



Monticello Nuclear Generating Plant
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March 13, 2014

L-MT-14-006
10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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Monticello Nuclear Generating Plant
Docket 50-263
Renewed License No. DPR-22

License Amendment Request for Fuel Storage Changes
Supplement to Propose a Spent Fuel Pool
Boral Monitoring Program Technical Specification (TAC ME9893)

- References:
- 1) Letter from M A Schimmel (NSPM) to Document Control Desk (NRC), "License Amendment Request For Fuel Storage Changes," L-MT-12-076, dated October 30, 2012 (ADAMS Accession No. ML12307A433)
 - 2) Letter from M A Schimmel (NSPM) to Document Control Desk (NRC), "License Amendment Request For Fuel Storage Changes, Supplement to Respond to NRC Staff Requests for Additional Information," L-MT-13-048, dated June 7, 2013 (ADAMS Accession No. ML13158A269)
 - 3) Letter from M A Schimmel (NSPM) to Document Control Desk (NRC), "License Amendment Request For Fuel Storage Changes, Supplement to Respond to NRC Staff Requests for Additional Information," L-MT-13-046, dated May 16, 2013 (ADAMS Accession No. ML13136A145)

Pursuant to 10 CFR 50.90, the Northern States Power Company, a Minnesota corporation (NSPM), doing business as Xcel Energy, requested in Reference 1 an amendment to the Monticello Nuclear Generating Plant (MNGP) Renewed Operating License (OL) and Technical Specifications (TS) to reflect fuel storage system changes and a revised criticality safety analysis that addresses the legacy fuel types in addition to the planned use of the AREVA ATRIUM™ 10XM fuel design.

In Reference 2, NSPM responded to an NRC Staff request for additional information (RAI) regarding the Boral neutron absorber monitoring program and took the position that regulations did not support the creation of TS for such a program. In a telephone conference on September 19, 2013, NRC Staff offered an alternative interpretation of

regulations and requested that NSPM supplement the Reference 1 License Amendment Request (LAR) to add a Boral monitoring program. The purpose of this letter is to provide a revision to the proposed TS to incorporate such a program. The proposed change would add new TS Section 5.5.14, "Spent Fuel Pool Boral Monitoring Program".

The proposed TS program provides a high-level framework to support the specific approaches to Boral monitoring that were described in Reference 3.

Enclosure 1 provides a description of the proposed changes and includes the technical evaluation and associated no significant hazards determination and environmental evaluation. Enclosure 2 provides a marked-up copy of the TS pages showing the proposed changes.

The MNGP Plant Operations Review Committee has reviewed the proposed TS changes. In accordance with 10 CFR 50.91(b), a copy of this application supplement is being provided to the designated Minnesota Official.

If there are any questions or if additional information is needed, please contact Glenn Adams at 612-330-6777.

Summary of Commitments

The TS program proposed in this supplement supersedes the two commitments made in Reference 3. Therefore, those commitments are withdrawn.

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

Executed on: March 13, 2014



Karen D. Fili
Site Vice-President
Monticello Nuclear Generating Plant
Northern States Power Company-Minnesota

Enclosures (2)

cc: Administrator, Region III, USNRC
Project Manager, Monticello Nuclear Generating Plant, USNRC
Resident Inspector, Monticello Nuclear Generating Plant, USNRC
Minnesota Department of Commerce

ENCLOSURE 1

Evaluation of the Proposed Change
License Amendment Request Supplement
to Propose a Spent Fuel Pool Boron Monitoring Program
Technical Specification

- 1.0 SUMMARY DESCRIPTION
- 2.0 DETAILED DESCRIPTION
- 3.0 TECHNICAL EVALUATION
 - 3.1 Design Description
 - 3.2 Current Licensing Basis
 - 3.3 Justification for the Proposed Changes
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1.0 SUMMARY DESCRIPTION

Pursuant to 10 CFR 50.90, the Northern States Power Company, a Minnesota Corporation (NSPM), doing business as Xcel Energy, hereby requests an amendment to the renewed operating license for Monticello Nuclear Generating Plant (MNGP). Specifically, NSPM proposes to revise Technical Specification (TS) 5.5, "Programs and Manuals" to add TS 5.5.14, "Spent Fuel Pool Boral Monitoring Program" for the purpose of assuring that the Spent Fuel Pool storage rack neutron absorber material (Boral) meets the minimum requirements assumed in the criticality safety analysis.

