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Constellation Energy

May 12, 2004

U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant; Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318
Independent Spent Fuel Storage Installation; Docket No. 72-8
Response to NRC Request for Additional Information Regarding License Amendment Request for Technical Specifications Revision to Support the ISFSI NUHOMS-32P® Upgrade and Supplemental Information

REFERENCES:

(a) Letter from Mr. G. Vanderheyden (CCNPP) to Document Control Desk (NRC), dated December 12, 2003, License Amendment Request: Revision to the Technical Specifications to Support the ISFSI NUHOMS-32P® Upgrade

(b) Letter from Mr. S. C. O'Connor (NRC) to Mr. G. Vanderheyden (CCNPP), dated April 6, 2004, "Request For Additional Information On Calvert Cliffs Independent Spent Fuel Storage Installation Amendment Application"

By Reference (a) we submitted a license amendment request to incorporate Technical Specification changes to support the Calvert Cliffs Independent Spent Fuel Storage Installation (ISFSI) NUHOMS-32P® Upgrade. The purpose of this letter is to provide our response to Nuclear Regulatory Commission (NRC) staff's request for additional information transmitted by Reference (b). In addition, this letter provides a calculation that updates the information provided in Attachments (5) and (7) of Reference (a) as a result of a radiological shielding design change to the NUHOMS-32P® Upgrade. The design change involves a slight reduction in canister lead shielding to accommodate an increase in the top shield plug plate thickness to meet future transportation requirements.

Attachment (1) provides the response to the request for additional information. Attachment (2) is an affidavit signed by Transnuclear, Inc., the owner of the proprietary information contained in the updated shielding calculation (Attachment 3). The affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission, and addresses, with specificity, the considerations listed in 10 CFR 2.390(b)(4). Accordingly, it is respectfully requested that the information that is proprietary to Transnuclear, Inc. be withheld from public disclosure. The non-proprietary version of this calculation is included in this transmittal for public disclosure (Attachment 4).

A001
NMSS01

Should you have questions regarding this matter, we will be pleased to discuss them with you.

Very truly yours,

STATE OF MARYLAND :
: **TO WIT:**
COUNTY OF CALVERT :

I, George Vanderheyden, being duly sworn, state that I am Vice President - Calvert Cliffs Nuclear Power Plant, Inc. (CCNPP), and that I am duly authorized to execute and file this License Amendment Request on behalf of CCNPP. To the best of my knowledge and belief, the statements contained in this document are true and correct. To the extent that these statements are not based on my personal knowledge, they are based upon information provided by other CCNPP employees and/or consultants. Such information has been reviewed in accordance with company practice and I believe it to be reliable.

Subscribed and sworn before me, a Notary Public in and for the State of Maryland and County of St. Mary's, this 12th day of May, 2004.

WITNESS my Hand and Notarial Seal:

Janet L. Scully
Notary Public

My Commission Expires:

March 25 2007
Date

GV/GT/bjd

Attachments:
(1) Response to the NRC Request for Additional Information
(2) Transnuclear, Inc. Proprietary Affidavit
(3) Proprietary Transnuclear, Inc. Calculation, "Shielding Evaluation with the new Top Shield Plug for NUHOMS-32P®" Document No. 1095-60, Revision No. 0
(4) Non-Proprietary Transnuclear, Inc. Calculation, "Shielding Evaluation with the new Top Shield Plug for NUHOMS-32P®" Document No. 1095-60, Revision No. 0

cc: S. C. O'Connor, NRC (10 copies)

(Without Enclosure 1 of Attachment 1 and Attachments 2, 3, 4)

J. Petro, Esquire
J. E. Silberg, Esquire
Director, Project Directorate I-1, NRC
G. S. Vissing, NRC
H. J. Miller, NRC
Resident Inspector, NRC
R. I. McLean, DNR

ATTACHMENT (1)

RESPONSE TO THE NRC REQUEST FOR

ADDITIONAL INFORMATION

Calvert Cliffs Nuclear Power Plant, Inc.
May 12, 2004

THERMAL

REQUEST 1

Explain why the maximum allowable decay heat generation rate can be held constant even when the neutron source term is increased by about 50%.

Revisions to Calvert Cliffs Technical Specifications includes an increase of the neutron source per assembly from a maximum of 2.23E8 for the NUHOMS-24P® to a maximum of 3.3E[8] n/sec for the NUHOMS-32P®. This information is needed to assure compliance with 10 CFR 72.122 and 72.128.

RESPONSE

Per Attachment A of Attachment (9) of the application (Reference 1), a combination of neutron source, gamma source, and heat source is selected to bound all assemblies that will be inserted into the Independent Spent Fuel Storage Installation (ISFSI). Note that the three criteria, namely the thermal, neutron dose, and gamma dose criteria are completely independent of each other.

