

UNITED STATES NUCLEAR REGULATORY COMMISSION

NORTHERN STATES POWER COMPANY

PRAIRIE ISLAND NUCLEAR GENERATING PLANT

DOCKET NO. 50-282
50-306

REQUEST FOR AMENDMENT TO
OPERATING LICENSES DPR-42 & DPR-60

LICENSE AMENDMENT REQUEST DATED August 15, 1996

Amendment of Containment Cooling Systems Technical
Specifications to Conform to Their Supporting Analyses

Northern States Power Company, a Minnesota corporation, requests authorization for changes to the Prairie Island Operating License, Appendix A as shown on the attachments labeled Exhibits A, B, and C. Exhibit A describes the proposed changes, reasons for the changes, and the supporting safety evaluation and significant hazards determination. Exhibit B contains current Prairie Island Technical Specification pages marked up to show the proposed changes. Exhibit C contains the revised Technical Specification pages.

This letter contains no restricted or other defense information.

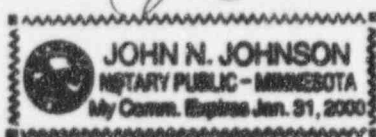
NORTHERN STATES POWER COMPANY

By M. D. Wadley
M. D. Wadley
Plant Manager
Prairie Island Nuclear Generating Plant

On this 15 day of August, 1996 before me a notary public in and for said County, personally appeared M. D. Wadley, Plant Manager, Prairie Island Nuclear Generating Plant, and being first duly sworn acknowledged that he is authorized to execute this document on behalf of Northern States Power Company, that he knows the contents thereof, and that to the best of his knowledge, information, and belief the statements made in it are true and that it is not interposed for delay.

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John N. Johnson



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Amendment of Containment Cooling Systems Technical Specifications to Conform to Their Supporting Analyses

EXHIBIT A

Description of the Proposed Changes, The Reasons for Requesting the Changes, and the Supporting Safety Evaluation/Significant Hazards Determination

Pursuant to 10 CFR Part 50, Sections 50.59 and 50.90, the holders of Operating Licenses DPR-42 and DPR-60 hereby propose the following changes to the Facility Operating Licenses and Appendix A, Technical Specifications:

BACKGROUND

This License Amendment Request revises the Prairie Island Technical Specifications, 3.3.B.2 which define the Containment Cooling Systems Limiting Conditions for Operation. The Containment Cooling Systems comprise the Containment Spray System and the Containment Fan Cooler Units. These independent systems are provided to cool the post accident containment atmosphere and to scrub iodine to minimize off site and control room doses.

In 1995, Prairie Island performed an engineering self-assessment of the plant Cooling Water System. In support of this self-assessment, re-analyses of the Cooling Water System were performed including containment cooling capability through the containment fan cooler units which are supplied by the Cooling Water System. NSP reported to the NRC in LER 95-009, dated August 2, 1995, that predicted Cooling Water flow to some components, including the containment fan cooler units, is lower than the design flows. Subsequently, the scope of analyses was broadened to encompass containment spray and containment fan cooler unit performance.

Recently completed analyses demonstrate current TS 3.3.B.2 may not adequately limit equipment inoperabilities to maintain the plant in a safe condition. Based on preliminary analyses results, in May 1996 Prairie Island implemented administrative controls to assure plant safety and communicated our findings to the NRC by telephone

call. Final analyses results were communicated to the NRC Staff in a June 26, 1996 meeting.

This license amendment request proposes to amend the Technical Specifications to conform to the supporting analyses and thus maintain plant safety. These proposed changes are consistent with the results of NSP's recently completed analyses, the intent of the plant administrative controls on containment cooling system operation issued in May 1996 and the guidance of NUREG-1431, Standard Technical Specifications, Westinghouse Plants, Revision 1, 4/07/95.

PROPOSED CHANGES AND REASONS FOR CHANGES

The proposed changes to Prairie Island Operating License Appendix A, Technical Specifications are described below, and the specific wording changes are shown in Exhibits B and C.

1. Technical Specification 3.3.B. CONTAINMENT COOLING SYSTEMS, Paragraph 2.a: Interdependencies of the containment fan cooler units and the containment spray pumps have been eliminated and one train (two units) of containment fan cooling is allowed out of service for seven days.

Justification: With one train inoperable, another train comprising two containment fan cooler units remains available. Specification of the containment spray train status is not required since they are controlled by their own Limiting Condition for Operation in this section.

