Xcel Energy®

FEB 20 2013

L-PI-13-017
10 CFR 50.90

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

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

License Amendment Request (LAR) to Revise Technical Specification (TS) 3.5.3, "ECCS [Emergency Core Cooling System] - Shutdown"

Pursuant to 10 CFR 50.90, Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), hereby requests an amendment to the TS for the Prairie Island Nuclear Generating Plant (PINGP), Units 1 and 2, to remove TS 3.5.3 Limiting Condition for Operation (LCO) Note 1. NSPM evaluated the proposed changes in accordance with 10 CFR 50.92 and concluded that they involve no significant hazards consideration.

The enclosure to this letter, "Evaluation of the Proposed Changes" contains the licensee's evaluation of the proposed changes.

NSPM requests approval of this LAR within one calendar year of the submittal date. Upon NRC approval, NSPM requests 90 days to implement the associated changes. In accordance with 10 CFR 50.91, NSPM is notifying the State of Minnesota of this LAR by transmitting a copy of this letter and enclosure to the designated State Official.

If there are any questions or if additional information is needed, please contact Mr. Dale Vincent, P.E., at 651-388-1121.

Summary of Commitments

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

I declare under penalty of perjury that the foregoing is true and correct.
Executed on FEB 20 2013

James E. Lynch
Site Vice President, Prairie Island Nuclear Generating Plant
Northern States Power Company - Minnesota

Enclosures (1)

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

ENCLOSURE

Evaluation of the Proposed Changes

License Amendment Request (LAR) to Revise Technical Specification (TS) 3.5.3, "ECCS [Emergency Core Cooling System] - Shutdown"

ATTACHMENTS:

1. Technical Specification Pages (Markup)
2. Bases Pages (Markup)
3. Technical Specification Pages (Retyped)

1. SUMMARY DESCRIPTION

This evaluation supports a request to amend Renewed Operating Licenses DPR-42 and DRP-60 for Prairie Island Nuclear Generating Plant (PINGP), Units 1 and 2, respectively.

Pursuant to 10 CFR 50.90, Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), hereby requests an amendment to the TS for PINGP, Units 1 and 2, to revise TS 3.5.3, "ECCS - Shutdown". This LAR proposes to remove TS 3.5.3 Limiting Condition for Operation (LCO) Note 1 which is incorrect and may not adequately maintain system operability.

Currently plant operations in TS 3.5.3 are administratively controlled under the provisions of NRC Administrative Letter (AL) 98-10, "Dispositioning of Technical Specifications That Are Insufficient to Assure Plant Safety", Reference 1, to assure that plant safety is maintained. This LAR is submitted in accordance with the guidance of AL 98-10. In accordance with the guidance of Administrative Letter 98-10, NSPM submits this LAR as a required LAR to resolve non-conservative TS, that is, this is not a "voluntary request from a licensee to change its licensing basis" and should not be subject to "forward fit" considerations.

2. DETAILED DESCRIPTION

2.1 Proposed Changes

A brief description of the associated proposed TS changes is provided below along with a discussion of the justification for each change. The specific wording changes to the TS are provided in Attachments 1 and 3 to this enclosure.

> **TS 3.5.3, "ECCS - Shutdown":** This LAR proposes to remove LCO Note 1 which states, "An RHR [Residual Heat Removal] train may be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned to the ECCS mode of operation." The number will be removed from current Note 2. These changes are acceptable because, with the Note removed, one train of ECCS will be required to remain aligned for ECCS operation throughout the Applicability of this TS which assures one train of ECCS will be maintained operable.

Although Bases changes are not a part of this LAR, Attachment 2 to this enclosure includes marked up Bases pages for information. The TS Bases changes are directly related to the proposed TS changes.

In summary these changes are acceptable because they assure the required safety-related systems are operable and the TS limiting conditions for operation are met.

2.2 Background

TS 3.5.3 LCO Note 1 allows either or both trains of RHR to be aligned for shutdown cooling and to also be considered operable for the purpose of meeting the LCO requirements of this TS. One train of RHR must be operable for ECCS while in the Applicability of TS 3.5.3.

In 2008, the NRC issued Generic Letter (GL) 2008-01 (Reference 2) in which the NRC requested:

> ... each addressee evaluate its ECCS, DHR [decay heat removal] system, and containment spray system licensing basis, design, testing, and corrective actions to ensure that gas accumulation is maintained less than the amount that challenges operability of these systems, and that appropriate action is taken when conditions adverse to quality are identified.

