NOV 1 1 2005

L-PI-05-104
10 CFR 50.90

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

Prairie Island Nuclear Generating Plant Units 1 and 2
Dockets 50-282 and 50-306
License Nos. DPR-42 and DPR-60

License Amendment Request (LAR) to Add a Condition to Technical Specification (TS) 3.6.5, "Containment Spray and Cooling Systems," for Two Inoperable Fan Coil Units

Pursuant to 10 CFR 50.90, the Nuclear Management Company, LLC (NMC) hereby requests an amendment to the TS for the Prairie Island Nuclear Generating Plant (PINGP) Units 1 and 2 to revise TS 3.6.5, "Containment Spray and Cooling Systems". The proposed changes revise an existing Condition, two Surveillance Requirements and add a new Condition which will allow continued plant operation with TS limitations when two Containment Cooling System fan coil units (FCUs), one in each train, are inoperable. NMC has evaluated the proposed changes in accordance with 10 CFR 50.92 and concluded that they involve no significant hazards consideration.

Exhibit A contains the licensee's evaluation of this LAR. Exhibit B provides a markup of TS and TS Bases pages. Exhibit C provides retyped TS pages.

Upon NRC approval of this LAR, NMC requests 90 days to implement the associated changes. In accordance with 10 CFR 50.91, NMC is notifying the State of Minnesota of this LAR by transmitting a copy of this letter and attachments to the designated State Official.

Summary of Commitments

This letter contains no new commitments and no revisions to existing commitments.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on NOV 1 1 2005

Thomas J. Palmisano
Site Vice President, Prairie Island Nuclear Generating Plant Units 1 and 2
Nuclear Management Company, LLC

cc: Administrator, Region III, USNRC
Project Manager, Prairie Island, USNRC
Resident Inspector, Prairie Island, USNRC
State of Minnesota

Exhibits:

A. Licensee's Evaluation
B. Proposed Technical Specification and Bases Changes (markup)
C. Proposed Technical Specification (retyped)

Exhibit A

LICENSEE'S EVALUATION

License Amendment Request (LAR) to Add a Condition to Technical Specification (TS) 3.6.5, "Containment Spray and Cooling Systems," for Two Inoperable Fan Coil Units

1.0 DESCRIPTION

This LAR is a request to amend Operating Licenses DPR-42 and DPR-60 for Prairie Island Nuclear Generating Plant (PINGP) Units 1 and 2.

The Nuclear Management Company, LLC (NMC) requests Nuclear Regulatory Commission (NRC) review and approval of revised TS requirements for Containment Cooling system components required for train operability. These changes clarify TS 3.6.5 requirements and provide plant operational flexibility.

2.0 PROPOSED CHANGE

A brief description of the associated proposed TS and TS Bases changes is provided below along with a discussion of the justification for each change. The specific wording changes to the TS and Bases are provided in Exhibits B and C.

TS 3.6.5, "Containment Spray and Cooling Systems", Conditions C, D and E, Surveillance Requirements (SRs) 3.6.5.2 and 3.6.5.3 and associated Bases:

TS 3.6.5 Condition C is restated on the basis of containment fan coil unit (FCU) inoperability to be consistent with the proposed new Condition D. A new TS 3.6.5 Condition D is proposed and current Condition D is re-lettered as Condition E and modified. The new Condition D provides the Required Actions and Completion Time for the situation when one FCU in each train is inoperable. SR 3.6.5.2 and SR 3.6.5.3 are revised to allow the SRs to be met for individual FCUs and plant operation to continue while in Conditions C and D. One FCU inoperable in each train is an acceptable plant configuration for a short time

period under TS controls as discussed below in Section 4.0, Technical Analysis. The re-lettered Condition E is modified to include provisions for new Condition D Required Action and Completion Time not met.

The new proposed Condition D includes a second Completion Time limiting the total time the Limiting Condition for Operation (LCO) is not met consistent with the second Completion Time included in current Condition C. NMC is aware that the TS Task Force (TSTF) industry traveler, TSTF-439, "Eliminate Second Completion Times Limiting Time From Discovery of Failure To Meet an LCO", proposes to eliminate all second Completion Time limits for total time that an LCO is not met from the improved Standard Technical Specifications. If the NRC approves TSTF-439 prior to approval of this LAR, NMC may elect to eliminate the second Completion Times from TS 3.6.5 Conditions C and D through a supplement to this LAR.

The Bases will also be revised to support these changes. Although the Bases changes are not a part of this LAR, marked up Bases pages are included for information.

These changes are acceptable since system analyses demonstrate that any two FCUs, whether they are in the same train or from opposite trains, are sufficient to provide the required containment cooling following a design basis accident. With these proposed changes the system safety function will be met.