In Reference 6.6, NSPM responded to an NRC Staff request for additional information (RAI) regarding the Boral neutron absorber monitoring program and took the position that regulations did not support the creation of TS for such a program. In a telephone conference on September 19, 2013, NRC Staff offered an alternative interpretation of regulation and requested that NSPM supplement the Reference 6.1 License Amendment Request (LAR) to add a Boral monitoring program. The purpose of this letter is to provide a revision to the proposed TS to incorporate such a program. The proposed change would add new TS section 5.5.14, "Spent Fuel Pool Boral Monitoring Program".

This enclosure addresses only the incremental changes associated with the addition of this monitoring program.

2.0 DETAILED DESCRIPTION

The proposed insertion of TS 5.5.14, "Spent Fuel Pool Boral Monitoring Program" would create a new program to monitor the spent fuel pool neutron absorber Boral for potential degradation for the express purpose of ensuring the Boral neutron attenuation capability described in the criticality safety analysis. The criticality safety analysis is described by Enclosure 3 to Reference 6.1; however, a description of that analysis will ultimately reside in the Updated Safety Analysis Report (USAR), pursuant to 10 CFR 50.71(e).

The proposed program provides routine monitoring and actions to ensure that the condition of Boral in the spent fuel pool racks is appropriately monitored to ensure that the Boral neutron attenuation capability described in the criticality safety analysis of USAR Section 10.2.1 is maintained. The proposed program includes the following elements:

- a. Periodic physical examination of representative Boral coupons or in situ storage racks at a frequency defined by observed trends or calculated projections of Boral degradation.

- b. Neutron attenuation testing of a representative Boral coupon or in situ storage rack performed prior to December 31, 2015, and thereafter at a frequency of not more than 10 years, or more frequently based on observed trends or calculated projections of Boral degradation.
- c. Description of appropriate corrective actions for discovery of non-conforming Boral.

The proposed program would leverage the use of existing Boral coupons as a representative means to monitor the Spent Fuel Pool (SFP) rack Boral for blistering or other physical phenomena that could affect its neutron absorber capability. However, the proposed program also makes provision for in situ testing if that ever becomes necessary.

The proposed TS program provides a high-level framework to support the specific approaches to Boral monitoring that were described by NSPM in Reference 6.3. In recognition of the proposed TS's supremacy over the (non-TS) program description previously described, Commitment #2 of Reference 6.3 is withdrawn. Also, Commitment #1 of Reference 6.3 is superseded because the proposed TS establishes the same firm deadline that was prescribed in the commitment for the next neutron attenuation test. Therefore, this Commitment #2 is also withdrawn.

3.0 TECHNICAL EVALUATION

3.1 Design Description

Design information applicable to the proposed amendment includes the description of MNGP spent fuel storage facilities that is provided in Reference 6.1 and the USAR. In short, the spent fuel pool storage system consists of High Density Fuel Storage System (HDFSS) modules and one low-density module. The HDFSS modules are composed of rectangular fuel storage tubes that are arranged in a 13x13 array; each tube fabricated by forming an inner and outer sheet of stainless steel sandwiching a core of borated aluminum (Boral). Boral is a neutron absorber that helps maintain the high-density fuel array in a subcritical condition. The low-density storage rack design is aluminum construction with a cell pitch sufficient to maintain fuel subcriticality without the need for any neutron absorber material.

The neutron absorbing capability of the installed Boral is stated in terms of the boron-10 areal density, which is currently ensured through compliance with the MNGP Aging Management Program (AMP). The MNGP AMP is described in Reference 6.1.

The proposed criticality safety analysis (CSA) provided in Reference 6.1 takes no additional credit for the neutron absorbing capability of the installed Boral. The proposed CSA assumes the same value of boron areal density as that assumed in the analysis of record.

3.2 Current Licensing Basis

Permanent design features of the storage racks such as cell-to-cell pitch help ensure the subcriticality criteria are met as long as fuel assemblies meet k-infinity maximum reactivity requirements. Another important storage rack design feature is the integrity of the installed neutron absorber material (Boral). The design bases of the SFP and fuel handling systems are further described in the USAR Section 10.2.1.