In response to this GL, NSPM performed tests on and evaluations of the RHR system.

In 2009, as described in Licensee Event Report (LER) 1-09-04, (Agencywide Documents Access and Management System (ADAMS) Accession Number ML091560611), NSPM concluded that if a Mode 4 loss of coolant accident (LOCA) occurred in the reactor coolant system (RCS) piping during plant heat-up or cool-down, the water in attached piping, such as, the RHR system aligned for shutdown cooling would likely flash to steam. NSPM determined that a Mode 4 LOCA would cause loss of suction for any portion of the ECCS subsystems aligned to the RCS for shutdown cooling and therefore, a loss of function. Current TS 3.5.3 requires one train of ECCS (the RHR system is a subsystem of ECCS) to be operable in Mode 4 to mitigate a LOCA. This TS also includes LCO Note 1 which allows RHR train(s) to be considered operable to meet the LCO requirement for ECCS while aligned to the RCS for decay heat removal. However, both trains of RHR aligned to the RCS would likely become inoperable due to a Mode 4 LOCA and the LCO would not be met. Thus, LCO 3.5.3 Note 1 may allow plant operations which would not maintain the plant in a safe condition.

This LAR proposes to remove TS 3.5.3 LCO Note 1 to eliminate TS information to the plant operators which could cause non-conservative operation.

NRC Administrative Letter (AL) 98-10 (Reference 1) provides guidance for correction of facility TS when they are found to contain non-conservative values. The NRC staff expressed their expectation in AL 98-10 that, following imposition of administrative controls, an amendment to the TS will be submitted in a timely fashion. NSPM has imposed administrative controls on the plant operations which allow only one train of

RHR to be aligned for shutdown cooling in Mode 4 with the other train aligned for ECCS.

With the TS changes proposed in this LAR the plant will continue to operate safely and the health and welfare of the public is protected.

3. TECHNICAL EVALUATION

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

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

ECCS Description

In Mode 4, the required ECCS train consists of two separate subsystems: safety injection (SI) and RHR. The ECCS accumulators and the refueling water storage tank (RWST) are also part of the ECCS, but are not considered in this LAR since the ECCS accumulators are not required to be operable in Mode 4 in accordance with TS 3.5.1, "Accumulators", and the RWST has its own TS 3.5.4, "RWST", requiring operability in Mode 4.

The ECCS flow paths consist of piping, valves, heat exchangers, and pumps such that water from the RWST or containment Sump B can be injected into the RCS following a design basis accident (DBA). The major components of each subsystem are the RHR pumps, RHR heat exchangers, and the SI pumps. Both subsystems consist of two 100% capacity trains that are interconnected and redundant such that either train is capable of supplying 100% of the flow required to mitigate the accident consequences. This interconnecting and redundant subsystem design provides the operators with the ability to utilize components from opposite trains to achieve the required 100% flow to the core if necessary due to individual component inoperability. In Mode 4, TS 3.5.3, "ECCS – Shutdown", requires one of the two independent (and redundant) ECCS trains to be operable to ensure that sufficient ECCS flow is available to the core following a DBA.

During an event requiring ECCS actuation, a flow path is required to provide an abundant supply of water from the RWST to the RCS via the ECCS pumps and their respective supply headers to each of the two cold leg injection nozzles and the reactor vessel upper plenum. In the long term, this flow path may be switched to take its supply from the containment sump and to supply its flow to the RCS cold legs or directly into the reactor vessel upper plenum.

Shutdown Cooling Description

The residual heat removal (low head) pumps are normally used in Mode 4, Hot Shutdown; Mode 5, Cold Shutdown; and Mode 6, Refueling. Whenever the reactor is in Mode 1, Power Operation; Mode 2, Startup; or Mode 3, Hot Standby, the pumps are aligned for emergency duty. During normal plant cooldown operation, the residual heat removal system is initiated when the primary system pressure and temperature have been reduced to 425 psig and 350 °F respectively.

Shutdown cooling requirements in Mode 4 are specified in TS 3.4.6, "RCS Loops – MODE 4". Reactor coolant is circulated through two RCS loops connected in parallel to the reactor vessel, each containing a steam generator, a reactor coolant pump (RCP), and appropriate flow, pressure, level, and temperature instrumentation for control, protection, and indication. In Mode 4, either RCPs or RHR pumps can be used to provide forced circulation. In accordance with TS requirements, forced flow is provided from at least one RCS loop or one RHR loop for decay heat removal and transport. The flow provided by one RCS loop or RHR loop is adequate for decay heat removal and boric acid mixing. The other intent of TS 3.4.6 is to require that two paths be available to provide redundancy for decay heat removal, that is, two RCS loops, two RHR trains or either combination of one RCS loop and one RHR train.

