



May 21, 2008

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

Serial No.: 07-0450I
NLOS/MAE: R1
Docket No.: 50-423
License No.: NPF-49

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3
STRETCH POWER UPRATE LICENSE AMENDMENT REQUEST
ADDITIONAL INFORMATION IN CONNECTION WITH THE NRC AUDIT HELD
ON MAY 13, 2008 IN ROCKVILLE, MARYLAND

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), December 13, 2007 (Serial No. 07-0450C), March 5, 2008 (Serial No. 07-0450D), March 27, 2008 (Serial No. 07-0450E) and April 24, 2008 (Serial No. 07-0450F). The NRC staff forwarded requests for additional information (RAIs) in October 29, 2007, November 26, 2007, December 14, 2007, December 20, 2007 and April 23, 2008 letters. DNC responded to the RAIs in letters dated November 19, 2007 (Serial No. 07-0751), December 17, 2007 (Serial No. 07-0799), January 10, 2008 (Serial Nos. 07-0834, 07-0834A, 07-0834C, and 07-0834F), January 11, 2008 (Serial Nos. 07-0834B, 07-0834E, 07-0834G, and 07-0834H), January 14, 2008 (Serial No. 07-0834D), January 18, 2008 (Serial Nos. 07-0846, 07-0846A, 07-0846B, 07-0846C, and 07-0846D), January 31, 2008 (Serial No. 07-0834I), February 25, 2008 (Serial Nos. 07-0799A and 07-0834J), March 10, 2008 (Serial Nos. 07-0846E and 07-0846F), March 25, 2008 (Serial No. 07-0834K), April 4, 2008 (Serial No. 07-0834L), April 29, 2008 (Serial No. 08-0248) and May 15, 2008 (Serial No. 08-0248A).

Please find attached Westinghouse Electric Company's letter NEU-08-31, "Millstone Unit 3 (NEU) Stretch Power Uprate (SPU) Program Rod Withdrawal at Power (RWAP) Peak Reactor Coolant System Pressure", dated May 19, 2008. This letter is provided to the NRC in connection with the NRC's recent audit held on May 13, 2008 in Rockville, Maryland.

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).

Commitments made in this letter: None

Attachment

cc: U.S. Nuclear Regulatory Commission
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Regional Administrator
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NRC Senior Resident Inspector
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ATTACHMENT

STRETCH POWER UPRATE LICENSE AMENDMENT REQUEST

WESTINGHOUSE ELECTRIC COMPANY'S LETTER NEU-08-31
MILLSTONE UNIT 3 (NEU) STRETCH POWER UPRATE (SPU) PROGRAM
ROD WITHDRAWAL AT POWER (RWAP) PEAK REACTOR COOLANT
SYSTEM PRESSURE

MILLSTONE POWER STATION UNIT 3
DOMINION NUCLEAR CONNECTICUT, INC.



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Customer P.O.: 70155283
W Sales Order: 38944
Our ref: NEU-08-31

Schedule WBS: N/A
Schedule Activity: N/A

May 19, 2008

**DOMINION NUCLEAR CONNECTICUT
MILLSTONE POWER STATION – MILLSTONE UNIT 3
Millstone Unit 3 (NEU) Stretch Power Uprate (SPU) Program
Rod Withdrawal at Power (RWAP) Peak Reactor Coolant System Pressure**

Dear Mr. Thomas:

The purpose of this letter is to transmit the Millstone Unit 3 (NEU) Stretch Power Uprate (SPU) Program Rod Withdrawal at Power (RWAP) Peak Reactor Coolant System Pressure. This is contained in Attachment 1.

If you have any questions concerning this matter, please contact me at 412-374-6345.

Very truly yours,

WESTINGHOUSE ELECTRIC COMPANY

A handwritten signature in black ink that reads "R.C. Grandys /for".

Donna Rogosky
Customer Project Manager

/am

Attachment

cc:	M. Kai	Dominion
	M. O'Connor	Dominion
	J. A. Lewis	Dominion
	J. Murray	Dominion
	B. S. Kaufman	Dominion
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	R. C. Grendys	Westinghouse
	D. Rogosky	Westinghouse
	D. P. Dominicis	Westinghouse
	D. C. Kovacic	Westinghouse
	Y. Stetson	Westinghouse
	A. Marshall	Westinghouse
	NEU Project Letter File	

Internal Reference: LTR-TA-08-103

Attachment 1

Introduction

This letter provides supplemental information regarding the potential for reactor coolant system (RCS) pressure exceeding the limit (110 percent of the design value) as a result of a rod withdrawal at power (RWAP) event for the Millstone Unit 3 Stretch Power Uprate (SPU). A conservative generic analysis, which bounds most Westinghouse plants, demonstrated that the existing plant protection features are adequate for preventing the RCS pressure from exceeding the limit. However, it has been noted that the proposed SPU NSSS power (3666 MWt) exceeds the NSSS power modeled in the generic analysis (3608 MWt). Therefore, sensitivity calculations were performed to quantitatively demonstrate that, given other conservatisms in the generic analysis, it remains applicable for Millstone Unit 3 at the SPU conditions.

