

ENCLOSURE 4 CONTAINS PROPRIETARY INFORMATION



OCT 16 2013

L-PI-13-091  
10 CFR 72.48  
10 CFR 72.70

U S Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Director, Division of Spent Fuel Storage and Transportation  
Office of Nuclear Material Safety and Safeguards  
Washington, DC 20555-0001

Prairie Island Independent Spent Fuel Storage Installation (ISFSI)  
Docket 72-10  
Materials License No. SNM-2506

Biennial Report of Changes, Tests and Experiments, Updated Safety Analysis Report (SAR), and Updated Technical Specification (TS) Bases for Prairie Island ISFSI

Pursuant to 10 CFR 72.48(d)(2), 10 CFR 72.70(c)(2) and Prairie Island ISFSI Technical Specification (TS) 5.4.d, Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), by this letter submits a brief description of any changes, tests and experiments, Prairie Island ISFSI SAR page revisions, and Prairie Island ISFSI TS Bases page revisions for the Prairie Island ISFSI. The last update was submitted October 20, 2011 (ADAMS Accession Number ML11298A235).

Enclosure 1 to this letter contains the affidavit, pursuant to the requirements of 10 CFR 2.390(b)(1)(iii), regarding the trade secret information contained in Enclosure 4.

Enclosure 2, 10 CFR 72.48 Changes, Tests and Experiments, contains a brief description of any changes, tests, and experiments made pursuant to 10 CFR 72.48(c), including a summary of the evaluation of each.

Enclosure 3, Information Regarding Changes to the Prairie Island ISFSI SAR, identifies those changes made based on approved license amendments, changes made under the provisions of 10 CFR 72.48, and editorial changes.

Enclosure 4, Updated Prairie Island ISFSI SAR - Proprietary, is a CD-ROM containing the proprietary version of the Prairie Island ISFSI SAR Revision 15 in its entirety. As discussed in Enclosure 1 to this letter, NSPM requests that this proprietary version of

NM5524  
NM5526

the Prairie Island ISFSI SAR be withheld from public disclosure pursuant to 10 CFR 2.390(a)(4). NSPM requests that the proprietary version of the Prairie Island ISFSI SAR Revision 14 be destroyed or marked superseded.

Enclosure 5, Updated Prairie Island ISFSI Safety Analysis Report – Non-Proprietary, is a CD-ROM containing the non-proprietary version of the Prairie Island ISFSI SAR Revision 15 in its entirety. The non-proprietary version of the Prairie Island ISFSI SAR may be disclosed to the public. NSPM requests that the non-proprietary version of the Prairie Island ISFSI SAR Revision 14 be destroyed or marked superseded.

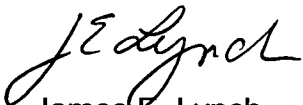
Enclosure 6, ISFSI TS Bases Page Changes, contains three copies of ISFSI TS Bases, Revisions 8 and 9, revised pages and instructions for entering the pages. These revisions are submitted pursuant to ISFSI TS 5.4.d for ISFSI TS Bases changes which have been implemented since the previous ISFSI SAR submittal.

If there are any questions or if additional information is needed, please contact Mr. Dale Vincent, P.E., at 651-267-1736.

#### Summary of Commitments

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

I certify that the ISFSI SAR information presented herein accurately presents changes made since the previous submittal up through September 30, 2013.



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

Enclosures (6)

cc: Administrator, Region III, USNRC  
Director, Spent Fuel Project Office, USNRC  
NMSS Project Manager, Prairie Island ISFSI, USNRC  
NRR Project Manager, Prairie Island Nuclear Generating Plant, USNRC  
Resident Inspector, Prairie Island Nuclear Generating Plant, USNRC

ENCLOSURE 1

AFFIDAVIT PURSUANT TO 10 CFR 2.390

2 Pages Follow

**AFFIDAVIT PURSUANT**  
**TO 10 CFR 2.390**

Transnuclear, Inc.                     )  
State of Maryland                 ) SS.  
County of Howard                 )

I, Paul Triska, depose and say that I am a Vice President of Transnuclear, Inc., duly authorized to execute this affidavit, and have reviewed or caused to have reviewed the information which is identified as proprietary and referenced in the paragraph immediately below. I am submitting this affidavit in conformance with the provisions of 10 CFR 2.390 of the Commission's regulations for withholding this information.