Note that the RHR trains for each unit do not have identical piping configurations. On Unit 1, only RHR Train B can discharge to an RCS cold leg. Conversely, on Unit 2, only RHR Train A can discharge to an RCS cold leg. Two trains of RHR can be used for RCS cool down by cross-connecting the two trains. However, if only one train is used for cool down, Train B must be used on Unit 1 and Train A must used on Unit 2.

Current TS Requirements, Basis and Limitations

LCO 3.5.3 requires, "One ECCS train shall be OPERABLE," in Mode 4 when both RCS cold leg temperatures are greater than the safety injection (SI) pump disable temperature specified in Pressure and Temperature Limits Report (PTLR) (currently 218 °F). In its present form, LCO 3.5.3 is modified by two Notes. Note 1 states, "An RHR train may be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned to the ECCS mode of operation." The TS 3.5.3 Bases state in the Applicable Safety Analysis discussion:

> . . . due to the lower pressure and temperatures in the RCS, the probability of

> occurrence of a DBA is reduced. Therefore, the ECCS operational requirements are reduced. It is understood in these reductions that certain automatic SI actuations are not available. Since the RHR System may be aligned to provide normal shutdown cooling, time may be required for manual alignment of ECCS equipment. In this Mode, sufficient time exists for manual actuation of the required ECCS to mitigate the consequences of a DBA. Therefore, only one train of ECCS is required for MODE 4. This requirement dictates that single failures are not considered for this LCO due to the time available for operators to respond to an accident.

The specific TS 3.5.3 Bases for LCO Note 1 states:

> Note 1 allows an RHR train to be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned (remote or local) to the ECCS mode of operation and not otherwise inoperable. This allows operation in the RHR mode during MODE 4.

In the course of performing evaluations in response to GL 2008-01, NSPM determined that during a Mode 4 LOCA, the contents of piping connected to the RCS will flash to steam, and pumps aligned to the RCS will lose suction and become inoperable. If operators aligned both trains of RHR to perform shutdown cooling as allowed by TS 3.5.3 LCO Note 1, following a Mode 4 LOCA neither train would be operable as required by the LCO to mitigate the LOCA. This condition was documented and discussed for PINGP in LER 1-09-04 (ML091560611).

Proposed Changes

This license amendment request proposes to remove TS 3.5.3 LCO Note 1 and remove the number (2) from the remaining LCO Note. With the current Note 1 removed from TS, the operators cannot credit an RHR train aligned for shutdown cooling as part of an operable ECCS train. With this change, one train of RHR will be required to be aligned for ECCS operation whenever the plant is in TS 3.5.3 Applicability. This change will assure that TS 3.5.3 LCO requirements are met with one train of ECCS operable during the Applicability.

NRC approval of this LAR will also change the plant licensing basis as described in USAR Section 10.2. The USAR discusses cooling the plant down using two trains of RHR. Since the TS changes proposed in this LAR require the plant to cool down on a single RHR train, the plant licensing basis described in the USAR will be revised.

Technical Basis for Change

Removal of TS 3.5.3 LCO Note 1, as proposed in this LAR, will require one train of RHR to be aligned for ECCS operation which will leave only one train of RHR available for shutdown cooling. In accordance with AL 98-10, shutdown procedures were revised in 2009 following identification of this issue to include compensatory measures that

require one train of RHR to be aligned for ECCS operations during plant cooldown. Subsequently, a PINGP unit has cooled down through Mode 4 four or more times. Since previous plant shutdowns were routinely performed with two trains of RHR shutdown cooling, plant cooldown was evaluated to determine the impact of cooldown on a single RHR train. The cooldown rates for the first three cooldowns were compared to the cooldown rates for four previous refueling outages through temperature ranges where two trains of RHR were utilized and a discernable difference in cooldown rates was not identified. NSPM concluded that plant shutdown utilizing one RHR train as required by the proposed TS changes will not significantly extend plant cooldown times and should not change the plant's ability to comply with TS shutdown tracks.

The LCO statement for TS 3.5.3 requires one train of ECCS to be operable during the applicability of this TS: the TS changes proposed in this LAR will assure that the LCO will continue to be met. If a Mode 4 LOCA were to occur, the RHR train aligned for ECCS operation will be protected from the voiding effects of the LOCA and be available for mitigation of the LOCA.