3.0 BACKGROUND

In 2004 and 2005 PINGP Unit 2 experienced leaks in the containment cooling FCUs which comprise the Containment Cooling System. On November 17, 2004, while Unit 2 was at 100% power, NMC personnel identified leaks from two FCUs, one from each train. The FCUs were isolated and both trains of Containment Cooling were declared inoperable. Since TS 3.6.5 does not define a Condition and Required Actions for two trains of Containment Cooling inoperable, LCO 3.0.3 was entered. In accordance with TS LCO 3.0.3 requirements, Unit 2 was shutdown until FCU repairs were completed.

On February 11, 2005, while Unit 2 was at 100% power, NMC personnel identified leaks from two FCUs, again one from each containment cooling train. Both FCUs were isolated and both trains of containment cooling were declared inoperable. Since TS 3.6.5 does not define a Condition and Required Actions for two trains of Containment Cooling inoperable, LCO 3.0.3 must be entered. LCO 3.0.3 allows one hour to plan for a unit shutdown and an additional six hours to initiate and complete shutdown to Mode 3.

Following the Unit 2 FCU leaks, actions were taken to address the cause and condition. In the May 2005 Unit 2 refueling outage, NMC replaced the FCU faces on the four Unit 2 containment FCUs.

Engineering analyses demonstrate that the current TS requirements are unnecessarily restrictive, thus, NMC requests NRC review and approval of the proposed TS changes which will clarify containment cooling FCU operability requirements and provide operational flexibility.

4.0 TECHNICAL ANALYSIS

PINGP is a two unit plant located on the right bank of the Mississippi River approximately 6 miles northwest of the city of Red Wing, Minnesota. The facility is owned by the Northern States Power Company (NSP) and operated by NMC. Each unit at PINGP employs a two-loop pressurized water reactor designed and supplied by Westinghouse Electric Corporation. The initial PINGP application for a Construction Permit and Operating License was submitted to the Atomic Energy Commission (AEC) in April 1967. The Final Safety Analysis Report (FSAR) was submitted for application of an Operating License in January 1971. Prairie Island Unit 1 began commercial operation in December 1973 and Unit 2 began commercial operation in December 1974.

The PINGP was designed and constructed to comply with NSP's understanding of the intent of the AEC General Design Criteria (GDC) for Nuclear Power Plant Construction Permits, as proposed on July 10, 1967. PINGP was not licensed to NUREG-0800, "Standard Review Plan (SRP)."

Containment Cooling System

The containment cooling system, along with the containment spray system, provides containment atmosphere cooling to limit post accident pressure and temperature in containment to less than the design values.

The containment cooling system is an Engineered Safety Feature (ESF) system designed to ensure that the heat removal capability required during the post accident period is provided.

Four FCUs, any two of which are of sufficient capacity to supply 100% of the containment cooling system post-accident design cooling requirements, are provided. The four FCU are arranged in two trains, each of which is normally supplied with chilled water during summer operation or cooling water from separate trains of the cooling water system (CL) for winter or emergency operation. Air is drawn into the coolers through the fan and discharged to the containment atmosphere including various compartments (e.g., steam generator and pressurizer compartments). More detailed technical information on the FCUs is provided in PINGP Updated Safety Analysis Report (USAR) Figures 6.3-1A and B, and Figures 10.4-1D and 2C.

During normal operation, all four fan coil units are operating. The fans may be operated at high or low speed with chilled water (summer operation) or CL water supplied to the

cooling coils. In post accident operation following an actuation signal, the containment cooling system fans are designed to start automatically in slow speed if not already running and dampers re-align to direct flow to the upper containment environment. If running in high speed, the fans automatically shift to slow speed. The fans are operated at the lower speed during accident conditions to prevent motor overload from the higher mass atmosphere. The temperature of the cooling water is an important factor in the heat removal capability of the fan coil units.

Containment cooling performance for post accident conditions is given in the plant USAR Section 6.3. The result of the analyses is that one train of containment cooling (two FCUs) with one train of containment spray can provide 100% of the required peak cooling capacity during post accident conditions.

CL System

The CL system provides cooling for both safety related and non-safety related components. Safety related components supplied by CL include:

Unit 1 Emergency Diesel Generators
Containment Fan Coil Units
Component Cooling Heat Exchangers
Safeguards Chilled Water System
Back-up water supply to Auxiliary Feedwater Pumps

The CL system is shared between the two units. The system consists of two trains that are automatically split on a safety injection signal in either unit to provide two redundant trains. In addition to supplying the above safety related loads, there are several piping connections to the headers that supply water to cool non-safety related loads. The single largest non-safety related supply lines (one per unit), which supply the majority of the Turbine Building loads, can be isolated by automatic closure of a safety related motor operated valve on a safety injection signal coincident with a low pressure condition in the safety related supply header or can be remotely closed from the Control Room. Additional system description is provided in the PINGP USAR, Section 10.4.

