Northern States Power Company
Prairie Island Nuclear Generating Plant
1717 Wakonade Dr. East
Welch, Minnesota 55089

April 17, 2000

10 CFR Part 50
Section 50.90

U S Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
Docket Nos. 50-282 License Nos. DPR-42
50-306 DPR-60

License Amendment Request Dated April 17, 2000
Removal of Boric Acid Storage Tanks from the Safety Injection System

Attached is a request for a change to the Technical Specifications, Appendix A of the Operating Licenses, for the Prairie Island Nuclear Generating Plant (PINGP). Northern States Power Company (NSP) submits this request in accordance with the provisions of 10CFR50.90.

This License Amendment Request proposes the following changes to the Technical Specifications:

- Removing Section 3.2 and associated bases from the PINGP Technical Specifications
- Increasing Section 3.3.A.1 boron concentration requirement for the Refueling Water Storage Tank
- Removing Table 3.5-2B and associated bases (Functional Unit 9 and associated actions 34, 35, and 36) Engineered Safety Feature Actuation System instrumentation requirements for the Boric Acid Storage Tank level and automatic actuation logic and actuation relay operability requirements.
- Removing Table 4.1-1C instrument surveillance requirements for Charging Flow, BAST Level, Volume Control Tank Level, Boric Acid Make-Up Flow, and discussion of the BAST to Refueling Water Storage Tank transfer logic
- Removing Table 4.1-2B sampling requirements for Boric Acid Storage Tank (BAST) boron concentration
- Removing Section 4.5.B.3 requirements to test BAST and Refueling Water Storage Tank (RWST) to Safety Injection (SI) suction valves.

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These changes are proposed to meet two primary objectives:

Objective 1 – Eliminate High Concentration Boric Acid from SI System
Current accident analyses indicate that the high concentration boric acid in the BASTs is not required in order for the SI system to adequately mitigate design basis accidents (i.e., the lower concentration boric acid in the RWST is sufficient to mitigate all accidents). Part of this proposed change includes modifying the SI system such that the RWST is the only suction source to the SI pumps. The BAST will no longer be used as a suction source to the SI pumps (i.e., no need to automatically open the BAST to SI suction valves on receipt of an S signal) and no automatic functions will be required to switch the SI suction source from the BAST to the RWST. However, in order to support long-term post-LOCA subcriticality, NSP proposes to raise the minimum RWST boric acid concentration requirements from 2500 ppm to 2600 ppm to ensure adequate margin.

Objective 2 – Align Prairie Island Technical Specifications with Standard Technical Specifications
This is the primary reason for the proposed deletion of the balance of Technical Specification Section 3.2 and associated bases, as well as the proposed deletion of the specific surveillance requirements of Table 4.1-1C and Table 4.1-2B noted above. Standard Technical Specifications do not include a section that would correspond to current Section 3.2 of the PINGP Technical Specification. This change supports the planned submittal of Standard Technical Specifications for Prairie Island.

Exhibit A contains a description of the proposed changes, the reasons for requesting the changes, the supporting safety evaluation, and the significant hazards evaluation. Exhibit B contains current Prairie Island Technical Specification pages marked up to show the proposed changes. Exhibit C contains the revised Prairie Island Technical Specification pages incorporating the proposed changes.

To assure orderly implementation of the modifications, procedure changes, training, etc, required to support the proposed Technical Specifications, NSP requests that the implementation period be extended to 90 days upon issuance of this proposed amendment.

Please contact Jeff Kivi (612-388-1121) if you have any questions related to this License Amendment Request.

Joel P. Sorensen
Site General Manager
Prairie Island Nuclear Generating Plant

c: Regional Administrator - Region III, NRC
Senior Resident Inspector, NRC
NRR Project Manager, NRC
James Bernstein, State of Minnesota
J E Silberg

Attachments:

Affidavit

Exhibit A - Evaluation of Proposed Changes to the Technical Specification Appendix A of Operation License DPR-42 and DPR-60.

Exhibit B - Proposed Changes Marked Up on Existing Technical Specification Pages.

Exhibit C - Revised Technical Specification Pages.

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 APRIL 17, 2000
REMOVAL OF BORIC ACID STORAGE TANKS
FROM THE SAFETY INJECTION SYSTEM

Northern States Power Company, a Minnesota corporation, requests authorization for changes to Appendix A of the Prairie Island Operating License as shown in the attachments labeled Exhibits A, B, and C. Exhibit A contains a description of the proposed changes, the reason for requesting the changes, and the supporting safety evaluation and significant hazards evaluation. 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 Joel P. Sorensen
Joel P. Sorensen
Site General Manager
Prairie Island Nuclear Generating Plant

On this 17th day of April 2000 before me a notary public in and for said County, personally appeared Joel P. Sorensen, Site General 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.

Marlys E Davis

MARLYS E. DAVIS
NOTARY PUBLIC-MINNESOTA
My Commission Expires Jan. 31, 2005

Exhibit A

Prairie Island Nuclear Generating Plant
License Amendment Request Dated April 17, 2000
Removal of Boric Acid Storage Tanks from the Safety Injection System

Evaluation of Proposed Changes to the Technical Specification Appendix A of Operation License DPR-42 and DPR-60

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 Technical Specifications contained in Appendix A of the Facility Operating Licenses:

Background and Reasons for Changes

In this amendment request Northern States Power Company (NSP) proposes changes to the Prairie Island Nuclear Generating Plant (PINGP) Technical Specification to support two primary objectives:

Objective 1 – Eliminate High Concentration Boric Acid from SI System
Generic Letter 85-16, "High Boron Concentrations," noted, "...there have been incidents at operating reactor plants in which boric acid has crystallized in the internals of vital safety related pumps and piping, thereby rendering those systems inoperable." GL 85-16 recommended, "In light of the safety risks inherent in the present system and these new calculations which show a reduced need for boron injection, the staff encourages you to reevaluate the need for maintaining high concentrations of boron in your boron injection tanks."

Current accident analyses indicate that the high concentration boric acid in the Boric Acid Storage Tanks (BASTs) is not required in order for the Safety Injection (SI) system to adequately mitigate design basis accidents (i.e., the lower concentration boric acid in the RWST is sufficient to mitigate all accidents). Part of this proposed change includes modifying the SI system such that the Refueling Water Storage Tank (RWST) is the only suction source to the SI pumps. The BAST will no longer be used as a suction source to the SI pumps (i.e., no need to automatically open the BAST to SI suction valves on receipt of an S signal) and, therefore, no automatic functions will be required to swap the SI suction source from the BAST to the RWST. However, in order to support long-term post-LOCA (loss of coolant accident) subcriticality, NSP proposes to raise the minimum RWST boric acid concentration requirements from 2500 ppm to 2600 ppm to ensure adequate margin.

Thus, Technical Specifications related to ensuring the high concentration boric acid in the BASTs is available to the SI system in order to mitigate a postulated steam line break are no longer necessary.

In addition, Technical Specification 3.3.A.1 (which specifies minimum inventory and boric acid concentration of the RWST) is being revised to raise the minimum boric acid concentration to 2600 ppm.

Objective 2 – Align PINGP Technical Specifications and Standard Technical Specifications

This is the primary reason for the proposed deletion of the balance of Technical Specification Section 3.2 and associated bases, as well as the proposed deletion of the specific surveillance requirements of Table 4.1-1C and Table 4.1-2B noted above. Standard Technical Specifications do not include a section that would correspond to current Section 3.2 of the PINGP Technical Specification. This change supports the planned submittal of Standard Technical Specifications for Prairie Island. The justification below evaluates each of the Technical Specification changes that are proposed to meet this objective.

The proposed changes provide a net safety benefit. Overall, the changes proposed in this license amendment request decrease the complexity of the injection phase of emergency core cooling. This will improve the reliability of the SI system because the number of active components is reduced (reducing the potential impact of a component failure during a postulated accident). In addition, the proposed changes should enhance the reliability of the SI system by eliminating the use of concentrated boric acid in that system. This will preclude any potential loss of SI suction due to boron precipitation (e.g., caused by a failure of heat tracing) and eliminates potential piping material degradation due to high concentration boric acid solution or from high piping temperature due to malfunctioning heat tracing.