The NUHOMS-24P® thermal calculations assume a decay heat of 660W per assembly as specified in Technical Specification Limiting Condition for Operation (LCO) 3.1.1(5). The neutron shielding calculations assume 2.23E8 n/sec/assembly as specified in Technical Specification 2.1. The gamma shielding calculations bound a photon source of 1.53E15 MeV/sec/assembly as specified in Technical Specification 2.1. All assemblies shall meet all three criteria before being inserted into the NUHOMS-24P® ISFSI. The NUHOMS-24P® thermal and dose calculations will bound all assemblies meeting these criteria.

Similarly, for the NUHOMS-32P® DSC, thermal calculations also assume a decay heat of 660W per assembly. The neutron shielding calculations assume 3.3E8 n/sec/assembly. The gamma shielding calculations bound a photon source of 1.53E15 MeV/sec/assembly. Any assembly meeting all three criteria may be inserted into the NUHOMS-32P® ISFSI. In other words, if an assembly meets the gamma and neutron criteria but not the decay heat limits, the assembly will not be inserted into a dry shielded canister (DSC). The NUHOMS-32P® thermal and dose calculations will bound all assemblies meeting these criteria.

The spent fuel pool residence time will be determined by the most limiting of the three criteria: thermal source, gamma source, and neutron source. For low-enrichment high-burnup assemblies, the neutron source is most limiting. Thus, an increase in the neutron source limit will correspond to a decrease in spent fuel pool residence time but an increase in neutron dose. For example, a 3.40 w/o assembly burned to 47 GWD/MTU and residing in the spent fuel pool for 11 years has a thermal source of 654.3W, a neutron source of 3.272E8 n/sec, and a gamma source of 1.308E15 MeV/sec. This assembly could be inserted into the NUHOMS-32P® DSC but not the NUHOMS-24P® DSC. It would take 22 years of spent fuel pool residence time for the neutron source to reach the 2.23E8 n/sec limit. Note that the thermal and gamma sources meet their respective limits at less than 11 years residence time. Increasing the NUHOMS-32P® neutron source limit to 3.3E8 n/sec has no effect on the gamma or thermal sources, since in both cases they are bounded by the design basis values. Note that some of the dose increase from the increased neutron source is partially offset by the NUHOMS-32P® basket design, which provides more internal shielding than the NUHOMS-24P® basket design.

In addition, Calvert Cliffs has only two NUHOMS-24P® DSCs remaining to load. We have enough spent fuel assemblies that meet the current limits to load these remaining DSCs. Since we plan to only load NUHOMS-32P® DSCs in the future we felt there was no need to revise the NUHOMS-24P® limits.

REQUEST 2

Explain the impact on the calculated total decay heat per assembly with respect to the increase in the maximum fuel assembly weight from 1300 lbs to 1450 lbs. Clarify how this increase in maximum fuel weight will not violate Limiting Condition for Operation (LCO) 3.1.1(5) for maximum allowed heat generation rates per fuel assembly.

Page 6 of Attachment (9) of the application, "ISFSI 24P Assembly Insertion Requirements," states that an assembly loading of 0.386 MTU was assumed in the decay heat calculations. Increasing the fuel assembly weight would likely be directly related to an increased assembly loading of greater than 0.386 MTU. This appears to invalidate the decay heat calculations. This information is needed to assure compliance with 10 CFR 72.122 and 72.128.

RESPONSE

The increase in weight from 1300 to 1450 lbs does not include any increase in uranium mass. The increase in assembly weight is to be used for structural calculations only and accounts for weight increases caused by other materials such as corrosion products and control rod storage.

REQUEST 3

Clarify whether the assumed assembly loading of 0.386 MTU used in decay heat calculations has been verified for the intended fuel to be stored at the ISFSI in both the NUHOMS-24P® and NUHOMS-32P® storage designs.

The use of unverified assembly loading could potentially invalidate the decay heat calculated values and therefore LCO 3.1.1(5) could be violated. This information is needed to assure compliance with 10 CFR 72.122 and 72.128.

RESPONSE

Per Calvert Cliffs ISFSI Updated Safety Analysis Report (USAR) Table 3.1-1, the design basis value of 0.386 MTU/assembly for the NUHOMS-24P® system is nominal and not bounding.

For the NUHOMS-32P® system, we are proposing a limiting assembly mass of 0.400 MTU. This number bounds all standard CE 14x14 fuel assemblies used at Calvert Cliffs. The ISFSI fuel loading procedure for the NUHOMS-32P® canister will include tables that are independently verified by two individuals and that ensure all spent fuel assemblies meet all applicable Technical Specifications including 3.1.1(5) prior to insertion into a DSC. The procedure tables were determined in calculation package CA06432, "32P Assembly Insertion Requirements," which assumes a limiting assembly mass of 0.400 MTU per assembly (see Enclosure 1).

REQUEST 4

Clarify whether the calculation of decay heat provided in Attachment (9) of the application, "ISFSI 24P Assembly Insertion Requirements," considers the uncertainties of calculated values.

