thermal aging temperature was determined to be bounded by the value in the current Environmental Qualification Program Basis Document (EQ-PBD). The resulting peak temperatures were determined to exceed the value of the peak temperature for post-LOCA. However, these temperatures were bounded by the temperature of the High Energy Line Break (HELB). Since the EQ equipment in the ECCS pump room is qualified to the bounding HELB peak temperatures, it is concluded that this equipment is qualified to the post-LOCA temperatures.

Based on the calculations, it is concluded that the SW System can supply sufficient cooling to the REC System through the cross-connection to remove sufficient heat from the ECCS pump rooms, thereby maintaining the temperature in these rooms such that the continued environmental qualification of electrical equipment in the ECCS pump rooms following a LOCA is assured.

In support of this LAR, two scenarios were performed on the CNS simulator to test the ability of the operators to perform the manual actions needed to align the SW System to the REC System. The two scenarios were different but both involved the loss of the ability of the REC System to provide cooling to the critical loops, and the need to align the SW

System to the REC System. Two different crews of the control room operating staff participated in these simulator scenarios, with one crew performing one scenario and the other crew performing the other scenario. The following is a summary of these simulator scenarios.

Simulator Scenario No. 1: This scenario involves the plant operating at 100% power when a small earthquake occurs. The earthquake causes a leak to develop in the REC system, resulting in loss of REC cooling to the coolers in the Reactor Building ECCS quadrant rooms. The Control Room operator must identify that aligning the SW System to provide cooling to the REC critical loops is needed and follow the appropriate procedure to take the specific actions required.

Simulator Scenario No. 2: This scenario involves an inadvertent HPCI initiation with failure of fuel cladding. The plant is operating at 100% power when an inadvertent HPCI initiation occurs, with HPCI injecting into the reactor. The reactor is scrammed, followed by loss of offsite power. Emergency Diesel Generator (DG) no. 1 fails to start. DG no. 2 starts and energizes its 4160-volt essential services bus. A leak in the REC system occurs. Failure of fuel cladding prohibits entry into the Reactor Building (secondary containment). The temperature in the HPCI pump room in the Reactor Building increases, requiring the Control Room operator to place SW backup cooling in service. As in scenario no. 1, the Control Room operator must identify that aligning the SW System to provide cooling to the REC critical loops is needed and follow the appropriate procedure to take the specific actions required.

Results: In both scenarios the control room staff recognized the need to align SW to the REC critical loops and made this alignment within one hour using station procedures. The performances of these two scenarios demonstrated the ability of the control room staff to align SW to REC within one hour.

As noted earlier, the current licensing basis requires that the REC System be able to function for a minimum of seven days following a LOCA, with the SW System capable of providing cooling to the REC critical loops from day eight to day 30 through the cross connections between the two systems. The SW System is able to provide sufficient cooling for the essential loads of both the SW System and the REC System. The current limits on REC System leakage are based on maintaining seven days of inventory available in the REC surge tank. TS Surveillance Requirement SR 3.7.3.1 verifies that leakage from the REC System is within limits every 24 hours. This license amendment request (LAR) proposes to revise the licensing basis to allow crediting of the SW System to provide cooling to the REC System at any time following a LOCA. As a result, the LAR eliminates the current provision that the REC System must be available for at least seven days following a LOCA.

The basis for the revised technical specifications proposed in this LAR is that SW backup is needed only if leakage from the REC System results in less than 30 days of inventory in the REC surge tank. SW backup is not needed if the REC inventory is sufficient for 30 days of LOCA mitigation. The proposed 14-day Completion Time for new Required

Action A.2.1 to restore an inoperable SW backup subsystem to operable status and Required Action A.2.2 to restore REC leakage to within limits was evaluated and was concluded to have a negligible impact on core damage frequency.

The source of the water in the SW System is the Missouri River. This water contains silt. The water in the REC System is clean, high quality water, with no silt. Because of its higher quality water, the REC System is preferred over the SW System as the source of cooling to the critical loops of REC. As a result, the REC System will be used for as long as it remains available during LOCA mitigation.

The calculations performed to validate aligning SW to REC at any time following a LOCA assumed a period of one hour to align the SW System to the REC critical loops following loss of REC cooling to the ECCS pump rooms. These calculations have confirmed that completing this system alignment within one hour assures that temperatures in the ECCS pump rooms will support continued environmental qualification and operability of the ECCS pumps during the period of LOCA mitigation.

The conclusions that (1) one hour to align the SW System to the REC System is acceptable, and (2) the SW System can cool the essential REC loads as well as the SW loads, are true for a loss of REC at any time following a LOCA, from occurrence out to the mitigation period of 30 days.

The actions required to align SW to the REC critical loops can be performed from the control room by the use of remotely operated valves, with one set of actions (lifting of leads to allow closure of the SW outlet valves) being performed in the Cable Spreading Room. Licensed operators have been trained on recognizing the need for this alignment and have the skills and abilities to make this system alignment. The actions to make this alignment are specified in site procedures.

The valves that cross connect the SW System to the REC System are included in the programs for Inservice Testing (IST) and motor operated valve (MOV) testing. The IST program testing includes opening stroke testing of the valves quarterly and testing of the position indication every two years. The MOV program testing includes diagnostic testing of the valves. The test results for these valves demonstrate that the valves are highly reliable. The valves are included in the preventive maintenance program, and receive periodic cleaning and lubrication of the valve stem, examination of the motor operator, and verification of position indication.

The safety evaluation (SE) issued with Amendment 185 contained numerous provisions intended to ensure reliable operation of the SW backup to REC. Certain of those provisions would be impacted by this proposed amendment. NPPD reviewed the Amendment 185 SE to ensure that CNS will continue to comply with its provisions. The following Table 1 presents the provisions from the Amendment 185 SE and a discussion of how CNS will continue to comply with each provision.

Table 1
Provisions of Amendment 185 Safety Evaluation and CNS Compliance

No.	Amendment 185 Provision	CNS Compliance with Provision
1	"Procedures have been established to aid plant operators in determining if a loss of all REC cooling has occurred and to specify actions to be taken."	Procedures that are used to determine if REC cooling is lost and that specify actions to be taken if REC cooling is lost will be maintained.
2	"The SW System is able to fulfill its safety function as well as the safety function of the REC System when the SW-to-REC intertie valves are open."	Calculations have determined that the SW System can provide sufficient cooling to the essential loads of the REC System, in addition to providing required cooling of SW loads, at any time following a LOCA.
3	"The SW-to-REC intertie capability satisfies the applicable CNS design-basis criteria for safety-related applications."	This proposed license amendment will not make any changes to the design or as-built configuration of the SW or REC System.
4	"Measures have been established to assure that silting will not prevent the SW System from performing the REC cooling function."	This provision will continue to be satisfied based on continuing to maintain administrative controls that will ensure silt accumulation in the cross-connections between the SW System and the REC critical loops will not block flow from the SW System if aligned to the REC System.
5	"Even though the control room annunciation and indication for monitoring the status of the REC System are not safety-related or essential, they are highly reliable and diverse. The staff considers the use of control room annunciators as described in the November 14, 2000 supplemental letter (response to Question 9) to be adequate for this particular application because operator action is not immediately necessary and is not anticipated for at least 7 days following event initiation."	As a result of this proposed amendment, SW alignment to REC may be needed sooner than seven days. The highly reliable and diverse control room instrumentation is adequate to alert the control room staff of the need to align SW backup, even if SW must be aligned to REC sooner than seven days following a LOCA. Furthermore, the control room staff would be cognizant of leakage from REC. The ability of the control room staff to align the SW System to the critical loops of the REC System within one hour from recognizing the need has been demonstrated by simulator scenarios. NPPD considers the control room instrumentation to be adequate for ensuring timely recognition of the need to align SW to REC and for making this alignment, even if this is needed sooner than seven days following occurrence of the event, including immediately following occurrence.