The remaining components (one containment fan cooler train and two containment spray trains) in this degraded condition are capable of providing all post-accident iodine removal and containment heat removal needs. The 7 day allowed outage time is proposed taking into account the redundant heat removal capabilities afforded by combinations of the containment spray system and containment fan cooler system and low probability of a design basis accident occurring during this period. This proposed specification is consistent with NUREG-1431 guidance.

2. Technical Specification 3.3.B. CONTAINMENT COOLING SYSTEMS, Paragraph 2.b: Interdependencies of the containment fan cooler units and the containment spray pumps have been eliminated and containment spray "pump" has been changed to containment spray "train".

Justification: Current analyses show that one containment spray train is sufficient to mitigate a design basis accident. Thus, with one train inoperable, another train remains available. Specification of the containment fan cooler unit status is not required since they are controlled by their own Limiting Condition for Operation in this section.

In this condition, the remaining operable containment spray and containment fan cooler trains are adequate to perform the iodine removal and containment cooling functions. The 72 hour allowed outage time is proposed taking into account the redundant heat removal capabilities afforded by the containment spray system and containment fan cooler trains, reasonable time for repairs, and low probability of a design basis accident occurring during this period.

These changes have been proposed to conform the Technical Specifications to the results of recent Prairie Island containment cooling analyses and NUREG-1431. Reduction of the spray additive tank allowed outage time is based on recent plant staff evaluations as discussed further below.

3. Technical Specification 3.3.B, CONTAINMENT COOLING SYSTEMS, Paragraph 2.c: This paragraph has been deleted in its entirety.

Justification: Allowance for two containment fan cooler units within the same train to be inoperable is provided by proposed Specification 3.3.B.2.a and therefore is unnecessary in this paragraph.

4. Technical Specification 3.3.B, CONTAINMENT COOLING SYSTEMS, Paragraph 2.d: This paragraph has been deleted in its entirety.

Justification: Allowance for two containment spray trains (or pumps) to be inoperable has been eliminated. Current plant analyses demonstrate that at least one containment spray train is required to mitigate design basis accidents, thus it is not appropriate to allow both containment spray trains to be inoperable. If this condition were to occur, the plant condition would fall within the requirements of TS 3.0.C.

5. Technical Specification 3.3.B, CONTAINMENT COOLING SYSTEMS, Paragraph 2.e: The allowed outage time for the spray additive tank has been reduced from 72 hours to 24 hours.

Justification: The spray additive tank provides sodium hydroxide (NaOH) to adjust the pH in the containment post-accident sump to scrub and retain the iodine in the water solution. A single, common tank supplies both trains of containment spray.

Recent evaluations by the plant staff show that the containment spray system will not adequately mitigate a design basis accident if no pH adjustment is provided. Thus, for that reason and because a common spray additive tank supplies both containment spray trains, 72 hours allowed outage time is judged to be excessive.

This Specification proposes 24 hours allowable outage time for the tank which will allow the plant staff to implement corrective actions with minimal perturbations on the plant. This proposed outage time is acceptable because 1) inoperability of the tank does not necessarily mean a complete loss of function and 2) there is a low probability of an accident during this short time the tank is allowed out of service.

The most likely reason for the tank to be inoperable is failure to meet the sodium hydroxide volume or solution concentration requirements of Specification 3.3.B.1.c. If these specification requirements are not met it is unlikely that there will be a total loss of function. The volume and concentration in the spray additive tank have margins to assure iodine removal requirements are satisfied. For example, the tank level could be low and therefore the tank would be declared inoperable, however it is unlikely the tank would be completely empty. Thus, if a design basis accident were to occur, the containment sump water pH would still be adjusted to a value near to, or within the desired value. A substantial deviation in level or chemical concentration would be necessary to result in inadequate iodine removal from the containment atmosphere and retention in the sump water. Additionally, the conservative dose analyses provide margin in meeting the regulatory limits. Furthermore there is a low probability of a design basis accident occurring during the short time this tank is allowed inoperable.

The alternative to providing this Specification would be to allow the plant to fall under the provisions of TS 3.0.C if the tank cannot meet the requirements of TS 3.3.B.1.c. The plant would then have seven hours to place the plant in hot shutdown condition. This places unnecessary stress on the plant, and its staff when there is unlikely to be a substantial loss of function. Each shutdown of the plant causes thermal cycles on the reactor and associated systems and increases the potential for plant upset and challenges to safety systems. Therefore, 24 hours allowed outage time is proposed as a reasonable time to allow the tank to be out of service while corrective actions are taken.

