Exelon Nuclear
200 Exelon Way
Kennett Square, PA 19348

www.exeloncorp.com

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10 CFR 50.55a

May 30, 2003

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

Peach Bottom Atomic Power Station, Units 2 and 3
Facility Operating License Nos. DPR-44 and DPR-56
NRC Docket Nos. 50-277 and 50-278

Subject: Response to Request for Additional Information Concerning a Proposed Alternative Associated with the Risk-Informed Inservice Inspection Program

References:
1) Letter from M.P. Gallagher (Exelon Generation Company, LLC) to U. S. Nuclear Regulatory Commission, dated June 25, 2002

2) Letter from S. P. Wall (U. S. Nuclear Regulatory Commission) to J. L. Skolds (Exelon Generation Company, LLC), dated May 1, 2003

Dear Sir/Madam:

In the Reference 1 letter, Exelon Generation Company (Exelon), LLC submitted a proposed alternative (RR-44) to the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," requirements for the selection and examination of Class 1 and 2 piping welds. The alternative proposed by Peach Bottom Atomic Power Station, Units 2 and 3, uses methodology for a Risk-Informed Inservice Inspection (RISI) program approved by the U. S. Nuclear Regulatory Commission (NRC).

In the Reference 2 letter, the U. S. Nuclear Regulatory Commission requested additional information. Attached is our response to these questions.

If you have any questions, please contact us.

Very truly yours,

D. B. Helker /FOR

Michael P. Gallagher
Director, Licensing & Regulatory Affairs
Mid-Atlantic Regional Operating Group

Attachment 1 - Response to Request for Additional Information

cc: H. J. Miller, Administrator, Region I, USNRC
A. C. McMurtray, USNRC Senior Resident Inspector, LGS
J. P. Boska, Project Manager, USNRC

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ATTACHMENT 1

Response to Request for Additional Information Concerning a Proposed Alternative Associated with the Risk-Informed Inservice Inspection Program

Question 1:

1. Enclosure 2, Section 4, Implementation and Monitoring Program

   EGG stated that the Risk-Informed Inservice Inspection (RI-ISI) program is a living program requiring feedback of new relevant information to ensure the appropriate identification of high safety-significant piping locations. Regulatory Guide (RG) 1.178, "An Approach for Plant-Specific Risk-Informed Decisionmaking for Inservice Inspection of Piping," Section C.3.4, specifies acceptance guidelines for implementation of the RI-ISI program. It recommends that the accepted RI-ISI program plan have a program in place to monitor industry findings. As discussed in Section C.4.1, "Documentation that Should Be Included in a Licensee's RI-ISI Submittal," licensees are requested to provide a description of the implementation, performance monitoring, and corrective action strategies and programs in sufficient detail for the NRC staff to understand the new ISI program and its implications.

   We request that you describe the program that you will use at PBAPS to monitor information that may have an impact on the proposed RI-ISI program. Also, identify the sources of information (domestic and international) that the program will monitor and discuss how soon the information will be reviewed and when the examination program will be adjusted and implemented. Give an example (such as intergranular stress corrosion cracking (IGSCC) was found in the IGSCC Category A welds) to show how the program works, assuming the relevant information has an impact on the proposed RI-ISI program.

Response:

Exelon Generation Company, LLC (Exelon) monitors, and implements corrective actions through use of a formal operating experience program. This formalized program reviews industry information (as a few examples, vendor service information letters, INPO Significant Operating Experience Reports (SOERs), and NRC Information Notices) that would be distributed to the responsible inservice inspection coordinator at each station for review. The information sources, such as the INPO SOERs, are based on domestic as well as international sources. This review allows the station inservice inspection coordinator to initiate a condition report as a means to create corrective actions. This condition report serves as a means to begin the evaluation of a potential new damage mechanism. In the example of intergranular stress corrosion cracking (IGSCC) found in the IGSCC Category A welds, this review would begin with an evaluation against the probabilistic risk assessment model and determination of the significance of the change. If the change was determined to be significant, a determination of the risk probabilities would be identified, evaluated against acceptance criteria, risk rankings established, and new weld examination selection performed, if necessary.

Exelon is aware of ongoing industry efforts with NRC, EPRI, and NEI with regards to enhancing the living ISI program and will evaluate recommendations for incorporation into the program as they are developed and implemented.

