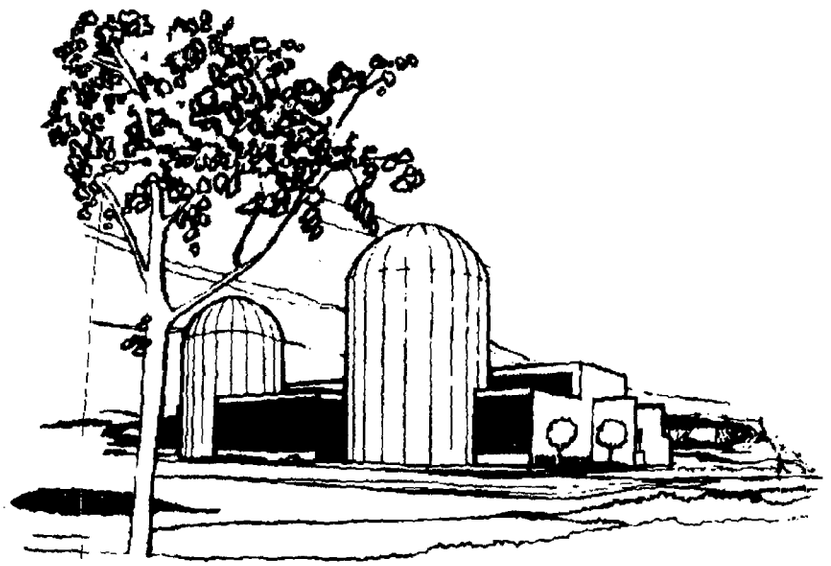
PRAIRIE ISLAND
INDEPENDENT SPENT FUEL
STORAGE INSTALLATION



Technical Specifications
LCO / SR

CONTROLLED DOCUMENT

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Form 17-4435

Docket Number: 72-10
License Number: SNM-2506

NORTHERN STATES POWER COMPANY, A MINNESOTA CORPORATION (NSPM)
DOCKET NO. 72-10
PRAIRIE ISLAND INDEPENDENT SPENT FUEL STORAGE INSTALLATION
AMENDMENT TO MATERIALS LICENSE NO. SNM-2506

Amendment 7
License SNM-2506

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The amendment application dated March 28, 2008, as supplemented by letter on June 26 and August 29, 2008; June 26 and September 28, 2009; and January 18, May 4, and July 27, 2010, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;

   B. The Prairie Island Independent Spent Fuel Storage Installation will continue to operate in conformity with the application, as amended, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance that (i) the activities authorized by this amendment can be conducted without endangering public health and safety, and (ii) such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to public health and safety; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by the enclosed changes to Materials License No. SNM-2506, indicated by margin notations.

3. This license amendment is effective as of the date of its issuance.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Eric J. Benner, Chief
Licensing Branch
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety
and Safeguards

Enclosure: Amended License

Date of Issuance: 8/20/10

3.1 CASK INTEGRITY

3.1.1 Cask Cavity Vacuum Drying

LCO 3.1.1 The cask cavity vacuum drying pressure shall be below the limit.

APPLICABILITY: LOADING OPERATIONS.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each cask.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Cask cavity vacuum drying pressure limit not met.	A.1 Return cask to pool and reflood.	7 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.1.1	----------NOTE---------- Not required to be met prior to the specified Frequency. ---------- Verify that the equilibrium cask cavity vacuum drying pressure is brought to $\leq$ 10 mbar absolute for $\geq$ 30 minutes after isolation from the vacuum drying system.	Once prior to helium backfill (SR 3.1.2.2)

3.1 CASK INTEGRITY

3.1.2 Cask Helium Backfill Pressure

LCO 3.1.2 The cask cavity shall be backfilled with helium to within the limits.

