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

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DOMINION NUCLEAR CONNECTICUT, INC. (DNC)
MILLSTONE POWER STATION UNIT 3
LICENSEE QUALIFICATION FOR PERFORMING
DYNAMIC ROD WORTH MEASUREMENT ANALYSIS

Dominion Nuclear Connecticut, Inc. (DNC) intends to use Westinghouse supplied methods to perform physics calculations in support of Dynamic Rod Worth Measurement (DRWM) for low power physics testing of Millstone Unit 3. This testing will take place on or about May 1, 2004. The Safety Evaluation Report issued by the Nuclear Regulatory Commission (NRC) for WCAP-13360-P-A, "Westinghouse Dynamic Rod Worth Measurement Technique" contains the requirement to provide to the NRC confirmation that the competencies to perform DRWM design calculations will be demonstrated. Attachments 1 and 2 demonstrate that these criteria have been met for Millstone Unit 3. Documentation of training, qualification and benchmark calculations is available at the Millstone site for NRC review.

There are no regulatory commitments contained within this letter.

If you should have any questions regarding this submittal, please contact Mr. Paul R. Willoughby at (804) 273-3572.

Very truly yours,

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Attachments (2)

A001

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Attachment 1

Millstone Power Station Unit 3
Demonstration of the Ability To Perform Computations to Support
Dynamic Rod Worth Measurements

Millstone Power Station Unit 3
Demonstration of the Ability To Perform Computations to Support Dynamic Rod Worth Measurements

1.0 INTRODUCTION

Westinghouse performed the initial application of Dynamic Rod Worth Measurements (DRWM) at Millstone Unit 3 on March 21, 2001. A subsequent application was performed on October 4, 2002. Dominion Nuclear Connecticut (DNC) now intends to perform the analytical computations necessary to support the DRWM.

Attachment 2 contains the criteria identified in the Nuclear Regulatory Commission (NRC) SER and is required to be addressed in order to perform computations to support DRWM. Successfully meeting these criteria constitutes inherent approval to use DRWM in Low Power Physics Testing (LPPT). This report demonstrates that these criteria have been met.

Personnel performing computations to support DRWM were trained by Westinghouse in these computations on November 4 and 5, 2002 and received procedures on how to perform these computations at that time. This training included the ability to set up input, understand and interpret output results, understand applications and limitations, and to perform analyses in compliance with the procedures provided by Westinghouse.

Cross sections to support DRWM computations were obtained from the PHOENIX-P lattice physics code (See Reference [1]). The flux solutions for these computations are obtained from the ANC code (see Reference [2]). NRC review and approval of these codes and associated procedures is contained in Reference [3]. Application of these codes and procedures and the Westinghouse DRWM procedure is controlled by the DNC quality assurance program defined in Reference [4]. This quality assurance program meets the requirements of 10 CFR 50, Appendix B.

2.0 COMPARISON OF RESULTS

TABLE 1 provides the DRWM measured and predicted rod worths based on Westinghouse predictions for the Millstone Unit 3 Cycle 9 LPPT. TABLE 2 provides the DRWM measured and predicted rod worths based on DNC predictions for the Millstone Unit 3 Cycle 9 LPPT.

TABLE 3 compares the predicted rod worths based on Westinghouse and DNC data. TABLE 4 compares the rod worths measured by the DRWM technique to support the measured data using Westinghouse analytical data and DNC analytical data.

3.0 DISCUSSION OF RESULTS

Comparing Westinghouse and DNC predicted results, it can be seen from TABLE 3 that the maximum percent difference in the predicted worth of any bank is 0.0%, and the maximum pcm difference in the predicted worth of any bank is 0.1 pcm occurring in several banks. The difference in the total predicted rod worth is 0.0% or 0.2 pcm.

Comparing measured results based on Westinghouse and DNC supporting analytical data, it can be seen from TABLE 4 that the maximum percent difference in the measured worth of any bank is 0.3% occurring in Control Bank A, and the maximum pcm difference in the measured worth of any bank is 2.9 pcm occurring in Control Bank A. The difference in the total measured rod worth is 0.2% or 8.2 pcm.

