UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

January 26, 2010

Mr. David A. Heacock
President and Chief Nuclear Officer
Dominion Nuclear Connecticut, Inc.
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060-6711

SUBJECT: MILLSTONE POWER STATION, UNIT NO. 3 – REQUEST FOR ADDITIONAL INFORMATION REGARDING THE SPENT FUEL POOL CRITICALITY AMENDMENT REQUEST (TAC NO. MD8251)

Dear Mr. Heacock:

By letter dated July 13, 2007 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML072000386), Dominion Nuclear Connecticut, Inc. (DNC) submitted a license amendment request (LAR) for a stretch power uprate (SPU) of Millstone Power Station, Unit 3 (MPS3). Included in a supplement dated July 13, 2007 (ADAMS Accession No. ML072000281), was a request to amend the MPS3 spent fuel pool (SFP) storage requirements. By letter dated March 5, 2008 (ADAMS Accession No. ML080660108), DNC separated the MPS3 SFP storage requirements request from the MPS3 SPU request.

By letters dated August 8, 2008, and February 2, 2009, the Nuclear Regulatory Commission (NRC) staff requested additional information (ADAMS Accession Nos. ML082001097 and ML090140227, respectively) regarding DNC's LAR. By letter dated September 30, 2008, DNC responded to the August 8, 2008, request (ADAMS Accession No. ML082770113). By letters dated March 5 and March 23, 2009, DNC responded to the February 2, 2009, request (ADAMS Accession Nos. ML0906505130 and ML0908306670, respectively). The NRC staff has reviewed DNC's response to these requests for additional information and determined that additional information is required in order to complete the review.

The enclosed questions were sent to Mr. William D. Bartron, of your staff, in draft form to ensure that the questions were understandable, the regulatory basis for the questions was clear, and to determine if the information was previously docketed. During a phone call with Mr. Bartron on January 21, 2010, it was agreed that you would provide a response by February 26, 2010.

If you have any questions, please contact me at 301-415-1603.

Sincerely,

Carleen J. Sanders, Project Manager
Plant Licensing Branch, LPLI-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-423

Enclosure:
Request for Additional information

cc w/ encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION

MILLSTONE POWER STATION, UNIT NO. 3

SPENT FUEL POOL CRITICALITY LICENSE AMENDMENT REQUEST

DOCKET NO. 50-423

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The August 8, 2008, and February 2, 2009, NRC letters contained questions 1-25, questions 26-30 are presented below.

26. In response to RAI # 5 DNC states:

> NUREG/CR-6665, Reference 4, identifies both specific power and operating history effects as weakly correlated to increased reactivity for discharged fuel assemblies. The maximum impact noted in Reference 4 is approximately 0.00200 Δ Keff. This result is caused by reduced power operation near the end of assembly depletion. The depletion calculations supporting the analysis presented in WCAP-16721-P do not include part power operation. Instead, the soluble boron concentration is maintained at a constant value above the cycle average value for the entire depletion. The spectral hardening from the presence of boron, especially at the end of the cycle when the concentration is several hundred ppm above physical values, provides additional margin to account for this potential impact. The use of additional margin is the approach suggested in Reference 4 for accounting for the potential for operating history effects.

In order to determine if the conservatism gained from taking credit for using a higher than actual soluble boron concentration during the simulated depletion of the fuel in the reactor is

enough to cover the 0.00200 Δ Keff, the NRC staff needs to know how much more than the actual boron concentration was used. Please provide additional information regarding how much soluble boron concentration was used during the simulated depletion of the fuel in the reactor compared to the actual.

27. In RAI #21 the licensee performed new criticality analysis using site specific burnup profiles.

    a. In RAI #21 the licensee determined penalties for burnups where the original analysis in WCAP-16721 was shown to be non-conservative. Those penalties were determined using a depletion code and criticality code different than that used in WCAP-16721. Since the development and utilization of the penalties constitutes more than just a comparison study, either provide a code validation or justify not performing a criticality code validation for the new code.

    b. In Table 21-6 there is a Burnup Worth column that is used to determine the penalty. Explain the basis and origin for that column.

    c. In RAI #21 the licensee indicates the depletion parameters used were the same as for WCAP-16721. Provide a list of the fuel assembly and depletion parameters used for each case in RAI #21.

    d. As part of the response to RAI # 21 the licensee states, "Since the limiting Top-1/3 Assembly comparison covers only existing No Blanket fuel from completed MPS3 cycles, credit has been taken for as-built fuel density, dish and chamfer fractions, Pre-Uprate (3411 MWt) core power, and as-operated cycle soluble boron concentration." In earlier RAI responses, the licensee took credit for having modeled these parameters conservatively.

        i. Since the No Blanket fuel modeling no longer has those conservatisms, explain how the earlier RAI responses are affected.

        ii. Since these parameters had been modeled conservatively in the original analysis, there were no biases or uncertainties included for these parameters. Since the No Blanket fuel modeling no longer has those conservatisms, explain how the biases and uncertainties are affected.

    e. In its RAI #21 response, the licensee states the title to technical specification (TS) Figure 3.9-4 will be changed. That change was not provided as part of the revised TS markup. Please revise the marked-up TS page to indicate that change.

28. In DNC's response to RAI #5, DNC claims that ignoring the Integrated Fuel Burnable Absorber (IFBA) is conservative. In that response, DNC claims that it is conservative to ignore the presence of IFBA when performing the depletion portion of a spent nuclear fuel criticality analysis. DNC's submittal states they performed two sets of analyses; one in which all residual IFBA was artificially removed after the depletion, and one in which all residual IFBA was retained after the depletion. DNC's submittal indicates that when the

residual IFBA is artificially removed the effect of neutron spectral hardening is shown, but when the residual IFBA is left in the fuel assembly, the residual IFBA overcomes the neutron spectral hardening with a conservative result.

There is no indication in NUREG/CR-6760 that any residual IFBA was artificially removed in reaching its conclusions. The information presented in NUREG/CR-6760 indicates that any residual IFBA was left in the fuel assembly when determining the effect. DNC response is inconsistent with NUREG/CR-6760 and has not been accepted by NRC staff in the past.

There is currently insufficient information in DNC's submittal to reconcile the different conclusions. Please provide a detailed comparison of DNC's analysis and the analysis performed in NUREG/CR-6760 and justify the differences.

29. In DNC's response to RAI #5, DNC states their fuel management does not use fixed burnable absorbers.

    a. Has MPS3 ever used any other flux suppression devices such as hafnium inserts to reduce the neutron dose to reactor vessel welds?
    b. If so, how do they affect the reactivity of the discharged fuel assemblies?

30. Please verify the average core exit temperature for nominal reactor coolant system (RCS) flow. Please verify the maximum core exit temperature for the minimum TS allowed RCS flow. Please provide the maximum fuel assembly exit temperature for the minimum TS allowed RCS flow. Please provide the moderator temperature used for each case in the RAI #21 responses.

If you have any questions, please contact me at 301-415-1603.

Sincerely,

/ra/

Carleen J. Sanders, Project Manager
Plant Licensing Branch, LPLI-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-423

Enclosure:
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ADAMS Accession No.: ML100200490 *via e-mail

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