APPLICABILITY: LOADING OPERATIONS.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each cask.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Cask initial helium backfill pressure limit not met.	----------NOTE---------- Action A.1 applies until a gas other than helium is introduced into the cask for subsequent operations or the helium is removed for the performance of SR 3.1.1.1. ----------	
	A.1 Initiate action to establish a helium environment in the cask.	Immediately
	AND	
	A.2 Establish cask cavity backfill pressure within limits.	Prior to leak testing (SR 3.1.3.1)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action A.1 and associated Completion Time not met.	B.1 Return cask to pool and reflood.	7 days

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.1.2.1	----------NOTE---------- Not required to be met prior to the specified Frequency. ---------- Verify that a helium environment has been established in the cask cavity.	Once within 34 hours after commencing cask draining
SR 3.1.2.2	----------NOTE---------- Not required to be met prior to the specified Frequency. ---------- Verify that the cask cavity helium pressure is $\geq$ 1345 mbar absolute and $\leq$ 1445 mbar absolute.	Once prior leak testing (SR 3.1.3.1)

B 3.1 CASK INTEGRITY

B 3.1.1 Cask Cavity Vacuum Drying

BASES

BACKGROUND

A cask is placed in the spent fuel pool and loaded with fuel assemblies meeting the requirements of the Functional and Operating Limits. A lid is then placed on the cask. Subsequent operations involve lifting the cask above the fuel pool level, removing water from the cask fuel cavity, and then moving the cask to the decontamination area. After the cask lid is secured, vacuum drying of the cask cavity is performed and the cask cavity is backfilled with helium. During normal storage conditions, the cask is backfilled with helium, which is a better heat conductor than air, which results in lower temperatures for stored fuel and the basket.

Cavity vacuum drying is utilized to remove residual water/moisture from the fuel cavity after the cask has been drained of water. Any water which was not drained from the cask cavity evaporates from fuel or basket surfaces due to the vacuum. This is aided by the temperature increase due to the heat generation of the fuel.

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 protective environment is accomplished by removing water from the cask cavity and backfilling the cavity with an inert gas.

BASES (continued)

LCO

A vacuum drying pressure of less than the limit indicates that all liquid water has evaporated and has been removed from the cask cavity. Removing water from the cask cavity helps to ensure the long term minimization of fuel clad corrosion.

APPLICABILITY

Cavity vacuum drying is performed during LOADING OPERATIONS before the cask is transported to the ISFSI storage pad. Therefore, the vacuum requirements do not apply after the cask is backfilled with helium prior to TRANSPORT OPERATIONS and STORAGE OPERATIONS.

ACTIONS

The ACTIONS Table is modified by a Note indicating that a separate Condition entry is allowed for each cask. This Note is acceptable because the internal environment of one cask is independent of the internal environment of subsequent casks or adjacent casks. The Required Actions for each Condition provide appropriate compensatory actions for each cask not meeting the LCO. Subsequent casks that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions.

A.1

If the cask cavity drying pressure limit cannot be achieved the cask is to be placed back into the spent fuel pool within 7 days. Seven days is sufficient time to reflood the cask. Once placed in the spent fuel pool, the fuel is provided with adequate decay heat removal to maintain the loaded fuel within limits.

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.1.1.1

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.

Cask cavity dryness is demonstrated by evacuating the cask cavity to a high vacuum and verifying that the vacuum is held over a specified time period. A maintained high vacuum for the specified time period is an indication that no further evaporation is occurring and the cask cavity is dry. During the dryness demonstration period, the vacuum evacuation pump is to be isolated from the cask cavity. This is accomplished by closing the isolation valve and shutting down of vacuum pump or other system line-ups established to ensure a leaking evacuation pump isolation valve could not be inappropriately maintaining the vacuum in the cask.

The dryness demonstration must be performed successfully on each cask prior to placing the cask in storage. The dryness demonstration must be performed prior to completing the final helium backfill required by SR 3.1.2.2.

REFERENCES None.

B 3.1 CASK INTEGRITY

B 3.1.2 Cask Helium Backfill Pressure

BASES

BACKGROUND

A cask is placed in the spent fuel pool and loaded with fuel assemblies meeting the requirements of the Functional and Operating Limits. A lid is then placed on the cask. Subsequent operations involve lifting the cask above the fuel pool level, removing water from the cask fuel cavity, and then moving the cask to the decontamination area. After the cask lid is secured, vacuum drying of the cask cavity is performed and the cask cavity is backfilled with helium. For normal storage conditions, the cask is backfilled with helium, which is a better heat conductor than air, which results in lower temperatures for stored fuel and the basket.