The changes proposed by this amendment request are similar to those submitted or approved previously for three other Westinghouse two-loop plants: the R.E. Ginna Nuclear Power Plant (Amendment 57 to Facility Operating License Number DPR-18, issued December 7, 1993), the Point Beach Nuclear Power Plant (Amendment Request submitted March 29, 1994), and the Kewaunee Nuclear Power Plant (Amendment 116 to Facility Operating License Number 116, issued March 28, 1995). This amendment request most closely resembles the Kewaunee license amendment request; however, it differs on a number of key points:

- The increase in RWST boric acid concentration is higher for Prairie Island because of differences in core design.
- This amendment request addresses the four criteria of 10CFR50.36 in support of Objective 2 and the removal of the balance of Section 3.2 of Technical Specifications.
- The Kewaunee submittal addressed immediate changes to the boric acid concentration in the BASTs, whereas, Prairie Island will not be reducing the BAST

boric acid concentration until a later phase of the overall boric acid reduction project. The Kewaunee submittal included additional issues related to emergency boration (and removing boric acid transfer pumps from Technical Specifications) and the time needed to borate to shutdown. These issues are not addressed in this amendment request because boric acid transfer pumps are not currently addressed in the Prairie Island Technical Specifications and because there are no immediate plans to remove the BASTs from service (or reduce their boric acid concentration) for the purposes of the CVCS. Following implementation of this amendment, the BAST may be modified per the requirements of 10CFR50.59.

Proposed Changes and Justification

The proposed changes to Prairie Island Operating License Appendix A, Technical Specifications are described below, and the specific changes to the Technical Specifications are shown in Exhibit B. Proposed changes will include administrative details such as revising Technical Specification Table of Contents, Page TS-ii to delete "Chemical and Volume Control System" from the Table of Contents.

This license amendment request proposes six specific changes to the Prairie Island Technical Specifications requirements:

1. Removing Section 3.2 and associated bases from the Prairie Island Technical Specifications
2. Increasing Section 3.3.A.1 boron concentration requirement for the Refueling Water Storage Tank
3. Removing Table 3.5-2B (Functional Unit 9 and associated actions 34, 35, and 36) Engineered Safety Feature Actuation System instrumentation requirements for the Boric Acid Storage Tank level and automatic actuation logic and actuation relay operability requirements.
4. Removing Table 4.1-1C instrument surveillance requirements for Charging Flow, BAST Level, Volume Control Tank Level, Boric Acid Make-Up Flow, and discussion of the BAST to Refueling Water Storage Tank transfer logic
5. Removing Table 4.1-2B sampling requirements for BAST boron concentration
6. Removing Section 4.5.B.3 requirements to test BAST and RWST to SI suction valves.

The specific justification for the changes proposed by this amendment are:

1. Limiting Conditions for Operation, 3.2. Chemical and Volume Control System: Delete this section and associated bases section.

   Justification: NSP has performed analyses that demonstrate that the high concentration boric acid solution in the BASTs is not required to mitigate any Design Basis Accidents (DBA). In particular, the BAST supply to SI is not required to mitigate a steam line break (SLB - the DBA that the BAST was originally designed to mitigate). Neither is the BAST supply to SI required to achieve safe shutdown. The current Technical Specification requirements for two redundant boric acid flowpaths and the availability of two charging pumps are not required by the Prairie Island accident analyses. The Prairie Island accident analyses meet acceptance criteria crediting only the SI system supplied from the RWST throughout the injection phase.

The bases for current Technical Specification Section 3.2 indicate, "The chemical and volume control system provides control of the reactor coolant system boron inventory." This boration function of the CVCS can be evaluated against the guidance of Section 50.36 of Title 10 of the Code of Federal Regulations (10CFR 50.36) to show that:

Criterion 1 - The boration function of CVCS is not used to detect a significant abnormal degradation of RCS pressure boundary prior to a DBA. Thus, an LCO for the boration function of CVCS is not required per Criterion 1.

Criterion 2 - The boration function of CVCS is not a process variable, design feature, or operating restriction that is an initial condition of a DBA or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. Thus, an LCO for the boration function of CVCS is not required per Criterion 2.

Criterion 3 - The equipment that provides the boration function of CVCS is not a structure, system, or component that is part of the primary success path which functions or actuates to mitigate a DBA or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. Thus, an LCO for the boration function of CVCS is not required per Criterion 3.

Criterion 4 - Although the boration function of the CVCS was considered in the current PRA model as one of the long term reactivity control functions for an ATWS (anticipated transient without scram) event, the loss of the boration function is a non-significant risk contributor to core damage frequency (CDF) or large early release frequency (LERF). Thus, an LCO is not required for the boration function of CVCS per Criterion 4.

Thus, the four criteria of 10CFR50.36.ii would not require the boration function of the CVCS to have an LCO in the Technical Specifications.

Dividing Section 3.2 into its component sections, the justification for removing each section is tabulated below.

Removed Section	Justification for Change
3.2.A	• See the above discussion of the boration function of the CVCS with respect to the four criteria of 10CFR50.36.ii.
3.2.B.1	• See the above discussion of the boration function of the CVCS with respect to the four criteria of 10CFR50.36.ii. • The NRC approved NSP's proposed change to safety classification of positive displacement charging pumps and charging pump motors in the Prairie Island Operational Quality Assurance Plan (approval letter dated January 8, 1996). • Charging pumps are not credited in the Prairie Island accident analyses. • Reactor coolant pump seal cooling is provided from CVCS and from the Component Cooling (CC) system. CC is a single failure proof, safety-related system supplied by safeguards power. From a risk standpoint, seal cooling is important to protecting reactor coolant system integrity (preventing seal LOCA), but not for reactor coolant pump operability and is not the basis for inclusion of a charging pump LCO in the current Prairie Island Technical Specifications. The seal cooling function of CVCS requires very little charging pump flow (on the order of 6 to 8 gpm per reactor coolant pump). This is within the capability of a single charging pump, thus, the charging pump LCO of Section 3.2 (2 of 3 charging pumps operable) is not required to support this function. Also, during normal operations, at least one charging pump is always operating when the plant is above COLD SHUTDOWN. In addition, 10CFR50.36 does not require licensees with licenses issued prior to August 18, 1995 to propose new Technical Specifications to satisfy the four criteria of 10CFR50.36. Thus, no additional Technical Specification LCOs are necessary to support the seal cooling function of CVCS.
3.2.B.2	• See the above discussion of the boration function of the CVCS with respect to the four criteria of 10CFR50.36.ii. • Analysis using recently approved steam line break methodology indicates that using the Refueling Water Storage Tank (RWST) as the sole source of SI supply is acceptable. • Allows removal of concentrated boric acid as recommended by Generic Letter 85-16. • Supports simplification of SI during the injection phase of emergency core cooling.
3.2.B.3	• See the above discussion of the boration function of the CVCS with respect to the four criteria of 10CFR50.36.ii.
3.2.B.4	• See the above discussion of the boration function of the CVCS with respect to the four criteria of 10CFR50.36.ii. • High concentration boric acid no longer required to mitigate a steam line break, thus, the source of high concentration boric acid (the BASTs) will be isolated from the SI system; at which point, heat tracing is no longer necessary to ensure SI system operability.
3.2.B.5	• High concentration boric acid no longer required to mitigate a steam line break, thus, the source of high concentration boric acid (the BASTs) will be isolated from the SI system; at which point, no automatic valves, piping, or interlocks associated with equipment in Sections 3.2.B.1 through 3.2.B.4 are required to operate to mitigate a steam line break accident.

Removed Section	Justification for Change
3.2.B.6	• High concentration boric acid no longer required to mitigate a steam line break, thus, the source of high concentration boric acid (the BASTs) will be isolated from the SI system; at which point, valves 8809A and 8809B will be closed with the associated supply breakers open. Thus, there will be no need to have valve 8809C open with control room position indication and its breaker open.
3.2.B.7	• High concentration boric acid from the BAST is no longer needed to mitigate a steam line break accident, thus, there is no need to place Technical Specification controls on the manual valves in the boric acid system.
3.2.C and D	• This amendment proposes and justifies removing all CVCS LCOs from Sections 3.2.A and B of Technical Specifications; thus, the action statements of Sections 3.2.C and D would no longer be required.