Current TS Basis and Limitations

Current TS 3.6.5 Condition C provides Required Action and Completion Time for one containment cooling train inoperable. Each train comprises two FCUs supplied with CL from the same CL system header and provided with electrical power from the same safeguards AC train.

Currently, if one FCU in each train is inoperable, LCO 3.0.3 would have to be entered since TS 3.6.5 does not specify a condition for one FCU from each train inoperable. LCO 3.0.3 requires plant shutdown within the allowed Completion Times unless corrective measures are completed that permit continued operation. As discussed below, with the appropriate plant operating conditions, any two FCUs are capable of

removing the design basis containment post accident heat load. Thus the current TS is overly restrictive by not allowing one FCU from each train to be inoperable with appropriate TS controls. As currently written SR 3.6.5.2 and SR 3.6.5.3 require both FCUs in a containment cooling train to meet the SRs for plant operations to continue, thus revisions are proposed to these SRs which support the proposed TS changes.

Proposed TS Changes

Normally, both FCUs in each train are operating or maintained operable. If one or both FCUs become inoperable in one train, TS 3.6.5 Condition C is entered for an inoperable containment cooling train. Condition C applies when two FCUs in one train can provide the required containment cooling safety function and the other train cannot. Currently, no TS 3.6.5 condition is provided for the situation where neither train, by itself, can provide the required safety function, in which case, LCO 3.0.3 would be entered. However, plant analyses demonstrate that any two operable FCUs, one from each containment cooling train, can provide the required post-accident containment cooling if the inoperable FCUs are isolated. Since the required safety function of post-accident containment cooling continues to be provided, it is unnecessary to shut the plant down when one FCU from each train is inoperable. Thus the current TS is unnecessarily restrictive.

This LAR proposes to allow continued operation for 7 days with one FCU from each train inoperable by proposing a new Condition D which states, "One FCU in each train inoperable." Appropriate Required Actions specifying the required plant configuration, restoration requirements and Completion Times are also provided. Condition C is also revised to state the inoperabilities on the basis of FCUs to be consistent with the proposed Condition D.

The containment cooling system is designed with two trains such that a single failure will not defeat the capability of the system to provide the required post accident cooling. Once a TS Condition is entered for an inoperability that has specified time limits for the condition to exist, the system is not required to withstand a single failure in addition to the existing inoperability. For example, if one or two FCUs are inoperable in one train of containment cooling, a single failure could be postulated to fail the other containment cooling train that could leave the plant without containment cooling. Thus during the 7 day allowed Completion Time in Condition C the system cannot withstand a postulated single failure in addition to the inoperable FCU(s). In accordance with NRC guidance provided in Generic Letter 80-30, "Clarification Of The Term 'Operable' As It Applies To Single Failure Criterion For Safety Systems Required By Technical Specifications", plant operation is allowed to continue while the plant is in this configuration since a single failure is not postulated to occur.

Although the proposed condition allows continued operation with both trains inoperable, the safety function continues to be met through the use of components from both trains. From a single failure perspective, this is acceptable because a single failure is not postulated to occur in a system when it is under TS limitations. This approach is similar

to that used in other TS, such as TS 3.5.2, "ECCS – Operating" Condition A which allows plant operation to continue with, "One or more trains inoperable." (Emphasis added) TS 3.5.2 includes Condition C which requires plant shutdown when less than 100% of the flow equivalent to a single emergency core cooling system (ECCS) train is available. Like the containment cooling system, the ECCS only has two trains and both are allowed to be inoperable. TS Bases 3.5.2 discussion of Condition A provides insight on why this is acceptable with the statement, "With one or more trains inoperable and at least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available . . ." (emphasis added). Thus, unit operation is allowed to continue since the safety function is provided by the combination of remaining operable components from both trains.

Similar to TS 3.5.2, this LAR proposes new TS 3.6.5 Condition D which will allow both containment cooling trains to be inoperable provided the safety function, post-accident containment cooling, is provided by the remaining operable FCUs.

Normally, both FCUs in a train are operable with cooling flow available from the CL system. Engineering analyses demonstrate that any two operable FCUs from opposite trains can provide the required post-accident cooling assuming the inoperable FCU in each train is isolated which will increase the CL flow to the operable FCU.