3.3 Justification for the Proposed Changes

3.3.1 Justification for Technical Specification Changes

The proposed change to TS 5.5 will add to the license some basic elements of a SFP Boral monitoring program. At a fundamental level, these program elements are similar to the existing AMP. The requirement is administrative in nature in that it does not specify the use of any particular plant equipment, tools, or handling process. In that regard, the proposed TS does not change the fuel handling processes, fuel storage racks, the character of the nuclear fuel, or the SFP cooling and cleanup systems that might impose a new or increased safety risk with the Spent Fuel Pool.

The proposed Technical Specification is justified because it expressly requires the program to ensure that the neutron attenuation capability of the SFP storage racks meets the capability level assumed in the criticality safety analysis. The program allows demonstrating this capability by two redundant means:

- a. Physical examination of representative coupon(s). As explained in previous correspondence (Reference 6.6), the previous destructive examinations of MNGP Boral coupon sets have demonstrated that SFP storage rack Boral is showing no significant signs of degradation, and the remaining coupon set is representative of the in situ storage rack Boral. Monitoring the coupon set for physical changes will provide indication whether physical changes (such as swelling or blistering) that could affect criticality are occurring in the storage racks.
- b. Irrespective of the dimensional changes that might occur in the Boral coupons or in situ rack Boral (as identified in item a. above), a neutron attenuation test will provide quantitative evidence that Boral is performing its essential function. The minimum frequency of this test (i.e., 10 years) corresponds to that of NUREG-1801 Revision 2 (Reference 6.4).

These program elements are justified because they provide a reasonable means to confirm neutron attenuation capability with sufficient flexibility to address future contingencies (e.g., loss of coupons).

3.4 Conclusion

The proposed program is justified because it provides a reasonable means to confirm the continued integrity of MNGP SFP Boral at an appropriate criterion related to the value assumed in the criticality safety analysis. The program is administrative in nature; described at a summary level that does not require intrusive or destructive methods that would challenge the integrity of spent nuclear fuel or the storage racks.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

The NRC's acceptance criteria for spent fuel storage systems are based on 10 CFR 50 Appendix A GDC-62, insofar as it requires that criticality in the fuel storage systems be prevented by physical systems or processes, preferably by use of geometrically safe configurations.

As described in Reference 6.1, the applicable Monticello principal design criteria predate the general design criteria listed in 10 CFR 50, Appendix A. Further, while Monticello is not generally licensed to the 10 CFR 50 Appendix B GDC or the 1967 AEC proposed General Design Criteria, a comparison of the current GDC to the applicable AEC proposed General Design Criteria can be made, and is described in Reference 6.1.

10 CFR 50.36, "Technical Specifications" provides criteria for the content of reactor plant Technical Specifications. In Reference 6.6, NSPM addressed the applicability of MNGP SFP Boral monitoring to the criteria expressed in 50.36(c)(2), Limiting Conditions for Operation, and 50.36(c)(3), "Surveillance Requirements". Notwithstanding that position, NSPM proposes to add the Boral monitoring program to TS Section 5.5 under the general criteria of 50.36(c)(5), "Administrative Controls".

4.2 Precedent

In Reference 6.5, Luminant proposed a program in TS Section 5.5 for monitoring the condition of its SFP storage racks at Comanche Peak. The TS program proposed for Comanche Peak and MNGP are similar in that they each propose to use representative coupons and use evaluation and trending of degradation for its impacts on the criticality safety analysis. The MNGP program is necessarily different in that it provides the flexibility of re-using the remaining coupon set or the in situ storage racks if necessary. The MNGP program is also different in that it

does not set a coupon examination schedule, but bases the examination schedule on observed trends. Further, the MNGP program does not attempt to create any specific acceptance criteria (e.g., maximum coupon thickness) for the monitoring program, but more appropriately, it relates the acceptance criterion to the criticality safety analysis.

The level-of-detail used for the Boral TS Program in Section 5.5.14 is commensurate with that of similar MNGP TS programs, such as 5.5.2, Primary Coolant Sources Outside Containment.

4.3 Significant Hazards Consideration

Northern States Power Company, a Minnesota Corporation (NSPM), doing business as Xcel Energy, hereby requests an amendment to the renewed operating license for Monticello Nuclear Generating Plant (MNGP). Specifically, NSPM proposes to revise Technical Specification (TS) 5.5, "Programs and Manuals" to add TS 5.5.14, "Spent Fuel Pool Boral Monitoring Program" for the purpose of assuring that the Spent Fuel Pool storage rack neutron absorber material (Boral) meets the minimum requirements assumed in the criticality safety analysis.