While not part of the technical justification for removing Section 3.2, it is noted that these changes are consistent with the Standard Technical Specifications of NUREG-1431 and support the planned submittal of Standard Technical Specifications for Prairie Island.

2. Limiting Conditions for Operation, TS 3.3.A.1.a: Increase the required boron concentration in the RWST to 2600 ppm.

   Justification: This amendment proposes removing the BASTs as the initial source of suction to the SI pumps. Analysis shows that for purposes of long-term post-LOCA core subcriticality, it is desirable to increase the RWST boron concentration to ensure adequate margin.

3. Table 3.5-2B: Delete Functional Unit 9 and associated actions 34, 35, and 36.

   Justification: Currently, the SI system uses the BAST as its initial suction source and automatically transfers to the RWST on Lo-Lo level in the BAST. High concentration boric acid is no longer required to mitigate the effects of a steam line break, so the BAST is no longer required as a source to the SI pump suction. The proposed change removes the BAST from the SI system and uses the RWST as the lone SI pump suction source for injection. This eliminates the need for the automatic transfer of the BAST to the RWST and, thus, the need for Technical Specification requirements related to BAST level instrumentation and automatic actuation logic and actuation relays associated with BAST level. Similar to the deletion of Section 3.2, this change aligns the Technical Specifications with the Standard Technical Specifications.

4. Surveillance Requirements, Table TS 4.1-1C, Miscellaneous Instrumentation Surveillance Requirements, delete table items:
   - 5, Charging Flow;
   - 7, Boric Acid Tank level;
   - 9, Volume Control Tank Level; and

- 12, Boric Acid Make-Up Flow Channel.
- Delete table notation 33, Transfer logic to RWST.

Justification: Table item 7 and table notation 33 can be removed with the change in the SI function to eliminate the high concentration boric acid of the BASTs from the SI system, per Generic Letter 85-16. Table TS 4.1-1C Items 5, 7, 9, and 12 are all CVCS components. Removing surveillance requirements for these components reflects the removal of Section 3.2, which contains the LCOs for these components. This aligns the Technical Specifications with the Standard Technical Specifications of NUREG-1431 in support of the planned submittal of Standard Technical Specifications for Prairie Island.

5. Surveillance Requirements, Table TS 4.1-2B, Minimum Frequencies for Sampling Tests: Delete table item 10, BATs Boron Concentration.

   Justification: This amendment proposes removing BASTs as a suction source to the SI system and, as a consequence, removes BASTs from the Technical Specifications, thus, there is no need for BAST sampling requirements to be in the Technical Specifications. This also will align Technical Specifications with the Standard Technical Specifications of NUREG-1431 in support of the planned submittal of Standard Technical Specifications for Prairie Island.

6. Surveillance Requirements, Section 4.5, Engineered Safety Features, TS 4.5.B.3.c: Delete the requirement to test BAST and RWST to SI pump suction valves in accordance with Technical Specification section 4.2.

   Justification: This amendment request proposes a change to the automatic response of the SI system. Currently, motor-operated valves (MOVs) 8809A and 8809B, BAST to SI Pump Suction MOVs, are normally closed and open upon receipt of a SI signal. These MOVs stay open until the BAST Lo-Lo level setpoint is reached, at which time, MOVs 8808A and 8808B, RWST to SI Pump Suction MOVs, open automatically and MOVs 8809A and 8809B close automatically. The proposed change would remove all automatic function from MOVs 8809A and 8809B and MOVs 8808A and 8808B.

   There is no need to add Technical Specification requirements for these MOVs because, once their automatic function is removed, they are subject to Technical Specification TS 3.3.A.1.f, which requires that all manual valves that could (if improperly positioned) result in a reduction in safety injection below that assumed in the accident analysis be blocked and tagged in the proper position for injection. TS 3.3.A.1.f also requires that all changes in valve position be under direct administrative control.

   This amendment proposes eliminating all automatic functions of the BAST to SI pump suction valves (8809A, 8809B, and 8809C) and, as a consequence, removing these valves from Technical Specification, Section 3.2, thus, there is no reason to test them.

Safety Assessment

This proposed amendment request would eliminate the safety-related use of high concentration boric acid solution. This eliminates the need to include the BASTs and the rest of the CVCS in the PINGP Technical Specifications. This safety evaluation demonstrates:

- the proposed changes to Technical Specifications will improve overall plant safety
- plant design bases continue to be met
- bounding MSLB accidents are mitigated with the SI system taking suction from the RWST throughout the injection phase of safety injection
- bounding Loss of Coolant Accidents (LOCAs) are mitigated with the SI system taking suction from the RWST throughout the injection phase of safety injection

Thus, the changes proposed in this amendment request maintain or improve plant safety.

Safety Benefits of Reduced Boron Concentration

Generic Letter 85-16 identified dependence on high concentration boron as a potential safety issue. Some nuclear plants have experienced boric acid crystallization in boric acid subsystem piping or components to an extent that the system becomes inoperable. Generic Letter 85-16 encouraged licensees to evaluate the use of reduced boron concentrations. This amendment proposes to eliminate the BASTs as a safety related source of borated water and rely solely on the RWST, which currently supplies borated water at concentrations that are soluble at normal plant ambient temperatures. Thus, one way this proposed amendment will improve safety is by eliminating the potential for boric acid crystallizing out of solution and affecting the operability of safety related components.

Further benefits derive from the simplification of borated water source to the SI pumps. Currently, a safety injection signal opens the valves from the BAST to the SI pump suction. As the BAST is depleted another signal swaps the source for the SI pumps from the BAST to the RWST via additional motor valves repositioning. The proposed amendment would allow for a single source of borated water to the SI pumps during the injections phase (with no automatic valve repositioning required) reducing the potential for instrument failures, logic failures, or motor valve failures to impact the supply of borated water to the SI system.

Additional benefits are obtained by reducing the potential for stress corrosion cracking (SCC) in the SI system piping due to the reduction in boric acid concentration. In addition, reliance on heat tracing is eliminated in the SI system; thus, there is less chance of a required shutdown in the event of both channels of heat tracing being out of service.

Thus, implementation of the Technical Specification changes proposed here will improve overall safety.

Plant Design Basis

Applicable General Design Criteria (GDC) are identified in the Prairie Island FSAR as GDC 28 and GDC 30 (of the 1967 draft AEC GDC). GDC 28 requires the reactivity control system to be capable of making and holding the core subcritical from any hot standby or operating condition. GDC 30 requires the reactivity control system to be capable of making and holding the core subcritical under any anticipated conditions with appropriate margin for contingencies. NSP has evaluated these AEC GDC in a 10CFR50.59 evaluation used to reclassify the active function of the charging pumps to non-safety related. This evaluation was submitted to the NRC by letter dated June 14, 1995 in support of a request to change the safety classification of the charging pumps (the NRC accepted the proposed reclassification by a letter dated January 8, 1996. The 50.59 evaluation has been reviewed against the changes proposed by this LAR and the affected AEC GDC are still satisfied. Thus, the proposed changes will have no negative effects on the health and safety of the public.

Steam Line Break Accident Mitigation

In a MSLB, both core response and containment response can be limiting, so both were considered in the NSP analysis. Core response to the SLB accident includes consideration of fuel damage and the potential for reactor return to power. The current steam line break analysis indicates that all acceptance criteria can be met assuming the RWST as the sole source to the SI pump suction throughout the injection phase of accident mitigation.

These analyses also evaluated the containment response and concluded that the containment pressure response was within the acceptable containment design limits. The peak containment pressure, in the limiting case, was less than the containment pressure design limit of 60.7 psia. The peak containment temperature and temperature profile in the most limiting case were used to ensure the containment equipment needed to mitigate a MSLB is within the scope of the Prairie Island Environmental Qualification Program per 10CFR50.49. The analyses conclude that all containment design limits are met.