TS 3.4.6 requires redundancy in shutdown cooling in Mode 4 through two trains of RHR operable, two RCS loops operable, or a combination of one RHR train and one RCS loop operable, and one of the loops must be in operation. With the TS changes proposed in this LAR the requirements of TS 3.4.6 will continue to be met during the transition through the applicability of TS 3.5.3 through two RCS loops or alignment of one RHR train for shutdown cooling with one RCS loop. Because of the potential for RHR pump damage due to a Mode 4 LOCA, an RHR train is no longer considered operable for TS 3.5.3 when aligned for shutdown cooling.

Removal of TS 3.5.3 LCO Note 1 presents additional challenges when equipment is inoperable. If one train of ECCS is inoperable, such as an inoperable RHR pump or RHR heat exchanger, TS 3.5.2 Action Statements require the equipment to be restored to operable status within 72 hours. If the equipment is not restored to operable status, the plant is to be placed in Mode 3 within 6 hours and Mode 4 within an additional 6 hours (12 hours total after the 72 hour Completion Time is not met). Since one train of RHR is inoperable and RHR is required for cooling down to Mode 5, when the plant enters Mode 4, the operable RHR train will be required to cool down the plant. TS LCO 3.5.3 requires one train of ECCS operable during Mode 4 until one RCS cold leg temperature is less than the SI pump disable temperature.

With removal of the TS 3.5.3 LCO Note 1, the operable RHR train in the shutdown cooling mode can no longer be credited as operable for ECCS and thus, TS LCO 3.5.3 is not met when Mode 4 is entered. In this plant condition, per plant procedures, site management will be notified that the operable RHR train is aligned for shutdown cooling and TS 3.5.3 Condition A will be entered. TS 3.5.3 Condition A requires initiation of actions to restore the required ECCS RHR subsystem to operable status immediately. Part of the actions to restore RHR to operability include shutting down the unit for the repairs, so plant cooldown using the operable train of RHR would be continued to Mode 5.

This is allowed by LCO 3.0.4 which states, "This Specification shall not prevent changes in MODES or other specified conditions in the Applicability that are required to comply with ACTIONS or that are part of a shutdown of the unit." (emphasis added) LCO 3.0.4 Bases also state:

> The provisions of LCO 3.0.4 shall not prevent changes in MODES or other specified conditions in the Applicability that are required to comply with ACTIONS. In addition, the provisions of LCO 3.0.4 shall not prevent changes in MODES or other specified conditions in the Applicability that result from any unit shutdown. In this context, a unit shutdown is defined as a change in MODE or other specified condition in the Applicability associated with transitioning from MODE 1 to MODE 2, MODE 2 to MODE 3, MODE 3 to MODE 4, and MODE 4 to MODE 5.
>
> Upon entry into a MODE or other specified condition in the Applicability with the LCO not met, LCO 3.0.1 and LCO 3.0.2 require entry into the applicable Conditions and Required Actions until the Condition is resolved, until the LCO is met, or until the unit is not within the Applicability of the Technical Specification. (emphasis added)

Thus, shutdown of the unit for repair of an inoperable train of RHR would be performed in compliance with TS requirements.

Another function of the RCS in Mode 4 which may be performed by the RHR pumps is boron mixing. This function will continue to be performed by the RCPs or the RHR pump which is aligned for shutdown cooling; therefore, the TS changes proposed in this LAR do not affect boron mixing.

Conclusions

This LAR proposes to remove the ECCS – Shutdown TS LCO Note that allows RHR trains to be considered operable for ECCS while aligned for shutdown cooling. The effect of this change will require cooling the units down on one train of RHR and maintaining the other RHR train aligned for ECCS operation. Other TS requirements can continue to be met during plant cooldown in this configuration. Operation, maintenance and testing of the Prairie Island Nuclear Generating Plant with the proposed TS revisions will continue to protect the health and safety of the public.

4. REGULATORY SAFETY ANALYSIS

4.1 Applicable Regulatory Requirements/Criteria

Title 10 Code of Federal Regulations 50.36, "Technical specifications":

> (c) Technical specifications will include items in the following categories:
>
> 2) *Limiting conditions for operation.* (i) Limiting conditions for operation are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When a limiting condition for operation of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications until the condition can be met.