Information Notice 97-78

NRC Information Notice (IN) 97-78, "Crediting of Operator Actions in Place of Automatic Actions and Modifications of Operator Actions, Including Response Times," (Reference 7.4), discusses examples of licensees making changes to facilities or operations that credit operator actions in place of automated system or component actuation, and of licensees altering operator actions and response times that were previously evaluated. The IN identifies nine elements that are stated as being typically included in the NRC's review of licensees' analyses.

The proposed amendment does not involve either substitution of a manual action for an automatic system actuation or a new manual action. However, because it involves modification of when a manual action may be required, NPPD reviewed the nine elements addressed in IN 97-78 to determine if they would be satisfied by the proposed LAR. The following are the nine elements and a discussion of how each is addressed at CNS for this proposed amendment.

Element no. 1: "The specific operator actions required"

CNS Response:

Operators in the control room can align the SW System to the REC critical loops within one hour from identifying the need to make the alignment. Emergency Procedure 5.2REC, "Loss of REC," specifies the actions to make the alignment. The following is a summary of the actions specified in the procedure.

1. Close the REC MOVs that isolate the non-essential loop from the essential loop in both subsystems of the REC System.
2. Ensure the SW outlet valves on the REC heat exchangers in both subsystems are throttled closed.
    a. If Group 6 Isolation signal has been initiated, then instructions are provided to over-ride that signal via lifting leads and allow closure of the SW outlet valves.
3. Ensure the REC heat exchanger SW outlet temperature control valves are failed OPEN.
4. Place the switches for both divisions of the SW-to-REC crosstie to the OPEN position.

Element no. 2: "The potentially harsh or inhospitable environmental conditions expected."

CNS Response:

Except for a fire or the introduction of smoke or hazardous toxic chemicals into the Control Room Envelope (CRE), the CRE is maintained suitable for human occupancy at all times. (The CRE at CNS is comprised of the main Control Room and the Cable Spreading Room). The Cable Spreading Room is reached by traversing through the Computer Room (adjacent to the Control Room but outside the CRE) and down one set of

stairs. Because the actions to align SW to REC can be performed from within the CRE, there are no concerns with potentially harsh or inhospitable environmental conditions.

The Computer Room and the stairway to the Cable Spreading Room have restrictions against the presence of transient combustible material. This travel path does not require passing through radiation areas, steam/hot environment, and is not congested or difficult to traverse. There is minimal increased risk to the operator in traversing this pathway and taking the required action in the Cable Spreading Room.

Element no. 3: "A general discussion of the ingress/egress paths taken by the operators to accomplish functions."

CNS Response:

An operator may be required to exit the Control Room, enter the Computer Room and traverse one set of stairs to gain access to the Cable Spreading Room to lift one lead. Because the actions to align SW to the critical loops of REC can be performed from within the CRE and the short travel path through the Computer Room, there are no concerns with potentially harsh or inhospitable environmental conditions.

Element no. 4: "The procedural guidance for required actions."

CNS Response:

Procedural guidance on when SW backup is needed and actions to take to align SW to REC is contained in Emergency Procedure 5.2REC. The following information is included in 5.2REC.

1. Conditions for when Procedure 5.2REC is to be entered. These include (a) REC header pressure less than or equal to 62 psig, (b) rising temperature on equipment cooled by REC, (c) multiple low REC flow alarms in the control room, and (d) multiple REC pump alarms in the control room.

2. Automatic actions that the plant will take. These include start of REC pumps that are in STANDBY, and closure of five valves.

3. Immediate actions to be taken by the operators. These include starting available REC pumps and closing two valves if automatic actions do not restore REC header pressure.

4. Subsequent actions to be taken by the operators. These include scramming the reactor and stopping the recirculation pumps if REC header pressure is not restored or if SW cooling to both REC heat exchangers is lost, venting containment if containment pressure is rising, and initiating SW to REC flow.

The actions that the operators must take to align SW to REC are specified in an attachment in Procedure 5.2REC. The following are the actions that the operators must take.

1. Close the MOVs (two) that isolate the non-essential loop from the essential loop in both subsystems of REC.
2. Ensure the SW outlet valves on the REC heat exchangers in both subsystems are closed.
3. Ensure the REC Heat Exchanger Outlet TCVs are failed open.
4. Place the switches for both divisions of the SW-to-REC crosstie to the OPEN position.

Element no. 5: "The specific operator training necessary to carryout actions, including any operator qualifications required to carry out actions."

CNS Response:

Licensed operators receive initial training and requalification training on a specific task entitled "Operate Service Water Backups for Critical Loop Cooling" (Task # 208017C0101). Training on this task in initial licensed operator training is provided in simulator lesson plan SKL012-42-19, entitled "OPS Reactor Equipment Cooling System." The objective of this lesson plan is for the operator to demonstrate an understanding of the REC System under normal operation, loads, interlocks, and integrated plant functions, and system operating procedures. This is evaluated both by a written examination in the classroom and by participation in the simulator.

Training on this task in requalification training is provided by simulator lesson plan SKL012-47-11, entitled "Loss of All REC." The simulator scenario is a loss of REC as a consequence of the REC pumps tripping. Operator actions include scramming the reactor and stabilizing the plant by use of the emergency procedures.

The task was last trained in Licensed Operator Requalification Training in Training Cycle 02-13, which covered the time period of April 24, 2006, through June 1, 2006.

Element no. 6: "Any additional support personnel and/or equipment required by the operator to carry out actions."

CNS Response:

Because the actions required to align SW to REC are performed by the operators in the control room, and the lifting of the lead in the Cable Spreading Room can be performed by one of the Control Room operators, no additional support personnel are required. (Lifting of the lead allows the SW outlet valves on the REC heat exchangers to close. This task may be assigned to a qualified Non-Licensed operator trained in removal/installation of Emergency Operating Procedure jumpers).

Element no. 7: "A description of information required by the control room staff to determine whether such operator action is required, including qualified instrumentation

used to diagnose the situation and to verify that the required action has successfully been taken."

CNS Response:

The operator determines the need to align flow from the SW System to the REC System through the following two concurrent methods:

1. Upon recognizing concurrent annunciation of the REC Low Pressure and the REC Surge Tank Low Level alarms, the operator initiates actions to determine the location of the REC pipe break. This allows the operator to determine whether the essential REC piping is intact or not. If the essential REC piping is intact but the REC surge tank cannot provide adequate Net Positive Suction Head (NPSH) for the REC pumps, the SW System is aligned to the REC System.

2. By procedure the operator is directed to align the SW System to the REC System prior to the temperature in the ECCS pump rooms exceeding 150°F.

The instrumentation used by the operators to determine if aligning SW to REC is needed, along with the steps directing entry into Emergency Procedure 5.2REC, is identified in the following Table 2.

