March 6, 2002

Mr. Michael P. Gallagher
Director-Licensing
Exelon Corporation
200 Exelon Way
Kennett Square, PA 19348

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3

Dear Mr. Gallagher:

By letter dated July 2, 2001, Exelon Generation Company, LLC (Exelon), submitted for Nuclear Regulatory Commission (NRC) review an application, pursuant to 10 CFR Part 54, to renew the operating licenses for the Peach Bottom Atomic Power Station, Units 2 and 3. The NRC staff is reviewing the information contained in this license renewal application and has identified, in the enclosure, areas where additional information is needed to complete its review. Specifically, the enclosed request for additional information (RAI) is from Appendix B Aging Management Activities.

Please provide a schedule by letter, or electronic mail for the submittal of your response within 30 days of the receipt of this letter. Additionally, the staff would be willing to meet with Exelon prior to the submittal of the response to provide clarification of the staff's request for additional information.

Sincerely,

/***RA***/

Raj K. Anand, Project Manager
License Renewal and Environmental Impacts Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket Nos. 50-277 and 50-278

Enclosure: As stated

cc w/encl: See next page

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EMCB AMP RAIs for Peach Bottom LRA

B1.1 “Flow Accelerated Corrosion Program”

B1.1-1 Monitoring of water chemistry to control pH and dissolved oxygen content is effective in reducing flow accelerated corrosion (FAC). The staff is not certain that this activity is included in the applicant’s FAC AMP. If so, would this affect the description of the preventive or mitigative actions program attributes?

B1.1-2 The staff is not clear as to the applicant’s approach in identifying the susceptible components and locations to manage FAC. Provide information regarding how the susceptible components and locations are identified to manage FAC.

B1.1-3 The staff believes that there should be a predictive code in place in order to analytically evaluate FAC. Will CHECKWORKS, or some other predictive code, be used for the analytical evaluations? If so, provide the basis for the acceptability of the code used.

B1.1-4 The extent of the degradation of the main feedwater piping at the time of discovery of the incident reported in NRC IN 2001-09, “Main Feedwater System Degradation in Safety-Related ASME Code Class 2 Piping Inside the Containment of a Pressurized Water Reactor,” is of particular concern given the maturity of the industry’s FAC program. Even though this reported incident is related to a PWR plant, numerous incidents of wall thinning due to erosion/corrosion have been reported for both PWR and BWR plants. The staff is not certain whether the applicant has considered the operating experience reported in NRC Information Notice 2001-09. Please address this issue.

B1.3 “Closed Cooling Water Chemistry”

B1.3-1 The applicant has identified the chemistry control parameters to be monitored that include, per the recommendations of EPRI TR-107396, nitrite, pH and methylbenzyl triazole (TTA) levels. Chlorides, sulfates, nitrate, turbidity and metals are monitored on a regular basis as diagnostic parameters to provide indication of abnormal conditions. The applicant does not link these parameters to the degradation of the particular structures’ and components’ intended functions as specified in Section A.1.2.3.3. of NUREG-1800. The applicant needs to provide linkage of the parameters monitored to the degradation of the specific components intended function(s).

B1.3-2 Section 5, “Performance Monitoring,” of EPRI TR-107396 recommends that the sampling frequency on the CCW chemistry should be increased if aging effects are detected or suspected. Address this and if so, the applicant should confirm that the increased frequencies are included in the station procedures.

B1.3-3 Chlorides, sulfates, nitrate, turbidity and metals are monitored on a regular basis as diagnostic parameters to provide indication of abnormal conditions. As indicated in Section A1.2.3.6 of NUREG-1800 (July 2001), the applicant should state the acceptance criteria for these species.

B1.3-4 Section A1.2.3.10 of NUREG-1800 indicates that the information provided by the operating experience of an AMP may indicate when an existing program has succeeded and when it has failed in intercepting aging degradation in a timely manner. An existing AMP is effective if the operating experience of the AMP (including corrective actions, if necessary) demonstrates that aging degradation has been found in a timely manner prior to the actual loss of the component intended function. To this end, please describe any operating experience related to component age degradation due to cracking and loss of material, or reduction of heat transfer due to corrosion, occurring prior to age- related failures of the intended functions of the component. In addition, address the corrective actions performed prior to age-related failures.

B1.4 “Condensate Storage Tank Chemistry Activities”

B1.4-1 The staff believes that there should be a one-time inspection program to verify the effectiveness of the CST water chemistry control to manage loss of material of carbon steel components exposed to the CST water. If there is, include it; if not, explain the basis of not including a one-time inspection for this AMP.