This license amendment request proposes to remove the Technical Specification LCO Note that allows RHR trains aligned for shutdown cooling to be considered operable for ECCS operation. The proposed change will require one train of RHR to be aligned for ECCS operation at all times during the Modes or other specified conditions of applicability to assure the LCO requirement is met. Since the plant has two trains of RHR, this change limits shutdown cooling to one train of RHR. The proposed changes have minimal impact on the capability to meet TS LCOs and Required Actions. With these changes, the Technical Specifications will continue to specify limiting conditions for operation which assure safe operation, maintenance and testing of the plant.

Thus with the changes proposed in this license amendment request, the requirements of Title 10 CFR 50.36 continue to be met.

General Design Criteria

The construction of the Prairie Island Nuclear Generating Plant was significantly complete prior to issuance of 10 CFR 50, Appendix A, General Design Criteria. The Prairie Island Nuclear Generating Plant was designed and constructed to comply with the Atomic Energy Commission General Design Criteria as proposed on July 10, 1967 (AEC GDC) as described in the plant Updated Safety Analysis Report. AEC GDC proposed Criteria that have applicability to ECCS are listed in Table 1 below. Those AEC GDC which may be impacted by the proposed change are indicated by "yes" in the "Affected" column and are discussed below.

Table 1

AEC GDC Applicable to ECCS

GDC	Subject	Affected
4	Sharing of Systems	Yes
37	Engineered Safety Features Basis for Design	No
38	Reliability and Testability of Engineered Safety Features	No
40	Missile Protection	No
41	Engineered Safety Features Performance Capability	No
42	Engineered Safety Features Components Capability	No
43	Accident Aggravation Prevention	No
44	Emergency Core Cooling Systems Capability	Yes
45	Inspection of Emergency Core Cooling Systems	No
46	Testing of Emergency Core Cooling System Components	No
47	Testing of Emergency Core Cooling Systems	No
48	Testing of Operational Sequence of Emergency Core Cooling Systems	No

Criterion 4 - Sharing of Systems

Reactor facilities shall not share systems or components unless it is shown safety is not impaired by the sharing.

The residual heat removal pumps and heat exchangers serve dual functions. The residual heat removal heat exchangers and residual heat removal pumps are relied upon during periods of reactor shutdown, however during other plant operating modes, this equipment is aligned to perform the ECCS low head safety injection function. This license amendment request proposes to remove the Technical Specification LCO Note that allows RHR trains aligned for shutdown cooling to be considered operable for ECCS operation in Mode 4 above the safety injection pump disable temperature. The proposed change will require one train of RHR to be aligned for ECCS operation at all times during the Modes or other specified conditions of applicability to meet the LCO, and thus will further assure separation of system functions. With this change, the AEC GDC stated above will continue to be met when the plant is operated with the plant Technical Specifications revised as proposed. Thus with the change proposed in this license amendment request, the requirements of AEC GDC 4 continue to be met and the plant Technical Specifications will provide the basis for safe plant operation.

Criterion 44 - Emergency Core Cooling Systems Capability

At least two emergency core cooling systems, preferably of different design principles, each with a capability for accomplishing abundant emergency core cooling, shall be provided. Each emergency core cooling system and the core shall be designed to prevent fuel and clad damage that would interfere with the emergency core cooling function and to limit the clad metal-water reaction to negligible amounts for all sizes of breaks in the reactor coolant pressure boundary, including the double-ended rupture of the largest pipe. The performance of each emergency core cooling system shall be evaluated conservatively in each area of uncertainty. The systems shall not share active components and shall not share other features or components unless it can be demonstrated that (a) the capability of the shared feature or component to perform its required function can be readily ascertained during reactor operation, (b) failure of the shared feature or component does not initiate a loss-of-coolant accident, and (c) capability of the shared feature or component to perform its required function is not impaired by the effects of a loss of coolant accident and is not lost during the entire period this function is required following the accident.

The active ECCS components (safety injection pumps, residual heat removal pumps and heat exchangers), along with the passive accumulators and the refueling water storage tank provide the cooling water necessary to meet AEC GDC 44. This license amendment request proposes to remove the Technical Specification LCO Note that allows RHR trains aligned for shutdown cooling to be considered operable for ECCS operation in Mode 4 above the safety injection pump disable temperature. The proposed change will require one train of RHR to be aligned for ECCS operation at all times during the Modes or other specified conditions of applicability to assure the LCO requirement is met. A loss of coolant accident in Mode 4 may cause loss of suction and resultant inoperability of pumps aligned to the RCS. This change is proposed specifically to assure that the requirements of (c) are met, that is, with one train of RHR aligned for ECCS operation and isolated from the RCS, its required function is not impaired by the effects of a loss of coolant accident. With this change, the AEC GDC stated above will continue to be met when the plant is operated with the plant Technical Specifications revised as proposed. Thus with the change proposed in this license amendment request, the requirements of AEC GDC 44 continue to be met and the plant Technical Specifications will continue to provide the basis for safe plant operation.