Question 2:

2. Enclosure 2, Table 2

   RG 1.178, Section 2.1, "Traditional Engineering Analysis," states that an RI-ISI program should assess failure potential force defined piping segment (from leaks to breaks). The

residual heat removal (RHR) system piping is identified as susceptible to thermal stratification, cycling and stripping (TASCS) and erosion-cavitation (E-C). Generally, the Class 1 piping inside the containment is made of austenitic stainless steel and is susceptible to IGSCC.

In order for the NRC staff to assess the level of safety provided by the RI-ISI program, as required by 10 CFR 50.55a(a)(3)(i), confirm that there is:

a. no piping in the reactor core isolation cooling (RCIC) and RHR systems susceptible to IGSCC,

b. no piping in the core spray, main steam, RCIC, and RHR systems susceptible to flow accelerated corrosion (FAC), and

c. no piping in the reactor water cleanup system susceptible to TASCS.

Response:

a. The PBAPS ISI Augmented and Section XI database tables for PBAPS, Units 2 and 3, as well as the RI-ISI final report were reviewed, and it is confirmed that the RCIC and the RHR systems do not have piping susceptible to IGSCC.

b. The PBAPS RI-ISI final report was reviewed, and it is confirmed that the core spray, main steam, RCIC, and RHR systems do not have piping susceptible to FAC within the scope of the ASME Section XI piping boundaries.

c. The PBAPS RI-ISI final report was reviewed, and it is confirmed that the reactor water cleanup system does not have piping susceptible to TASCS (Thermal Stratification, Cycling and Stripping).

Question 3:

3. Enclosure 2, Tables 3 and 4

Welds subject only to FAC or only to IGSCC degradation mechanisms are not included in the population of welds from which inspections are selected. These welds are included in Tables 3 and 4, but not included in Tables 5 and 6. EGC indicated that the RI-ISI program utilized the examination methodology and selection criteria of EPRI-TR-112657, Revision B.

As outlined by Reference 2, the NRC staff requests the following information in order to verify conformance with the criteria of the EPRI Topical Report. Expand Tables 3 and 4 (or provide additional tables) by including two additional columns. Identify in these new columns, the number of welds exposed only to FAC and only to IGSCC for each system. If any welds are subject to both FAC and IGSCC, include a footnote providing the number of these welds.

Response:

Tables 3 and 4 of the Program Summary include those elements where the only degradation mechanism identified was either FAC or IGSCC (Categories B - G). This information was included in these tables to show the complete results of the risk evaluation. Tables 5 and 6 of the Summary then identify the total number of elements selected for examination under the RI-ISI Program. Per the EPRI TR methodology, elements only subject to FAC or IGSCC (Categories B - G) are not included in the population from which the RI-ISI Program selects and performs for-cause inspections.

Per question 3, the following information is provided regarding those locations where the degradation mechanism assessment only identified FAC or IGSCC (Cat B - G).

Unit 2				Unit 3			
Category	System	Count	Mechanism	Category	System	Count	Mechanism
1	FW	45	FAC-only	1	FW	45	FAC-only
1	RD	12	FAC-only	1	RD	7	FAC-only
3	FW	1	FAC-only	3	FW	1	FAC-only
3	RWCU	2	FAC-only	3	RWCU	3	FAC-only
		60				56	
2	MR	2	IGSCC-only	5	RWCU	5	IGSCC-only
2	RPV	3	IGSCC-only				
5	RWCU	6	IGSCC-only				
		11				5	
Note: One (1) Risk Category 3 RWCU weld per unit has both FAC and IGSCC degradation mechanisms identified. These welds are conservatively left in the RI-ISI population and both are currently selected for examination within the RI-ISI Program.							

Question 4:

4. Enclosure 2, Section 2.3, Augmented Programs

   EGC stated that no augmented programs are subsumed in the RI-ISI program, with the exception of the IGSCC Category A welds. In order for the NRC staff to assess compliance with approved methodology and to confirm proper classification, as delineated in Generic Letter 88-01, provide the following additional information regarding IGSCC Category A welds:

   a. the number of IGSCC Category A welds that are included in the RI-ISI program in each piping system and their inspection category, and

   b. identify the dissimilar metal welds in each piping system, the material used for buttering in each weld and their inspection category.