This proposed change supplements the Fuel Storage Changes application previously documented in a letter to the NRC dated October 30, 2012.

NSPM has evaluated whether or not a significant hazards consideration is involved with the specific proposed changes by focusing on the three standards set forth in 10 CFR 50.92(c). This evaluation is a supplement to the Significant Hazards Consideration previously submitted for the Fuel Storage Changes application. The original Significant Hazards Consideration is not affected. A Significant Hazards Consideration review for the proposed TS is provided below.

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

Response: No

The proposed amendment would establish a TS requirement to establish and maintain a monitoring program for Spent Fuel Pool (SFP) storage rack Boral. In that regard, the proposed TS does not change the fuel handling processes, fuel storage racks, the character of the nuclear fuel, or the SFP cooling and cleanup systems that might affect the probability or consequences of an accident associated with the Spent Fuel Pool. Therefore, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

Response: No

The proposed amendment would establish a TS requirement to establish and maintain a monitoring program for SFP storage rack Boral. As such, the proposed changes introduce no new material interactions, man-machine interfaces, or processes that could create the potential for an accident of a new or different type. Thus, the proposed change cannot cause a new or different kind of accident.

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

Response: No

The proposed amendment would establish a TS requirement to establish and maintain a monitoring program for SFP storage rack Boral. The proposed TS expressly establishes an acceptance criterion that relates directly to the minimum neutron attenuation capability assumed in the criticality safety analysis. Thus, it is expressly created to maintain the safety margin established in the analysis. As such, the proposed changes introduce no change to plant system operation or nuclear fuel characteristics that would affect the margin of safety for plant systems. Therefore, the proposed changes do not involve a significant reduction in the margin of safety.

Therefore, based on the above, NSPM has concluded that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c) and, accordingly a finding of "no significant hazards consideration" is justified.

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.

5.0 ENVIRONMENTAL CONSIDERATIONS

10 CFR 51.22(c)(9) provides criteria for and identification of licensing and regulatory actions eligible for categorical exclusion from performing an environmental assessment. A proposed amendment of an operating license for a

facility requires no environmental assessment if the operation of the facility in accordance with the proposed amendment does not: (1) involve a significant hazards consideration, (2) result in a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, and (3) result in a significant increase in individual or cumulative occupational radiation exposure. NSPM has reviewed this supplement and determined that the proposed amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment needs to be prepared in connection with these changes. The basis for this determination follows.

1. As demonstrated in the 10 CFR 50.92 evaluation, the proposed amendment does not involve a significant hazards consideration.
2. The proposed amendment does not result in a significant change in the types or increase in the amounts of any effluents that may be released offsite. Implementation of the proposed project involves no new physical activity: loading procedures and the quantity of fuel handling operations do not change. Thereby, implementing the new TS is not expected to generate any solid, gaseous, or liquid effluent that would not otherwise be generated in the course of routine spent fuel pool operations over its lifetime.
3. The proposed amendment does not result in an increase in individual or cumulative occupational radiation exposure. Implementation of the proposed amendment will not involve a campaign of fuel movements nor will it involve any increase in the amount or frequency of fuel handling operations.

Accordingly, the proposed amendment meets the eligibility criterion for a categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, NSPM concludes that pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment. The proposed change does not alter the environmental assessment performed in support of the Fuel Storage Changes license amendment request.

6.0 REFERENCES

- 6.1 Letter from M A Schimmel (NSPM) to Document Control Desk (NRC), "License Amendment Request For Fuel Storage Changes," L-MT-12-076, dated October 30, 2012 (ADAMS Accession No. ML12307A433).
- 6.2 NUREG-1865, Safety Evaluation Report Related to the License Renewal of the Monticello Nuclear Generating Plant, published October 2006 (ADAMS Accession No. ML063050414).
- 6.3 Letter from M A Schimmel (NSPM) to Document Control Desk (NRC), "License Amendment Request For Fuel Storage Changes, Supplement to Respond to NRC Staff Requests for Additional Information," L-MT-13-046, dated May 16, 2013 (ADAMS Accession No. ML13136A145).