Loss of Coolant Accident Mitigation

The BASTs currently supply the initial source of borated water to the SI pumps. Changing the initial SI pump suction source to the RWST will not adversely affect the large or small break LOCA analyses because the evaluation models used in analyzing these accidents do not take credit for the high concentration boric acid solution in the BASTs. The proposed increase to 2600 ppm borated water in the RWST will provide sufficient negative reactivity to maintain the post-LOCA core subcritical.

The effects on post-LOCA sump pH of removing BAST inventory as a supply to the SI pumps and increasing the RWST boric acid concentration has also been evaluated. The PINGP calculation that evaluated sump pH assumed (for the minimum pH case) that the high concentration boric acid of the BAST was injected and that the RWST boric acid concentration was 3500 ppm. The resulting containment sump water pH was determined to meet the acceptance criteria (above a minimum pH of 7). Maximum sump pH is not a concern as the maximum pH limit of 10.5 only applies to inputs used for environmental qualification of electrical equipment (EQ). For sump pH to be an EQ concern, the proposed changes would have to result in equipment submergence issues. Sump pH is not an issue with respect to spray pH, as containment spray is not used in recirculation mode at Prairie Island. As noted below, the proposed changes do not introduce any equipment submergence issues, thus, the proposed removal of the BASTs as a SI suction source and increase in RWST boron concentration requirement is acceptable with respect to containment sump pH.

The effects on containment spray pH of increasing the RWST minimum boron concentration is not a concern as the PINGP calculation of maximum and minimum spray pH assume 3500 ppm boron concentration in the RWST for the minimum pH case and 2500 ppm boron concentration in the RWST for the maximum pH case. That is, the proposed increase in RWST boron concentration is bounded by the assumptions of the minimum pH case and causes the assumptions of the maximum pH case to be conservative. Thus, the PINGP calculations will still meet acceptance criteria following proposed increase in RWST boron concentration.

The effects of removing BAST inventory as a supply to the SI pumps has been evaluated for it's affect on containment sump liquid inventory. The BASTs provide a minimal liquid volume and are not credited in the PINGP calculation that evaluates sump inventory. Thus, the proposed removal of the BASTs as a SI suction source is acceptable with respect to minimum containment sump inventory. The current analysis which credits the BAST determined that equipment submergence is not a concern. Because the BAST is being removed as a source of inventory, the proposed change will not adversely affect the analysis of maximum sump level (with respect to equipment submergence).

Safe Shutdown with the RWST as the Only Source of Borated Water

This amendment request proposes the removal of the BASTs from the Prairie Island Technical Specifications; however, the BASTs will still be used in plant operation to fulfill non-safety related functions of the CVCS. Following the implementation of the proposed amendment, the CVCS can be redesigned to use lower concentration boric acid solution in the BASTs. Any future modification to reduce BAST boron concentration will be addressed by the PINGP modification process and, thus, be evaluated against 10CFR50.59 to evaluate whether the change represents an unreviewed safety question.

Conclusion

The Technical Specification changes proposed in this amendment have been evaluated to show:
- the AEC GDCs on reactivity control are still satisfied
- the MSLB and LOCA accident analyses still meet acceptance criteria
- the elimination of the BASTs as a safety related source of borated water to the SI system allows plant modifications which will improve the overall safety of the plant

Therefore, Northern States Power concludes there is reasonable assurance that the health and safety of the public will not be adversely affected by the proposed amendment.

Evaluation of Significant Hazards Considerations

This amendment request proposes the following changes to the Technical Specifications:

1. Removing Section 3.2, Chemical and Volume Control System (CVCS) and associated bases from the Prairie Island Technical Specifications
2. Increasing Section 3.3.A.1 boron concentration requirement for the Refueling Water Storage Tank (RWST)
3. Removing Table 3.5-2B (Functional Unit 9 and associated actions 34, 35, and 36) Engineered Safety Feature Actuation System instrumentation requirements for the Boric Acid Storage Tank (BAST) level and automatic actuation logic and actuation relay operability requirements.
4. Removing Table 4.1-1C instrument surveillance requirements for Charging Flow, BAST Level, Volume Control Tank Level, Boric Acid Make-Up Flow, and discussion of the BAST to RWST transfer logic
5. Removing Table 4.1-2B sampling requirements for BAST boron concentration
6. Removing Section 4.5.B.3 requirements to test BAST and RWST to Safety Injection (SI) suction valves.

These changes 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) <u>The proposed amendment will not involve a significant increase in the probability or consequences of accidents previously evaluated.</u>

The proposed change to the CVCS and SI system (increasing the concentration of boric acid in the RWST and eliminating the BAST as a suction source, respectively) and elimination of or change to associated Technical Specifications do not affect accident initiation. None of the equipment being removed from Sections 3.2 or 3.5 of Technical Specifications are accident initiators. Thus, the proposed changes will not significantly increase the probability of an accident previously evaluated.

Consequences are evaluated in terms of off-site and on-site (control room personnel) dose. Loss of coolant accident (LOCA) dose is unaffected by the proposed changes because the LOCA analysis input assumptions are not changed by the changes proposed in this amendment request. The approved steam line break (SLB) methodology (approved by the NRC in letter dated January 19, 2000) and the expected dose are unaffected by the proposed change.

Therefore, the proposed changes will not involve a significant increase in the probability or consequences of an accident previously evaluated.

(2) <u>The proposed amendment will not create the possibility of a new or different kind of accident from any accident previously evaluated.</u>

The proposed changes to the plant and its Technical Specifications do not introduce any new accident initiators. The proposed changes reduce the number of automatic component actuations needed to support Safety Injection accident mitigation functions. The proposed changes also remove the Technical Specification requirements for the balance of the CVCS components. These requirements were in Technical Specifications to support the boration function of CVCS; however, all boration functions can be met by the safety-related SI system. All the other functions of the CVCS are either backed up by a safety related system or are not required to preclude an accident (reference NSP letter of June 14, 1995 and NRC letter of January 8, 1996).

Therefore, the proposed changes will not create the possibility of a new or different kind of accident.

(3) <u>The proposed amendment will not involve a significant reduction in the margin of safety.</u>

The proposed changes do not significantly impact the plant response to an accident with respect to the ability to protect fission product barriers. The proposed changes will not result in any significant increase in fuel cladding damage in the event of a postulated accident (accident analyses show the proposed changes meet all acceptance criteria related to maintaining cladding integrity). The proposed changes will not reduce the integrity of the RCS (reduction of boric acid concentrations in the SI systems will not promote any degradation of the components that make up the RCS pressure boundary). The proposed changes will not result in a reduction in containment integrity in the event of a postulated accident (the changes proposed by this amendment do not change the results of the accident analyses with respect to containment response.)

Therefore, the proposed changes will not involve a significant reduction in the margin of safety.

The Northern States Power Company evaluation, pursuant to 10 CFR Part 50, Section 50.91, indicates that operation of the Prairie Island Nuclear Generating Plant in accordance with the proposed license amendment request does not involve any significant hazards considerations as defined by NRC regulations in 10 CFR Part 50, Section 50.92.

Environment Assessment

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

1. The changes do not involve any hazards consideration,

2. The changes do not involve any change in the expected types or increase in the amounts of any effluents that may be released offsite, or

3. The changes do not involve any expected increase in individual or cumulative occupational radiation exposure.

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

Exhibit B

Prairie Island Nuclear Generating Plant

License Amendment Request Dated April 17, 2000

Proposed Changes Marked Up
On Existing Technical Specification Pages

Exhibit B consists of existing Technical Specification pages with the proposed changes highlighted on those pages. The pages affected by this License Amendment Request are listed below:

TS-ii
TS.3.2-1
TS.3.2-2
TS.3.3-1
TABLE TS.3.5-2B (page 6 of 9)
TABLE TS.3.5-2B (page 9 of 9)
TABLE TS.4.1-1C (page 1 of 4)
TABLE TS.4.1-1C (page 4 of 4)
TABLE TS.4.1-2B (page 1 of 2)
TS.4.5-3
B.3.2-1
B.3.5-1
B.3.5-4

TABLE OF CONTENTS (Continued)

3.2 CHEMICAL AND VOLUME CONTROL SYSTEM

Applicability

Applies to the operational status of the chemical and volume control system.

