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October 5, 2005

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Serial No.	05-617
MPS Lic/PRW	R0
Docket No.	50-423
License No.	NPF-49

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3
SUPPLEMENT TO REQUEST FOR A LICENSE AMENDMENT TO REVISE BURNUP LIMIT FOR ONE LEAD TEST ASSEMBLY (LBDCR LBC-MP3-04-004)

In a letter dated December 16, 2004, Dominion Nuclear Connecticut, Inc. (DNC), requested an amendment to Facility Operating License NPF-49 to revise the current fuel rod average licensing basis burnup limit for one lead test assembly (LTA) containing advanced zirconium based alloys to a limit not exceeding 71,000 MWD/MTU.

On August 25, 2005, DNC received questions regarding the submittal from the NRC via electronic mail. The attachment to this letter provides supplemental information in response to the questions provided by the NRC staff.

In accordance with 10 CFR 50.91(b), a copy of this supplemental information is being provided to the State of Connecticut.

There are no commitments made in this submittal.

If you have any questions or require additional information, please contact Mr. Paul R. Willoughby at (804) 273-3572.

Very truly yours,

Leslie N. Hartz
Vice President – Nuclear Engineering

Attachments: (1)

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COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by Leslie N. Hartz, who is Vice President - Nuclear Engineering, of Dominion Nuclear Connecticut, Inc. She has affirmed before me that she is duly authorized to execute and file the foregoing document in behalf of that Company, and that the statements in the document are true to the best of her knowledge and belief.

Acknowledged before me this 5th day of October, 2004.

My Commission Expires: August 31, 2008.

Margaret B. Bennett
Notary Public

(SEAL)

ATTACHMENT

LICENSING BASIS DOCUMENT CHANGE REQUEST (LBDCR) LBC-MP3-04-004 LICENSE AMENDMENT TO REVISE BURNUP LIMIT FOR ONE LEAD TEST ASSEMBLY

SUPPLEMENTAL INFORMATION

MILLSTONE POWER STATION UNIT 3
DOMINION NUCLEAR CONNECTICUT, INC

LICENSING BASIS DOCUMENT CHANGE REQUEST (LBDCR) LBC-MP3-04-004 LICENSE AMENDMENT TO REVISE BURNUP LIMIT FOR ONE LEAD TEST ASSEMBLY

SUPPLEMENTAL INFORMATION

In a letter dated December 16, 2004, Dominion Nuclear Connecticut, Inc. (DNC), requested an amendment to Facility Operating License NPF-49 to revise the current fuel rod average licensing basis burnup limit for one lead test assembly (LTA) containing advanced zirconium based alloys to a limit not exceeding 71,000 MWD/MTU.

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NRC Question 1

In determining that the gap fractions from Regulatory Guide (RG) 1.25, as modified in NUREG/CR-5009, can be extended to a higher lead test assembly (LTA) lead rod average burnup of 71 GWD/MTU, was any additional information considered, other than the cited NUREG and the NEI comment to Draft Regulatory Guide DG-1081 for the alternative source term? In the development of RG 1.183, the cited NEI comment to DG-1081 was previously found by the NRC staff to not resolve the uncertainty in high burnup fuel gap release and the supporting data provided insufficient information on gap release from fuel above 62 GWD/MTU.

DNC Response

The current fuel handling accident (FHA) analysis for Millstone Power Station Unit 3 (MPS3) is based on the guidance found in RG 1.183 which conservatively identifies a gap fraction of 0.08 for I-131 (the primary dose contributor), 0.10 for Kr-85, and 0.05 for other iodines and noble gases. With the uncertainties associated with the LTA having projected lead rod average burnup of about 71 GWD/MTU, the gap fractions were increased to the gap fractions identified in RG 1.25, as modified by NUREG/CR-5009. These gap fractions are 0.12 for I-131, 0.30 for Kr-85, and 0.10 for other iodines and noble gases.

As stated in DNC's December 16, 2004 submittal, the basis for assuming that the above increases in the gap fractions are reasonably conservative is found in the NEI letter to the NRC dated March 31, 2000, which discusses gap fractions for stable and long-lived fission gas as a function of burnup. The position presented in the NEI letter is that a gap fraction of 0.08 would be conservative for a burnup of 70 GWD/MTU and a gap fraction of 0.0925 would be conservative for a burnup of 75 GWD/MTU. Gap fractions for short-lived nuclides would be substantially lower. In comparison, use of gap fractions based on RG 1.25 and NUREG/CR-5009 would result in a significantly increased level of conservatism being applied.