B1.4-2 Cracking of stainless steel components exposed to the CST water may occur in locations of low flow or stagnant conditions. The staff believes that the CST chemistry activities AMP alone is inadequate to manage cracking of stainless steel components exposed to the CST water. Address station activities related to BWRVIP-75 or NRC GL 88-01 which delineates the extent, method, and schedule of the inspection and test techniques to detect cracking and ensures that cracks will be detected and repaired before the loss of intended function of the components.

B1.4-3 Section A1.2.3.10 of NUREG-1800 indicates that the information provided by the operating experience of an AMP may indicate when an existing program has succeeded and when it has failed in intercepting aging degradation in a timely manner. An existing AMP is effective if the operating experience of the AMP (including corrective actions, if necessary) demonstrates that aging degradation has been found in a timely manner prior to the actual loss of the component intended function. To this end, please describe any crack initiation and growth due to stress corrosion cracking and loss of material due to corrosion experienced in the station prior to actual loss of intended function of the component. In addition, address the operating experience of aging degradation found and the corrective actions performed prior to age-related failures.

B1.5 “Torus Water Chemistry Activities”

B1.5-1 In the LRA, it is indicated that the loss of material of carbon steel structural supports submerged in torus water is managed by the ISI AMP. The staff believes that the ISI AMP or the one-time inspection AMP should be applied to the carbon steel components exposed to torus water in the HPCI, RCIC, RHR, core spray, and main steam systems. Please discuss.

B1.5-2 The staff believes that there should be a one-time inspection that will be performed to verify the effectiveness of the torus water chemistry control. If there is, include it; if not, explain the basis for not including the one-time inspection.

B1.5-3 For components exposed to torus water, address station activities related to BWRVIP-75 or NRC GL 88-01, which delineates the extent, method, and schedule of the inspection and test techniques to detect cracking and ensure that cracks will be detected and repaired before the loss of intended function of the component.

B1.5-4 As recommended in Table C-2 of Appendix C of the EPRI Report TR-103515, "BWR Water Chemistry Guidelines," the increased frequencies of sampling measurements of the torus water chemistry should be included in the station procedures if chemical ingress is detected or suspected. Confirm that this is done, and if not, provide a basis.

B1.5-5 The system description of the HPCI in the UFSAR indicates that HPCI has a primary water source from the condensate storage tank, which has demineralized water with a backup supply of torus water available from the suppression pool. The UFSAR also indicates that RCIC could have a water source from either the condensate water tank or the pressure suppression pool. Therefore, the components may be exposed to either torus water or demineralized water, or both. The specific limits of chemistry parameters and sampling frequency are quite different between the torus water chemistry and the CST water chemistry AMPs. Which of these two AMPs is credited for these systems and provide justification?

B1.5-6 Section A1.2.3.10 of NUREG-1800 indicates that the information provided by the operating experience of an AMP may indicate when an existing program has succeeded and when it has failed in intercepting aging degradation in a timely manner. An existing AMP is effective if the operating experience of the AMP (including corrective actions, if necessary) demonstrates that aging degradation has been found in a timely manner prior to the actual loss of the component intended function. To this end, please describe any crack initiation and growth due to stress corrosion cracking and loss of material due to corrosion experienced in the station prior to actual loss of intended function of the component. In addition, address the operating experience of the aging degradation found and the corrective actions performed prior to age-related failures.

B1.5-7 The amount of debris in strainers relates to the quality of the torus water. Address the operating experience of the strainers as well as debris in the torus water.

B1.6 "Fuel Pool Chemistry Activities"

B1.6-1 The staff believes that there should be a one-time inspection program to verify the effectiveness of the fuel pool water chemistry control to mitigate the loss of material of the carbon steel component exposed to fuel pool water. If so, include it; if not, what is your basis for not including this one-time inspection program?

B1.6-2 The fuel pool chemistry activities AMP alone cannot adequately manage cracking of stainless steel components exposed to fuel pool water. The fuel pool water could be contaminated due to free surface (the free surface of a liquid is the external surface of a liquid that is exposed directly to an air/gas environment). The staff believes that there should be a one-time inspection to verify the absence of cracking of stainless steel components exposed to fuel pool water (including consideration of free surface contamination). Please address. If not, what is the basis for not including this one-time inspection?

B1.6-3 Section A1.2.3.10 of NUREG-1800 indicates that the information provided by the operating experience of an AMP may indicate when an existing program has succeeded and when it has failed in intercepting aging degradation in a timely manner. An existing AMP is effective if the operating experience of the AMP (including corrective actions, if necessary) demonstrates that aging degradation has been found in a timely manner prior to the actual loss of the component intended function. To this end, please describe any crack initiation and growth due to stress corrosion cracking and loss of material due to corrosion experienced in the station prior to actual loss of intended function of the component. In addition, address the operating experience of aging degradation found and the corrective actions performed prior to age-related failures.