Since the engineering analyses assume the CL flow to the inoperable FCUs is isolated, the proposed TS requires the plant operators to immediately initiate actions to isolate the inoperable FCUs. Isolation of the inoperable FCUs assures that the heat removal capability assumed in the analyses is obtained. Isolation of FCUs may also be required to assure TS requirements for containment integrity are met. The proposed TS Required Action wording for this action is, "Initiate action to isolate both inoperable FCUs." with a specified Completion Time of "Immediately". The use of "Immediately" here is appropriate because the action should be pursued without delay and in a controlled manner. This Required Action and Completion Time are consistent with other TSs where it is desired to accomplish an action without delay (given the potential surrounding circumstances), but a specific time may be inappropriate.

SR 3.6.5.2 and SR 3.6.5.3 requirements are specified in terms of requiring both FCUs in the containment cooling trains to meet the SR. Proposed Condition D specifies that one FCU may be inoperable in both trains and plant operation may continue under the TS controls. To assure that the SRs are consistent with the proposed revisions to Conditions C and the new Condition D, this LAR also proposes to revise these SRs by removing reference to "trains". These SRs will continue to require the cooling water flow to be determined for all FCUs and all FCU fan motors to be tested. When FCUs are inoperable as allowed by proposed Conditions C and D, the revised SRs will not be required to be met on the inoperable the FCUs.

The changes proposed in this LAR provide additional plant operating flexibility and may prevent an unnecessary plant shutdown when two FCUs, one in each train, are inoperable.

Basis for Proposed TS Revisions

Deterministic Considerations

An engineering evaluation was performed which demonstrated that any two FCUs are capable of removing more heat from containment following a design basis accident than credited in the Updated Safety Analysis Report (USAR). The analysis was performed using the plant CL system thermal-hydraulic analyses models. The analysis methods are the same as those previously reviewed by the NRC as part of the response to NRC Generic Letter 96-06.

FCU 24 is the limiting FCU for either unit at PINGP. FCU 24 is located at the upper floor (Elevation 755') in the Unit 2 containment, at a higher elevation in containment than the other Unit 2 FCUs, and is provided with water from Train B of the CL system. FCU 13 is located at the upper floor (Elevation 755') in the Unit 1 containment and is provided with water from Train A of the CL system. Hydraulic analyses of the CL system have demonstrated that Train B of the Cooling Water System is more limiting than Train A. Thus, for a given accident condition, the CL flows and pressures at FCU 24 will present the limiting case for heat removal.

FCU heat removal is credited following either a loss of coolant accident (LOCA) or a main steamline break accident (MSLB). The FCU heat removal capability assumed in the PINGP USAR LOCA analysis is the same, or greater than, that assumed for the PINGP MSLB Containment Analysis. The analysis of the heat removal capability of FCU 24 was determined with the following limiting assumptions:

- A large break LOCA is assumed to occur. Several sensitivities were performed with varying containment atmospheric temperatures of 270, 240 and 210°F. 270°F represents the peak containment temperature during the LOCA.

- A coincident loss of off-site power (LOOP) is assumed to occur. This minimizes the number of CL pumps that are operating. With the supply ring header split by the safety injection signal, there is only one pump operating on the header to provide the necessary cooling.

- The operating CL pump is assumed to be operating at minimum in-service testing pump curve to demonstrate pump operability; which in this case is the 93% curve.

- Worst case fouling factors are assumed for the FCU heat transfer surfaces.

- Maximum CL inlet temperature of 95 °F is assumed.

- The instrument air system is assumed not to be available. This results in air operated valves in the CL system failing open, which, in turn, maximizes the flow demand on the system. This minimizes the flow and pressure available to the

FCUs. The instrument air compressors are non-safety related; however, the air compressors are automatically loaded on the emergency diesel generator and would be available during a LOOP. However, as the compressors are not safety related components, credit is not taken for their operation during this scenario.

- FCU 22 is assumed to be isolated. FCU 22 and FCU 24 are the FCUs in the Unit 2 containment supplied from Train B of the CL system.

The objective of the analysis was to determine the total heat removal capability of two FCUs with the other FCU in each train isolated. The above analysis determines the FCU heat removal for FCU 24 which is the limiting FCU. The predicted heat removal capacity for FCU 24 was multiplied by two to obtain a conservative value for the heat removal capacity of two FCUs with the other FCU in each train isolated. The calculations demonstrated that the heat removal from two FCUs each with the heat removal capability of FCU 24 would exceed the USAR credited heat removal rates. Since the calculations assumed the other FCU in the same train is isolated, the proposed TS includes requirements to isolate the inoperable FCUs.