- 6.4 NUREG-1801, Generic Aging Lessons Learned (GALL) Report, Revision 2, dated December 2010.
- 6.5 Letter from Fred W. Madden (Luminant) to Document Control Desk (NRC), Comanche Peak Nuclear Power Plant (CPNPP) Docket Nos. 50-445 and 50-446, License Amendment Request (LAR) 13-01, Revision to Technical Specifications 3.7.16, "Fuel Storage Pool Boron Concentration," 3.7.17, "Spent Fuel Assembly Storage," 4.3, "Fuel Storage," and 5.5 "Programs and Manuals", dated March 28, 2013, (ADAMS Accession No. ML13095A023).
- 6.6 Letter from M A Schimmel (NSPM) to Document Control Desk (NRC), "License Amendment Request For Fuel Storage Changes, Supplement to Respond to NRC Staff Requests for Additional Information," L-MT-13-048, dated June 7, 2013, (ADAMS Accession No. ML13158A269).

ENCLOSURE 2

Marked-Up Technical Specification Pages

**5.5-12
Insert (new Section 5.5.14)**

2 pages follow

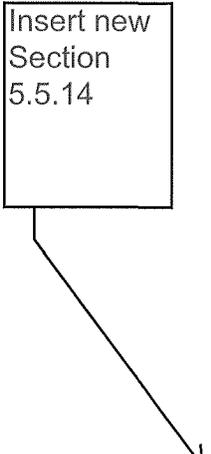
5.5 Programs and Manuals

5.5.13 Control Room Envelope Habitability Program

A Control Room Envelope (CRE) Habitability Program shall be established and implemented to ensure that CRE habitability is maintained such that, with an OPERABLE Control Room Emergency Filtration (CREF) System, CRE occupants can control the reactor safely under normal conditions and maintain it in a safe condition following a radiological event, hazardous chemical release, or a smoke challenge. The program shall ensure that adequate radiation protection is provided to permit access and occupancy of the CRE under design basis accident (DBA) conditions without personnel receiving radiation exposures in excess of 5 rem total effective dose equivalent (TEDE) for the duration of the accident. The program shall include the following elements:

- a. The definition of the CRE and the CRE boundary.
- b. Requirements for maintaining the CRE boundary in its design condition including configuration control and preventative maintenance.
- c. Requirements for (i) determining the unfiltered air in-leakage past the CRE boundary into the CRE in accordance with the testing methods and at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, "Demonstrating Control Room Envelope Integrity at Nuclear Power Reactors," Revision 0, May 2003, and (ii) assessing CRE habitability at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, Revision 0.
- d. Measurement, at designated locations, of the CRE pressure relative to all external areas adjacent to the CRE boundary during the pressurization mode of operation by one subsystem of the CREF System, operating at the flow rate required by the VFTP, at a Frequency of 24 months on a STAGGERED TEST BASIS. The results shall be trended and used as part of the 24 month assessment of the CRE boundary.
- e. The quantitative limits on unfiltered air in-leakage into the CRE. These limits shall be stated in a manner to allow direct comparison to the unfiltered air in-leakage measured by the testing described in paragraph c. The unfiltered air in-leakage limit for radiological challenges is the in-leakage flow rate assumed in the licensing basis analyses of DBA consequences. Unfiltered air in-leakage limits for hazardous chemicals must ensure that exposure of CRE occupants to these hazards will be within the assumptions in the licensing basis.
- f. The provisions of SR 3.0.2 are applicable to the Frequencies for assessing CRE habitability, determining CRE unfiltered in-leakage, and measuring CRE pressure and assessing the CRE boundary as required by paragraphs c and d, respectively.

Insert new
Section
5.5.14



Insert to TS 5.5

New Section 5.5.14

5.5.14 Spent Fuel Pool Boral Monitoring Program

The program provides routine monitoring and actions to ensure that the condition of Boral in the spent fuel pool racks is appropriately monitored to ensure that the Boral neutron attenuation capability described in the criticality safety analysis of USAR Section 10.2.1 is maintained. The program shall include the following:

- a. Periodic physical examination of representative Boral coupons or in situ storage racks at a frequency defined by observed trends or calculated projections of Boral degradation.
- b. Neutron attenuation testing of a representative Boral coupon or in situ storage rack shall be performed prior to December 31, 2015, and thereafter at a frequency of not more than 10 years, or more frequently based on observed trends or calculated projections of Boral degradation.
- c. Description of appropriate corrective actions for discovery of non-conforming Boral.