

September 13, 2013

MEMORANDUM TO: Anthony Hsia, Deputy Director
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety
and Safeguards

FROM: Chris Allen, Project Manager */RA/*
Licensing Branch
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety
and Safeguards

SUBJECT: SUMMARY OF AUGUST 15, 2013, MEETING WITH NORTHERN
STATES POWER COMPANY TO DISCUSS THEIR AMENDMENT
REQUEST REVISING MINIMUM THERMAL CONDUCTANCE
REQUIREMENTS FOR TN-40HT CASK COMPONENTS (TAC NO.
L24773)

Background.

This was a category 1 public meeting between Northern States Power Company (NSPM) staff, U.S. Nuclear Regulatory Commission (NRC) staff, and stakeholders, to discuss the proposed Prairie Island independent spent fuel storage installation (ISFSI) license amendment request (LAR) to Special Nuclear Materials (SNM) license number SNM-2506. Regulatory commitments were not made at the meeting. NSPM provided presentation slides prior to the meeting. The slides can be found in the NRC's Agencywide Documents Access and Management System under accession number ML13224A377.

Discussion.

The meeting took place on August 15, 2013, at the Three White Flint Building in Rockville, Maryland. Attendees included NSPM staff, NRC's Division of Spent Fuel Storage and Transportation (SFST) staff, and one member of the public (via telephone). An agenda as well as an attendance list is enclosed (Enclosures 1 and 2, respectively). SFST and NSPM staff introduced themselves and made introductory remarks. Then, NSPM staff presented the background and the changes requested in the Prairie Island ISFSI LAR.

NSPM staff explained that neutron absorber plates (poison plates) are joined to aluminum plates as part of a dual plate construction and subsequently attached to the storage basket for reactivity control during storage. Prairie Island ISFSI Technical Specification (TS) 4.3.2.b requires the poison plates be tested for minimum conductivity. This ensures that the total conductance of the dual plate construction of poison and aluminum plates, which is dependent on both the thickness and the conductivity of the poison plates and aluminum plates, is at least 3.98 Btu/hr-°F. Tests of the first three TN-40HT baskets showed that TS 4.3.2.b was not met.

NSPM staff explained the main reason for the LAR was to revise the minimum thermal conductance requirements for TN-40HT cask components as follows:

1. establish a new section in the safety analysis report (SAR) to include the lower conductance thermal evaluation and to demonstrate that all temperature limits are met and bounded by previous thermal analyses,
2. revise the minimum thermal conductance of poison and aluminum plates in the TS 4.3.2.b from 3.98 to 3.55 Btu/hr-°F,
3. revise the minimum nominal thickness of aluminum plate in the TS 4.3.2.b at which thermal conductivity testing of poison plates is not required from 0.359 to 0.320 inches, and
4. revise conductivity and conductance values in the TS Table 4.3-3 based on the change to TS 4.3.2.b.

NSPM staff also explained the LAR would provide flexibility for manufacturing future baskets by allowing the use of more commercially available absorber and aluminum plate materials.

NSPM stated the objectives of the thermal analysis were to re-analyze all thermal conditions, to maintain the current SAR as bounding and to limit the impact of reducing the poison plate conductivity to thermal design functions. In the current SAR, normal/off-normal, accident (fire, buried cask, etc.) and vacuum drying are analyzed using both a full length model and a cross-section model. In the LAR, the full length model was used for all these conditions. The lower conductance analysis results indicated the maximum fuel cladding temperatures for the LAR remain bounded by the current SAR evaluations even with a lower poison plate conductivity value. NSPM stated that, while the current SAR will be updated with a section containing the results of the lower conductance analysis, the current SAR results remain conservatively bounding or unaffected. While the fuel cladding temperatures of the lower conductance analysis were even lower than in the SAR (design basis analysis) the SAR temperatures are not replaced by them. Thus, other analyses that use the thermal analysis results as an input are unaffected by the LAR. Finally, NSPM stated that the proposed TS changes do not impact the health and safety of the public. Model details as well as analytical results are discussed in ML13224A377.

During the meeting, SFST and NSPM staff discussed a variety of topics associated with the analytical models and the results. SFST staff inquired if the poison plates are physically attached to the aluminum plates for the entire length of the plates. NSPM responded that there was a gap between the two plates and that the gap in the model was greater than the actual gap for conservatism. SFST staff also asked about the variation between the design bases results versus the LAR analysis results. NSPM replied that, on average, the difference was approximately fifteen percent. SFST staff queried NSPM if it was appropriate to utilize air in the vacuum drying model instead of helium, and NSPM responded that the use of air during vacuum drying was permitted per the license conditions. SFST staff remarked that a range of conductivity values were published by the American Society of Mechanical Engineers and asked why NSPM only utilized a single value. NSPM explained their practice was to use nominal values. Additionally, NSPM pointed out that test specimens exhibited higher thermal conductivity values than those specified in American Society of Mechanical Engineers publications. SFST staff asked questions about the meaning of conductivity values in TS table 4.3-3 and if the underlying assumptions for fuel assembly decay heat associated with TS table 4.3-3 adequately reflected reality. NSMP responded that the conductivity values in TS table 4.3-3 were the minimum values required to transfer heat. They also pointed out that, because uniform loading was assumed, fuel assembly temperatures in the middle of the basket bounded fuel assembly temperatures on the periphery of the basket. Concerned about the performance of seals during a postulated fire accident, SFST staff questioned the adequacy of fuel assembly heat flux assumptions utilized in the fire analysis. NSPM responded that they felt the seals

would be more affected by heat from the fire than from the fuel assemblies, and they clarified their position during subsequent discussion of the model.

After discussing the technical aspects of the LAR, the review schedule was discussed. NSPM expressed a need for approval of the LAR by January 31, 2014, to support a loading campaign scheduled for spring 2014. They intend to use the three baskets previously fabricated of which the first will be at the site ready for loading in April 2014. The NRC stated that it has started its formal review and that, based upon a preliminary review schedule, issuance of an amended license might occur by the end of February 2014. Since the members of the public in attendance did not have any questions or comments, the meeting was adjourned at this time.

Docket No. 72-10

TAC No. L24773

Enclosures: 1. Attendees
2. Agenda

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| OFC: | SFST | SFST | SFST |
| NAME: | WAllen | WWheatley | MSampson |
| DATE: | 9-3-13 | 9/3/13 | 9/13/13 |

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MEETING ATTENDEES
Meeting Between Northern States Power Company
and the Nuclear Regulatory Commission
August 15, 2013

| | |
|------------------------|------------------|
| Chris Allen | NRC |
| Natreon Jordan | NRC |
| Joe Borowsky | NRC |
| David Tang | NRC |
| Alexander Velazquez | NRC |
| Chris Brown | NRC |
| JoAnn Ireland | NRC |
| Mark Lombard | NRC |
| Anna Lahkola | Foreign Assignee |
| Carlyn Greene | Ux Consulting |
| Mike Baumann | NSPM |
| Gene Eckholt | NSPM |
| Oley Nelson | NSPM |
| Don Shaw | Transnuclear |
| Kamran Tavassoli | Transnuclear |

AGENDA

Meeting Between Northern States Power Company
and the Nuclear Regulatory Commission
August 15, 2013

- Introduction
- Purpose of Meeting
- Background
- Proposed Changes
- Reason for Amendment Request
- Thermal Analysis
- Discussion/Q&A
- Summary/Closing Remarks
- Adjourn