Probabilistic Considerations

NMC also considered probabilistic risk insights associated with the proposed license changes. The PINGP probabilistic risk assessment (PRA) analysis success criteria for adequate containment air handling is any two of four containment FCUs operating in slow fan speed, the cooling medium is switched to the cooling water system and the discharge dampers are aligned to the containment dome.

The risk associated with containment FCU unavailability is low because the containment FCUs do not provide a significant role in the prevention or mitigation of a core damaging accident, nor do they function to prevent or mitigate a large early release should a core damaging accident occur. Large, early releases are primarily the result of accidents that produce core damage while at the same time providing a pathway for fission products to bypass the containment (intersystem loss of coolant accident events, steam generator tube rupture). The containment FCUs do not prevent or mitigate these types of accidents. The primary role of the containment FCUs in accident situations is to cool and condense the steam released in non-containment bypass events inside containment, to limit containment pressure to within design conditions and prevent a (late) release in fission products due to containment overpressure. Late releases have lower radiological consequences as the fission products have had some time to decay.

Since the PRA model credits any two FCUs operable, regardless of train, the TS changes proposed in this LAR are consistent with the PRA model and do not change the baseline CDF or LERF. In light of the PRA insights, the current TS is overly restrictive in that it only credits two FCU operable in the same train. This is consistent with the findings of the industry Risk Informed Technical Specifications initiative that

has identified other TS which are more restrictive than necessary when evaluated using risk assessments.

Conclusions

PINGP has experienced simultaneous multiple FCU inoperabilities. If an FCU from each train has been inoperable, the TS required plant shutdown track has been entered and on some occurrences the plant has shutdown. Engineering analyses demonstrate that any two FCUs from opposite trains are capable of providing the safety function, post-accident containment cooling, if cooling water flow to the inoperable FCUs is isolated.

This LAR proposes a new TS 3.6.5 Condition D which will allow plant operation to continue for 7 days while repairs can be effected provided cooling water flow to the FCUs is isolated and concomitant changes to Condition C and relabeled Condition E. SR 3.6.5.2 and SR 3.6.5.3 have been revised to support continued operation of the plant under the proposed TS Conditions. The proposed TS provisions are similar those provided for the ECCS in PINGP TS 3.5.2. These changes will allow increased plant operating flexibility and may prevent unnecessary plant shutdowns. Since the safety function will continue to be provided, operation of the Prairie Island Nuclear Generating Plant with this revised Technical Specification will continue to protect the health and safety of the public.

5.0 REGULATORY SAFETY ANALYSIS

5.1 No Significant Hazards Consideration

The Nuclear Management Company has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

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

   Response: No

   This license amendment proposes to revise the Technical Specifications to allow plant operation to continue for a limited time period under Technical Specification controls with two fan coil units, one fan coil unit from each containment cooling train, providing the required cooling function. Analyses demonstrate that any two fan coil units, whether they are in the same train or from opposite trains, are sufficient to supply the required containment cooling following a design basis accident when the plant in the proper configuration as required by the proposed Technical Specifications.

The containment cooling system is required for accident mitigation and is not an accident initiator, thus revising the equipment required to provide the safety function does not involve a significant increase in the probability of an accident previously evaluated.

Since the proposed change continues to provide the post-accident containment cooling function under Technical Specification controls, this change does not involve an increase in the consequences of an accident. Thus this change does 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

This license amendment proposes to revise the Technical Specifications to allow plant operation to continue for a limited time period under Technical Specification controls with two fan coil units, one fan coil unit from each containment cooling train, providing the required cooling function. Analyses demonstrate that any two fan coil units, whether they are in the same train or from opposite trains, are sufficient to supply the required containment cooling following a design basis accident when the plant in the proper configuration as required by the proposed Technical Specifications.

The proposed licensing basis changes do not involve a change in the function or use of the containment cooling system. It does assure that the containment cooling function is provided during plant operations for post-accident mitigation. There are no new failure modes or mechanisms created through allowing different combinations of fan coil units to provide the cooling function as proposed by this Technical Specification change. There are no new accident precursors generated by providing the required cooling function with an operable fan coil unit from each train.

Therefore, the 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 license amendment proposes to revise the Technical Specifications to allow plant operation to continue for a limited time period under Technical Specification controls with two fan coil units, one fan coil unit from each containment cooling train, providing the required cooling function. Analyses demonstrate that any two

fan coil units, whether they are in the same train or from opposite trains, are sufficient to supply the required containment cooling following a design basis accident when the plant in the proper configuration as required by the proposed Technical Specifications.

Current plant Technical Specifications allow plant operation to continue for 7 days with the containment cooling function provided by the two operable fan coil units of a single operable containment cooling train. This is acceptable because engineering analyses demonstrate that the two fan coil units of a single train can provide the required post-accident containment cooing.

