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November 12, 2002

U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318
Third Interval Inservice Inspection Program Relief Request No. RR-RI-ISI-2;
Risk-Informed Inservice Inspection (ISI) Program

REFERENCES:

(a) Letter from Mr. C. H. Cruse (CCNPP) to NRC Document Control Desk, dated May 29, 2002, Third Interval Inservice Inspection Program Relief Request No. RR-RI-ISI-2; Risk-Informed Inservice Inspection (ISI) Program

(b) Phone call between Mr. A. L. Simpson, et al (CCNPP) and Mr. Simon C. F. Sheng, et al (NRC), September 19, 2002

In Reference (a) Calvert Cliffs Nuclear Power Plant submitted a proposed Risk-Informed Inservice Inspection Program as an alternative to American Society of Mechanical Engineers Section XI inspection requirements for Class 1 and 2 piping. In a phone call with the Staff (Reference b), the Staff identified several areas where additional information was needed. The Staff's requests and Calvert Cliffs Nuclear Power Plant's responses are presented in Attachment 1.

Should you have questions regarding this matter, we will be pleased to discuss them with you.

Very truly yours,

Peter E. Katz

PEK/ALS/bjd

Attachment: (1) Response to Questions Discussed During September 19, 2002 Phone Call Regarding Inservice Inspection Program Relief Request No. RR-RI-ISI-2

cc: J. Petro, Esquire
J. E. Silberg, Esquire
Director, Project Directorate I-1, NRC
D. M. Skay, NRC
H. J. Miller, NRC
Resident Inspector, NRC
R. I. McLean, DNR

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ATTACHMENT (1)

RESPONSE TO QUESTIONS DISCUSSED DURING SEPTEMBER 19, 2002 PHONE CALL REGARDING INSERVICE INSPECTION PROGRAM RELIEF REQUEST NO. RR-RI-ISI-2

Calvert Cliffs Nuclear Power Plant, Inc.
November 12, 2002

ATTACHMENT (1)

RESPONSE TO QUESTIONS DISCUSSED DURING SEPTEMBER 19, 2002
PHONE CALL REGARDING INSERVICE INSPECTION PROGRAM
RELIEF REQUEST NO. RR-RI-ISI-2

NRC Question No. 1:

The submittal highlights the strengths of the current version of the Calvert Cliffs Probabilistic Risk Assessment (PRA) (Revision 0). However, the current version of the PRA was apparently not used to support the RI-ISI [Risk-Informed-Inservice Inspection] analysis. Please identify the PRA version that was used for your RI-ISI analysis and describe how you evaluated the analysis results reported in this submittal and determined that they are applicable to the current PRA model.

CCNPP Response to Question No. 1:

Revision A of the Calvert Cliffs Nuclear Power Plant (CCNPP) PRA was used to develop the RI-ISI Analysis. This analysis was completed in March of 1999. Revision 0, with internal and external events, of the CCNPP PRA was completed in May of 2002. An update of the Inservice Inspection (ISI) Consequence Evaluation was completed in May of 2002 to determine the impact of using Revision 0 of the PRA. This review included a detailed review of each pipe segment using the new initiating event frequencies and conditional core damage probabilities (CCDPs) as well as system and component risk achievement worths from Revision 0.

The results of the review showed that five segments would change from a medium to a low risk and one segment from a high to a medium risk. The five segments changed to a low risk are all Reactor Coolant System drain line segments between manual isolation valves. The segment downgraded from a high to medium risk is on a containment spray discharge line. None of the changes in risk are included in the ISI Risk Impact Analysis. The review of the ISI Consequence Evaluation, using Revision 0 of the PRA, was performed to ensure that the risks shown in the Risk Impact Analysis are bounding. Further, these improvements are not credited in the inspection program.

NRC Question No. 2:

When crediting enhanced inspection effectiveness, the risk reduction values [change in CDF/LERF (core damage frequency/large early release frequency)] for the feedwater system are reported with very high precision (e.g., -4.44E-27 for CDF). Please explain how these estimates were developed.

CCNPP Response to Question No. 2:

The change in CDF due to application of the RI-ISI process was estimated using the following equation:

- $\Delta R_{CDF} = CCDP*RF*[(POD_S*N_S) - (POD_R*N_R)]$

CCDP	Conditional Core Damage Probability
RF	Rupture Frequency
POD_S	Probability of Detection (POD) associated with the American Society of Mechanical Engineers (ASME) Section XI Code Program
POD_R	Probability of Detection associated with the Electric Power Research Institute (EPRI) TR-112657 RI-ISI Program
N_S	Number of Inspection Locations in the ASME Section XI Code Program
N_R	Number of Inspection Locations in the EPRI TR-112657 RI-ISI Program

The change in LERF due to application of the RI-ISI process was estimated by substituting the conditional large early release probability for CCDP in the above equation. In addition, the analysis was performed both with and without taking credit for enhanced inspection effectiveness due to an increased POD from application of the RI-ISI process. The calculations were performed in an Excel Spreadsheet. The results of the spreadsheet calculations for the Unit 1 Feedwater System (FWS) are provided in the following table.