The information for which proprietary treatment is sought is contained in the Prairie Island Independent Spent Fuel Storage Installation (ISFSI) Safety Analysis Report (SAR), (Docket Number: 72-10, License Number: SNM-2506), Revision 15, as listed below:

1. SAR Appendix 3A
2. SAR Appendix 7B
3. Portions of SAR Section A1.5, SAR Drawings TN40HT-72 series, as follows:
  - Transnuclear Drawing TN40HT-72-2, Revision 1
  - Transnuclear Drawing TN40HT-72-3, Revision 0
  - Transnuclear Drawing TN40HT-72-4, Revision 0
  - Transnuclear Drawing TN40HT-72-5, Revision 0
  - Transnuclear Drawing TN40HT-72-6, Revision 0
  - Transnuclear Drawing TN40HT-72-7, Revision 0
  - Transnuclear Drawing TN40HT-72-8, Revision 0
  - Transnuclear Drawing TN40HT-72-9, Revision 0
  - Transnuclear Drawing TN40HT-72-21, Revision 3
  - Transnuclear Drawing TN40HT-72-22, Revision 3
4. Portions of SAR Section A3.3.2.2.8
5. SAR Appendix A3A
6. Portions of SAR Section A4.2.3.8, plus Tables A4.2-25 and -26 and Figures A4.2-5 through -12.
7. Portions of SAR Section A4B.1.5.6, plus Figure A4B.1-1.
8. Portions of SAR Appendix A7B

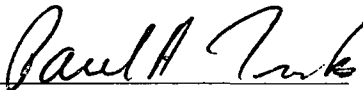
These documents have been appropriately designated as proprietary.

I have personal knowledge of the criteria and procedures utilized by Transnuclear, Inc. in designating information as a trade secret, privileged or as confidential commercial or financial information.

Pursuant to the provisions of paragraph (b) (4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure, included in the above referenced document, should be withheld.

- 1) The information sought to be withheld from public disclosure are portions of certain TN-40 and TN-40HT spent fuel storage cask design drawings and analyses, as included in the Prairie Island ISFSI SAR, which are owned and have been held in confidence by Transnuclear, Inc.
- 2) The information is of a type customarily held in confidence by Transnuclear, Inc. and not customarily disclosed to the public. Transnuclear, Inc. has a rational basis for determining the types of information customarily held in confidence by it.
- 3) Public disclosure of the information is likely to cause substantial harm to the competitive position of Transnuclear, Inc. because the information consists of descriptions of the design and analysis of dry spent fuel storage systems, the application of which provide a competitive economic advantage. The availability of such information to competitors would enable them to modify their product to better compete with Transnuclear, Inc., take marketing or other actions to improve their product's position or impair the position of Transnuclear, Inc.'s product, and avoid developing similar data and analyses in support of their processes, methods or apparatus.

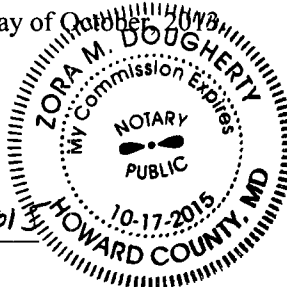
Further the deponent sayeth not.

  
Paul Triska  
Vice President, Transnuclear, Inc.

Subscribed and sworn to me before this 4<sup>th</sup> day of October, 2013.

  
Notary Public

My Commission Expires 10 / 17 / 2015



## **ENCLOSURE 2**

### **10 CFR 72.48 CHANGES, TESTS and EXPERIMENTS**

Below is a brief description and a summary of the safety evaluation for each of those changes, tests, and experiments which were carried out for the Prairie Island Independent Spent Fuel Storage Installation (ISFSI) by Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), without prior Nuclear Regulatory Commission (NRC) approval, pursuant to the requirements of 10 CFR 72.48.

#### **10 CFR 72.48 Evaluation 1092: ISFSI Safety Analysis Report (SAR) - Add new Helium Environment section**

##### Description of Change

The activity involved establishing a definition of an acceptable helium environment within the dry fuel storage casks that will ensure the thermal design criteria are satisfied. This definition is determined in a new thermal analysis which was incorporated into the Independent Spent Fuel Storage Installation Safety Analysis Report, and was reflected in the Technical Specification Bases and cask loading procedures. It is needed in the unlikely event that there is a delay in establishing the normal helium environment within the cask. The new analysis determined that an environment of at least 75% helium in the cask cavity while the cask is in the Auxiliary Building will ensure that the thermal design criteria are satisfied.