Likewise, engineering analyses demonstrate that any two fan coil units from opposite containment cooing trains can also provide the required post-accident containment cooling if the cooling water flow to the other fan coil unit in each train is isolated. This license amendment request proposes Technical Specifications which will allow plant operation to continue for 7 days with the containment cooling function provided by two fan coils from opposite trains provided the cooling water flow to the other fan coil unit in each train is isolated. Thus, from a cooling capacity perspective, this proposed Technical Specification change does not involve a reduction in a margin of safety.

When inoperable plant systems are under Technical Specification controls that limit the time for inoperability, a single failure in addition to the inoperable equipment is not postulated. Therefore, whether two inoperable fan coil units are in the same train or opposite trains does not change the availability of the two remaining operable fan coil units. Thus from a Technical Specification perspective, this proposed Technical Specification change does not involve a reduction in a margin of safety.

Therefore, based on the considerations given above, the proposed changes do not involve a significant reduction in a margin of safety.

Based on the above, the Nuclear Management Company 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

General Design Criteria

The construction of the PINGP was significantly complete prior to issuance of 10 CFR 50, Appendix A, General Design Criteria. The PINGP was designed and constructed to comply with the Atomic Energy Commission General Design Criteria as proposed on July 10, 1967 (AEC GDC) as described in the plant Updated Safety Analysis Report

(USAR). AEC GDC 41 and 52 provide guidance for containment cooling system considerations.

AEC GDC proposed Criterion 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 features shall provide this required safety function assuming a failure of a single active component.

The containment cooling system comprises two trains, each with the capacity to provide 100% of the post-accident cooling requirements. The system design provides sufficient capacity for loss of one train following an accident. During identified system inoperabilities the applicable Technical Specification Condition is entered. When a system inoperability is under the control of a Technical Specification with limited time for continued plant operation with the inoperability, a single failure is not postulated to occur. Since analyses have demonstrated that any two fan coil units are capable of providing the required post-accident cooling, the cooling requirements are met when any two fan coil units are operable. With the changes proposed in this license amendment request, the requirements of this Criterion continue to be met.

AEC GDC proposed Criterion 52 – Containment Heat Removal System

Where active heat removal systems are needed under accident conditions to prevent exceeding containment design pressure, at least two systems, preferably of different principles, each with full capacity, shall be provided.

The Prairie Island Nuclear Generating Plant does require active heat removal systems under accident conditions and two systems, the containment spray system and containment cooling system, are provided. This license amendment request does not affect the availability and operability of the containment spray system. Any two fan coil units in the containment cooling system have the full capacity to provide the containment cooling system required post-accident cooling. With the changes proposed in this license amendment request, the requirements of this Criterion continue to be met.

Generic Letter 80-30, Clarification Of The Term "Operable" As It Applies To Single Failure Criterion For Safety Systems Required By Technical Specifications

Plant safety systems required to mitigate postulated accidents are designed with redundant trains, each capable of providing 100% of the safety function, to assure that a single failure within the system does not prevent the system from performing its safety function, that is, they must meet the single failure criterion. When a train of a safety related system is inoperable, the single failure criterion may not be met. Generic Letter

80-30 provides guidance on single failure criterion with respect to the Technical Specification requirements. Guidance is provided as follows,

> The NRC's Standard Technical Specifications (STS) were formulated to preserve the single failure criterion for systems that are relied upon in the safety analysis report. By and large, the single failure criterion is preserved by specifying Limiting Conditions for Operation (LCOs) that require all redundant components of safety related systems to be OPERABLE. When the required redundancy is not maintained, either due to equipment failure or maintenance outage, action is required, within a specified time, to change the operating mode of the plant to place it in a safe condition. The specified time to take action, usually called the equipment out-of-service time, is a temporary relaxation of the single failure criterion, which, consistent with overall system reliability considerations, provides a limited time to fix equipment or otherwise make it OPERABLE.

Current Prairie Island Nuclear Generating Plant Technical Specifications apply this guidance when one or both fan coil units in a single train are inoperable. In this condition, redundancy is not maintained, action is required to place the plant in a safe condition and an equipment out-of-service time to take action (the Completion Time) is specified during which the single failure criterion is relaxed. During the Completion Time the remaining operable train provides the safety function.

Generic Letter 80-30 guidance does not limit its applicability to loss of redundancy of equipment in a single train. This license amendment request proposes to apply this guidance when loss of redundancy occurs in both trains and the remaining operable equipment in both trains provides the safety function during the proposed Completion Time. Engineering analyses demonstrate any two fan coil units remaining operable in the opposite trains are capable of providing 100% of the post-accident required cooling. In this condition, redundancy is not maintained, action is required to place the plant in a safe condition and a Completion Time is specified during which the single failure criterion is relaxed. Since a single failure is not postulated during the Completion Time, the two opposite train operable fan coil units are capable of providing the required safety function. The changes proposed in this license amendment request meet the guidance of Generic Letter 80-30.