Backfilling the cask cavity with helium promotes heat transfer from the fuel and the inert atmosphere protects the fuel cladding. Providing a helium pressure greater than atmospheric pressure ensures that there will be no in-leakage of air over the life of the cask.

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 the accident analysis (References 1 and 2).

BASES

APPLICABLE SAFETY ANALYSIS (continued)

The thermal analyses of the cask are performed assuming that helium is in the cask. But during the period from draining of the cask until evacuation of the air and its replacement by helium, heat conduction out of the fuel occurs through air, which has a lower conductivity than helium. A thermal analysis for TN-40HT casks has shown that under these conditions, the maximum fuel cladding temperature will remain below the limit of 752°F for at least 34 hours (Reference 3).

Establishment of even a low pressure helium environment satisfies the helium properties described in design basis thermal analyses because thermal conductivity of gases is not pressure dependent until a very high vacuum is attained.

The heat-up analysis for the TN-40 casks does not contain a time limit on when helium must be introduced into the cask to maintain acceptable fuel cladding temperature. However, the time derived for the TN-40HT casks, .i.e. the Frequency established for SR 3.1.2.1, is conservatively applied to TN-40 casks.

LCO

Backfilling the cask cavity with helium ensures that the heat transfer, is in accordance with cask design functions.

Backfilling the cask cavity with helium at a pressure exceeding atmospheric pressure will ensure that there will be no air in-leakage into the cavity which could damage the fuel cladding over the licensed storage period. An initial helium pressure limit is specified to ensure that the pressure within the cask remains within the design pressure limits over the life of the cask (Reference 3). The helium pressure is the as left value immediately after helium fill is completed in preparation for long term storage.

BASES (continued)

APPLICABILITY Helium backfill is performed during LOADING OPERATIONS prior to transporting the cask to the ISFSI storage pad.

ACTIONS The ACTIONS Table is modified by a Note indicating that a separate Condition entry is allowed for each cask. This Note is acceptable because the internal environment of one cask is independent of the internal environment of subsequent casks or adjacent casks. The Required Actions for each Condition provide appropriate compensatory actions for each cask not meeting the LCO. Subsequent casks that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions.

A.1

Required Action A.1 is modified by a Note which allows exiting this Required Action to vent the helium cask environment to perform subsequent actions that may be necessary to ready the cask for storage.

The thermal analyses of the cask are performed assuming that helium is in the cask. If the helium back fill pressure is not met, then actions must be initiated immediately to establish a helium environment.

A.2

If the helium backfill pressure cannot be obtained, actions must be taken to meet the LCO. Once the helium atmosphere is established by Required Action A.1, there is enough conduction to maintain the loaded fuel within its temperature limits and to prevent thermal expansion from damaging the basket. Therefore, no time limit is required for this action, other than completion prior to helium leak testing.

BASES

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.

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.

Establishment of even a low pressure (i.e. a fraction of a mbar) helium environment satisfies the helium properties described in design basis thermal analyses because thermal conductivity of gases is not pressure dependent until a high vacuum is attained. Thereby, design basis heat removal requirements will be satisfied provided some helium has been introduced to, and maintained in, the cask cavity within the 34 hour vacuum drying time frame analyzed in 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.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.2.2 (continued)

The long-term integrity of the stored fuel is dependent on storage in a dry, inert environment and maintenance of adequate heat transfer mechanisms. Filling the cask cavity with helium at the initial pressure specified will ensure that there will be no air in-leakage, which could potentially damage the fuel cladding, and that the cask cavity internal pressure will remain within limits for the life of the cask.

Backfilling with helium at a specified pressure must be performed successfully on each cask prior to performance of leak testing activities and TRANSPORT and STORAGE OPERATIONS.

REFERENCES

1. SAR Section 8.2.
2. SAR Section A8.2.
3. SAR Section A3.3.