Table 2
Instrumentation Used to Determine Need for Aligning SW to REC

Window Number	Alarm Window Title	Initiating Instrument(s) And Setpoint(s)	Step(s) Directing Entry Into Procedure 5.2REC
M-1/A-1	REC SYSTEM LOW PRESSURE	REC-PS-452A - 61.2 psig REC-PS-452B1 - 62.4 psig REC-PS-452B2 - 60.2 psig	If REC System header pressure on REC-PI-452, REC HEADER PRESSURE, remains ≤ 62 psig, enter Procedure 5.2REC
M-1/A-3	REC SURGE TANK LOW LEVEL	REC-LS-488B - 5" above visible bottom of sightglass	Monitor surge tank for indication of system leakage.....If level cannot be maintained, enter Procedure 5.2REC
M-1/B-1 M-1/B-2 M-1/B-3 M-1/B-4	REC PUMP A (B, C & D) FAILURE	REC-REL-AR(RCC-A) - Relay operation caused by breaker failure due to overload or undervoltage REC-REL-AR(RCC-B) REC-REL-AR(RCC-C) REC-REL-AR(RCC-D)	For multiple loss of REC pumps, enter Procedure 5.2REC
M-1/D-1 M-1/D-2 M-1/D-3 M-1/D-4	REC PUMP A (B, C & D) LOW DISCH PRESS	REC-REL-PS450A and ANN-REL-PS450AXH, and REC-REL-K3C(30) REC-PS-450A - 65 psig (Each Alarm - A TO D Relays)	If REC System header pressure on REC-PI-452, REC HEADER PRESSURE, ≤ 62 psig, enter Procedure 5.2REC.

Window Number	Alarm Window Title	Initiating Instrument(s) And Setpoint(s)	Step(s) Directing Entry Into Procedure 5.2REC
Procedure 5.2SW	SERVICE WATER CASUALTIES	• Service water header pressure lowering. • Service water loop crosstie valve automatic isolation. • Indication/report of service water piping failure. • Service water pump trip causing low system pressure isolation. • River level ≤ 873' or forecasted to lower to ≤ 873'.	If SW System pressure < 38 psig in both loops and SW cooling cannot be restored to TEC, perform following: Enter following: Procedure 5.2REC. If SW pump cavitation observed: ..... Enter Procedure 5.2REC to reduce REC System loads as much as possible.

NOTE: This instrumentation is not currently classified as any of the types of variables as reflected in Regulatory Guide 1.97. Footnote 2 in Regulatory Guide 1.97, Revision 2, excludes from primary information variables associated with contingency actions that are identified in written procedures. Aligning SW to REC is a contingency action that is taken in the event that REC is not available for required cooling of the ECCS pump rooms as part of LOCA mitigation, with the actions needed for this alignment specified in written procedures. This instrumentation is used to determine if this alignment is needed. No changes to the instrumentation used by the operators, or its classification, are needed for this proposed license amendment.

Element no. 8: "The ability to recover from credible errors in performance of manual actions, and the expected time required to make such a recovery."

CNS Response:

The need for SW backup to REC is determined solely through the use of Emergency Procedure 5.2 REC. It is entered upon a direct entry condition or as directed from another procedure (see listing attached in Element 7).

The procedure contains two steps that direct the operator to align the SW System to the REC System. Due to the nature of the steps, either step can provide the guidance to the operator to reach the conclusion that SW cooling is required.

1. If annunciators M-1/A-1, REC SYSTEM LOW PRESSURE, and M-1/A-3, REC SURGE TANK LOW LEVEL, are alarming, the operator is directed into a series of steps due to a REC pipe break condition. This pathway has the following actions:
   a. Secure REC pumps.
   b. Isolate nonessential loads.
   c. Determine the physical location of the leak from the REC System. This will allow determining whether the critical loops are available. If one or both critical loop(s)

are intact, but the REC Surge tank cannot maintain adequate NPSH to the REC pumps, the SW System is aligned to the intact critical loop(s) in the REC System.

2. If critical loop(s) cooling is required and REC pumps are unable to supply that cooling, the operator is directed to align SW to REC prior to the temperature in the ECCS quadrant rooms exceeding 150°F.

The worst possible operator error would be failure to recognize the need to align the SW System to REC. Abnormal conditions that are alarmed in the control room include (1) low pressure in the REC System, (2) failure of the REC pumps to start and/or provide adequate pressure, (3) temperature in the ECCS pump rooms, and (4) REC flow alarms that indicate the SW System has been incorrectly aligned to REC. These alarms are both visual and audible and provide sufficient notice that SW should be aligned to the REC critical loops.

As stated in the safety evaluation accompanying License Amendment 185 (Reference 7.3), although the control room annunciation and indications are not safety related or essential, they are highly reliable and diverse. Based on the various annunciators and indications available to the operators, it is expected that failure to align SW to REC when needed, either as a result of failing to recognize the need for this alignment or as a result of an error of omission or commission, would be recognized and corrected in a timely manner.

One credible operator error would be failure to determine which of the two divisions should be used in making the alignment. Two separate divisions, referred to as Divisions I and II, are available to align the SW System to the REC System. Division II of the SW-to-REC alignment is preferred over Division I. Failure to use Division II creates the potential for a single failure that could preclude being able to provide adequate SW cooling to the REC critical loops. (This single failure was discussed in Attachment 2, Section 5.6, of NPPD letter to the NRC dated June 15, 1999 [Reference 7.5]). This condition is accommodated by Emergency Procedure 5.2REC directing the operator to initiate Division II of the SW to REC Cross-Tie if Division II power is available. Thus, the credible operator error would be initiating Division I rather than Division II.

The likelihood of this error is minimized by the arrangement of the keylock switches that are used to align SW to the REC critical loops. These keylock switches, approximately five inches apart on vertical board "M" in the control room, are clearly marked as Division I and Division II. This board is arranged with Division I on the left and Division II on the right, with the keylock switches arranged in the same relationship. The keys for the keylock switches are in the key depository on the side of the Reactor Operator desk in the control room. There is no recovery time for this failure, as either division of SW can supply the required cooling. The credible error scenario results in increased risk only during the approximate one minute required to complete the action of motor operated valve (MOV) position change, but do not constitute a condition that requires additional action to supply cooling.

Element no. 9: "Consideration of the risk significance of the proposed operator actions."

CNS Response:

The Risk Management staff of CNS Engineering performed a Human Reliability Analysis (HRA) that addresses the reliability of operator actions needed to align the SW System to the REC critical loops following a LOCA. The HRA focused on the reliability of operator actions to align SW to REC based on the existing alarms in the control room, the operating procedures, the system design features, and the results of scenarios performed on the CNS simulator.

The simulator was used to validate the timing of operator response to a LOCA with loss-of-offsite power where degraded conditions in the REC System occur, requiring that the SW System be aligned to the REC critical loops.

The following are the conclusions of the HRA:

A. The operating crew was able to determine the existence of degraded REC System performance from the available control room indications of plant conditions. This was confirmed by the simulator performances.

B. The impact of the degraded REC conditions was recognized and restoration was appropriately prioritized in response to a seismic event or a LOCA with loss of offsite power.

C. The control room personnel were able to discriminate REC trouble from other competing plant complications.

D. The operators followed appropriate station procedures to isolate the leaking non-critical REC header and to align the SW System to the REC critical loops.

E. The correct alignment was made within the allotted time of 60 minutes.

F. Ensuring sufficient flow from SW to the REC critical loops is established helps ensure recovery from postulated errors of omission or commission.

The conclusion of the HRA is that the overall risk significance for the proposed operator actions is negligible. This is supported by the observations of control room personnel in the simulator which confirmed the reliability of operator action to align SW to REC to be approximately 99.4%.