##### Summary of Evaluation

The activity ensured that the thermal design criteria are satisfied during cask loading operations when a helium environment consisting of at least 75% helium is introduced into the cask cavity within 34 hours of commencing cask draining operations. In particular, the calculations that support the proposed activity show that the maximum fuel cladding temperature remains below the limit of 752 °F. These calculations were performed by changing inputs to a thermal model already described in the Safety Analysis Report. The analysis was performed using an updated version of the computer code that provides essentially the same results as the one used for the thermal analyses in the Safety Analysis Report.

The evaluation showed that a helium environment consisting of at least 75% helium has no effect on the probability or consequence of accidents or malfunctions. It does not create the possibility of an accident of a different type or a malfunction with a different result. There are no design basis limits for a fission product barrier exceeded, and there is no departure from a method of evaluation described in the Safety Analysis Report.

**10 CFR 72.48 Evaluation 1099: Change ISFSI SAR to reflect short aluminum and poison plates**Description of Change

The activity involved revising design drawings for the TN-40HT cask baskets to allow the aluminum and neutron absorbing plates to be as much as two inches shorter than the distance between the outermost faces of the adjacent fuel compartments. This change was made to provide clarification and flexibility to the fabricator of the TN-40HT casks. The analyses supporting the change show that all design limits and criteria continue to be satisfied.

Summary of Evaluation

The activity ensures that the thermal, criticality, and structural design criteria are satisfied even if the aluminum and neutron absorbing plates in the cask basket are as much as two inches shorter than the distance between the outermost faces of the adjacent fuel compartments. The calculations supporting the change were performed by changing inputs to the models already described in the Safety Analysis Report. The analyses were performed using updated versions of the computer code that provide essentially the same results as the ones used in the Safety Analysis Report.

The evaluation shows that the proposed activity has no effect on the probability or consequence of accidents or malfunctions. It does not create the possibility of an accident of a different type or a malfunction with a different result. There are no design basis limits for a fission product barrier exceeded, and there is no departure from a method of evaluation described in the Safety Analysis Report.

### ENCLOSURE 3

#### INFORMATION REGARDING CHANGES TO THE PRAIRIE ISLAND INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) SAFETY ANALYSIS REPORT (SAR)

Changes were made to the Prairie Island ISFSI updated Safety Analysis Report (SAR) which are identified in the following list by their input numbers (with which side-barred changes are denoted). Note that ISFSI SAR Input Numbers can be searched on the Prairie Island ISFSI SAR CD-ROM, Enclosure 4, to locate each change.

ISFSI SAR Input No.	Revised Sections	Basis	Description
01304073	9.6	License Amendments (LA) 202/189 (ML11187A231)	Change ISFSI SAR for Prairie Island Nuclear Generating Plant LA 202/189 for new Cyber Security Plan
01330158	A3.3, Tables A3.3-33, 34	10 CFR 72.48 Evaluation 1092	Add new Helium Environment section
01368790	A3.3, Table A3.2-2, Tables A3.3-3 through 7, 13 through 16, 34, Figures A3.3-5, 11,12,14,15, 26, 27, Tables A4.2-20 through 24	10 CFR 72.48 Evaluation 1099	Change ISFSI SAR to reflect short aluminum and poison plates
01372903	9.4	Editorial	Change ISFSI SAR to reflect Quality Assurance Topical Report requirements for procedures
01373061	A4A.5, A7A.8, Table A4A.4-1, Tables A4A.5-3, 4, 5	10 CFR 72.48 Screening 4222	Update ISFSI SAR new vent and drain cover bolt analysis
01382140	A3.3, A3.6	10 CFR 72.48 Evaluation 1099	Revise ISFSI SAR Volume 2 to reflect use of ANSYS 10.0 computer code

Summaries of evaluations prepared under the provisions of 10 CFR 72.48 are provided in Enclosure 2 to this letter.