4.0 CONCLUSIONS

Based on the results in Section 2.0 and the discussions of results in Section 3.0, it is concluded that the review criteria in the document in ATTACHMENT 2 have been met. Therefore, DNC has demonstrated the qualification to perform its own analytical computations to support DRWM tests for future LPPT. The first application of DNC analytical computations to support DRWM in LPPT will occur with the start up of Millstone Unit 3 Cycle 10, which will occur on or about May 01, 2004.

5.0 REFERENCES

1. Nguyen, T. Q., et. al., Qualification of the PHOENIX-P/ANC Nuclear Design System for Pressurized Water Reactor Cores, WCAP-11596-P-A (Proprietary) and WCAP-11597-P-A (Nonproprietary), June 1988.
2. Liu, Y. S., Meliksetian, A., Rathkopf, J. A., Little, D. C., Nakano, F., Poploski, M. J., ANC – A Westinghouse Advanced Nodal Computer Code, WCAP-10965-P-A (Proprietary) and WCAP-10966-P-A (Nonproprietary), December 1985.
3. Bordelon, F. M., et. al., Westinghouse Reload Safety Evaluation Methodology, WCAP-9272-P-A (Proprietary), July 1985.
4. Quality Assurance Program (QAP) Topical Report – Millstone Power Station, Revision 25.

TABLE 1

MEASURED AND PREDICTED ROD WORTHS BASED ON WESTINGHOUSE PREDICTIONS

BANK	WORTH (pcm)		DIFFERENCE	
	Measured	Predicted	% (M-P/P)	pcm (M-P)
CA	915.3	899.4	1.8	15.9
CB	513.7	533.1	-3.6	-19.4
CC	828.3	844.6	-1.9	-16.3
CD	611.6	588.5	3.9	23.1
SA	435.4	421.1	3.4	14.3
SB	875.2	895.7	-2.3	-20.5
SC	335.4	340.6	-1.5	-5.2
SD	339.8	339.5	0.1	0.3
SE	49.5	51.4	-3.7	-1.9
TOTAL	4904.2	4913.9	-0.2	-9.7

TABLE 2

MEASURED AND PREDICTED ROD WORTHS BASED ON DNC PREDICTIONS

BANK	WORTH (pcm)		DIFFERENCE	
	Measured	Predicted	% (M-P/P)	pcm (M-P)
CA	918.2	899.5	2.1	18.7
CB	513.9	533.1	-3.6	-19.2
CC	830.7	844.5	-1.6	-13.8
CD	611.8	588.5	4.0	23.3
SA	435.6	421.1	3.4	14.5
SB	877.4	895.7	-2.0	-18.3
SC	336.2	340.7	-1.3	-4.5
SD	339.0	339.6	-0.2	-0.6
SE	49.6	51.4	-3.5	-1.8
TOTAL	4912.4	4914.1	0.0	-1.7

TABLE 3

COMPARISON OF PREDICTED ROD WORTHS BASED ON WESTINGHOUSE AND DNC DATA

BANK	PREDICTED ROD WORTH (pcm)		DIFFERENCE	
	Westinghouse	DNC	% (D - W)/W	pcm (D-W)
CA	899.4	899.5	0.0	0.1
CB	533.1	533.1	0.0	0.0
CC	844.6	844.5	0.0	-0.1
CD	588.5	588.5	0.0	0.0
SA	421.1	421.1	0.0	0.0
SB	895.7	895.7	0.0	0.0
SC	340.6	340.7	0.0	0.1
SD	339.5	339.6	0.0	0.1
SE	51.4	51.4	0.0	0.0
TOTAL	4913.9	4914.1	0.0	0.2