Summary

This proposed license amendment will not result in any change to the normal operation of the REC System or to planned operation of REC for LOCA mitigation. No physical modifications to the REC System are needed in support of this proposed license

amendment. This proposed amendment makes no changes to the plan to continue to maintain the REC System as a system needed to provide cooling to the ECCS pump rooms following a LOCA. If the REC System is available following a LOCA it will be used to provide the required cooling of the ECCS pump rooms. SW will be aligned to the REC System to provide the required cooling only in the event that REC is unavailable, or becomes unavailable during the period of LOCA mitigation.

Conclusion

Based on the justification presented above, the SW System can provide adequate cooling of the SW and essential REC loads if aligning the SW System is needed at any time following a LOCA. This provides assurance of continued safe operation of CNS. Therefore, a plant shutdown of CNS as a result of loss of the REC System, as is required by the current TS 3.7.3, is unnecessary.

5.0 Regulatory Safety Analysis

5.1 No Significant Hazards Consideration

10 CFR 50.91(a)(1) requires that licensee requests for operating license amendments be accompanied by an evaluation of no significant hazard posed by issuance of the amendment. Nebraska Public Power District (NPPD) has evaluated this proposed amendment with respect to the criteria given in 10 CFR 50.92 (c). The following is the evaluation required by 10 CFR 50.91(a)(1).

NPPD is requesting an amendment of the operating license for the Cooper Nuclear Station (CNS) to revise the requirements for the Reactor Equipment Cooling (REC) System in the CNS Technical Specifications (TS). The safety-related function of the REC system is to supply cooling water to the coolers in the rooms in which the emergency core cooling system (ECCS) pumps are located, in order to remove the heat generated by the pumps and maintain the room temperature within applicable limits. The function of the ECCS pumps is to supply water to the reactor vessel in the event of an accident that reduces the inventory of water in the reactor pressure vessel in order to keep the nuclear fuel in the core covered with water and thereby cooled. These are large pumps, either motor-driven or steam turbine-driven, that generate significant amounts of heat. Unless this heat is removed the temperature in the rooms in which the pumps are located will increase. In general, high temperature in a room for an extended period of time can have a deleterious effect on the equipment in that room. Cooling of the ECCS pump rooms provided by the REC system helps to ensure the continued ability of the ECCS pumps and other safety related equipment in the area to function.

A system capable of supplying cooling water to the ECCS pump room coolers for 30 days following a loss-of-coolant accident (LOCA) must be available. With no leakage from the REC System, it would be able to supply this cooling water for the required 30 days. The current licensing basis for the REC System is that it must

have sufficient inventory of water so that it can operate for seven days following a LOCA. This allows for some leakage from the REC System. The current licensing basis also allows the Service Water (SW) System to be aligned to the REC System through cross-connections between the two systems, such that the SW System can provide the required cooling of essential loads in the REC System from day eight out to the required LOCA mitigation period of 30 days.

The current TS Bases state that the ability of the SW System to provide water to the REC critical loops must be operable in order for the REC System to be considered operable. The proposed license amendment would revise TS by (1) adding a new Condition to allow continued plant operation for 14 days with REC leakage exceeding limits with one of the two SW cross-connections inoperable, (2) adding a new part to the Condition requiring a controlled reactor shutdown if REC leakage exceeds limits and both SW cross-connections are inoperable, and (3) revising the surveillance requirement for verifying REC leakage by replacing surge tank water level with system leakage as the parameter that is verified to be within limits.

The proposed revisions to TS would allow unlimited continued plant operation when either (1) the REC System is experiencing leakage in excess of the rate that would allow 30 days of REC operation, provided that both cross-connections from SW are operable and able to supply water to the REC System; or (2) the SW System is not able to supply water to the REC System, provided that the REC System has an inventory of water that would allow 30 days of operation following a LOCA. The proposed change is based on (1) the ability of the SW System to provide cooling of the REC System at any time following a LOCA with sufficient flow to cool the heat loads of both the REC and SW Systems, and (2) the ability to align the SW System to the REC System within one hour following identification of the need to make this alignment.

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

Response: No.

Four design basis accidents have been previously evaluated at CNS. These are (1) a control rod drop accident, in which a control rod inserted into the reactor core becomes uncoupled and drops out of the reactor core during operation; (2) a loss-of-coolant accident, in which a pipe in the reactor coolant system breaks, resulting in a loss of reactor coolant inventory and the ability to cool the nuclear fuel, (3) a fuel handling accident, in which a fuel assembly is dropped during fuel handling operations and impacts fuel assemblies in the reactor core, and (4) a main steam line break accident, in which a main steam line breaks resulting in the discharge of steam at high pressure and temperature.

The proposed license amendment makes no changes to the design or operation of the control rod drive system. Thus, there is no increase in the probability of a control rod drop accident.

The proposed license amendment makes no changes to the design or operation of the reactor coolant system. Thus, there is no increase in the probability of a loss-of-coolant accident. (The design basis LOCA does not involve a postulated break in the systems associated with the proposed license amendment).

The proposed license amendment makes no changes to the design of the fuel handling system, or to the method of moving fuel. Thus, there is no increase in the probability of a fuel handling accident.

The proposed license amendment makes no changes to the design of the main steam system or to how the reactor is operated. Thus, there is no increase in the probability of a main steam line break accident.

Based on the above, the proposed changes do not result in a significant increase in the probability of an accident previously evaluated.

The SW System is able to supply sufficient cooling to perform the function of the REC System to remove the heat generated by the ECCS pumps, as well as providing sufficient cooling to the heat loads in the SW System. Aligning the SW System to the REC System sooner than the current seven days, as will be allowed by the proposed changes to the TS, will not adversely impact the ability of the ECCS pumps to meet their function.

Because the function of the REC System is to remove the heat generated by the ECCS pumps from the rooms in which the pumps are located, the REC system is indirectly involved in the mitigation of an accident.

Based on the above, the change does not involve a significant increase in the consequences of an accident previously evaluated.

NPPD concludes that the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

Response: No.

The proposed license amendment would allow continued plant operation with leakage from the REC System in excess of limits, provided that the

required cooling water can be supplied by the SW System. This involves revising the actions for mitigating a LOCA, in that the SW System may need to be aligned to the REC System sooner than 7 days following a LOCA, as is required by the current licensing basis. Allowing leakage from the REC System to exceed limits and requiring that the SW System be aligned to the REC System sooner than what is currently required by the licensing basis does not create the possibility of a new or different kind of accident from any previously evaluated.

The proposed license amendment request does not involve physical modification of any system in the plant, nor do they involve a change to how the plant is operated. No new equipment is being added. Use of the SW System to supply water to the REC System in the event of REC leakage is part of the current CNS design and licensing basis.

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

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

Response: No.

This proposed license amendment would revise TS to allow continued plant operation with leakage from the REC System in excess of limits, provided that the SW System can be aligned to the REC System and supply the cooling water required by the REC System to meet its safety function. The safety function of the REC System is to remove the heat generated by the ECCS pumps from the rooms in which the pumps are located. This proposed change to TS revises the timing for taking an action involved in mitigating a LOCA, in that the SW System may need to be aligned to the REC System sooner than seven days following a LOCA, as currently allowed by license requirements. It has been demonstrated that this alignment can be made sooner than the current required seven days. Making this alignment sooner than seven days does not adversely impact the ability to mitigate a LOCA.

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

Based on the responses to the above questions, NPPD concludes 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.