Generic Analysis Description

The generic RWAP RCS pressure analysis was performed with the LOFTRAN computer code (Reference 1). As in other peak RCS pressure analyses (e.g., loss of load/turbine trip), conservative initial condition uncertainties and modeling features are applied in the generic RWAP analysis so as to maximize the resultant peak RCS pressure. In order to obtain conservative RCS pressure results that can be applied to multiple plants, the following assumptions were made in the generic RWAP analysis:

- (1) The initial NSSS power level is 8 percent of 3608 MWt. Eight percent corresponds to the minimum power level at which the high neutron flux low setting reactor trip can be blocked (10 percent) minus 2 percent uncertainty.
- (2) Minimum reactivity feedback, including a +7 pcm/°F moderator temperature coefficient, was assumed in the generic study to allow the core power to increase more rapidly, which results in a greater power mismatch between the primary and secondary systems.
- (3) The range of positive reactivity insertion rates considered is consistent with the bounding range that was examined in the RWAP DNB analysis. A sensitivity study showed that insertion rates less than 20 pcm/sec are non-limiting with respect to RCS pressure. The maximum reactivity insertion rate analyzed was 110 pcm/sec, which exceeds the maximum possible reactivity insertion rate associated with the simultaneous withdrawal of the two control rod banks having the maximum combined worth at the maximum speed.
- (4) The initial reactor vessel average temperature (T_{avg}) is 586.5°F, which is very conservative (high) for an initial power level of 8 percent; a high initial T_{avg} is conservative because the rate of liquid expansion becomes more severe with increased temperature.
- (5) The initial pressurizer water level, which corresponds to 10% power plus uncertainty, is 35.1% of span. Maximizing the initial pressurizer water level minimizes the available pressurizer vapor volume space and maximizes the net pressurization effect for a given pressurizer liquid insurge.
- (6) Accounting for an uncertainty of ± 50 psi, cases were evaluated at initial pressurizer pressure values of 2200 psia and 2300 psia. A sensitivity study showed that the direction

of conservatism is dependent on the reactivity insertion rate, and thus a range of initial pressurizer pressure values was considered.

- (7) There was no credit taken for the pressurizer power-operated relief valves' (PORVs) relief capacity.
- (8) There was no credit taken for the pressurizer spray system to control RCS pressure.
- (9) There was no credit taken for the steam dump control system.
- (10) The pressurizer safety valve (PSV) lift setpoints were assumed to be at a maximum value of 2600 psia, which accounts for 3 percent setpoint tolerance plus 1 percent setpoint shift. The setpoint shift is modeled along with a purge delay time of 1.5 seconds to account for water-filled PSV loop seals as discussed in WCAP-12910 Rev. 1-A (Reference 2).
- (11) A maximum (bounding for all 4-loop plants) pressurizer surge line friction factor was applied to maximize the pressure drop between the RCS and pressurizer, and thereby maximize the peak RCS pressure during PSV relief conditions.
- (12) Maximum (bounding for all 4-loop plants) main steam safety valve setpoints were applied to delay the secondary-side steam relief.
- (13) The generic RWAP analysis showed that the following two reactor trip functions were sufficient in helping (along with the PSVs) provide the protection required to limit the peak RCS pressure to an acceptable level: high pressurizer pressure (HPPT = High Pressurizer Pressure Trip) and high positive neutron flux rate (PFRT = Positive Flux Rate Trip). For the HPPT, a setpoint of 2440 psia and a signal delay time of 2 seconds were applied. For the PFRT, a setpoint of 9 percent with a time constant of 2 seconds and a signal delay time of 3 seconds were applied.
- (14) The RCCA trip insertion characteristics were based on the assumption that the highest worth assembly is stuck in its fully withdrawn position.

The generic analysis for 4-loop Westinghouse plants resulted in peak RCS pressures for RWAP events of 2708 psia and 2704 psia with plus and minus initial pressure uncertainties, respectively.

Comparison with Millstone Unit 3 SPU

Table 1 provides a comparison of the critical input parameters between the generic analysis input and the Millstone Unit 3 SPU configuration. As noted in Table 1, the only Millstone Unit 3 SPU critical input parameters not bounded by the generic analysis are the nominal (100%) NSSS power and the initial pressurizer water level. On the other hand, there are several parameters in the generic analysis which are overly conservative with respect to the SPU. Of particular note, Millstone Unit 3 does not have water-filled loop seals, so there is no PSV loop seal purge delay.