4.2 Precedent

On July 23, 2012, Exelon Generation submitted an LAR for Braidwood Station, Units 1 and 2, and Byron Station, Units 1 and 2, (ADAMS Accession No. ML12206A057) which proposes to delete the Limiting Condition for Operation (LCO) Note associated with Technical Specifications (TS) Section 3.5.3, "ECCS - Shutdown," to reflect current plant configuration and ensure the Residual Heat Removal (RHR) system operability meets the TS 3.5.3 LCO requirement. The proposed changes correct a non-conservative TS

which may not adequately ensure the RHR system operability requirements during shutdown cooling operations in MODE 4.

4.3 Significant Hazards Consideration

Northern States Power Company, a Minnesota corporation (NSPM) evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

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

Response: No

This license amendment request proposes to revise the Technical Specification for ECCS operability requirements in Mode 4 by removing the LCO Note which allows the RHR subsystem to be considered operable for ECCS when aligned for shutdown cooling. These changes will require one train of RHR to be aligned for ECCS operation throughout the mode and other specified conditions of applicability.

The ECCS and RHR subsystem are not accident initiators and therefore the proposed removal of the LCO Note does not involve an increase in the probability of an accident.

The proposed removal of the LCO Note will require that one train of RHR is aligned for ECCS operation during the mode and other specified conditions of applicability which assures that one train of ECCS is operable to mitigate the consequences of a loss of coolant accident. Thus the proposed removal of the LCO Note does not involve a significant increase in the consequences of an accident.

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

2. Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

This license amendment request proposes to revise the Technical Specification for ECCS operability requirements in Mode 4 by removing the LCO Note which allows the RHR subsystem to be considered operable for ECCS when aligned for shutdown cooling. These changes will require one train of RHR to be aligned

for ECCS operation throughout the mode and other specified conditions of applicability.

The proposed Technical Specification changes to remove the LCO Note involve changes to when system trains are operated, but they do not change any system functions or maintenance activities. The changes do not involve physical alteration of the plant, that is, no new or different type of equipment will be installed. The changes do not alter assumptions made in the safety analyses but ensure that one train of ECCS is operable to mitigate the consequences of a loss of coolant accident. These changes do not create new failure modes or mechanisms which are not identifiable during testing and no new accident precursors are generated.

Therefore, the proposed Technical Specification changes do not create the possibility of a new or different kind of accident from any previously evaluated.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No

This license amendment request proposes to revise the Technical Specification for ECCS operability requirements in Mode 4 by removing the LCO Note which allows the RHR subsystem to be considered operable for ECCS when aligned for shutdown cooling. These changes will require one train of RHR to be aligned for ECCS operation throughout the mode and other specified conditions of applicability.

This license amendment proposes Technical Specification changes which assure that the ECCS – Shutdown TS LCO requirements are met if a Mode 4 LOCA were to occur. With these changes, other TS requirements for shutdown cooling in Mode 4 will continue to be met. Based on review of plant operating experience, there is no discernable change in cooldown rates when utilizing a single train of RHR for shutdown cooling. Thus, no margin of safety is reduced as part of this change.

Therefore, the proposed Technical Specification changes do not involve a significant reduction in a margin of safety.

Based on the above, Northern States Power Company, a Minnesota corporation (NSPM) concludes that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c) and, accordingly, a finding of "no significant hazards consideration" is justified.

4.4 Conclusions

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

5. ENVIRONMENTAL CONSIDERATION

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

6. REFERENCES

1.0 NRC Administrative Letter (AL) 98-10, "Dispositioning of Technical Specifications That Are Insufficient to Assure Plant Safety", dated December 29, 1998, ADAMS Accession No. ML031110108.

2.0 Generic Letter (GL) 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems", dated January 11, 2008, ADAMS Accession No. ML072910759.

ENCLOSURE, ATTACHMENT 1

Technical Specification Pages (Markup)

3.5.3-1

1 page follows

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.3 ECCS – Shutdown

LCO 3.5.3 One ECCS train shall be OPERABLE.

---NOTES---

~~1.An RHR train may be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned to the ECCS mode of operation.~~

~~2.~~An SI train may be considered OPERABLE when the pump is capable of being manually started from the control room.