5.2 Applicable Regulatory Requirements/Criteria

The construction of CNS predated the 1971 issuance of 10 CFR 50, Appendix A, "General Design Criteria for Nuclear Power Plants." CNS is designed to conform with the proposed general design criteria (GDC) published in the July 11, 1967, Federal Register, except where commitments were made to specific 1971 GDC. These GDC to which CNS is designed and constructed are specified in Updated Safety Analysis Report (USAR) Appendix F, "Conformance to AEC Proposed General Design Criteria." The following is a discussion of the applicable regulations and the Draft GDC from USAR Appendix F, and a discussion of continued conformance.

5.2.1 10 CFR 50.36, Technical Specifications

10 CFR 50.36(b) requires that each license authorizing operation of a utilization facility to include technical specifications (TS). 10 CFR 50.36(d) requires that TS contain Limiting Conditions for Operation (LCOs) and Surveillance Requirements (SRs).

- 10 CFR 50.36(d)(2)(i) specifies the requirements for LCOs. It states, in part, that when an LCO is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the TS. The proposed changes modify the Conditions and Required Actions in TS Section 3.7.3, "REC System," under which a plant shut down is required. However, the Conditions and Required Actions continue to require a plant shutdown if the LCO is not met. Therefore, this regulation continues to be met with the proposed revisions to TS 3.7.3. No changes to the LCO in TS Section 3.7.3 are proposed.

- 10 CFR 50.36(d)(3) specifies the requirements for SRs. It states that SRs are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the LCOs will be met. With the revised wording and the addition of the two proposed notes to SR 3.7.3.1, the SR continues to meet this regulation in that the testing specified in the revised SR will continue to ensure that the REC System is able to perform its safety related function.

With the proposed changes to TS 3.7.3, the CNS TS continue to comply with the requirements of 10 CFR 50.36.

5.2.2 10 CFR 50.49, Environmental Qualification of electric equipment important to safety for nuclear power plants

CNS has a program for qualifying electrical equipment in accordance with 10 CFR 50.49(a). The rooms in which the ECCS pumps are located are

encompassed within the CNS environmental qualification (EQ) program. The use of the REC System to supply cooling to the room coolers in the ECCS pumps rooms for 7 days following a LOCA, with the use of the SW System after 7 days, provides adequate cooling to ensure qualification of the equipment in those rooms. The valves that supply water from the SW System to the REC critical loops are included in the EQ program. The use of the SW System to supply cooling to these room coolers at any time following a LOCA, as proposed in this amendment request, will continue to provide adequate cooling of the ECCS pump rooms, and continued compliance with 10 CFR 50.49.

5.2.3 Proposed GDC 21, Single Failure Definition

"Multiple failures resulting from a single event shall be treated as a single failure."

The safety design basis for the REC System includes the REC System being designed with sufficient redundancy so that no single, active system component failure can prevent the system from achieving its safety objective. The safety objective of the REC System is to provide cooling to the rooms in which the ECCS pumps are located. The revision of TS 3.7.3, REC System, proposed in this amendment request, does not involve a revision of the REC System design. As a result the REC System continues to meet Draft GDC 21.

5.2.4 Proposed GDC 41, Engineered Safety Features Performance Capability

"Engineered safety features such as emergency core cooling and containment heat removal systems shall provide sufficient performance capability to accommodate partial loss of installed capacity and still fulfill the required safety function. As a minimum, each engineered safety feature shall provide this required safety function assuming a failure of a single active component."

The function of the REC System is to remove the heat generated by the ECCS pumps from the rooms in which the pumps are located in order to ensure continued operation of the pumps and continued environmental qualification of the electrical equipment in the rooms. The REC System has two subsystems. Each subsystem consists of two pumps supplying one heat exchanger. Cooling water to the heat exchangers is supplied from the SW System. Either REC subsystem has sufficient capacity with one pump operating to transfer the critical services design cooling load during postulated transient or accident conditions. The cross-connection of the REC System to the SW System, and interconnection of the two REC subsystems through crosstie lines, provides assurance that the REC System

will continue to function under a variety of degraded conditions. The REC subsystems are designed with electrical division independence.

The proposed change to the timing for supplying water from the SW System to the REC System has no impact on the design of the REC System. Therefore, CNS continues to comply with Draft GDC 41, based on the design of the REC System discussed above.

6.0 Environmental Consideration

10 CFR 51.22 provides criteria for, and identification of, licensing and regulatory actions eligible for categorical exclusion from performing an environmental assessment or environmental impact statement. 10 CFR 51.22(c)(9) identifies an amendment to an operating license for a reactor which changes an inspection or a surveillance requirement as a categorical exclusion provided that 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 a significant increase in individual or cumulative occupational radiation exposure.

CNS review has determined that the proposed amendment, which would change a surveillance requirement, does not involve (1) a significant hazards consideration, (2) a significant change in the types or significant increase in the amounts of any effluent that might be released offsite, or (3) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