## ENCLOSURE 4

### UPDATED PRAIRIE ISLAND INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) SAFETY ANALYSIS REPORT (SAR) PROPRIETARY

#### Updating Instructions

A complete copy of the proprietary version of the Prairie Island ISFSI SAR Revision 15 is included on the enclosed CD-ROM.

Contact Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), at 651-267-1736 if you require additional assistance.

The enclosed proprietary version of the Prairie Island ISFSI SAR Revision 15 (CD-ROM) contains the following files:

File name	Size (kilobytes)	Disclosure status
001 Volume 1 - ISFSI SAR - Proprietary.pdf	99,128	Proprietary
002 Volume 2 - ISFSI SAR - Proprietary.pdf	24,738	Proprietary

## **ENCLOSURE 5**

### **UPDATED PRAIRIE ISLAND INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI) SAFETY ANALYSIS REPORT (SAR) NON-PROPRIETARY**

#### **Updating Instructions**

A complete copy of the non-proprietary version of the Prairie Island ISFSI SAR Revision 15 is included on the enclosed CD-ROM.

Contact Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), at 651-267-1736 if you require additional assistance.

The enclosed non-proprietary version of the Prairie Island ISFSI SAR Revision 15 (CD-ROM) contains the following files:

<b>File name</b>	<b>Size (kilobytes)</b>	<b>Disclosure status</b>
003 – Volume 1 – ISFSI SAR – Non-Proprietary.pdf	29,449	Non-proprietary
004 – Volume 2 – ISFSI SAR – Non-Proprietary.pdf	20,883	Non-proprietary

## **ENCLOSURE 6**

### **Prairie Island Independent Spent Fuel Storage Installation Bases Page Changes**

Updating Instructions (1 page)

Revisions 8 and 9 Pages (4 pages x 3 copies)

**Prairie Island  
Independent Spent Fuel Storage Installation  
Updating Instructions**

Remove and discard individual Bases pages and replace with the new pages provided. Special instructions, where applicable, are included with the replacement pages.

When page removal/replacement is complete, review the Bases Current Pages list to ensure your copy of the Bases is current and complete. Contact Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), at 651-267-1736 if you require additional assistance.

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**PRAIRIE ISLAND NUCLEAR GENERATING PLANT  
INDEPENDENT SPENT FUEL STORAGE INSTALLATION  
RECORD OF REVISION BASES CHANGES AND LICENSE AMENDMENTS**

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<b>NSPM Revision (REV) No.</b>	<b>Date of Issue</b>	<b>License Amendment No.</b>	<b>Remarks</b>
-	-	1 through 6	Original Bases were part of Technical Specifications
7	8/20/2010	7	Initial Issue of revised format and Inclusion of TN-40HT design.
8	12/12/2012	..	Clarify "helium environment" requirement in ISFSI SR 3.1.2.1.
9	8/27/13	-	Revise B 3.1.5 paraphrase of regulatory requirements.

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## BASES

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### ACTIONS (continued)

#### B.1

If a helium cask environment cannot be achieved and maintained, fuel clad temperatures may increase beyond the analyzed condition. Therefore, the cask will be required to be placed back into the spent fuel pool within 7 days and re-flooded. This time is sufficient time to return the cask to the spent fuel pool and re-flood the cask cavity. Once placed in the spent fuel pool, the fuel is provided adequate decay heat removal to maintain the loaded fuel within limits.

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### SURVEILLANCE REQUIREMENTS

#### SR 3.1.2.1

This Surveillance is modified by a Note. The Note clarifies that meeting the Surveillance is not required, and thus there is not a failure to meet the LCO per SR 3.0.1 and SR 3.0.4 does not apply, prior to the specified Frequency.

While, the effective thermal conductivity of the cavity gas is not dependant upon pressure, it is dependant upon the make-up of the gases within the cask cavity. Thermal analyses have shown that maximum fuel cladding temperature limit of 752°F is not exceeded during LOADING OPERATIONS provided a 75% helium environment (based on partial pressure) is established within the cask. Thus, design basis heat removal requirements will be satisfied provided an environment of at least 75% helium has been established, and maintained in the cask cavity within the 34 hour vacuum drying time frame (Reference 3).

#### SR 3.1.2.2

This Surveillance is modified by a Note. The Note clarifies that meeting the Surveillance is not required, and thus there is not a failure to meet the LCO per SR 3.0.1 and SR 3.0.4 does not apply, prior to the specified Frequency.