Objective

To define those conditions of the chemical and volume control system necessary to assure safe reactor operation and safe COLD SHUTDOWN.

Specification

A. When fuel is in a reactor and reactor coolant system average temperature is at or below 200°F there shall be at least one flow path to the core for boric acid injection. If no OPERABLE flow path exists, suspend all operations involving CORE ALTERATIONS or positive reactivity changes.

B. A reactor shall not be made or maintained critical nor shall the reactor coolant system average temperature exceed 200°F unless the following conditions are satisfied (except as specified in 3.2.C or 3.2.D below):

1. Two of the three charging pumps shall be OPERABLE.

2. At least one boric acid tank shall be aligned to the unit and shall contain a minimum of 2000 gallons of 11.5% to 13% by weight boric acid solution at a temperature of at least 145°F.

3. System piping, valves and pumps shall be OPERABLE to the extent of establishing two independent flow paths for boric acid injection -- one flow path from the boric acid tanks to the core and one flow path from the refueling water storage tank to the core.

4. Two channels of heat tracing shall be OPERABLE for the flow paths from the boric acid tanks required to meet the requirements of Specification 3.2.B.3.

5. Automatic valves, piping, and interlocks associated with the above components which are required to operate for the steam line break accident are OPERABLE.

3.2.B.6. Motor-operated valve Number 8809C (Boric Acid Storage Tank to the SI Pumps) for that unit shall be open, shall have its valve position monitor light OPERABLE, and shall have its motor control center supply breaker physically locked in the off position.

7. Manual valves in the boric acid system shall be physically locked in the position required for automatic boric acid injection following a steam line break accident.

C. During STARTUP OPERATION or POWER OPERATION, any one of the following conditions of inoperability may exist for each unit during the time intervals specified, provided STARTUP OPERATION is discontinued until OPERABILITY is restored (except as specified in 3.2.D below). If OPERABILITY is not restored within the time specified, place the affected unit in at least HOT SHUTDOWN within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

1. Two of the three charging pumps may be inoperable for 72 hours.

2. A unit may operate for 2 hours with no OPERABLE boric acid storage tank.

3. One of the 2 independent flow paths in each unit for boric acid addition to the core may be inoperable for 72 hours. Prior to initiating repairs, the other flow path shall be verified OPERABLE.

4. One channel of heat tracing may be inoperable for 72 hours.

5. Any one redundant automatic valve required for boric acid injection following a steam line break may be inoperable for 72 hours.

6. The valve position monitor light for motor-operated valve No. 8809C (Boric Acid Storage Tank to the SI Pumps) may be inoperable for 72 hours provided the valve position is verified to be open once each shift.

D. During plant shutdown, if the boron concentration of the reactor coolant system is equivalent to or greater than the COLD SHUTDOWN boron concentration, the requirements of 3.2.B.2 are not required to be satisfied.

3.3 ENGINEERED SAFETY FEATURES

Applicability

Applies to the operating status of the engineered safety features.

Objective

To define those limiting conditions that are necessary for operation of engineered safety features: (1) to remove decay heat from the core in an emergency or normal shutdown situations, and (2) to remove heat from containment in normal operating and emergency situations.

Specifications

A. Safety Injection and Residual Heat Removal Systems

1. A reactor shall not be made or maintained critical nor shall reactor coolant system average temperature exceed 200°F unless the following conditions are satisfied (except as specified in 3.3.A.2 below):

   a. The refueling water tank contains not less than 200,000 gallons of water with a boron concentration of at least ~~2500~~ 2600 ppm.

   b. Each reactor coolant system accumulator shall be OPERABLE when reactor coolant system pressure is greater than 1000 psig.

      OPERABILITY requires:
      (1) The isolation valve is open
      (2) Volume is 1270 ±20 cubic feet of borated water
      (3) A minimum boron concentration of 1900 ppm
      (4) A nitrogen cover pressure of 740 ± 30 psig

   c. Two safety injection pumps are OPERABLE except as specified in Sections 3.3.A.3 and 3.3.A.4.

   d. Two residual heat removal pumps are OPERABLE.

   e. Two residual heat exchangers are OPERABLE.

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
8. LOSS OF POWER					
a. Degraded Voltage 4kV Safeguards Bus	4/Bus (2/phase on 2 phases)	2/Bus (1/phase on 2 phases)	3/Bus	1, 2, 3, 4	31, 32, 33
b. Undervoltage 4kV Safeguards Bus	4/Bus (2/phase on 2 phases)	2/Bus (1/phase on 2 phases)	3/Bus	1, 2, 3, 4	31, 32, 33
9. ~~BORIC ACID STORAGE TANK~~ Deleted					
~~a. Lo-Lo Level~~	~~2 channels with 2 sensors per channel~~	~~1 sensor per channel in both channels~~	~~2 sensors in one channel~~	~~1, 2, 3, 4~~	~~34~~
~~b. Automatic Actuation Logic and Actuation Relays~~	~~2~~	~~1~~	~~2~~	~~1, 2, 3, 4~~	~~35, 36~~

Action Statements

ACTION 30: With the number of OPERABLE channels one less than the Total Number of Channels, declare the associated auxiliary feedwater pump inoperable and take the action required by Specification 3.4.2. However, one channel may be bypassed for up to 8 hours for surveillance testing per Specification 4.1, provided the other channel is OPERABLE.

ACTION 31: With the number of OPERABLE channels one less than the Total Number of Channels, operation in the applicable MODE may proceed provided the inoperable channel is placed in the bypassed condition within 6 hours.

ACTION 32: With the number of OPERABLE channels two less than the Total Number of Channels, operation in the applicable MODE may proceed provided the following conditions are satisfied:

a. One inoperable channel is placed in the bypassed condition within 6 hours, and,

b. The other inoperable channel is placed in the tripped condition within 6 hours, and,

c. All of the channels associated with the redundant 4kV Safeguards Bus are OPERABLE.

ACTION 33: If the requirements of ACTIONS 30 or 31 cannot be met within the time specified, or with the number of OPERABLE channels three less than the Total Number of Channels, declare the associated diesel generator(s) inoperable and take the ACTION required by Specification 3.7.B.

ACTION 34: ~~With the number of OPERABLE channels less than the Total Number of Channels, operation may proceed provided the inoperable channel is placed in the tripped condition within 6 hours and the Minimum Channels OPERABLE requirement is met. Restore the inoperable channel to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.~~Deleted.

ACTION 35: ~~With one channel inoperable, restore the inoperable channel to OPERABLE status within 72 hours or be in at least HOT SHUTDOWN within the next 6 hours and in COLD SHUTDOWN within the following 30 hours~~. Deleted.

ACTION 36: ~~Two channels may be inoperable for up to 1 hour for surveillance testing per Specification 4.1. Restore at least one channel to OPERABLE status within this 1 hour or initiate the action necessary to place the affected unit in HOT SHUTDOWN, and be in at least HOT SHUTDOWN within the next 6 hours and in COLD SHUTDOWN within the following 30~~ hours. Deleted.