7.0 References

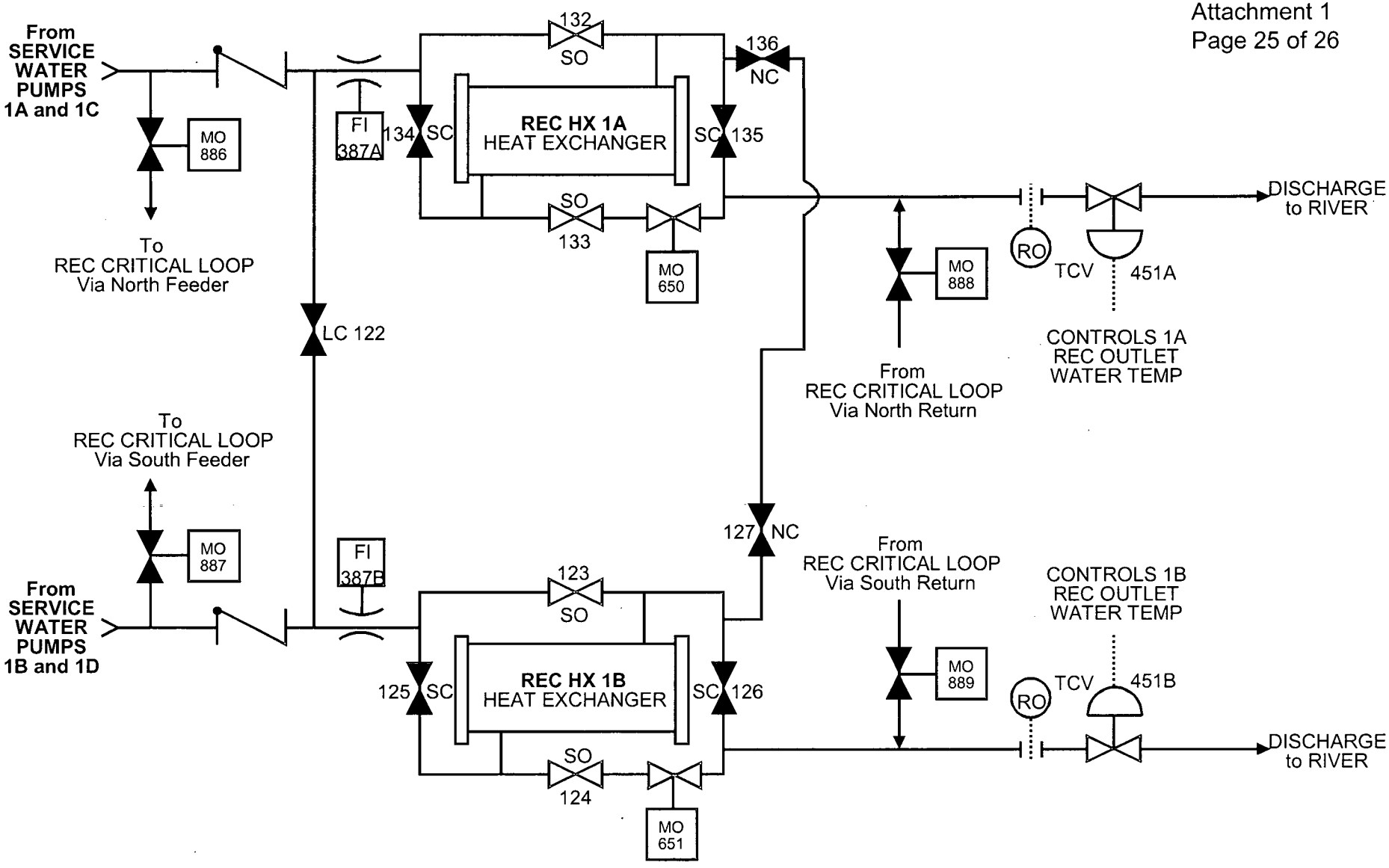
7.1 USAR Section X-6

7.2 USAR Section X-8

7.3 License Amendment No. 185, dated March 13, 2001

7.4 NRC Information Notice 97-78, "Crediting of Operator Actions in Place of Automatic Actions and Modifications of Operator Actions, Including Response Times," dated October 23, 1997.

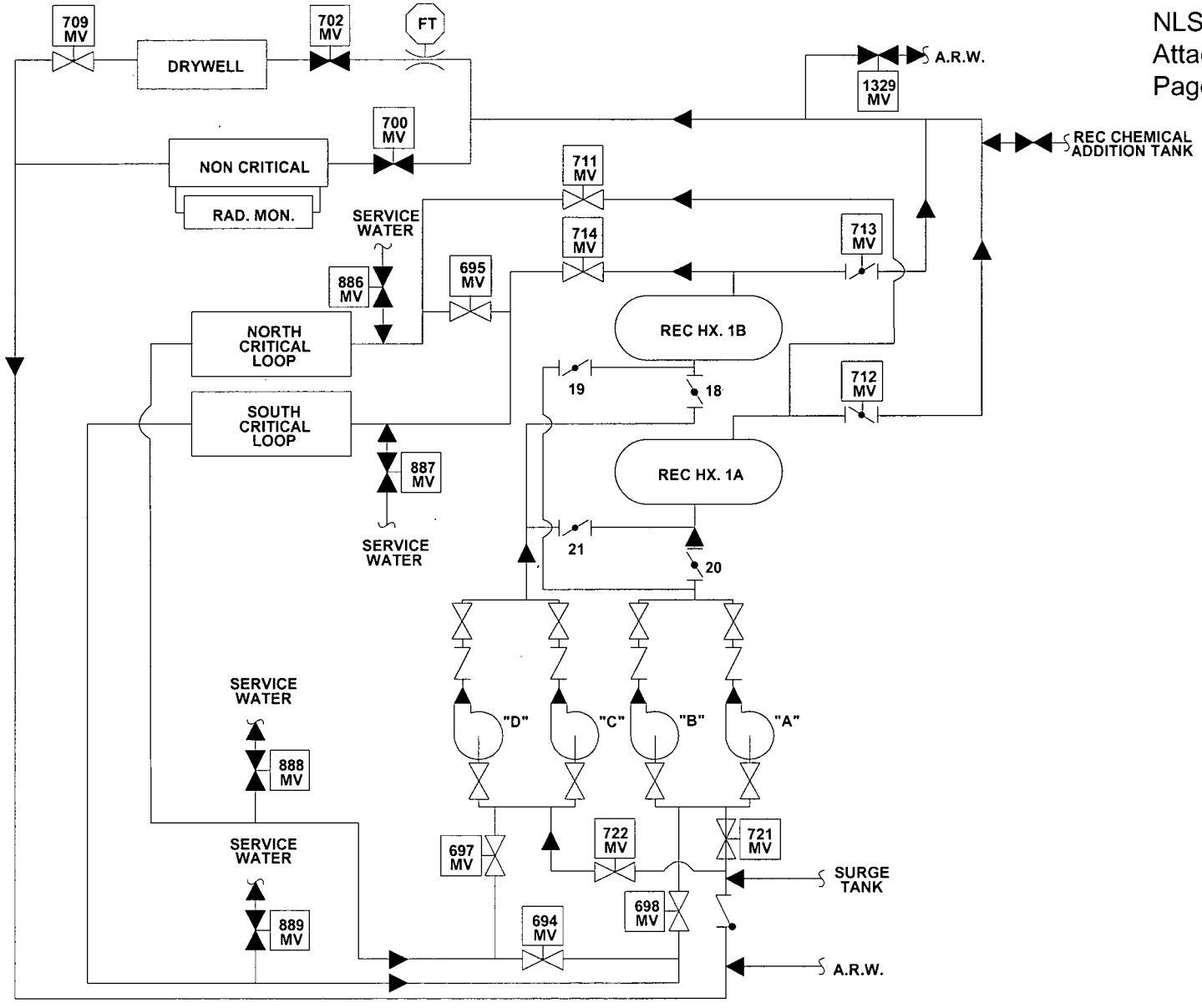
7.5 Letter from John H. Swailes, NPPD, to the NRC Document Control Desk, "Proposed License Amendment – Service Water Backup to the Reactor Equipment Cooling Post LOCA," dated June 15, 1999.



SERVICE WATER to REC HEAT EXCHANGERS

Figure 1

CXA06185



REC SYSTEM Normal Power Operation

Figure 2

CXA06272

Attachment 2

Proposed Technical Specification Revisions
(Markup)

Cooper Nuclear Station, Docket No. 50-298, DPR-46

Revised Technical Specification Pages

3.7-6
3.7-7

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
B. One REC subsystem inoperable for reasons other than Condition A.	B.1 Restore the REC subsystem to OPERABLE status.	30 days
C. Required Action and associated Completion Time of Condition A or B not met. OR Both REC subsystems inoperable for reasons other than Condition A.	C.1 Be in MODE 3. AND C.2 Be in MODE 4.	12 hours 36 hours
OR Leakage exceeds limits with both SW backup subsystems inoperable		
A. REC leakage exceeds limits AND One SW backup subsystem is inoperable	A.1 Verify by administrative means one SW backup subsystem OPERABLE AND A.2.1 Restore the inoperable SW backup subsystem to OPERABLE status OR A.2.2 Restore REC leakage to within limits	1 hour 14 days 14 days

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.7.3.1	Verify the REC ~~surge tank water level~~ system leakage is within limits.	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

- - - - - - - - - - - - - NOTES - - - - - - - - - - - - - -
1. SR 3.0.1 is not applicable.
2. REC System leakage beyond limits by itself is only a degradation of the REC System and does not result in the REC System being inoperable.