APPLICABILITY: MODE 4 when both RCS cold leg temperatures are > SI pump disable temperature specified in PTLR.

ACTIONS

---NOTE---

LCO 3.0.4.b is not applicable to ECCS safety injection (SI) subsystem.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required ECCS residual heat removal (RHR) subsystem inoperable.	A.1 Initiate action to restore required ECCS RHR subsystem to OPERABLE status.	Immediately
B. Required ECCS safety injection (SI) subsystem inoperable.	B.1 Restore required ECCS SI subsystem to OPERABLE status.	1 hour

ENCLOSURE, ATTACHMENT 2

Bases Pages (Markup)

B 3.5.3-1
B 3.5.3-2
B 3.5.3-3
B 3.5.3-4
B 3.5.3-5
B 3.5.3-6

6 pages follow

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.3 ECCS – Shutdown

BASES

BACKGROUND

The Background section for Bases 3.5.2, "ECCS-Operating," is applicable to these Bases, with the following modifications.

In MODE 4, the required ECCS train consists of two separate subsystems: safety injection (SI) and residual heat removal (RHR).

The ECCS flow paths consist of piping, valves, heat exchangers, and pumps such that water from the refueling water storage tank (RWST) or containment Sump B can be injected into the Reactor Coolant System (RCS) following the accidents described in Bases 3.5.2.

In the event of a loss of coolant accident (LOCA) while in the Applicability of Technical Specification (TS) 3.5.3, fluid in the RHR suction piping could flash to steam, resulting in the RHR system not remaining capable of responding to the LOCA. Also, if a LOCA occurs in MODE 4 that is of sufficient size to depressurize and drain the RCS, any operating RHR pump could lose its suction source at some point. As a result, any operating RHR pump is assumed to fail if it is not shut down prior to steam and/or air voiding. See References 1 and 2.

These issues are similar in that they both relate to the RHR system's ability to mitigate a LOCA while in MODE 4, and similar corrective actions are required to address both concerns. However, the immediate precursor of each failure is distinctly different. The first concern is a result of trapped fluid in the RHR system remaining at a temperature that is sufficiently high such that flashing will occur when the system is depressurized. The second concern is due to the fact that during a LOCA of sufficient size to depressurize and drain the RCS any operating RHR pump would lose its suction source. Due to these issues, one RHR train must be aligned for ECCS

BASES

BACKGROUND (continued)

mode of operation to satisfy LCO 3.5.3 when both RCS cold leg temperatures are greater than the SI pump disable temperature specified in the PTLR.

APPLICABLE SAFETY ANALYSES

Due to the lower heat generation rate associated with operation in MODE 4 it has been judged that the full power licensing analyses described in the Applicable Safety Analyses section of Bases 3.5.2 would bound the consequences of a Design Basis Accident (DBA) in MODE 4. It is also recognized that due to the lower pressure and temperatures in the RCS, the probability of occurrence of a DBA is reduced. Therefore, the ECCS operational requirements are reduced. It is understood in these reductions that certain automatic SI actuations are not available. ~~Since the RHR System may be aligned to provide normal shutdown cooling, time may be required for manual alignment of ECCS equipment.~~ In this MODE, the heat generation rate is lower and sufficient time exists for manual actuation of the required ECCS to mitigate the consequences of a DBA. Therefore, only one train of ECCS is required for MODE 4. This requirement dictates that single failures are not considered for this LCO due to the time available for operators to respond to an accident.

The ECCS trains satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES (continued)

LCO

In MODE 4, one of the two independent (and redundant) ECCS trains is required to be OPERABLE to ensure that sufficient ECCS flow is available to the core following a DBA.

In MODE 4, an ECCS train consists of an SI subsystem and an RHR subsystem. Each train includes the piping, instruments, and controls to ensure an OPERABLE flow path capable of taking suction from the RWST and transferring suction to the containment sump.

During an event requiring ECCS actuation, a flow path is required to provide an abundant supply of water from the RWST to the RCS via the SI subsystem capable (through manual actions) of injecting into each of the cold leg injection nozzles and reactor vessel upper plenum nozzles. In the long term, a flow path is required to provide recirculation flow via the RHR subsystem from the containment sump into each of the reactor vessel upper plenum nozzles.

This LCO is modified by one~~two~~ Notes which~~. Note 1 allows an RHR train to be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned (remote or local) to the ECCS mode of operation and not otherwise inoperable. This allows operation in the RHR mode during MODE 4.~~

~~Note 2~~ allows an SI train to be considered OPERABLE when the pump is capable of being manually started for ECCS injection from the control room.