The NRC question states that, during the development of RG 1.183, the NRC staff did not find that the NEI letter provided sufficient information on gap release from fuel above 62 GWD/MTU to resolve uncertainty regarding high burnup fuel gap release. It is assumed the NRC staff was not taking a potential burnup extension into consideration at that time but, instead, was limiting the review to the existing fuel burnup limit of 62 GWD/MTU.

The material in the NEI letter is based on supporting material listed in the letter. In addition to these references, the sufficiency in conservatism of the selected gap fractions is supported by the prediction of fission product gas release provided by the Westinghouse PAD code as discussed in the response to NRC Question 2 below.

It is recognized that the positions proposed in the NEI letter are not definitive regarding the gap fractions since the projection of the gap fractions for burnups beyond 64 GWD/MTU, while believed to be conservative, are not fully supported by empirical data at this time. The overall program to have LTAs experience burnups beyond 62 GWD/MTU will include the identification of the fraction of fission products entering the fuel/clad gap at these higher burnup levels to provide definitive empirical support and resolve the issue of uncertainty.

NRC Question 2

Describe the fission product gas release predicted for the fuel rods in the LTA by your fuel management program. Is the fuel management program validated to the power history and burnups expected for the LTA? Does the predicted fission product gas release tend to agree with the gap fractions you assumed for the LTA involved in a fuel handling accident (FHA)?

DNC Response

The fission product gas release predicted by the Westinghouse PAD code for the LTA fuel rods at their projected high burnup (approximately 71 GWD/MTU for the lead rod) is 7.8% as an upper bound for stable and long-lived nuclides. This is consistent with the NEI letter to the NRC, dated March 31, 2000, which recommends 8% for a burnup of 70 GWD/MTU and is well below the gap fractions that have been assumed for a FHA involving the LTA. High burnup fuel performance data is being obtained by Westinghouse from several on-going LTA programs. For a recent LTA program where high burnup fission gas release data has been measured, the PAD upper bound fission gas release model predictions bounded the measured fission gas release data. This provides confidence that the upper bound PAD fission gas release prediction for the MPS3 high burnup LTA is conservative.

NRC Question 3

On page 5 of Attachment 1 in the submittal dated December 16, 2004, it states that the current FHA dose analysis limiting calculated total effective dose equivalent (TEDE) is 4.9 rem for the Millstone 3 control room. However, the latest information the NRC staff has on the design basis FHA is from Rev. 17 of the MPNS-3 final safety analysis report (FSAR), in which the FHA control room dose result is listed as 4.46 rem TEDE. This is also the value reported in the alternative source term submittal, dated 3/4/03, which was approved on 3/17/04 as Amendment #219. Please explain this discrepancy.

NRC Question 4

The staff has performed an independent sensitivity analysis of the FHA to verify the licensee's assertion that the lower LTA peaking factor of 1.15 offsets the higher gap fractions. The staff's results show that an analysis with the LTA gave a slightly higher dose result both offsite and in the control room than an analysis assuming the assumptions as documented in the MPNS-3 FSAR.

A. **Was a design basis FHA dose analysis performed assuming damage to the high burnup LTA? If so, please provide a description of the analysis, including inputs, assumptions and results.**
B. **Were sensitivity analyses performed to determine the impact of the uncertainty in the gap fraction assumptions on the dose result? If so, please provide a description of the analyses, including inputs, assumptions and results.**

DNC Response to Questions 3 and 4.A

In a letter dated March 17, 2004, DNC received Amendment 219 for partial implementation of the AST for the FHA at MPS3. The FHA assumes all 264 fuel rods in the dropped fuel assembly are damaged as well as 50 rods in the fuel assembly upon which it was dropped. The dose to the MPS3 control room reported in that amendment was 4.46 rem TEDE. In a letter dated May 24, 2004, DNC made a submittal to the NRC regarding full implementation of the AST at MPS3. The FHA was reanalyzed in that submittal using ARCON96 X/Q's for the MPS3 control room and updated unfiltered inleakage rates based on tracer gas testing. The reported dose to the MPS3 control room from a FHA in the full implementation submittal for the AST is 4.9 rem TEDE.