TABLE 4

COMPARISON OF MEASURED ROD WORTHS BASED ON WESTINGHOUSE AND DNC SUPPORTING ANALYTICAL DATA

BANK	MEASURED ROD WORTH (pcm)		DIFFERENCE	
	Westinghouse	DNC	% (D - W)/W	pcm (D-W)
CA	915.3	918.2	0.3	2.9
CB	513.7	513.9	0.0	0.2
CC	828.3	830.7	0.3	2.4
CD	611.6	611.8	0.0	0.2
SA	435.4	435.6	0.0	0.2
SB	875.2	877.4	0.3	2.2
SC	335.4	336.2	0.2	0.8
SD	339.8	339.0	-0.2	-0.8
SE	49.5	49.6	0.2	0.1
TOTAL	4904.2	4912.4	0.2	8.2

Attachment 2

Millstone Power Station Unit 3
Criteria From WCAP-13360-P-A For A Utility Performing
Dynamic Rod Worth Measurements Computations

Criteria From WCAP-13360-P-A For Performing Dynamic Rod Worth Measurements Computations

In order to independently perform physics calculations to support the use of the Dynamic Rod Worth Measurement (DRWM) technique during the Low Power Physics Testing (LPPT), the following five criteria must be met. Compliance with the following five criteria demonstrates qualification and constitutes inherent NRC approval to use DRWM in the LPPT. To document qualification, a notification of compliance with the criteria and the date of the intended first application of the codes to determine the DRWM physics constants for LPPT must be sent to the Nuclear Regulatory Commission (NRC). Any voluntary limitations or restrictions on the use of the DRWM methodology must also be addressed in the notification. The NRC would then, at their option, audit the application of the DRWM program to ensure compliance.

1) Criterion 1: Eligibility of Codes for DRWM Computations

Only lattice physics codes and methods, which have received prior NRC review and approval are eligible to be used in determining the physics constants to be used in DRWM. The NRC review ensures that the codes being used for the DRWM computations were developed under a qualified QA program and were properly benchmarked and verified.

2) Criterion 2: Application of Procedures to DRWM Computations

In a manner consistent with the procedures obtained from Westinghouse, the utility analyses shall be performed in conformance with in-house application procedures which ensure that the use of the methods is consistent with the Westinghouse approved application of the DRWM methodology.

3) Criterion 3: Training and Qualification of Utility Personnel

The first application of DRWM for LPPT will be performed by Westinghouse. This will ensure that DRWM is applicable to the specific plant, provide personnel with training in the DRWM technique and be used to meet Criterion 4 - Comparison Calculations for the DRWM Technique. The first application of DRWM for LPPT by Westinghouse will be applicable for all of the same plant type at the plant site of application. If the fuel vendor should change subsequent to the first application, a second application by Westinghouse is not required.

A training program will be established and implemented to ensure that each qualified user of the DRWM methodology has a good working knowledge of the codes and methods used for DRWM. This training shall include the ability to set up input decks, understand and interpret output results, understand applications and limitations, and to perform analyses in compliance with the procedures provided by Westinghouse.

4) Criterion 4: Comparison Calculations for the DRWM Technique

Prior to the first application of performing analytical computations in support of DRWM for LPPT, the utility will demonstrate its ability to use the methods supplied by Westinghouse by comparing its calculated results with the analyses and results obtained by Westinghouse during the first, or subsequent, application(s) of DRWM at the utility's plant. These comparisons must be documented in a report which is part of the utility's QA records. Any significant differences between the calculations and the comparison data must be discussed in the report. As a minimum, the following parameters should be compared to the supplier of the DRWM methodology calculations, and should agree within the given acceptable deviation:

Parameter	Acceptable Deviation
Calculated Bank Worth	±2% or ±25 pcm
Calculated Total Worth of All Banks	±2%
Measured Bank Worth Obtained for First Application	±2% or ±25 pcm
Measured Total Worth Obtained for First Application	±2%

5) Criterion 5: Quality Assurance and Change Control

All calculations for DRWM, using the Westinghouse methodology which has been approved by the NRC, shall be conducted under the control of a quality assurance program which meets the requirements of 10 CFR 50, Appendix B. The QA program will also include the following:

a) A provision for implementing changes in the methods and procedures being used for DRWM. [Westinghouse has a requirement to inform utilities performing DRWM calculations of changes to the DRWM process.]

b) A provision for informing Westinghouse of any problems or errors discovered while using the DRWM methods or procedures.