APPLICABILITY

In MODES 1, 2, and 3, the OPERABILITY requirements for ECCS are covered by LCO 3.5.2.

In MODE 4 with RCS temperature below 350°F and both RCS cold leg temperatures above the SI pump disable temperature specified in the PTLR, one OPERABLE ECCS train is acceptable without single failure consideration, on the basis of the stable reactivity of the reactor and the limited core cooling requirements.

BASES

APPLICABILITY (continued)

In MODE 4 when any RCS cold leg temperature is ≤ the SI pump disable temperature, and MODES 5 and 6, plant conditions are such that the probability of an event requiring ECCS injection is extremely low. Core cooling requirements in MODE 4 when any RCS cold leg temperature is ≤ the SI pump disable temperature are addressed by LCO 3.4.6, "RCS Loops-MODE 4." Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops-MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops-MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation-High Water Level," and LCO 3.9.6, "Residual Heat Removal (RHR) and Coolant Circulation-Low Water Level."

ACTIONS

A Note prohibits the application of LCO 3.0.4.b to an inoperable ECCS safety injection (SI) subsystem when entering MODE 4 with both RCS cold legs temperatures greater than the SI pump disable temperature specified in the PTLR. There is an increased risk associated with entering MODE 4 with both RCS cold legs temperatures greater than the SI pump disable temperature specified in the PTLR from MODE 5 with an inoperable ECCS SI subsystem and the provisions of LCO 3.0.4.b, which allow entry into a MODE or other specified condition in the Applicability with the LCO not met after performance of a risk assessment addressing inoperable systems and components, should not be applied in this circumstance.

A.1

With no ECCS RHR subsystem OPERABLE, the plant is not prepared to respond to a loss of coolant accident or to continue a cooldown using the RHR pumps and heat exchangers. The Completion Time of immediately to initiate actions that would restore at least one ECCS RHR subsystem to OPERABLE status ensures that prompt action is taken to restore the required cooling capacity. Normally, in MODE 4, reactor decay heat is removed

BASES

ACTIONS

A.1 (continued)

from the RCS by an RHR loop. If no RHR loop is OPERABLE for this function, reactor decay heat must be removed by some alternate method, such as use of the steam generators. The alternate means of heat removal must continue until the inoperable RHR loop components can be restored to operation so that decay heat removal is continuous.

With both RHR pumps and heat exchangers inoperable, it would be unwise to require the plant to go to MODE 5, where the only available heat removal system is the RHR. Therefore, the appropriate action is to initiate measures to restore one ECCS RHR subsystem and to continue the actions until the subsystem is restored to OPERABLE status.

B.1

With no ECCS SI subsystem OPERABLE (neither train), due to the inoperability of the SI pump or flow path from the RWST, the plant is not prepared to provide high pressure response to Design Basis Events requiring SI. The 1 hour Completion Time to restore at least one SI subsystem to OPERABLE status ensures that prompt action is taken to provide the required cooling capacity or to initiate actions to place the plant in MODE 5, where an ECCS train is not required.

C.1

When the Required Actions of Conditions B cannot be completed within the required Completion Time, a controlled shutdown should be initiated. Twenty-four hours is a reasonable time, based on operating experience, to reach MODE 5 in an orderly manner and without challenging plant systems or operators.

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.5.3.1

The applicable Surveillance descriptions from Bases 3.5.2 apply.

REFERENCES

The applicable references from Bases 3.5.2 apply.

1. NRC Information Notice 2010-11.

2. Westinghouse NSAL-09-8.

ENCLOSURE, ATTACHMENT 3

Technical Specification Pages (Retyped)

3.5.3-1

1 page follows

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.3 ECCS – Shutdown

LCO 3.5.3 One ECCS train shall be OPERABLE.

----------NOTE----------
An SI train may be considered OPERABLE when the pump is capable of being manually started from the control room.

APPLICABILITY: MODE 4 when both RCS cold leg temperatures are > SI pump disable temperature specified in PTLR.

ACTIONS

----------NOTE----------
LCO 3.0.4.b is not applicable to ECCS safety injection (SI) subsystem.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required ECCS residual heat removal (RHR) subsystem inoperable.	A.1 Initiate action to restore required ECCS RHR subsystem to OPERABLE status.	Immediately
B. Required ECCS safety injection (SI) subsystem inoperable.	B.1 Restore required ECCS SI subsystem to OPERABLE status.	1 hour