TABLE TS.4.1-1C (Page 1 of 4)

MISCELLANEOUS INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT REQUIRED	CHECK	CALIBRATE	FUNCTIONAL TEST	RESPONSE TEST	MODES FOR WHICH SURVEILLANCE IS
1. Control Rod Insertion Monitor	M	R	S/U[30]	N.A.	1, 2
2. Analog Rod Position	S	R	S/U[30]	N.A.	1, 2, 3[31], 4[31], 5[31]
3. Rod Position Deviation Monitor	M	N.A.	S/U[30]	N.A.	1, 2
4. Rod Position Bank Counters	S[32]	N.A.	N.A.	N.A.	1, 2, 3[31] 4[31], 5[31]
5. ~~Charging Flow~~	~~S~~	~~R~~	~~N.A.~~	~~N.A.~~	~~1, 2, 3, 4~~ Deleted.
6. Residual Heat Removal Pump Flow	S	R	N.A.	N.A.	4[37], 5[37], 6[37]
7. ~~Boric Acid Tank Level~~	~~D~~	~~R[33]~~	~~M[33]~~	~~N.A.~~	~~1, 2, 3, 4~~ Deleted.
8. Refueling Water Storage Tank Level	W	R	M	N.A.	1, 2, 3, 4
9. ~~Volume Control Tank Level~~	~~S~~	~~R~~	~~N.A.~~	~~N.A.~~	~~1, 2, 3, 4~~ Deleted.
10. Annulus Pressure (Vacuum Breaker)	N.A.	R	R	N.A.	See Note (39)
11. Auto Load Sequencers	N.A.	N.A.	M	N.A.	1, 2, 3, 4
12. ~~Boric Acid Make-up Flow Channel~~ Deleted.	~~N.A.~~	~~R~~	~~N.A.~~	~~N.A.~~	~~1, 2, 3, 4~~

TABLE TS.4.1-1C (Page 4 of 4)

TABLE NOTATIONS

FREQUENCY NOTATION

NOTATION	FREQUENCY
S	Shift
D	Daily
W	Weekly
M	Monthly
Q	Quarterly
S/U	Prior to each reactor startup
Y	Yearly
R	Each Refueling Shutdown
N.A.	Not applicable.

TABLE NOTATION

(30) Prior to each startup following shutdown in excess of two days if not done in previous 30 days.

(31) When the reactor trip system breakers are closed and the control rod drive system is capable of rod withdrawal.

(32) Following rod motion in excess of six inches when the computer is out of service.

(33) ~~Transfer logic to Refueling Water Storage Tank.~~ Deleted.

(34) When either main steam isolation valve is open.

(35) Includes those instruments named in the emergency procedure.

(36) Except for containment hydrogen monitors and refueling water storage tank level which are separately specified in this table.

(37) When RHR is in operation.

(38) When the reactor coolant system average temperature is less than the Over Pressure Protection System Enable Temperature specified in the PTLR.

(39) Whenever CONTAINMENT INTEGRITY is required.

TABLE TS.4.1-2B

MINIMUM FREQUENCIES FOR SAMPLING TESTS

TEST	FREQUENCY
1. RCS Gross Activity Determination	5/week
2. RCS Isotopic Analysis for DOSE EQUIVALENT I-131 Concentration	1/14 days (when at power)
3. RCS Radiochemistry $\bar{E}$ determination	1/6 months(1) (when at power)
4. RCS Isotopic Analysis for Iodine Including I-131, I-133, and I-135	a) Once per 4 hours, whenever the specific activity exceeds 1.0 uCi/gram DOSE EQUIVALENT I-131 or 100/$\bar{E}$ uCi/gram (at or above cold shutdown), and b) One sample between 2 and 6 hours following THERMAL POWER change exceeding 15 percent of the RATED THERMAL POWER within a one hour period (above hot shutdown)
5. RCS Radiochemistry (2)	Monthly
6. RCS Tritium Activity	Weekly
7. Deleted	
8. RCS Boron Concentration* (3)	2/Week (4)
9. RWST Boron Concentration	Weekly
10. ~~Boric Acid Tanks Boron Concentration~~ Deleted	~~2/Week~~
11. Caustic Standpipe NaOH Concentration	Monthly
12. Accumulator Boron Concentration	Monthly
13. Spent Fuel Pit Boron Concentration	Weekly

* Required at all times

B. Component Tests

1. Pumps

a. The safety injection pumps, residual heat removal pumps and containment spray pumps shall be tested pursuant to Specification 4.2. Acceptable levels of performance shall be that the pumps start and reach their required developed head on minimum recirculation flow and the control board indications and visual observations indicate that the pumps are operating properly for at least 15 minutes.

b. A test consisting of a manually-initiated start of each diesel engine, and assumption of load within one minute, shall be conducted monthly.

c. The vertical motor-driven cooling water pump shall be operated at quarterly intervals. An acceptable level of performance shall be that the pump starts and reaches its required developed head and the control board indications and visual observations indicate that the pump is operating properly for at least 15 minutes.

2. Containment Fan Motors

The Containment Fan Coil Units shall be run on low motor speed for at least 15 minutes at intervals of one month. Motor current shall be measured and compared to the nominal current expected for the test conditions.

3. Valves

a. ~~The refueling water storage tank outlet valves shall be tested in accordance with Section 4.2.~~ Deleted.

b. The accumulator check valves will be checked for OPERABILITY during each refueling shutdown.

c. ~~The boric acid tank valves to the Safety Injection System shall be tested in accordance with Section 4.2.~~ Deleted.

d. The spray chemical additive tank valves shall be tested in accordance with Section 4.2.

e. Actuation circuits for Cooling Water System valves that isolate non-essential equipment from the system shall be tested each refueling outage. Unit 1 SI actuation circuits for Train A and Train B valves shall be tested during Unit 1 refueling outages. Unit 2 SI actuation circuits for Train A and Train B valves shall be tested during Unit 2 refueling outages.

f. All motor-operated valves in the SIS, RHR, Containment Spray, Cooling Water, and Component Cooling Water System that are designed for operation during the safety injection or recirculation phase of emergency core cooling, shall be tested for OPERABILITY at each refueling shutdown.

3.2 CHEMICAL AND VOLUME CONTROL SYSTEM

Bases

The chemical and volume control system provides control of the reactor coolant system boron inventory (Reference 1). This is normally accomp- lished by using any one of the three charging pumps in series with any one of the four boric acid pumps. The design of the two-unit plant permits the alignment of any of the four boric acid transfer pumps to either reactor. An alternate method of boration will be use of the charging pumps taking suction directly from the refueling water storage tank. A third method will be to use the safety injection pumps. There are two sources of borated water available for injection to the core through 3 different paths.

(1) The boric acid transfer pumps can deliver the boric acid tank contents to the suction of the charging pumps that can inject it to the reactor coolant system through the charging line or the reactor coolant pump seals.

(2) The charging pumps can take suction directly from the refueling water storage tank. (1950 ppm boron solution. Reference is made to Specification 3.3.A.1.a.)

(3) The safety injection pumps can take their suctions from either the boric acid tanks or the refueling water storage tank and inject the contents to the reactor coolant system through the high head safety injection piping.

The quantity of boric acid in storage from either the boric acid tanks or the refueling water storage tank is sufficient to borate the reactor coolant in order to reach COLD SHUTDOWN at any time during core life.

Approximately 1800 gallons of at least 11.5% solution of boric acid are required to meet COLD SHUTDOWN condition. Thus, a minimum of 2000 gallons in the boric acid tank is specified. One boric acid tank must be aligned to each unit whose temperature exceeds 200°F (unless the plant is shutting down and the necessary boric acid has been injected). If the safety injection system is actuated while there are only 2000 gallons in the boric acid tank, more than 600 gallons of concentrated boric acid solution would be injected into the core before the pump suction is transferred to the refueling water storage tank. This 600 gallons injected into the core is more than sufficient to counteract the effects of the rupture of a steam pipe (Reference 2).

In order to ensure solution solubility at the boric acid concentration in the system, a minimum temperature of 145°F is required. Two channels of heat tracing are installed on lines normally containing concentrated boric solution to maintain the required minimum temperature.

References

1. USAR Section 10.2.3.2
2. USAR Section 14.5.5

3.5 INSTRUMENTATION SYSTEM

Bases

Instrumentation has been provided to sense accident conditions and to initiate reactor trip and operation of the Engineered Safety Features (Reference 1). The OPERABILITY of the Reactor Trip System and the Engineered Safety System instrumentation and interlocks ensures that: (1) the associated ACTION and/or reactor trip will be initiated when the parameter monitored by each channel or combination thereof reaches its setpoint, (2) the specified coincidence logic and sufficient redundancy is maintained to permit a channel to be out of service for testing or maintenance consistent with maintaining an appropriate level of reliability of the Reactor Protection and Engineered Safety Features instrumentation and, (3) sufficient system functions capability is available from diverse parameters.

The OPERABILITY of these systems is required to provide the overall reliability, redundancy and diversity assumed available in the facility design for the protection and mitigation of accident and transient conditions. The integrated operation of each of these systems is consistent with the assumptions used in the safety analysis.