Response:

Per the EPRI TR methodology, IGSCC Category A welds are to be subsumed into the RISI Program, and the IGSCC Program will remain in place to address Categories B - G. The Generic Letter 88-01 categorization scheme is not impacted by the RI-ISI analysis, but rather

the 88-01 categories are simply to be used to define which welds are Category A and can thus be subsumed into the RI-ISI Program.

Per question 4(a), the following information is provided regarding the IGSCC Category A welds that are included in the RI-ISI program in each piping system and their inspection category:

IGSCC CATEGORY "A" WELDS					
Unit 2			Unit 3		
Category	System	Count	Category	System	Count
2	CS	2	2	CS	2
2	RHR	14	2	RHR	11
4	CS	26	2	RPV	2
4	MR	54	4	CS	28
4	RHR	11	4	MR	66
4	RPV	14	4	RHR	6
4	RWCU	8	4	RPV	15
6	RWCU	13	4	RWCU	7
			6	RWCU	15
		142			152

Per question 4(b), IGSCC Category A dissimilar metal welds in each piping system, the material used for buttering in each weld, and their weld description and category are identified in the following tables:

Unit 2							
Weld Number	Augmented Program Number	IGSCC Category	System Description	Component Description	Butter Material	Selected for RISI Exam	RISI Exam Category
14-A-28	01	A	CORE SPRAY	PIPE TO PIPE	NONE	NO	R-A
14-B-28	01	A	CORE SPRAY	PIPE TO PIPE	NONE	NO	R-A
2-AHH-8	01	A	REACTOR PRESSURE VESSEL	SAFE-END TO RECIRC. INLET NOZ N2H	ASME ER308L	NO	R-A
2-AHG-8	01	A	REACTOR PRESSURE VESSEL	SAFE-END TO NOZ RECIRC. INLET N2G	ASME ER308L	NO	R-A
JP-B-6	01	A	REACTOR PRESSURE VESSEL	JET PUMP INST. NOZ N8B TO SAFE-END	ASME ER308L	NO	R-A
2-AHJ-8	01	A	REACTOR PRESSURE VESSEL	SAFE-END TO RECIRC. INLET NOZ N2J	ASME ER308L	NO	R-A
2-AHK-8	01	A	REACTOR PRESSURE VESSEL	SAFE-END TO RECIRC. INLET NOZ N2K	ASME ER308L	NO	R-A
3-I-19R	01	A	REACTOR PRESSURE VESSEL	CRD NOZZLE N9 TO CAP	ASME ER308L	NO	R-A
2-AHF-8	01	A	REACTOR PRESSURE VESSEL	SAFE-END TO RECIRC. INLET NOZ N2F	ASME ER308L	NO	R-A
JP-A-6	01	A	REACTOR PRESSURE VESSEL	JET PUMP INST. NOZ N8A TO SAFE-END	ASME ER308L	NO	R-A
2-BHE-8	01	A	REACTOR PRESSURE VESSEL	SAFE-END TO RECIRC. INLET NOZ N2E	ASME ER308L	NO	R-A
2-BHD-8	01	A	REACTOR PRESSURE VESSEL	SAFE-END TO RECIRC. INLET NOZ N2D	ASME ER308L	NO	R-A
2-BHC-8	01	A	REACTOR PRESSURE VESSEL	SAFE-END TO RECIRC. INLET NOZ N2C	ASME ER308L	YES	R-A
2-BHB-8	01	A	REACTOR PRESSURE VESSEL	SAFE-END TO RECIRC. INLET NOZ N2B	ASME ER308L	YES	R-A
2-BHA-8	01	A	REACTOR PRESSURE VESSEL	SAFE-END TO RECIRC. INLET NOZ N2A	ASME ER308L	NO	R-A
10-IA-22	01	A	RESIDUAL HEAT REMOVAL	ELBOW TO PIPE	NONE	NO	R-A
10-O-31	01	A	RESIDUAL HEAT REMOVAL	PIPE TO PIPE	NONE	NO	R-A
10-O-29	01	A	RESIDUAL HEAT REMOVAL	PIPE TO ELBOW	NONE	NO	R-A
10-O-26	01	A	RESIDUAL HEAT REMOVAL	ELBOW TO PIPE	NONE	NO	R-A
10-IB-25	01	A	RESIDUAL HEAT REMOVAL	PIPE TO TEE	NONE	NO	R-A
10-IB-22	01	A	RESIDUAL HEAT REMOVAL	ELBOW TO PIPE	NONE	NO	R-A
10-IA-25	01	A	RESIDUAL HEAT REMOVAL	PIPE TO TEE	NONE	NO	R-A