- -

Attachment 3

Proposed Technical Specification Revisions
(Final Typed)

Cooper Nuclear Station, Docket No. 50-298, DPR-46

Revised Technical Specification Pages

3.7-6
3.7-7

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. REC leakage exceeds limits AND One SW backup subsystem is inoperable	A.1 Verify by administrative means one SW backup subsystem OPERABLE AND A.2.1 Restore the inoperable SW backup subsystem to OPERABLE status. OR A.2.2 Restore REC leakage to within limits.	1 hour 14 days 14 days
B. One REC subsystem inoperable for reasons other than Condition A.	B.1 Restore the REC subsystem to OPERABLE status.	30 days
C. Required Actions and associated Completion Times of Conditions A or B not met. OR Leakage exceeds limits with both SW backup subsystems inoperable OR Both REC subsystems inoperable for reasons other than Condition A.	C.1 Be in MODE 3. AND C.2 Be in MODE 4.	12 hours 36 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.7.3.1	----------NOTES---------- 1. SR 3.0.1 is not applicable. 2. REC system leakage beyond limits by itself is only a degradation of the REC system and does not result in the REC system being inoperable. ---------- Verify the REC system leakage is within limits.	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

Attachment 4

**Proposed Technical Specification Bases Revisions
(Information Only)**

Cooper Nuclear Station, Docket No. 50-298, DPR-46

Revised Technical Specification Bases Pages

B 3.7-6
B 3.7-7
B 3.7-8
B 3.7-9
B 3.7-10
B 3.7-11
B 3.7-12
B 3.7-13
B 3.7-14
B 3.7-15
B 3.7-16

B 3.7 PLANT SYSTEMS

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

BASES

BACKGROUND

The SW System is designed to provide cooling water for the removal of heat from equipment, such as the diesel generators (DGs) and Reactor Equipment Cooling (REC) System heat exchangers, and to provide a supply of water for the Residual Heat Removal Service Water Heat Exchangers through the Residual Heat Removal Service Water Booster (RHRSWB) System pumps, required for a safe reactor shutdown following a Design Basis Accident (DBA) or transient. The SW System also provides cooling to unit components, as required, during normal operation. The SW System also provides cooling water to turbine building non-essential loads. If SW header pressure falls below 20 psig, the system automatically isolates the non-essential header by closing the discharge cross-tie valves. The SW system can be manually aligned as a backup to the REC System through remotely controlled motor operated valves. This configuration would be used in the event that the REC System becomes incapable of performing its essential cooling function and in this configuration the SW System provides cooling water to the room coolers for the Emergency Core Cooling System (Core Spray, RHR, HPCI) pump rooms and the RHR pump seal water coolers. ~~In the event of a loss of header pressure below 20 psig, automatic valving is provided to shut off all supply to the turbine building loop, thus assuring supply to the essential Reactor Equipment Cooling System loads via the SW backup cross tie valves.~~

REVISED

ADDED

DELETED

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 8000 gpm pumps, a suction source, valves, piping and associated instrumentation. Either of the two subsystems is capable of providing the required 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 system.

Cooling water is pumped from the Missouri River by the SW pumps to the essential components through the two main headers. After removing heat from the components, the water is collected into two discharge headers and routed to the discharge canal where the water is returned to the river. Service Water discharge from the turbine equipment cooling (TEC) heat exchangers is routed to the 1A circulating water (CW) discharge tunnel.

APPLICABLE SAFETY ANALYSES

Sufficient water level is available for all SW System post LOCA cooling requirements when the river level is at least 865 ft mean sea level with no additional makeup water source available (Ref. 1). A river level of 865 ft mean sea 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. SW backup to REC is capable of performing the essential heat removal function as evaluated in Reference 5.

ADDED

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.

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

BASES

APPLICABILITY

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

Under other plant conditions, the OPERABILITY requirements of the SW System and UHS are determined by the systems they support and therefore, the requirements are not the same for all facets of operation. Thus, the LCOs of the RHR Shutdown Cooling System (LCO 3.4.8, "RHR Shutdown Cooling System—Cold Shutdown," LCO 3.5.2, "ECCS—Shutdown," LCO 3.8.2, "AC Sources—Shutdown," LCO 3.9.7, "RHR—High Water Level," and LCO 3.9.8, "RHR—Low Water Level"), which require portions of the SW System to be OPERABLE, will govern SW System operation in MODES 4 and 5.

ACTIONS

A.1

With one SW subsystem inoperable, the SW subsystem must be restored to OPERABLE status within 30 days. With the unit in this condition, the remaining OPERABLE SW subsystem is adequate to perform the heat removal function. However, the overall reliability is reduced because a single failure in the OPERABLE SW subsystem could result in loss of SW function.

The 30 day Completion Time is based on the redundant SW System capabilities afforded by the OPERABLE subsystem and the low probability of an accident occurring during this time period.

Required Action A.1 is modified by two Notes indicating that the applicable Conditions of LCO 3.8.1, "AC Sources — Operating," LCO 3.4.7, "Residual Heat Removal (RHR) Shutdown Cooling System — Hot Shutdown," be entered and Required Actions taken if the inoperable SW subsystem results in an inoperable DG or RHR shutdown cooling subsystem, respectively. This is in accordance with LCO 3.0.6 and ensures the proper actions are taken for these components.

B.1 and B.2

If the SW subsystem cannot be restored to OPERABLE status within the associated Completion Time, or both SW subsystems are inoperable, or the UHS is determined inoperable the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 12 hours and in MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.7.2.1

This SR verifies the river water level to be sufficient for the proper operation of the SW pumps (net positive suction head and pump vortexing are considered in determining this limit). The 24 hour Frequency is based on operating experience related to trending of the parameter variations during the applicable MODES.

SR 3.7.2.2

Verification of the UHS temperature ensures that the heat removal capability of the SW System is within the assumptions of the DBA analysis. The 24 hour Frequency is based on operating experience related to trending of the parameter variations during the applicable MODES.

SR 3.7.2.3

Verifying the correct alignment for each manual, power operated, and automatic valve in each SW subsystem flow path provides assurance that the proper flow paths will exist for SW operation. This SR applies only to valves affecting the direct flow path. This SR excludes valves that, if mispositioned, would not affect system or subsystem OPERABILITY. Also, this SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves were verified to be in the correct position prior to locking, sealing, or securing. A valve is also allowed to be in the nonaccident position, and yet considered in the correct position, provided it can be automatically realigned to its accident position within the required time. This SR does not require any testing or valve manipulation; rather, it involves verification that those valves capable of being mispositioned are in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves.

This SR is modified by a Note indicating that isolation of the SW System to components or systems may render those components or systems inoperable, but does not affect the OPERABILITY of the SW System. As such, when all SW pumps, valves, and piping are OPERABLE, but a branch connection off the main header is isolated, the SW System is still OPERABLE.

The 31 day Frequency is based on engineering judgment, is consistent with the procedural controls governing valve operation, and ensures correct valve positions.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.2.4

This SR verifies that the automatic isolation valves of the SW System will automatically switch to the safety or emergency position to provide cooling water exclusively to the safety related equipment during an accident event. This is demonstrated by the use of an actual or simulated initiation signal. The initiation signal is caused by low SW header pressure (approximately 20 psig). This SR also verifies the automatic start capability of one of the two SW pumps in each subsystem.

Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, this Frequency is concluded to be acceptable from a reliability standpoint.

REFERENCES

1. NEDC 94-255, "Hydraulic Evaluation of Opening in Intake Structure Guide Wall," June 14, 1995.
2. USAR, Chapter V.
3. USAR, Chapter XIV.
4. 10 CFR 50.36(c)(2)(ii).
5. NEDC 00-095E, "CNS Reactor Building Post-LOCA Heating Analysis," October 22, 2007.