6. Technical Specification Bases 3.3, ENGINEERED SAFETY FEATURES: The discussion of containment cooling equipment combinations has been revised and discussion of containment cooling trains has been introduced.

Justification: The Technical Specifications have been rewritten based on the concept of containment cooling system trains. Accordingly the Bases have also

been rewritten to discuss these systems as trains. The proposed combinations of equipment inoperability are consistent with recently completed containment cooling system analyses. The Bases reference the Updated Safety Analysis Report (USAR) as support for the combinations of containment cooling equipment required in the event of a Design Basis Accident. As of the date of this submittal, the USAR has not been updated to incorporate the results of these recently completed analyses. However, the plant operators are aware of the change in equipment operability requirements through the issuance of the May 1996 administrative controls on containment cooling system operation. The USAR will be updated in 1997 in accordance with its normal schedule.

SAFETY EVALUATION

The Containment Cooling Systems includes the Containment Spray System and Containment Fan Cooler System which are Engineered Safety Feature systems. They provide containment atmosphere cooling to limit post accident pressure and temperature in the containment to less than the design values. Reduction of containment pressure and the iodine removal capability of the spray system reduces the release of fission product radioactivity from containment to the environment to within regulatory limits, in the event of a Design Basis Accident.

The Containment Spray System consists of two trains of equal capacity, each capable of maintaining the post accident containment design pressure and temperature. The two trains are independent except that each train is supplied sodium hydroxide (NaOH) from a single, common spray additive tank. Each Containment Spray train provides a spray of cold borated water mixed with sodium hydroxide from the spray additive tank into the upper regions of containment to reduce the containment pressure and temperature and to reduce fission products from the containment atmosphere during a design basis accident.

The Containment Fan Cooler System consists of two separate trains of unit coolers, each train originally designed with sufficient capacity to supply 100% of the design cooling requirements. Each train consists of two fan coil units supplied with cooling water from separate trains of the Cooling Water System. Fans are provided to force containment air past the unit cooling coils.

The Containment Cooling Systems limit the temperature and pressure that could be experienced following a design basis accident. Specifically their design bases are to:

- a. Cool and depressurize post-accident containment atmosphere to prevent temperature and pressure from exceeding containment design limits.
- b. Provide timely depressurization of the post-accident atmosphere to maintain projected off-site and control room doses within regulatory limits

The limiting design basis accidents considered are the large break LOCA and steam line break.

The original design for these systems intended that one train of containment spray would be functionally interchangeable with one train of containment fan cooling under post-accident conditions, that is, the two systems together would effectively serve as four full capacity trains. Thus the current Technical Specifications are framed to maintain the equivalent of any two containment cooling trains (two containment spray trains, or two containment fan cooler trains, or one containment spray train and one containment fan cooler train) operable while the two other trains may be inoperable.

In 1995, a hydraulic model of the Cooling Water System was developed to better understand and evaluate system capabilities. At peak post-accident containment atmosphere temperature, the model predicted that the system pressure would be insufficient to prevent boiling from occurring at the containment fan cooler unit in the upper level of each containment (LER 95-009).

In 1995 and 1996, further computer modeling using CONTEMPT was performed to more accurately evaluate Containment Cooling Systems' performance following a design basis accident. These analyses evaluated post-accident containment conditions following a large break LOCA and a main steam line break.

For the large break LOCA the following combinations of operable containment cooling equipment were evaluated:

- a. During post-accident injection phase one containment spray train and one containment fan cooler unit is operating. During the recirculation phase one containment fan cooler unit is operating, the containment spray train is secured. Containment cooling system design bases were met with these assumptions.
- b. Two containment fan cooler trains (four containment fan cooler units) are operating and no containment spray trains are operating. Containment cooling system design bases were not met with these assumptions.

- c. Three containment fan cooler units (one containment fan cooler train plus one containment fan cooler unit from the other train - this assumes one containment fan cooler unit is not available due to steam binding) are operating and no containment spray trains are operating. Containment cooling system design bases were not met with these assumptions.

For the main steam line break, the analyses were performed assuming one containment spray train with no containment fan cooler trains operable for the first 45 minutes of the accident, and no active containment heat removal after the initial 45 minutes. Due to the high containment temperatures during a main steam line break accident both containment fan cooler trains were assumed to be inoperable. This is conservative since the containment fan cooler trains would recover to an operable condition as containment atmosphere cooled. The analyses demonstrate that the system design bases are met using these conservative assumptions.

Off-site and control room dose analyses were performed. The control room analyses demonstrate that credit needs to be taken for iodine removal by the containment spray system to satisfy General Design Criterion 19.