Unit 3							
Weld Number	Augmented Program Number	IGSCC Category	System Description	Component Description	Butter Material	Selected for RISI Exam	RISI Exam Category
14-B-28	01	A	CORE SPRAY	PIPE TO PIPE	None	NO	R-A
14-A-28	01	A	CORE SPRAY	PIPE TO PIPE	None	NO	R-A
3-I-20	01	A	REACTOR PRESSURE VESSEL	CRD NOZZLE N9 TO CAP	ASME SFA 5.9 ER309L	NO	R-A
2-AHK-8	01	A	REACTOR PRESSURE VESSEL	SAFE END TO NOZ N2K	ASME SFA 5.14 ERNiCr-3	NO	R-A
2-BS-18	01	A	REACTOR PRESSURE VESSEL	SAFE END TO NOZ N1B	ASME SFA 5.14 ERNiCr-3	NO	R-A
2-AS-19	01	A	REACTOR PRESSURE VESSEL	SAFE END TO NOZ N1A	ASME SFA 5.14 ERNiCr-3	NO	R-A
2-AHF-8	01	A	REACTOR PRESSURE VESSEL	SAFE END TO NOZ N2F	ASME SFA 5.14 ERNiCr-3	NO	R-A
2-AHG-8	01	A	REACTOR PRESSURE VESSEL	SAFE END TO NOZ N2G	ASME SFA 5.14 ERNiCr-3	NO	R-A
2-AHH-8	01	A	REACTOR PRESSURE VESSEL	SAFE END TO NOZ N2H	ASME SFA 5.14 ERNiCr-3	NO	R-A
2-BHA-8	01	A	REACTOR PRESSURE VESSEL	SAFE END TO NOZ N2A	ASME SFA 5.14 ERNiCr-3	NO	R-A
2-BHB-8	01	A	REACTOR PRESSURE VESSEL	SAFE END TO NOZ N2B	ASME SFA 5.14 ERNiCr-3	NO	R-A
2-BHC-8	01	A	REACTOR PRESSURE VESSEL	SAFE END TO NOZ N2C	ASME SFA 5.14 ERNiCr-3	NO	R-A
2-BHD-8	01	A	REACTOR PRESSURE VESSEL	SAFE END TO NOZ N2D	ASME SFA 5.14 ERNiCr-3	YES	R-A
2-AHJ-8	01	A	REACTOR PRESSURE VESSEL	SAFE END TO NOZ N2J	ASME SFA 5.14 ERNiCr-3	NO	R-A
2-BHE-8	01	A	REACTOR PRESSURE VESSEL	SAFE END TO NOZ N2E	ASME SFA 5.14 ERNiCr-3	YES	R-A
JP-B-6	01	A	REACTOR PRESSURE VESSEL	N8B NOZ TO PEN SEAL	ASME SFA 5.14 ERNiCr-3	NO	R-A
14-A-46	01	A	REACTOR PRESSURE VESSEL	SAFE-END TO NOZ N5A	ASME SFA 5.14 ERNiCr-3	YES	R-A
14-B-45	01	A	REACTOR PRESSURE VESSEL	SAFE-END TO NOZ N5B	ASME SFA 5.14 ERNiCr-3	NO	R-A
JP-A-6	01	A	REACTOR PRESSURE VESSEL	N8A NOZ TO PEN SEAL	ASME SFA 5.14 ERNiCr-3	NO	R-A
10-IA-24	01	A	RESIDUAL HEAT REMOVAL	PIPE TO CROSS	None	NO	R-A