B1.7 “High Pressure Service Water Radioactivity Monitoring Activities”

B1.7-1 It was indicated in the LRA that leakage and minor degradation have been found in the RHR heat exchangers on the HPSW system water (raw water) side. Is the degradation caused by the presence of the radioactive contaminants? If so, what is the implication of the operating experience for the effectiveness of the AMP? If not, what is the relevance of the operating experience to the AMP?

B1.13 “Standby Liquid Control System Surveillance Activities”

B1.13-1 Since borated water can induce corrosion and cracking at tank bottom due to the presence of chlorides, sulfates, and contaminants, address why this AMP does not include preventive or mitigative actions such as controlling and monitoring the borated water chemistry to ensure that aging degradation is mitigated.

B1.13-2 Because borated water can induce corrosion and cracking at tank bottom due to the presence of chlorides, sulfates, and contaminants, discuss how the chemistry parameters of the tank are controlled and monitored periodically.

B1.13-3 (a) In addition to monitoring and controlling the borated water chemistry, has a one-time inspection been considered to verify the effectiveness of the chemistry control to manage loss of material and to verify the absence of cracking at the tank bottom?
Section VII.E2 of the GALL Report recommends a water chemistry AMP for managing SCC of the solution tank. The water chemistry AMP specifies periodic monitoring and control of chemical species and water quality which are not included in the subject AMP.
(b) Discuss the non-inclusion of periodic monitoring and control in this AMP, including possible verification of its effectiveness and whether it is consistent with the water chemistry AMP in GALL.

B1.13-4 The staff is not certain as to the effectiveness of the standby liquid control system surveillance activities AMP. Is one of the purposes of the daily monitoring of the solution tank liquid level to verify the effectiveness of this AMP? If not, specify what other process is in place to verify the effectiveness of this AMP. Explain how daily monitoring of the liquid level would serve as an effective indicator for wall thinning in localized regions of the tank wall and/or bottom. What are the specific acceptance criteria for the change in tank liquid level? What specific corrective actions would be taken if those acceptance criteria were not met?

B1.13-5 Section A.1.2.3.6 of NUREG-1800 (July 2001) states that acceptance criteria of the program and the basis should be described. Provide specific values for maximum acceptable level of conductivity, chlorides, and sulfates for controlling the borated water chemistry.

B2.1 “Lubricating and Fuel Oil Quality Testing Activities”

B2.1-1 The activities for the detection of water and microbes have not been included in the program scope, which is one of the ten attributes of the AMP. State explicitly whether sampling and testing of fuel oil in the EDG and diesel driven fire pump fuel oil systems include enhancement activities for the detection of water and microbes. If so, include the implementation schedule for these enhancement activities in addition to including the schedule in Appendix A of the LRA.

B2.1-2 Periodic cleaning of a tank allows for removal of sediments, and periodic draining of water collected at the bottom of a tank minimizes the amount of water and the length of the contact time. These measures are effective in mitigating corrosion inside fuel oil tanks. Are these measures adopted in the AMP? If not, provide the basis for not including these mitigation measures. Are the EDG fuel oil tanks considered to be the most bounding for the carbon steel diesel driven fire pump fuel oil tanks? If so, provide the basis. If not, justify the basis for not performing internal inspections of the diesel driven fire pump fuel oil tanks. If EDG tank inspections and wall measurements indicate significant deterioration and/or significant wall thinning, what specific actions will be taken for the diesel driven fire pump fuel oil tanks?

B2.1-3 The applicant described lubricating oil sample analyses to be performed periodically in accordance with an approved PBAPS procedure. ASTM provides an established industry standard. Is this approved PBAPS procedure consistent with ASTM procedures?

B2.1-4 Corrosion may occur at locations in which contaminants may accumulate, such as tank bottoms. Accordingly, the effectiveness of the present AMP needs to ensure that significant degradation is not occurring and the component intended function would be maintained during the period of extended operation. Thickness measurement of tank bottom would be an acceptable verification program. The applicant should state clearly such a need for verification and cross-reference another of the applicant’s AMP (B.2.4 Emergency Diesel Generator Inspection Activities) as the corresponding verification program.

B2.1-5 The staff found an inconsistency between the emergency diesel generator inspection activities AMP and the lubricating and fuel oil quality testing activities AMP. Why is the emergency diesel generator inspection activities AMP used together with the present AMP for components in the EDG system (fuel oil day tank and fuel oil storage tank, table 3.3-16 of the LRA), whereas the lubricating and fuel oil quality testing activities AMP is used alone for components in the fire protection system (fuel tank, table 3.3-7 of the LRA)? Should the UT and visual inspection activities described in B2.4 of the LRA be extended to be applied to components in systems other than the EDG?