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**B 3.1 CASK INTEGRITY****B 3.1.5 Cask Interseal Pressure****BASES**

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**BACKGROUND**

A cask is loaded, dried, and sealed prior to being transported to the ISFSI and placed on a storage pad. The cask is designed with redundant seals to contain the radioactive material. In addition, 10 CFR 72.122(h)(4) requires that confinement systems have the capability of being monitored. The monitoring systems provide:

- a. the capability to monitor interseal pressure that will indicate if cask seal integrity is compromised; and
- b. local alarms to indicate that potential seal degradation has occurred.

It is necessary to verify cask seal integrity at regular intervals to ensure the cask's interseal containment boundary is being maintained and to verify there is no seal leakage to the environment.

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**APPLICABLE  
SAFETY  
ANALYSIS**

The confinement of radioactive material during the storage of spent fuel in a cask is ensured by the use of multiple confinement barriers and systems. The barriers relied upon are the uranium dioxide fuel pellet matrix, the metallic fuel cladding tubes in which the fuel pellets are contained, and the cask in which the fuel assemblies are stored. Long-term integrity of the fuel cladding depends on storage in an inert atmosphere. This is accomplished by removing water from the cask cavity and backfilling the cavity with an inert gas. The failure of storage cask confinement capability is considered in



**Prairie Island  
Independent Spent Fuel Storage Installation  
Updating Instructions**

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**PRAIRIE ISLAND NUCLEAR GENERATING PLANT  
INDEPENDENT SPENT FUEL STORAGE INSTALLATION  
RECORD OF REVISION BASES CHANGES AND LICENSE AMENDMENTS**

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<b>NSPM Revision (REV) No.</b>	<b>Date of Issue</b>	<b>License Amendment No.</b>	<b>Remarks</b>
-	-	1 through 6	Original Bases were part of Technical Specifications
7	8/20/2010	7	Initial Issue of revised format and Inclusion of TN-40HT design.
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## BASES

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### ACTIONS (continued)

#### B.1

If a helium cask environment cannot be achieved and maintained, fuel clad temperatures may increase beyond the analyzed condition. Therefore, the cask will be required to be placed back into the spent fuel pool within 7 days and re-flooded. This time is sufficient time to return the cask to the spent fuel pool and re-flood the cask cavity. Once placed in the spent fuel pool, the fuel is provided adequate decay heat removal to maintain the loaded fuel within limits.

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### SURVEILLANCE REQUIREMENTS

#### SR 3.1.2.1

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While, the effective thermal conductivity of the cavity gas is not dependant upon pressure, it is dependant upon the make-up of the gases within the cask cavity. Thermal analyses have shown that maximum fuel cladding temperature limit of 752°F is not exceeded during LOADING OPERATIONS provided a 75% helium environment (based on partial pressure) is established within the cask. Thus, design basis heat removal requirements will be satisfied provided an environment of at least 75% helium has been established, and maintained in the cask cavity within the 34 hour vacuum drying time frame (Reference 3).

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## B 3.1 CASK INTEGRITY

### B 3.1.5 Cask Interseal Pressure

#### BASES

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**BACKGROUND** A cask is loaded, dried, and sealed prior to being transported to the ISFSI and placed on a storage pad. The cask is designed with redundant seals to contain the radioactive material. In addition, 10 CFR 72.122(h)(4) requires that confinement systems have the capability of being monitored. The monitoring systems provide:

- a. the capability to monitor interseal pressure that will indicate if cask seal integrity is compromised; and
- b. local alarms to indicate that potential seal degradation has occurred.

It is necessary to verify cask seal integrity at regular intervals to ensure the cask's interseal containment boundary is being maintained and to verify there is no seal leakage to the environment.

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**APPLICABLE SAFETY ANALYSIS** The confinement of radioactive material during the storage of spent fuel in a cask is ensured by the use of multiple confinement barriers and systems. The barriers relied upon are the uranium dioxide fuel pellet matrix, the metallic fuel cladding tubes in which the fuel pellets are contained, and the cask in which the fuel assemblies are stored. Long-term integrity of the fuel cladding depends on storage in an inert atmosphere. This is accomplished by removing water from the cask cavity and backfilling the cavity with an inert gas. The failure of storage cask confinement capability is considered in