Specified surveillance and maintenance outage times have been determined in accordance with WCAP-10271, "Evaluation of Surveillance Frequencies and Out of Service Times for the Reactor Protection Instrumentation System", and supplements to that report. Out of service times were determined based on maintaining an appropriate level of reliability of the Reactor Protection System and Engineered Safety Features instrumentation. ~~(Boric Acid Storage Tank instrumentation which provides automatic transfer of safety injection suction was not modeled in this WCAP.)~~

The evaluation of surveillance frequencies and out of service times for the reactor protection and engineered safety feature instrumentation described in WCAP-10271 included the allowance for testing in bypass. The evaluation assumed that the average amount of time the channels within a given trip function would be in bypass for testing was 4 hours.

Safety Injection

The Safety Injection System is actuated automatically to provide emergency cooling and reduction of reactivity in the event of a loss-of-coolant accident or a steam line break accident.

Safety injection in response to a loss-of-coolant accident (LOCA) is provided by a high containment pressure signal backed up by the low pressurizer pressure signal. These conditions would accompany the depressurization and coolant loss during a LOCA.

Safety injection in response to a steam line break is provided directly by a low steam line pressure signal, backed up by the low pressurizer pressure signal and, in case of a break within the containment, by the high containment pressure signal.

The safety injection of ~~highly~~ borated water will offset the temperature-induced reactivity addition that could otherwise result from cooldown following a steam line break.

3.5 INSTRUMENTATION SYSTEM

Bases continued

~~Automatic Transfer of Safety Injection Suction~~

~~The plant is equipped with three boric acid storage tanks for the two units. One tank is normally aligned to the safety injection system for each unit. Following initiation of the Engineered Safety Features, the safety injection pumps take suction from the aligned boric acid storage tank. When the boric acid storage tank level falls to the lo-lo level, an interlock automatically transfers the safety injection pumps suction from the boric acid storage tank to the refueling water storage tank. The boric acid storage tank that is not aligned to either unit, including its associated piping and interlocks, is not required to be OPERABLE.~~

Limiting Instrument Setpoints

1. The high containment pressure limit is set at about 10% of the maximum internal pressure. Initiation of Safety Injection protects against loss of coolant (Reference 2) or steam line break accidents as discussed in the safety analysis.

2. The Hi-Hi containment pressure limit is set at about 50% of the maximum internal pressure for initiation of containment spray and at about 30% for initiation of steam line isolation. Initiation of Containment Spray and Steam Line Isolation protects against large loss of coolant (Reference 2) or steam line break accidents (Reference 3) as discussed in the safety analysis.

3. The pressurizer low pressure limit is set substantially below system operating pressure limits. However, it is sufficiently high to protect against a loss of coolant accident as shown in the safety analysis (Reference 2).

4. The steam line low pressure signal is lead/lag compensated and its set-point is set well above the pressure expected in the event of a large steam line break accident as shown in the safety analysis (Reference 3).

5. The high steam line flow limit is set at approximately 20% of nominal full-load flow at the no-load pressure and the high-high steam line flow limit is set at approximately 120% of nominal full-load flow at the full load pressure in order to protect against large steam break accidents. The coincident low T_{avg} setting limit for steam line isolation initiation is set below its hot shutdown value. The safety analysis shows that these settings provide protection in the event of a large steam break (Reference 3).

6. Steam generator low-low water level and 4.16 kV Bus 11 and 12 (21 and 22 in Unit 2) low bus voltage provide initiation signals for the Auxiliary Feedwater System. Selection of these setpoints is discussed in the Bases of Section 2.3 of the Technical Specification.

Exhibit C

Prairie Island Nuclear Generating Plant

License Amendment Request Dated April 17, 2000

Revised Technical Specification Pages

Exhibit C consists of revised pages for the Prairie Island Nuclear Generating Plant Units 1 and 2 Technical Specifications with the proposed changes incorporated. The revised pages are listed below:

TS-ii
TS.3.3-1
TABLE TS.3.5-2B (page 6 of 9)
TABLE TS.3.5-2B (page 9 of 9)
TABLE TS.4.1-1C (page 1 of 4)
TABLE TS.4.1-1C (page 4 of 4)
TABLE TS.4.1-2B (page 1 of 2)
TS.4.5-3
B.3.5-1
B.3.5-4

TABLE OF CONTENTS (Continued)

3.3 ENGINEERED SAFETY FEATURES

Applicability

Applies to the operating status of the engineered safety features.

Objective

To define those limiting conditions that are necessary for operation of engineered safety features: (1) to remove decay heat from the core in an emergency or normal shutdown situations, and (2) to remove heat from containment in normal operating and emergency situations.

Specifications

A. Safety Injection and Residual Heat Removal Systems

1. A reactor shall not be made or maintained critical nor shall reactor coolant system average temperature exceed 200°F unless the following conditions are satisfied (except as specified in 3.3.A.2 below):

   a. The refueling water tank contains not less than 200,000 gallons of water with a boron concentration of at least 2600 ppm.

   b. Each reactor coolant system accumulator shall be OPERABLE when reactor coolant system pressure is greater than 1000 psig.

      OPERABILITY requires:
      (1) The isolation valve is open
      (2) Volume is 1270 $\pm$20 cubic feet of borated water
      (3) A minimum boron concentration of 1900 ppm
      (4) A nitrogen cover pressure of 740 $\pm$ 30 psig

   c. Two safety injection pumps are OPERABLE except as specified in Sections 3.3.A.3 and 3.3.A.4.

   d. Two residual heat removal pumps are OPERABLE.

   e. Two residual heat exchangers are OPERABLE.

TABLE TS.3.5-2B (Page 6 of 9)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
8. LOSS OF POWER					
a. Degraded Voltage 4kV Safeguards Bus	4/Bus (2/phase on 2 phases)	2/Bus (1/phase on 2 phases)	3/Bus	1, 2, 3, 4	31, 32, 33
b. Undervoltage 4kV Safeguards Bus	4/Bus (2/phase on 2 phases)	2/Bus (1/phase on 2 phases)	3/Bus	1, 2, 3, 4	31, 32, 33
9. Deleted					

Action Statements

ACTION 30: With the number of OPERABLE channels one less than the Total Number of Channels, declare the associated auxiliary feedwater pump inoperable and take the action required by Specification 3.4.2. However, one channel may be bypassed for up to 8 hours for surveillance testing per Specification 4.1, provided the other channel is OPERABLE.

ACTION 31: With the number of OPERABLE channels one less than the Total Number of Channels, operation in the applicable MODE may proceed provided the inoperable channel is placed in the bypassed condition within 6 hours.

ACTION 32: With the number of OPERABLE channels two less than the Total Number of Channels, operation in the applicable MODE may proceed provided the following conditions are satisfied:

a. One inoperable channel is placed in the bypassed condition within 6 hours, and,

b. The other inoperable channel is placed in the tripped condition within 6 hours, and,

c. All of the channels associated with the redundant 4kV Safeguards Bus are OPERABLE.

ACTION 33: If the requirements of ACTIONS 30 or 31 cannot be met within the time specified, or with the number of OPERABLE channels three less than the Total Number of Channels, declare the associated diesel generator(s) inoperable and take the ACTION required by Specification 3.7.B.

ACTION 34: Deleted.

ACTION 35: Deleted.

ACTION 36: Deleted.

TABLE TS.4.1-1C (Page 1 of 4)

MISCELLANEOUS INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHECK	CALIBRATE	FUNCTIONAL TEST	RESPONSE TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
1. Control Rod Insertion Monitor	M	R	S/U[30]	N.A.	1, 2
2. Analog Rod Position	S	R	S/U[30]	N.A.	1, 2, 3[31], 4[31], 5[31]
3. Rod Position Deviation Monitor	M	N.A.	S/U[30]	N.A.	1, 2
4. Rod Position Bank Counters	S[32]	N.A.	N.A.	N.A.	1, 2, 3[31] 4[31], 5[31]
5. Deleted.					
6. Residual Heat Removal Pump Flow	S	R	N.A.	N.A.	4[37], 5[37], 6[37]
7. Deleted.					
8. Refueling Water Storage Tank Level	W	R	M	N.A.	1, 2, 3, 4
9. Deleted.					
10. Annulus Pressure (Vacuum Breaker)	N.A.	R	R	N.A.	See Note (39)
11. Auto Load Sequencers	N.A.	N.A.	M	N.A.	1, 2, 3, 4
12. Deleted.					