System	Category	CDF Impact		LERF Impact	
		w/POD	w/o POD	w/POD	w/o POD
FWS	5 (3)	-4.44E-27	4.00E-11	-4.44E-28	4.00E-12
FWS	6 (3)	negligible	negligible	negligible	negligible
FWS Total		**-4.44E-27**	**4.00E-11**	**-4.44E-28**	**4.00E-12**
Grand Total		**-3.03E-08**	**-1.04E-08**	**-6.72E-09**	**-2.32E-09**

For Risk Category 5 (3), the spreadsheet should have calculated a value of 0 for the w/POD case for CDF and LERF impact. The correct calculation and result for CDF impact using the equation from above is provided below.

- $\Delta R_{CDF} = 1.00E\text{-}04 * 2.00E\text{-}07 * [(0.3*6) - (0.9*2)] = 0$

The Excel Spreadsheet instead erroneously calculated a result of -4.44E-27 when using the simplified equation above. It appears that in those cases where the value inside the brackets equals 0, the Excel Spreadsheet calculation will not produce the correct end result answer of 0 for ΔR_{CDF} and ΔR_{LERF}. This is apparently some peculiar function of Excel. It has been determined that if an equivalent, but longer form version of the equation is used, an Excel Spreadsheet calculation will produce the correct result of 0. This version of the equation is provided below.

- $\Delta R_{CDF} = CCDP*RF*(POD_S*N_S) - CCDP*RF*(POD_R*N_R)$

The correct results for the Unit 1 FWS are provided in the following table. The changes are shaded.

System	Category	CDF Impact		LERF Impact	
		w/POD	w/o POD	w/POD	w/o POD
FWS	5 (3)	no change	4.00E-11	no change	4.00E-12
FWS	6 (3)	negligible	negligible	negligible	negligible
FWS Total		**negligible**	**4.00E-11**	**negligible**	**4.00E-12**
Grand Total		**-3.03E-08**	**-1.04E-08**	**-6.72E-09**	**-2.32E-09**

As indicated in the above table, the original template result values of -4.44E-27 and -4.44E-28 for CDF and LERF impact respectively, have been modified to reflect "no change" for Risk Category 5 (3), and

"negligible" for the FWS total. Because these E-27 and E-28 values were virtually the same as 0 anyway, the grand totals for all systems remain unchanged. In essence, the change has no real bearing on the risk impact analysis results.

Attached please find a replacement for the second page of Table 3.6-1 (Page 20 of 30) of the original submittal which reflects these corrections.

NRC Question No. 3:

Section 3.6.1, page 8 of 30, states, "The presence of FAC [flow accelerated corrosion] was adjusted for in the performance of the quantitative analysis by excluding its impact on the risk ranking." Please clarify this sentence. In your response, please specify if FAC was included in your qualitative and quantitative results.

CCNPP Response to Question No. 3:

For the main steam and feedwater systems, the potential for FAC was identified because these two systems are considered susceptible per the augmented plant FAC Program at CCNPP. The table diagram in Section 3.6.1, page 9 of 30 of the Calvert Cliffs RI-ISI submittal, depicts the manner in which the presence of FAC is adjusted for in the performance of the quantitative risk impact analysis. For example, a Risk Category 3 location with a Medium Consequence Rank and a Medium Failure Potential Rank due to the identification of thermal stratification, cycling and striping (TASCS), thermal transients (TT), and FAC damage mechanisms, becomes a Risk Category 5 location [referred to in this example as 5 (3)], if the presence of FAC is ignored.

The impact of FAC is not included in the risk calculations. The exclusion of the impact of FAC on the risk ranking and therefore in the determination of the change in risk is performed, because FAC is a damage mechanism managed by a separate, independent plant augmented inspection program. The RI-ISI Program credits and relies upon this augmented plant inspection program to manage this damage mechanism. The plant FAC Program will continue to determine where and when examinations shall be performed. Hence, since the number of FAC examination locations remains the same "before" and "after" and no delta exists, there is no need to include the impact of FAC in the performance of the risk impact analysis.

NRC Question No. 4:

The submittal states that the RI-ISI program for Calvert Cliffs will deviate from the EPRI RI-ISI methodology for the assessment for thermal stratification, cycling and striping (TASCS). Please state if the revised methodology for assessing TASCS potential is in conformance with the updated criteria described in the EPRI letter to the NRC [Nuclear Regulatory Commission] dated March 28, 2001. Also, confirm that as stated in the March 28, 2001 letter, once the final material reliability program guidance has been developed, the RI-ISI program will be updated for the evaluation of susceptibility to TASCS, as appropriate.