Table 1			
Comparison of Westinghouse Generic RWAP RCS Pressure Analysis Critical Parameters to Millstone Unit 3 SPU Parameters			
Critical Parameter	Generic Analysis	Millstone Unit 3 SPU	Is Generic Analysis Parameter Bounding?
Nominal (100%) NSSS Power	3608 MWt	3666 MWt	No
Power Uncertainty	-2%	-2%	Yes
Moderator Temperature Coefficient	+7 pcm/°F	+5 pcm/°F	Yes
Maximum Reactivity Insertion Rate	110 pcm/sec	110 pcm/sec	Yes
Initial Vessel Average Temperature (at 10% power), Including Uncertainty	586.5°F	565.25°F	Yes
Initial Pressurizer Water Level	35.1 % of span	39.2 % of span	No
Nominal RCS Pressure	2250 psia	2250 psia	Yes
RCS Pressure Uncertainty	±50 psi	±50 psi	Yes
PSV Setpoint, Including Tolerance and Setpoint Shift	2600 psia	2575 psia	Yes
PSV Loop Seal Purge Delay	1.50 sec	0.0 sec ⁽¹⁾	Yes
HPPT Setpoint	2440 psia	2425 psia	Yes
HPPT Delay	2.0 sec	2.0 sec	Yes
PFRT Setpoint / Rate Time Constant	9.0% / 2 sec	6.08% ⁽²⁾ / 2 sec	Yes
PFRT Delay	3.0 sec	0.5 sec	Yes

(1) Millstone Unit 3 does not have water-filled loop seals.

(2) Based on the nominal trip setpoint of 5.0% plus the uncertainty of 1.08%.

In order to quantify the cumulative impact of the higher NSSS power, the higher initial pressurizer level, and the fact that there are no water-filled loop seals at Millstone Unit 3, the following sensitivity cases were run using the LOFTRAN code.

- The generic analysis was modified to model the SPU NSSS power of 3666 MWt with initial pressurizer pressures of 2300 psia and 2200 psia (2250 psia \pm 50 psi).
- The generic analysis was modified to model the SPU NSSS power of 3666 MWt and the SPU initial pressurizer water level of 39.2% span with initial pressurizer pressures of 2300 psia and 2200 psia.
- The generic analysis was modified to model the SPU NSSS power of 3666 MWt, the SPU initial pressurizer water level of 39.2% span, and a PSV loop seal purge delay time of 0.0 second with initial pressurizer pressures of 2300 psia and 2200 psia.

Table 2 summarizes the results of these cases in comparison to the generic analysis results. As noted previously, the generic analysis resulted in a peak RCS pressure of 2708 psia. For the two cases with the SPU power modeled, the peak RCS pressures reached is 2716 psia. For the cases where the initial pressurizer water level was increased to correspond to the Millstone Unit 3 SPU program, the peak RCS pressure increased to 2730 psia. Note that these cases also modeled the increased power. Therefore, when the generic analysis is run with all critical parameters bounding the Millstone Unit 3 SPU values, the peak RCS pressure remained below the limit of 2750 psia. For the cases with the PSV loop seal purge delay time removed, the peak RCS pressure decreased to 2703 psia. This is bounded by the results of the generic analysis. Note that these cases are still very conservative since the Tavg, moderator temperature coefficient, HPPT setpoint, PFRT setpoint, PFRT delay, and the PSV setpoint have not been modified. Therefore, the generic analysis remains applicable as a bounding analysis for Millstone Unit 3 at SPU conditions.

Table 2	
Peak RCS Pressure Results	
Case Description	Peak RCS Pressure (+/- Initial Pressure Uncertainty)
Generic Case	2708 psia / 2704 psia
NSSS Power = 3666 MWt	2716 psia / 2700 psia
NSSS Power = 3666 MWt, and Initial Pressurizer Water Level = 39.2%	2730 psia / 2709 psia
NSSS Power = 3666 MWt, Initial Pressurizer Water Level = 39.2%, and PSV Loop Seal Purge Delay = 0.0 second	2703 psia / 2666 psia

Conclusion

The results of the analysis demonstrate that a RWAP event will not result in RCS overpressurization for Millstone Unit 3 at the SPU conditions. When the critical parameters in the generic analysis are compared with the Millstone Unit 3 parameters at the SPU conditions, only the NSSS power and the pressurizer water level are not bounded. The sensitivities documented above show that when the Millstone Unit 3 SPU power level and pressurizer water level are accounted for, the peak RCS pressure remains below the limit value. In addition, when credit is taken for the fact that the plant does not have water-filled loop seals which would cause a delay in PSV relief, the peak RCS pressure is less limiting than that reached in the generic analysis. Therefore, the generic analysis is applicable to Millstone Unit 3 at the SPU conditions.

References

1. WCAP-7907-A, "LOFTRAN Code Description," T. W. T. Burnett, April 1984.
2. WCAP-12910 Revision 1-A, "Pressurizer Safety Valve Set Pressure Shift, WOG Project MUHP 2351/2352," G.O. Barrett, June 1993 (Westinghouse Proprietary Class 2).