Dominion Nuclear Connecticut, Inc.
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January 10, 2008

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2378

Serial No.: 07-0834A
NLOS/MAE: R0
Docket No.: 50-423
License No.: NPF-49

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING
STRETCH POWER UPRATE LICENSE AMENDMENT REQUEST
RESPONSE TO QUESTION CPNB-07-0048

Dominion Nuclear Connecticut, Inc. (DNC) submitted a stretch power uprate license amendment request (LAR) for Millstone Power Station Unit 3 (MPS3) in letters dated July 13, 2007 (Serial Nos. 07-0450 and 07-0450A), and supplemented the submittal by letters dated September 12, 2007 (Serial No. 07-0450B) and December 13, 2007 (Serial No. 07-0450C). The NRC staff forwarded requests for additional information (RAIs) in October 29, 2007 and November 27, 2007 letters. DNC responded to the RAIs in letters dated November 19, 2007 (Serial No. 07-0751) and December 17, 2007 (Serial No. 07-0499).

The NRC staff forwarded an additional RAI in a December 14, 2007 letter. The response to question CPNB-07-0048 of this RAI is provided in the attachment to this letter.

The information provided by this letter does not affect the conclusions of the significant hazards consideration discussion in the December 13, 2007 DNC letter (Serial No. 07-0450C).

Should you have any questions in regard to this submittal, please contact Ms. Margaret Earle at 804-273-2768.

Sincerely,

Leslie N. Hartz
Vice President - Nuclear Support Services

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 Support Services 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 10TH day of January, 2008.

My Commission Expires: May 31, 2010.

Vicki L. Hull
Notary Public

VICKI L. HULL
Notary Public
Commonwealth of Virginia
140542
My Commission Expires May 31, 2010

Commitments made in this letter: None

Attachment

cc: U.S. Nuclear Regulatory Commission
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Mr. S. W. Shaffer
NRC Senior Resident Inspector
Millstone Power Station

Director
Bureau of Air Management
Monitoring and Radiation Division
Department of Environmental Protection
79 Elm Street
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ATTACHMENT

LICENSE AMENDMENT REQUEST

STRETCH POWER UPRATE LICENSE AMENDMENT REQUEST

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

RESPONSE TO QUESTION CPNB-07-0048

MILLSTONE POWER STATION UNIT 3
DOMINION NUCLEAR CONNECTICUT, INC.

Piping and Non-Destructive Examination Branch

CPNB-007-0048

Section 2.1.5.2.3 of the licensee's submittal discusses, in part, degradation of nickel base Alloy 600/82/182 materials. The licensee's evaluation based on 4.3°F increase temperature for Alloy 600/82/182 components exposed to the hot leg temperature shows a reduction of approximately 18 percent in the remaining nozzle lifetimes before primary water stress-corrosion cracking (PWSCC) initiation. Please discuss how the inspections in MRP-139, tables 6-1 and 6-2 are adequate to detect PWSCC in a timely fashion, and any impact the increased temperature has on crack growth rate and inspection frequency of the welds. Also, discuss what mitigative actions and associated inspections are planned for Alloy 600/82/182 materials subject to the higher temperatures.

DNC Response

For Millstone Power Station 3 (MPS3), the only reactor coolant loop piping locations with PWSCC susceptible materials are the Reactor Pressure Vessel (RPV) hot and cold leg nozzles. The most recent volumetric inspection of these locations in 3R11 detected no cracking. Unmitigated hot leg locations with no cracking fall into PWSCC Category D of MRP-139 Table 6-1 for volumetric inspection requirements. Category D requires the same 5 year inspection interval for hot leg locations as for pressurizer locations, which operate at 653°F. However, there is new information being evaluated by ASME, which shows an increase in operating temperature above 624°F could increase the potential for PWSCC at these locations and would suggest that a once every other refueling outage inspection interval be used. Because of this new information MPS3 has chosen to consider this new threshold temperature in its evaluation to determine the appropriate inspection interval for its hot leg locations.

Operating temperature has been used as the basis for inspection interval determinations in MRP-139. The timing between pressurizer, hot leg, and cold leg temperatures reflects the transition in the slope of the crack growth curve. The transition occurs at approximately 608°F. The growth rate above this temperature is significantly greater and conversely significantly slower below this temperature. There is an interdependence between operating temperature and effective stress that results in exponential crack growth rates as temperature increases above this threshold temperature. This correlation was the basis used for the inspection interval determinations in MRP-139.

The qualitative results of considering the information above shows that MPS3 is conservative in keeping the Category D, 5 year inspection interval. The maximum

operating temperature of 622.6°F, which is based upon the maximum Tavg and the thermal design flow, was used as the threshold value for consideration. This value is still below the new threshold temperature of concern. Thus, the Category D, volumetric inspection interval should remain adequate for the SPU operating conditions until the flaw growth and tolerance evaluation described below is completed. If the results of the evaluation show that a shorter inspection interval will be required, then that interval will be implemented for all the hot leg locations of concern.

In MRP-139 Table 6-2, unmitigated hot leg locations, regardless of examination status, fall into PWSCC Category J and unmitigated cold leg locations fall into PWSCC Category K. Table 6-2 requires bare metal visual examinations of both Category J and K locations. However, for locations subject to periodic volumetric examinations, the bare metal visual examination provides minimal additional assurance of weld integrity. Moreover, because of the MPS3 design, personnel access to remove insulation and perform a bare metal examination of the RPV hot and cold leg nozzles is radiologically not practicable. Instead, under the rules for alternatives to MRP requirements, Millstone plans to perform a flaw growth and tolerance analysis on a plant-specific basis to show that the MRP-139 volumetric inspection interval is adequate for managing potential PWSCC of the RPV hot and cold leg nozzle locations so that the bare metal visual examination is not required. This alternative and evaluation is a matter of MRP-139 compliance under current operating conditions, and is needed irrespective of plans for power up-rate. However the evaluation will be performed for SPU operating conditions. Thus the reference to visual examinations per MRP-139 Table 6-2 in the application should be deleted. The statement in the 5th paragraph of page 2.1-61 should thus read: "Specifically, MPS3 will inspect the reactor vessel inlet and outlet nozzles in accordance with MRP-139 Table 6-1, which requires volumetric inspection of hot leg nozzle welds every 5 years and cold leg nozzles every 6 years unless mitigative actions are taken. Prior to cycle 13, a flaw growth and tolerance evaluation that considers the increased SPU piping temperatures will be performed to confirm that the 5 year volumetric inspection frequency is adequate for PWSCC management."

MPS3 has an on-going program to mitigate piping welds subject to PWSCC. The pressurizer welds have already been mitigated. There are plans to mitigate the hot leg and cold leg RPV nozzles, however the technology and schedule for doing this are not yet finalized. Due to the nozzle inaccessibility described above, a full structural weld overlay mitigation is not feasible. Other mitigation technologies are being considered. Mitigation plans for the RPV nozzles will be updated when demonstrated mitigation techniques become available.