ADDED

B 3.7 PLANT SYSTEMS

B 3.7.3 Reactor Equipment Cooling (REC) System

BASES

BACKGROUND

The REC System is designed to provide cooling water for the removal of heat from equipment, such as the room coolers for the core spray pump rooms, RHR pump rooms, and HPCI pump room, required for a safe reactor shutdown following a Design Basis Accident (DBA) or transient and the RHR pump seal water coolers (essential loads). The REC System also provides cooling to unit components, as required, during normal operation (non-essential loads). In the event of a loss of REC System pressure, automatic valving is provided to shut off all supply to nonessential loads, thus assuring supply to the essential loads.

The REC System consists of two ~~closed~~ subsystems, each consisting of two 1350 gpm pumps, a heat exchanger, valves, piping and associated instrumentation. A 550 gallon capacity surge tank, located at the highest point of the system, accommodates system volume changes, maintains static pressure in the loops to ensure adequate net positive suction head (NPSH), detects gross leaks in the REC System by providing a point to monitor inventory and provides a means for adding water. Either of the two subsystems with one REC pump operating or the Service Water supply is capable of providing the required cooling capacity to support the required essential 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 Service Water supply and return ~~backup cross-tie~~ valves to provide required component cooling in the event of REC leakage in excess of limits or a passive failure, such as a Class 1E pipe break.

ADDED

The Service Water (SW) System provides two subsystems for backup to the REC critical loops. The Service Water supply is a fully qualified essential supply to the REC critical loops. This configuration would be used in the event that the REC system becomes incapable of performing its essential cooling function. Because of the cross-tie capability in the critical REC loops either SW backup subsystem can supply the required cooling to the REC System.

Cooling water is pumped by the REC pumps, delivered to the REC heat exchangers, which are cooled by the Service Water System, and then to the components through the two main headers. After removing heat from the components, the water is then recirculated back to the REC pump suction.

BASES

APPLICABLE SAFETY ANALYSIS

Either REC loop has sufficient capacity with one pump operating to transfer the essential services design cooling heat load during postulated transient or accident conditions (Ref. 1). However, to provide additional margin, two REC pumps per loop are required to be OPERABLE to satisfy the requirements of the LCO.

ADDED

Through the intertie with the REC System, the SW System provides essential cooling equivalent to the critical loops of the REC System. The ability of the REC System (or the associated service water supply) 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 verifying ~~the REC surge tank water level is within limits and~~ a maximum supply water temperature of 100°F.

ADDED

An REC subsystem is considered inoperable if both of the following conditions exist: (1) leakage in excess of allowable limits, and (2) the subsystem of SW backup for the respective REC subsystem is inoperable. The limits are based on having a 30-day supply of inventory in the REC surge tank without crediting makeup. Leakage in excess of limits by itself does not result in either the REC subsystems or the REC system being inoperable. If it is determined that leakage exceeds these limits, then REC is considered degraded and SW backup is required to be OPERABLE to maintain the REC subsystem(s) OPERABLE. An OPERABLE SW backup subsystem requires an OPERABLE flow path from the SW System to the REC critical loops, an OPERABLE SW pump in the respective SW Subsystem, and the ability to align the SW backup valves in the REC System.

BASES

LCO (continued) 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.

In MODES 4 and 5, the OPERABILITY requirements of the REC System are determined by the systems it supports.

ACTIONS

A.1

Both REC subsystems are considered degraded if REC leakage exceeds limits. If REC leakage exceeds limits, in combination with one of the SW backup subsystems being inoperable, the REC System is considered OPERABLE but degraded and the remaining SW backup subsystem must be verified to be OPERABLE within 1 hour. The limit on REC leakage is based on maintaining 30 days of inventory in the surge tank without makeup to the surge tank. Administrative means may be used to verify the remaining SW backup subsystem is OPERABLE.

ADDED

A.2.1 and A.2.2

These actions require returning the inoperable SW backup system to OPERABLE status or restoring REC leakage to within limits within 14 days. The overall reliability is reduced in this condition since a single failure in the OPERABLE SW backup subsystem could result in a loss of the REC heat removal function.

The 14-day Completion Time is based on the plant risk being lower during this period of continued plant operation than the risk of shutting down and on the REC System remaining OPERABLE but degraded with REC leakage exceeding limits and one OPERABLE SW backup system during this period.

B.1 ~~and B. 2~~

With one REC subsystem inoperable for reasons other than Condition A, the REC subsystem must be restored to OPERABLE status within 30 days. With the unit in this condition, the remaining OPERABLE REC subsystem is adequate to perform the heat removal function. However, the overall reliability is reduced because a single failure in the OPERABLE REC subsystem could result in loss of REC function.

BASES

ACTIONS (continued)

The 30 day Completion Time is based on the redundant REC System capabilities afforded by the OPERABLE subsystem and the low probability of an accident occurring during this time period.

C.1 and C.2

ADDED

If the REC subsystem cannot be restored to OPERABLE status within the associated Completion Time, leakage exceeds limits with both SW backup subsystems inoperable, or both REC subsystems are inoperable, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 12 hours and in MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.3.1

This SR verifies the water level in the REC surge tank to be sufficient for the proper operation of the REC System (system volume changes, static pressure in the loops, and potential leakage in the system are considered in determining this limit). If REC leakage exceeds limits, the REC subsystems are considered OPERABLE but degraded. The 24 hour Frequency is based on operating experience related to trending of the parameter variations during the applicable MODES.

ADDED

This SR is modified by two Notes. Note 1 states that SR 3.0.1 is not applicable. Note 2 states that REC leakage beyond limits by itself is only a degraded condition and does not render the REC System inoperable. These notes reflect that the REC System remains OPERABLE based on the ability to align the SW System to the REC System and supply the required cooling water to the critical loops of the REC System.

SR 3.7.3.2

Verification of the REC System temperature ensures that the heat removal capability of the REC System is within the assumptions of the DBA analysis. The 24 hour Frequency is based on operating experience related to trending of the parameter variations during the applicable MODES.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.3.3

Verifying the correct alignment for each manual, power operated, and automatic valve in each REC subsystem flow path provides assurance that the proper flow paths will exist for REC operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves were verified to be in the correct position prior to locking, sealing, or securing. A valve is also allowed to be in the nonaccident position, and yet considered in the correct position, provided it can be automatically realigned to its accident position within the required time. This SR does not require any testing or valve manipulation; rather, it involves verification that those valves capable of being mispositioned are in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves.

This SR is modified by a Note indicating that 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. As such, when all REC pumps, valves, and piping are OPERABLE, but a branch connection off the main header is isolated, the REC System is still OPERABLE.

The 31 day Frequency is based on engineering judgment, is consistent with the procedural controls governing valve operation, and ensures correct valve positions.

SR 3.7.3.4

This SR verifies that the automatic isolation valves of the REC System will automatically switch to the safety or emergency position to provide cooling water exclusively to the safety related equipment during an accident event. This is demonstrated by the use of an actual or simulated initiation signal. The initiation signal is caused by low REC heat exchanger outlet pressure (which has an analytically determined limit of 55 psig decreasing). Also, a Group VI isolation signal will open the REC heat exchanger service water outlet valves and the REC critical loop supply valves to provide cooling water to essential components.

Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, this Frequency is concluded to be acceptable from a reliability standpoint.

BASES

REFERENCES

1. USAR, Section X-6.
2. 10 CFR 50.36(c)(2)(ii).
3. DC 93-057
4. NEDC 92-050X and NEDC 97-087

0.ATTACHMENT 3 LIST OF REGULATORY COMMITMENTS©

Correspondence Number: NLS2008002

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

COMMITMENT	COMMITMENT NUMBER	COMMITTED DATE OR OUTAGE
None		