In summary, these analyses demonstrated that one train of containment spray with one containment fan cooler operating following a design basis accident will meet the containment cooling system design bases and successfully mitigate the accident.

The proposed amendments to the Technical Specifications would allow one containment fan cooler train to be out of service for 7 days instead of the 72 hours allowed by current Technical Specifications. The remaining components (two containment spray trains and one containment fan cooler train) in this degraded condition provide iodine removal capabilities and are capable of providing at least 100% of the heat removal needs. The 7 day allowable outage time takes into account the redundant heat removal capabilities allowed by combinations of the containment spray system and containment cooling system and the low probability of a design basis accident occurring during the 7 day period. This change is consistent with the allowable outage time for this system in NUREG-1431.

The specification changes proposed in this license amendment request will bring the Prairie Island Technical Specifications into conformance with these recently completed containment cooling system analyses. These Technical Specifications are more conservative than the current Technical Specifications in that they require both containment spray trains to be operable if one containment fan cooler train is inoperable and both containment fan cooler trains to be operable if one containment spray train is inoperable. Furthermore, based on recent plant staff evaluations, the spray additive tank allowed outage time has been reduced from 72 hours to 24 hours.

Based on the results of the supporting analyses, Northern States Power Company believes there is reasonable assurance that the health and safety of the public will not be adversely affected by these proposed Technical Specification changes.

DETERMINATION OF SIGNIFICANT HAZARDS CONSIDERATIONS

The proposed changes to the Operating License have been evaluated to determine whether they constitute a significant hazards consideration as required by 10 CFR Part 50, Section 50.91 using the standards provided in Section 50.92. This analysis is provided below:

1. The proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated

Operation of the Prairie Island plant in accordance with the proposed changes does not involve a significant increase in the probability or consequences of an accident previously evaluated. None of the proposed changes involve a physical modification to the plant.

These changes will require operability of at least one containment spray pump at all times and reduces the spray additive tank allowable outage time from 72 hours to 24 hours. Both of these changes are more conservative and safer than currently required in the Prairie Island Technical Specifications. These proposed changes do allow one containment fan cooler train out of service for 7 days instead of 72 hours as allowed by current Technical Specifications. Recent plant analyses confirm that one containment fan cooler train with one containment spray train is sufficient to meet the system design bases. Since the probability of an accident occurring is low while one containment fan cooler train is out of service, the probability and consequences of an accident are not significantly increased.

In total these changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. The proposed amendment will not create the possibility of a new or different kind of accident from any accident previously analyzed

The proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated because the proposed changes, in themselves, do not introduce a new mode of plant operation, surveillance requirement or involve a physical modification to the plant.

The proposed changes do require more restrictive, safer containment spray train operability. The proposed changes also allow one containment fan cooler train to be out of service for 7 days instead of 72 hours as allowed by the current Technical Specifications. However this change does not create the possibility of a new kind of accident.

The proposed changes do not alter the design, function, or operation of any plant components and therefore, no new accident scenarios are created.

Therefore, the possibility of a new or different kind of accident from any accident previously evaluated would not be created by these amendments.

3. The proposed amendment will not involve a significant reduction in the margin of safety

This License Amendment Request require one containment spray train to be operable at all times which is more restrictive than current Technical Specifications and thus the margin of safety is not reduced.

This License Amendment Request will also allow one containment fan cooler train to be out of service for 7 days instead of 72 hours as allowed by the current Technical Specifications. Since the remaining containment cooling components can mitigate an accident and the probability of a design basis accident are low during this time, this change does not significantly reduce the plant margin of safety.

Therefore, a significant reduction in the margin of safety would not be involved with these amendments.

Based on the evaluation described above, and pursuant to 10 CFR Part 50, Section 50.91, Northern States Power Company has determined that operation the Prairie Island Nuclear Generating Plant in accordance with the proposed license amendment request does not involve any significant hazards considerations as defined by Nuclear Regulatory Commission regulations in 10 CFR Part 50, Section 50.92.

ENVIRONMENTAL ASSESSMENT

Northern States Power Company has evaluated the proposed changes and determined that:

1. The changes do not involve a significant hazards consideration, or
2. The changes do not involve a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or
3. The changes do not involve a significant increase in individual or cumulative occupational radiation exposure.

Accordingly, the proposed changes meet the eligibility criterion for categorical exclusion set forth in 10 CFR Part 51 Section 51.22(c)(9). Therefore, pursuant to 10 CFR Part 51 Section 51.22(b), an environmental assessment of the proposed changes is not required.