<u>NUREG-1431, Standard Technical Specifications, Westinghouse Plants</u>

NUREG-1431 does not provide Technical Specification guidance for relying on two containment cooling system fan coil units operable in opposite trains. However, it does provide guidance in at least one instance for relying on operable equipment from opposite trains. Technical Specification 3.5.2, "ECCS – Operating", specifies a Condition with Required Actions and Completion Time when both ECCS trains are inoperable provided at least 100% of the ECCS flow equivalent to a single operable ECCS train is available, that is, the safety function continues to be provided through the remaining operable equipment from opposite trains.

This license amendment request proposes a similar Technical Specification Condition with Required Actions and Completion Time for the containment cooling system when both containment cooling trains are inoperable and any two fan coil units in the opposite trains are operable, that is, the safety function continues to be provided through the remaining operable fan coil units from opposite trains. Thus, NUREG-1431 provides precedence for the type of Technical Specification requirements proposed by this license amendment request.

Regulatory Requirements/Criteria Conclusions

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

6.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

Exhibit B

Proposed Technical Specification and Bases Changes (markup)

Technical Specification Pages

3.6.5-2
3.6.5-3

Bases pages
(for information only)

B 3.6.5-8
B 3.6.5-9
B 3.6.5-10
B 3.6.5-11

6 pages follow

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One or both containment cooling fan coil unit(s) (FCU) in one train inoperable.	C.1 Restore containment cooling FCU(s)~~train~~ to OPERABLE status.	7 days AND 10 days from discovery of failure to meet the LCO
D One containment cooling FCU in each train inoperable.	D.1 Initiate action to isolate both inoperable FCUs. AND D.2 Restore all FCUs to OPERABLE status.	Immediately 7 days AND 10 days from discovery of failure to meet the LCO
E~~D~~. Required Action and associated Completion Time of Condition C or D not met.	E~~D~~.1 Be in MODE 3. AND E~~D~~.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.5.1	Verify each containment spray manual, power operated, and automatic valve in the flow path that is not locked, sealed, or otherwise secured in position is in the correct position.	31 days
SR 3.6.5.2	Operate each containment ~~cooling train~~ fan coil unit on low motor speed for ≥ 15 minutes.	31 days
SR 3.6.5.3	Verify ~~each containment cooling train~~ cooling water flow rate to each containment fan coil unit is ≥ 900 gpm.	24 months
SR 3.6.5.4	Verify each containment spray pump's developed head at the flow test point is greater than or equal to the required developed head.	In accordance with the Inservice Testing Program
SR 3.6.5.5	Verify each automatic containment spray valve in the flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	24 months
SR 3.6.5.6	Verify each containment spray pump starts automatically on an actual or simulated actuation signal.	24 months

BASES

ACTIONS (continued)

B.1 and B.2

If the inoperable containment spray train cannot be restored to OPERABLE status within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 84 hours. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging plant systems. The extended interval to reach MODE 5 allows additional time for attempting restoration of the containment spray train and is reasonable when considering the driving force for a release of radioactive material from the Reactor Coolant System is reduced in MODE 3.

C.1

With one or both of the containment cooling fan coil units (FCU) in one trains inoperable, the inoperable FCU(s)~~containment cooling train~~ must be restored to OPERABLE status within 7 days. In this degraded condition the remaining OPERABLE containment spray and cooling trains provide iodine removal capabilities and are capable of providing at least 100% of the heat removal needs. The 7 day Completion Time was developed taking into account the heat removal capabilities afforded by combinations of the Containment Spray System and Containment Cooling System and the low probability of a DBA occurring during this period.

The 10 day portion of the Completion Time for Required Action C.1 is based upon engineering judgment. It takes into account the low probability of coincident entry into two Conditions in this Specification coupled with the low probability of an accident occurring during this time. Refer to Section 1.3 for a more detailed discussion of the purpose of the "from discovery of failure to meet the LCO" portion of the Completion Time.

BASES

ACTIONS (continued)

D.1 and D.2

Condition D applies when one FCU in each train is inoperable. With two FCUs inoperable, the Required Actions are to isolate cooling water flow to both inoperable FCUs immediately. This will assure the containment cooling function continues to be provided.