B2.1-6 Section A.1.2.3.5 of NUREG-1800 states that it is necessary to confirm that the time for the next scheduled inspection will occur before a loss of SC intended function. Please provide the schedule for the lubricating oil and fuel oil analyses.

B2.1-7 Pore sizes of filters are used as a principal parameter in the determination of particulates. What is the pore size of the filter used in the testing procedures? Is it consistent with the latest applicable ASTM standards?

B2.1-8 The staff is not certain as to why the applicant is not using the updated ASTM standards. Provide the basis for using ASTM D2276-78 and D975-81 rather than ASTM D 2276-00 and D975-00, which are updated ASTM standards? If particular test procedures are used based on methods as documented in specific ASTM documents other than the ones quoted in the AMP these should be explicitly referenced.

B2.1-9 In the LRA, it is stated that minor contamination events such as sediment in the diesel driven fire pump fuel oil day tank (one event), water in the diesel driven fire pump fuel oil storage tank (two events), and water in the EDG fuel oil storage tanks (two events in 1988) have been detected and corrected in a timely manner. Are any of these events related to contaminations of the tank bottoms? These operating experiences suggest the need for an effective verification program to assure the effectiveness of the lubricating and fuel oil quality testing activities AMP. The staff is not certain whether there is a verification program in place to assure the effectiveness of this AMP. Please address.

B2.2 “Boraflex Management Activities”

B2.2-1 Section A.1.2.3.5 of NUREG-1800 states that it is necessary to confirm that the time for the next scheduled inspection will occur before a loss of SC intended function. Do the trending and monitoring of the silica level in the spent fuel pool water include the use of the EPRI RACKLIFE predictive code or its equivalent? If so, what is the monitoring schedule? If not, provide the basis for excluding the use of this methodology or its equivalent.

B2.2-2 Is neutron attenuation (blackness) measurement used in conjunction with boron areal density measurement, or is the latter a replacement for the former? Blackness measurement is used as an indicator of gap formation arising from material shrinkage which does not necessarily involve loss of materials to the spent fuel pool water.

B2.2-3 Is the data on silica levels used independently from the measurement on the loss of boron area density? The amount of boron carbide released from the Boraflex panel is determined through direct measurement of boron areal density and these data may be correlated with the levels of silica present through the use of a predictive code such as RACKLIFE or other similar codes (see RAI B2.2-1). Detection of gaps through blackness testing supplements these procedures (see RAI B2.2-2).

B2.2-4 In the LRA it is stated that spent fuel pool silica data is trended and compared in an industry-wide EPRI database. The staff believes that using a predictive code to trend and analyze the spent fuel pool silica data is necessary. Is this trending and comparison done in conjunction with a predictive code?

B2.8 “Generic Letter 89-13 Activities”

B2.8-1 Section A1.2.3.4, “Detection of Aging Effects,” of NUREG-1800 (July 2001) states that a justification needs to be provided as to whether the techniques are adequate to detect aging

effects before a loss of SC intended function. What type of visual inspection will be conducted (e.g., VT-1, etc.)?

B2.8-2 The staff believes that the Outdoor, Buried , and Submerged Component Inspection Activities AMP should cover the inspection of external protective coatings in the systems such as the HPSW and ESW containing raw water. If the inspection of external protective coatings is covered by this AMP, please include it; if not, explain the basis of not including this inspection of the external protective coatings of the HPSW and ESW systems in that AMP.

B2.12 “Heat Exchanger Inspection Activities”

B2.12-1 The applicant did not provide enough information for the staff to evaluate this AMP. Provide a more detailed description of the PBAPS inspection procedures in regards to methodology, frequency of inspections, and parameters inspected/monitored.
B2.12-2 Section A1.2.3.4, “Detection of Aging Effects,” of NUREG-1800 (July 2001) states that a justification needs to be provided as to whether the techniques are adequate to detect aging effects before a loss of SC intended function. It is indicated in the LRA that loss of material and cracking degradation are detected through component surface visual inspections of the HPCI and RCIC turbine lube oil coolers on the water side. At what levels (e.g., VT-1 etc.) would the visual inspection be conducted? In addition, the staff finds that the identified visual defects need to be further investigated, including NDE examinations if appropriate. Confirm that this will be done, or provide the basis for the decision not to further investigate these defects.

B2.12-3 Section A.1.2.3.5 of NUREG-1800 states that it is necessary to confirm that the time for the next scheduled inspection will occur before a loss of SC intended function. What is the schedule for the periodic component visual inspections and cleaning as part of the HPCI and RCIC turbine inspections? What is the justification for the inspection interval?

B2.12-4 The applicant stated that visual inspection would be conducted for fouling. However, no information is provided by the applicant in the acceptance criteria on fouling management. Does the acceptance criteria include effective cleaning of fouling in organisms and maintenance of the coating or lining?