TABLE NOTATIONS

FREQUENCY NOTATION

NOTATION	FREQUENCY
S	Shift
D	Daily
W	Weekly
M	Monthly
Q	Quarterly
S/U	Prior to each reactor startup
Y	Yearly
R	Each Refueling Shutdown
N.A.	Not applicable.

TABLE NOTATION

(30) Prior to each startup following shutdown in excess of two days if not done in previous 30 days.

(31) When the reactor trip system breakers are closed and the control rod drive system is capable of rod withdrawal.

(32) Following rod motion in excess of six inches when the computer is out of service.

(33) Deleted.

(34) When either main steam isolation valve is open.

(35) Includes those instruments named in the emergency procedure.

(36) Except for containment hydrogen monitors and refueling water storage tank level which are separately specified in this table.

(37) When RHR is in operation.

(38) When the reactor coolant system average temperature is less than the Over Pressure Protection System Enable Temperature specified in the PTLR.

(39) Whenever CONTAINMENT INTEGRITY is required.

TABLE TS.4.1-2B

MINIMUM FREQUENCIES FOR SAMPLING TESTS

	TEST	FREQUENCY
1.	RCS Gross Activity Determination	5/week
2.	RCS Isotopic Analysis for DOSE EQUIVALENT I-131 Concentration	1/14 days (when at power)
3.	RCS Radiochemistry $\overline{E}$ determination	1/6 months(1) (when at power)
4.	RCS Isotopic Analysis for Iodine Including I-131, I-133, and I-135	a) Once per 4 hours, whenever the specific activity exceeds 1.0 uCi/gram DOSE EQUIVALENT I-131 or 100/$\overline{E}$ uCi/gram (at or above cold shutdown), and b) One sample between 2 and 6 hours following THERMAL POWER change exceeding 15 percent of the RATED THERMAL POWER within a one hour period (above hot shutdown)
5.	RCS Radiochemistry (2)	Monthly
6.	RCS Tritium Activity	Weekly
7.	Deleted	
8.	RCS Boron Concentration* (3)	2/Week (4)
9.	RWST Boron Concentration	Weekly
10.	—Deleted	
11.	Caustic Standpipe NaOH Concentration	Monthly
12.	Accumulator Boron Concentration	Monthly
13.	Spent Fuel Pit Boron Concentration	Weekly

* Required at all times

B. Component Tests

1. Pumps

a. The safety injection pumps, residual heat removal pumps and containment spray pumps shall be tested pursuant to Specification 4.2. Acceptable levels of performance shall be that the pumps start and reach their required developed head on minimum recirculation flow and the control board indications and visual observations indicate that the pumps are operating properly for at least 15 minutes.

b. A test consisting of a manually-initiated start of each diesel engine, and assumption of load within one minute, shall be conducted monthly.

c. The vertical motor-driven cooling water pump shall be operated at quarterly intervals. An acceptable level of performance shall be that the pump starts and reaches its required developed head and the control board indications and visual observations indicate that the pump is operating properly for at least 15 minutes.

2. Containment Fan Motors

The Containment Fan Coil Units shall be run on low motor speed for at least 15 minutes at intervals of one month. Motor current shall be measured and compared to the nominal current expected for the test conditions.

3. Valves

a. Deleted.

b. The accumulator check valves will be checked for OPERABILITY during each refueling shutdown.

c. Deleted.

d. The spray chemical additive tank valves shall be tested in accordance with Section 4.2.

e. Actuation circuits for Cooling Water System valves that isolate non-essential equipment from the system shall be tested each refueling outage. Unit 1 SI actuation circuits for Train A and Train B valves shall be tested during Unit 1 refueling outages. Unit 2 SI actuation circuits for Train A and Train B valves shall be tested during Unit 2 refueling outages.

f. All motor-operated valves in the SIS, RHR, Containment Spray, Cooling Water, and Component Cooling Water System that are designed for operation during the safety injection or recirculation phase of emergency core cooling, shall be tested for OPERABILITY at each refueling shutdown.

3.5 INSTRUMENTATION SYSTEM

Bases

Instrumentation has been provided to sense accident conditions and to initiate reactor trip and operation of the Engineered Safety Features (Reference 1). The OPERABILITY of the Reactor Trip System and the Engineered Safety System instrumentation and interlocks ensures that: (1) the associated ACTION and/or reactor trip will be initiated when the parameter monitored by each channel or combination thereof reaches its setpoint, (2) the specified coincidence logic and sufficient redundancy is maintained to permit a channel to be out of service for testing or maintenance consistent with maintaining an appropriate level of reliability of the Reactor Protection and Engineered Safety Features instrumentation and, (3) sufficient system functions capability is available from diverse parameters.

The OPERABILITY of these systems is required to provide the overall reliability, redundancy and diversity assumed available in the facility design for the protection and mitigation of accident and transient conditions. The integrated operation of each of these systems is consistent with the assumptions used in the safety analysis.

Specified surveillance and maintenance outage times have been determined in accordance with WCAP-10271, "Evaluation of Surveillance Frequencies and Out of Service Times for the Reactor Protection Instrumentation System", and supplements to that report. Out of service times were determined based on maintaining an appropriate level of reliability of the Reactor Protection System and Engineered Safety Features instrumentation.

The evaluation of surveillance frequencies and out of service times for the reactor protection and engineered safety feature instrumentation described in WCAP-10271 included the allowance for testing in bypass. The evaluation assumed that the average amount of time the channels within a given trip function would be in bypass for testing was 4 hours.

Safety Injection

The Safety Injection System is actuated automatically to provide emergency cooling and reduction of reactivity in the event of a loss-of-coolant accident or a steam line break accident.

Safety injection in response to a loss-of-coolant accident (LOCA) is provided by a high containment pressure signal backed up by the low pressurizer pressure signal. These conditions would accompany the depressurization and coolant loss during a LOCA.

Safety injection in response to a steam line break is provided directly by a low steam line pressure signal, backed up by the low pressurizer pressure signal and, in case of a break within the containment, by the high containment pressure signal.

The safety injection of borated water will offset the temperature-induced reactivity addition that could otherwise result from cooldown following a steam line break.

3.5 INSTRUMENTATION SYSTEM

Bases continued

Limiting Instrument Setpoints

1. The high containment pressure limit is set at about 10% of the maximum internal pressure. Initiation of Safety Injection protects against loss of coolant (Reference 2) or steam line break accidents as discussed in the safety analysis.

2. The Hi-Hi containment pressure limit is set at about 50% of the maximum internal pressure for initiation of containment spray and at about 30% for initiation of steam line isolation. Initiation of Containment Spray and Steam Line Isolation protects against large loss of coolant (Reference 2) or steam line break accidents (Reference 3) as discussed in the safety analysis.

3. The pressurizer low pressure limit is set substantially below system operating pressure limits. However, it is sufficiently high to protect against a loss of coolant accident as shown in the safety analysis (Reference 2).

4. The steam line low pressure signal is lead/lag compensated and its set-point is set well above the pressure expected in the event of a large steam line break accident as shown in the safety analysis (Reference 3).

5. The high steam line flow limit is set at approximately 20% of nominal full-load flow at the no-load pressure and the high-high steam line flow limit is set at approximately 120% of nominal full-load flow at the full load pressure in order to protect against large steam break accidents. The coincident low T_{avg} setting limit for steam line isolation initiation is set below its hot shutdown value. The safety analysis shows that these settings provide protection in the event of a large steam break (Reference 3).

6. Steam generator low-low water level and 4.16 kV Bus 11 and 12 (21 and 22 in Unit 2) low bus voltage provide initiation signals for the Auxiliary Feedwater System. Selection of these setpoints is discussed in the Bases of Section 2.3 of the Technical Specification.