Unit 3							
Weld Number	Augmented Program Number	IGSCC Category	System Description	Component Description	Butter Material	Selected for RISI Exam	RISI Exam Category
10-IB-21	01	A	RESIDUAL HEAT REMOVAL	ELBOW TO PIPE	None	NO	R-A
10-IB-24	01	A	RESIDUAL HEAT REMOVAL	PIPE TO CROSS	None	NO	R-A
10-O-23	01	A	RESIDUAL HEAT REMOVAL	PIPE BEND TO PIPE	None	NO	R-A
10-O-26	01	A	RESIDUAL HEAT REMOVAL	PIPE TO PIPE BEND	None	NO	R-A
10-O-27	01	A	RESIDUAL HEAT REMOVAL	PIPE BEND TO PIPE	None	NO	R-A
10-IA-21	01	A	RESIDUAL HEAT REMOVAL	ELBOW TO PIPE	None	NO	R-A

Question 5:

5. The NRC staff notes that the third ISI interval is almost half gone for both PBAPS units. To implement the RI-ISI program into the current 10-year ISI interval, the requirements of 10 CFR 50.55a(g) must be satisfied.

   Describe how the RI-ISI program will be implemented into the Section XI ISI program. Identify the percentage of inspections to be performed in the remaining inspection periods.

Response:

For the first period of the third interval, PBAPS has maintained dual compliance for the Section XI and RI-ISI programs. The RI-ISI program will be formally implemented into the Section XI program during the second period of the third interval for both units. Credit will be taken for risk significant Section XI examinations performed during the current ten-year interval as allowed by EPRI TR-112657, Rev. B-A. The following table provides the current breakdown of completed (first period) and scheduled RI-ISI examinations, as well as the RI-ISI percent of completion for each period in the third ten-year interval for PBAPS, Units 2 and 3. PBAPS, Units 2 and 3 are currently in the second period of the third interval. This period includes one outage for each unit. The third and final period of the third interval includes two outages per unit.

Examination	Unit 2	Unit 3
Total Number of Scheduled Section XI Exams Credited as RI-ISI	75	74
Number of New RI-ISI Exams Added & Scheduled	28	33
Total number of Scheduled RI-ISI Exams	103	107
Section XI Exams Completed and Credited for RI-ISI in 1st Period	31	51
% RI-ISI Complete 1st Period	30%	48% *
RI-ISI Exams scheduled for 2nd Period	25	18
% RI-ISI Scheduled for Completion Through the 2nd Period	54%	64% *
RI-ISI Exams scheduled for 3rd Period	47	38
% RI-ISI Scheduled for Completion Through the 3rd Period	100%	100%

* Per ASME Code Case N-598

Question 6:

6. On page 2, EGC stated that the PBAPS Probabilistic Risk Analysis (PRA), 1999 PRA model PB299, Rev. 1, June 2000, was used for the RI-ISI analysis. RG 1.178, Section C.2.2, addresses elements of the PRA analysis that are integral in assessing acceptability of the program.

   In accordance with Reference 2, and as requested by RG 1.178, Section C.4.1, provide the baseline core damage frequency and baseline large early release frequency from this version of the PRA model. State which version of the EGC PRA was reviewed by the BWROG Peer Review/Certification team in 1998.

Response:

As stated in the Relief Request, the PRA model used for the RI-ISI analysis is the second upgrade to the PRA model since the IPE submittal in 1992. The version of the PRA model reviewed by the BWROG Peer Review/Certification team was the first upgrade to the IPE PRA model. The second upgrade included resolution to many of the certification comments.

The baseline core damage frequency from the PRA model used for the RI-ISI analysis (1999 PRA Model PB299, Rev. 1) is 4.48E-06. The baseline large early release frequency from this model is 6.17E-08.

Question 7:

7. On pages 9 and 10, EGC discussed use of the Markov piping reliability method to estimate the change in risk due to adding and removing locations from the inspection program.

   As outlined by Reference 2, the NRC staff requests the following information in order to verify conformance with the criteria of the EPRI Topical Report. Confirm that the change in risk is calculated utilizing the Markov model described in EPRI Topical Report TR-111061, dated December 1998, to estimate the "inspection efficiency factor" (IEF). Additionally, confirm that the method is the same as that described by EGC in a February 19, 2001, RAI response (Agencywide Document Access and Management System (ADAMS) accession number ML010570133), and approved by the NRC staff in a safety evaluation dated September 5, 2001 (ADAMS accession number ML012050103).

Response:

The same Markov model described in EPRI TR-111061 was used to quantify the change in risk. It is the same model used for all of the Exelon RI-ISI analyses, including the one referenced in the RAI as approved by the NRC staff in a Safety Evaluation Report dated September 5, 2001.