The LCO requires the OPERABILITY of a number of components within the subsystems. Due to the redundancy of components within the containment cooling system, the inoperability of two FCU does not render the containment cooling system incapable of performing its function. Engineering analyses demonstrate that two OPERABLE FCUs, one in each train, are capable of providing the necessary cooling.

With a FCU inoperable in both containment cooling trains and a FCU OPERABLE in both containment cooling trains, the two remaining OPERABLE FCUs can provide the necessary cooling provided the cooling water flow to the inoperable FCUs is isolated.

When one FCU in each containment cooling train is inoperable, both inoperable FCUs must be restored to OPERABLE status within 7 days. In this degraded condition the remaining OPERABLE containment spray and FCU from each cooling train provide iodine removal capabilities and are capable of providing at least 100% of the heat removal needs. The 7 day Completion Time was developed taking into account the heat removal capabilities afforded by combinations of the Containment Spray System and Containment Cooling System and the low probability of a DBA occurring during this period.

The 10 day portion of the Completion Time for Required Action D.2 is based upon engineering judgment. It takes into account the low probability of coincident entry into two Conditions in this Specification coupled with the low probability of an accident occurring during this time. Refer to Section 1.3 for a more detailed discussion of the purpose of the "from discovery of failure to meet the LCO" portion of the Completion Time.

BASES

ACTIONS (continued)

E.1 and E.2

If the Required Action and associated Completion Time of Condition C or D of this LCO are not met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.6.5.1

Verifying the correct alignment for manual, power operated, and automatic valves in the containment spray flow path provides assurance that the proper flow paths will exist for Containment Spray System operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these were verified to be in the correct position prior to locking, sealing, or securing. This SR does not require any testing or valve manipulation. Rather, it involves verification that those valves outside containment (there are no valves inside containment) and capable of potentially being mispositioned are in the correct position.

SR 3.6.5.2

Operating each containment ~~cooling train~~ fan coil unit on low motor speed for ≥ 15 minutes ensures that all trains are OPERABLE and that all associated controls are functioning properly.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.6.5.2 (continued)

Motor current is measured and compared to the nominal current expected for the test condition. It also ensures that blockage, fan or motor failure, or excessive vibration can be detected for corrective action. The 31 day Frequency was developed considering the known reliability of the fan coil units and controls, the two train redundancy available, and the low probability of significant degradation of the containment cooling train occurring between Surveillances. It has also been shown to be acceptable through operating experience.

SR 3.6.5.3

Verifying that ~~each containment cooling train~~ cooling water flow rate to each containment fan coil unit is ≥ 900 gpm provides assurance that the design flow rate assumed in the safety analyses will be achieved (Ref. 4).

Terminal temperatures of each fan coil unit are also observed. This test includes verifying operation of all essential features including low motor speed, cooling water valves and normal ventilation system dampers. The 24 month Frequency is based on; the need to perform these Surveillances under the conditions that apply during a plant outage; the known reliability of the Cooling Water System; the two train redundancy available; and, the low probability of a significant degradation of flow occurring between Surveillances.

SR 3.6.5.4

Verifying each containment spray pump's developed head at the flow test point is greater than or equal to the required developed head ensures that spray pump performance has not degraded. Flow and differential pressure are normal tests of centrifugal pump performance required by Section XI of the ASME Code. Since the

Exhibit C

Proposed Technical Specification Changes (retyped)

Technical Specification Pages

3.6.5-2
3.6.5-3

2 pages follow

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One or both containment cooling fan coil unit(s) (FCU) in one train inoperable.	C.1 Restore containment cooling FCU(s) to OPERABLE status.	7 days AND 10 days from discovery of failure to meet the LCO
D. One containment cooling FCU in each train inoperable.	D.1 Initiate action to isolate both inoperable FCUs. AND D.2 Restore all FCUs to OPERABLE status.	Immediately 7 days AND 10 days from discovery of failure to meet the LCO
E. Required Action and associated Completion Time of Condition C or D not met.	E.1 Be in MODE 3. AND E.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.5.1	Verify each containment spray manual, power operated, and automatic valve in the flow path that is not locked, sealed, or otherwise secured in position is in the correct position.	31 days
SR 3.6.5.2	Operate each containment fan coil unit on low motor speed for $\geq$ 15 minutes.	31 days
SR 3.6.5.3	Verify cooling water flow rate to each containment fan coil unit is $\geq$ 900 gpm.	24 months
SR 3.6.5.4	Verify each containment spray pump's developed head at the flow test point is greater than or equal to the required developed head.	In accordance with the Inservice Testing Program
SR 3.6.5.5	Verify each automatic containment spray valve in the flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	24 months
SR 3.6.5.6	Verify each containment spray pump starts automatically on an actual or simulated actuation signal.	24 months