In a letter dated December 16, 2004, DNC made a submittal to the NRC using a LTA as the dropped assembly in a FHA at MPS3. DNC intends to insert five LTAs in the MPS3 Cycle 12 reload. This will be the third irradiation cycle for these LTAs. One LTA will be used as a center assembly in order to obtain high burnup data. Because the lead rod average burnup is projected to exceed the current licensing basis limit of 62,000

MWD/MTU, conservative gap fractions are applied to the entire contents of the dropped assembly using gap fraction recommendations from RG 1.25, as modified by NUREG/CR-5009. The third cycle LTA, as the center assembly, has a lower analyzed peaking factor of 1.15 for the lead rod. The lower factor of 1.15 is credited for the limiting LTA assumed in the FHA in place of the lead rod peaking factor of 1.70 used for fuel limited to an irradiation of 62,000 MWD/MTU.

The FHA analysis contained in the December 16, 2004 submittal for the dropping of an LTA uses the base assumptions contained in the FHA analysis submitted on May 24, 2004 for full AST implementation and currently being reviewed by the NRC. The reported dose to the MPS3 control room from the May 24, 2004 submittal was 4.9 rem TEDE. The revised dose to the MPS3 control room in the December 16, 2004 submittal involving an LTA is slightly lower, but is also reported as 4.9 rem TEDE. If the base assumptions for the dropping of an LTA were to use the existing FSAR values for partial implementation of AST, approved in Amendment 219, dated March 17, 2004, the revised dose also decreases slightly from the reported value of 4.46 rem TEDE. In either case, dropping of the LTA upon another assembly using the conservative gap fractions and revised peaking factor for the LTA results in a slight decrease in the MPS3 control room dose as well as EAB and LPZ dose.

Table 1 below lists the common assumptions used in the three dose analyses discussed (e.g., 1. Amendment 219, March 17, 2004; 2. AST submittal, May 24, 2004; and 3. LTA submittal, December 16, 2004). Each analysis is performed using the AST for the MPS3 FHA at the MPS3 Control Room. Table 2 lists the different assumptions used in the three dose analyses. Table 3 compares the analyzed doses from the three dose analyses for the MPS 3 control room, EAB and LPZ. The reported doses in the May 24, 2004, and December 16, 2004, submittals were rounded-up for conservatism from the values as shown in Table 3.

Per a phone conversation on September 8, 2005, between DNC and the NRC, the responses to Questions 3 and 4.A above obviates the need to answer Question 4.B.

Table 1: Common FHA Assumptions

Assumption	**Value**
Iodine chemical form	Elemental: 57% Organic: 43%
Pool Decontamination Factor	Iodines: 200 Noble gases: 1
Decay Time	100 hours
Control Room Volume	2.38E+05 ft3
Control Room Isolation Time	10 seconds
Control Room Filtered Recirculation Rate	666 cfm
Control Room Filtered Intake Rate	230 cfm

Table 2: Specific FHA Assumptions

Parameter	**Amendment 219, dated March 17, 2004**	**AST Submittal dated May 24, 2004**	**LTA Submittal dated December 16, 2004**	
Fuel Damage	1 assembly plus 50 rods in the struck assembly	1 assembly plus 50 rods in the struck assembly	1 LTA plus 50 rods in the struck assembly (non-LTA)	
Gap Fractions	Halogens: 8% Noble gases: 10%	Halogens: 8% Noble gases: 10%	**LTA**	I-131: 12% Kr-85: 30% Halogens: 10% Noble Gas: 10%
			Non-LTA	Halogens: 8% Noble gases: 10%
Peaking Factor	1.7	1.7	LTA: 1.15 Non-LTA: 1.7	
Control Room Filter Efficiencies	95% all iodines	90% - particulate & elemental 70% - organic	90% - particulate & elemental 70% - organic	
Intake Flow Prior to Control Room Isolation	1450 cfm	1595 cfm	1595 cfm	
Control Room Unfiltered Inleakage	300 cfm at all times	350 cfm for 101 minutes 100 cfm during filtered intake	350 cfm for 101 minutes 100 cfm during filtered intake	
Control Room X/Q	3.75E-03 sec/m^3	2.82E-03 sec/m^3	2.82E-03 sec/m^3	

Table 3: FHA Doses

<u>**TEDE**</u>	**Amendment 219, dated March 17, 2004 (rem)**	**AST Submittal dated May 24, 2004 (rem)**	**LTA Submittal dated December 16, 2004 (rem)**
Unit 3 Control Room	4.46E+00	4.83E+00	4.82E+00
EAB	2.38E+00	2.38E+00	2.26E+00
LPZ	1.28E-01	1.28E-01	1.22E-01