Uncertainty values as low as 5% could result in fuel assemblies not meeting the maximum allowed heat generation rates per fuel assembly as it has been established by LCO 3.1.1(5). This information is needed to assure compliance with 10 CFR 72.122 and 72.128.

RESPONSE

When selecting the spent fuel assemblies for storage, we take into account the uncertainly in the burnup value. We reduce the burnup value limit of LCO 3.1.1(3) by the uncertainty reported in the topical report for our core physics code. The lower burnup limit is documented in the ISFSI fuel loading procedure tables that record the spent fuel assembly acceptance values. The lower burnup limit ensures that LCO 3.1.1(5) is met. Also, the new assembly mass value of 0.400 MTU/assembly in Enclosure 1 (CA06432, "32P Assembly Insertion Requirements") for the NUHOMS-32P® system is bounding for all standard CE 14x14 fuel assemblies.

RADIATION SAFETY

REQUEST

Explain why Technical Specification (TS) 2.1, "Fuel to be Stored at ISFSI," is not being revised to address changes in the gamma source term. The application requests only a change in the neutron source term.

The table on page 3 of Attachment 4 of the application, "Assembly Fuel Region Photon Source Term For 32P Shielding Analysis," shows the total photon source term as 4.31E15 photon/sec/assembly. Converting photon/sec/assembly into MeV/sec/assembly yields approximately 1.57[E15] MeV/sec/assembly. In TS 2.1, the gamma source per assembly must be < 1.53[E15] MeV/sec/assembly. The gamma source term from the NUHOMS-32P® appears to exceed the TS limit. This information is needed to assure compliance with 10 CFR 72.122 and 72.128.

RESPONSE

The gamma shielding calculations conservatively bound a photon source of 1.53E15 MeV/sec/assembly. The assembly fuel region source term used for the NUHOMS-32P®, as described on page 3 of Attachment (4) of the application (Reference 1), is the same as is given on page 70 of Attachment 9 of the application, "ISFSI 24P Assembly Insertion Requirements," where it is also shown as 1.539E15 MeV/sec/assembly. This includes photon sources from fuel fission products and actinides, as well as activation products in the cladding, upper and lower end fittings, and the plenum region. This photon source is the same as that used for the fuel region in the NUHOMS-24P® model. However, since the Monte Carlo N-Particle Transport Theory models for both the NUHOMS-24P® and NUHOMS-32P® utilized separate homogenized material regions for the upper end fitting, lower end fitting, and the plenum region, the activation sources specific to those regions were also included in those regions to ensure conservative modeling. These three end-region photon sources add an additional 2.13E13 MeV/sec/assembly to the model, for a total of 1.56E15 MeV/sec/assembly. The dose rates calculated using this source will bound an assembly with the Technical Specification 2.1 photon source limit of 1.53E15 MeV/sec/assembly.

All of the standard CE 14x14 assemblies currently stored in the spent fuel pool meet the 1.53E15 MeV/sec/assembly Technical Specification 2.1 limit with less decay time than is required to

meet the Technical Specification LCO 3.1.1(5) thermal limit, LCO 3.1.1(6) minimum cooling time, and Technical Specification 2.1 neutron source limit. There are no current plans to procure additional standard fuel assemblies. Only CE 14x14 value added pellet fuel assemblies are being procured today and they are not analyzed for storage in either the NUHOMS-24P® or NUHOMS-32P® ISFSI designs. Therefore, there was no need to request an increase in the Technical Specification 2.1 photon source term limit at this time.

CRITICALITY SAFETY

REQUEST

Revise the Technical Specifications to include the minimum required [B10] areal density for the borated aluminum canister neutron absorber plates. Additionally, revise the USAR to include the acceptance tests and criteria for the canister neutron absorber plates.

Minimum required [B10] areal density of the borated aluminum neutron absorber plates should be included in the Technical Specifications since any modification to this value could have a significant impact on criticality control of the storage system. The neutron absorber acceptance tests, for verifying the presence and uniformity of the minimum required absorber, are required if a percentage of poison material greater than 75% is considered in the criticality analysis.

This information is needed to ensure that the facility meets the criteria for nuclear criticality safety identified in 10 CFR 72.124.

RESPONSE

Enclosure (2) to this attachment contains the marked-up Technical Specification pages for the minimum required B10 areal density for the borated aluminum canister neutron absorber plates. Enclosure (3) contains the USAR information for the acceptance tests and criteria for the canister neutron absorber plates.

REFERENCE

1. Letter from Mr. G. Vanderheyden (CCNPP) to Document Control Desk (NRC), dated December 12, 2003, License Amendment Request: Revision to the Technical Specifications to Support the ISFSI NUHOMS-32P® Upgrade

ENCLOSURE (1)

32P ASSEMBLY INSERTION REQUIREMENTS

CA06432