CCNPP Response to Question No. 4:

The non-cyclic TASCS issue is a standard deviation to EPRI Topical Report No. TR-112657. As stated in Section 3 of the Calvert Cliffs RI-ISI submittal, the revised methodology for assessing TASCS at Calvert Cliffs is in conformance with the letter from EPRI to the NRC, dated February 28, 2001.

The Calvert Cliffs RI-ISI submittal is also in conformance with the updated criteria for determining TASCS susceptibility, provided in the EPRI letter to the NRC dated March 28, 2001.

As stated in Section 4 of the Calvert Cliffs RI-ISI submittal, the RI-ISI program is a living program. Therefore, once the EPRI Material Reliability Project guidance has been finalized, the Calvert Cliffs RI-ISI Program will be updated in accordance with the final Material Reliability Project criteria.

NRC Question No. 5:

Section 5 of the submittal addresses the proposed ISI program plan change. The submittal states that: Regardless of any standard ASME Section XI examinations that are performed in Unit 1 during the first period, CCNPP will perform examinations on 100% of the RI-ISI selections in both units during the second and third periods of the third ISI interval. Subsequent ISI intervals will also implement 100% of the examination locations selected per the RI-ISI program. These examinations will be distributed between periods such that the period percentage requirements of ASME Section XI, paragraphs IWB-2412 and IWC-2412 are met.

How will the sequence of subsequent interval examinations be determined? Provide assurance that the subsequent examinations of a selected component will not exceed 10 years.

CCNPP Response to Question No. 5:

Application of the risk-informed methodology does not alter Calvert Cliff's commitment to meeting existing ASME Section XI criteria for performing successive examinations. Therefore, successive examinations in subsequent intervals will be performed such that the requirements of IWB-2412, IWB-2420, IWC-2412, and IWC-2420 will be met. This means that the following will hold true:

1) The period percentage requirements of IWB-2412 and IWC-2412 will be met.
2) Per IWB-2420(a) and IWC-2420(a), the sequence of risk-informed examinations established during the third interval will be repeated during subsequent intervals to the extent practical.

Per a letter from Calvert Cliffs to the NRC dated October 30, 2000 (see Reference 6.6 in the RI-ISI submittal) and subsequent agreements, Calvert Cliffs will be performing 100% of their RI-ISI examinations in the second and third periods of the third interval for both units. In order to meet the period percentage requirements of IWB-2412 and IWC-2412 during subsequent intervals, some of the examinations that were performed in the second and third periods of the third interval will need to be moved up to the first period in the fourth interval. This will cause some fourth interval examinations to be performed less than 10 years after being performed in the third interval. However, it should not cause the time between examinations to extend beyond 10 years for a given item.

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Table 3.6-1

Unit 1 - Risk Impact Analysis Results

System[1]	Category	Consequence Rank	Failure Potential		Inspections			CDF Impact[3]		LERF Impact[3]	
			DMs	Rank	Section XI[2]	RI-ISI	Delta	w/ POD	w/o POD	w/ POD	w/o POD
CSS	4	High	None	Low	5	12	7	-3.15E-10	-3.15E-10	-7.00E-11	-7.00E-11
CSS	6	Medium	None	Low	7	0	-7	negligible	negligible	negligible	negligible
CSS	7	Low	None	Low	2	0	-2	negligible	negligible	negligible	negligible
CSS Total								**-3.15E-10**	**-3.15E-10**	**-7.00E-11**	**-7.00E-11**
MSS	6 (3)	Medium	None (FAC)	Low (High)	16	0	-16	negligible	negligible	negligible	negligible
MSS Total								**negligible**	**negligible**	**negligible**	**negligible**
FWS	5 (3)	Medium	TASCS, TT, (FAC)	Medium (High)	6	2	-4	no change	4.00E-11	no change	4.00E-12
FWS	6 (3)	Medium	None (FAC)	Low (High)	8	0	-8	negligible	negligible	negligible	negligible
FWS Total								negligible	**4.00E-11**	negligible	**4.00E-12**
Grand Total								**-3.03E-08**	**-1.04E-08**	**-6.72E-09**	**-2.32E-09**

Notes:

(1) Systems are described in Table 3.1-1.

(2) Only those ASME Section XI Code inspection locations that received a volumetric examination in addition to a surface examination are included in the count. Inspection locations previously subjected to a surface examination only were not considered in accordance with Section 3.7.1 of EPRI TR-112657.

(3) Per Section 3.7.1 of EPRI TR-112657, the contribution of low risk categories 6 and 7 need not be considered in assessing the change in risk. Hence, the word "negligible" is given in these cases in lieu of values for CDF and LERF impact. In those cases where no inspections were being performed previously via Section XI, and none are planned for RI-ISI purposes, "no change" is listed instead of "negligible".