February 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 Section 3.1, "Aging Management of Reactor Coolant System", Section 3.2, "Aging Management of Engineered Safety Feature Systems", Section 3.3, "Aging Management of Auxiliary Systems", and Section 3.4, "Aging Management of Steam and Power Conversion Systems."

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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REQUEST FOR ADDITIONAL INFORMATION
PEACH BOTTOM UNITS 2 AND 3

3.1 Aging Management of Reactor Coolant System

RAI 3.1-1

This is a global RAI applicable to all systems.

The application does not identify the aging effects of cracking due to stress corrosion cracking (SCC), cyclic loading, wear, loss of preload, and loss of material for closure bolting for valves and pumps in any system. Bolting that is heat treated to a high hardness condition and exposed to a humid environment within containment could be susceptible to SCC. NUREG-1399, "Resolution of Generic Safety Issue 29: Bolting Degradation or Failure in Nuclear Power Plants," indicates that the bolting material with yield strength greater than 150 ksi is susceptible to SCC. For high strength bolting, the effects of cyclic loading are generally seen in conjunction with SCC in causing crack initiation and growth. Vibration, cyclic loading, gasket creep and stress relaxation could cause loss of preload. Carbon steel bolting exposed to a humid environment within containment could be susceptible to loss of material.

The applicant should take into account the above information and review industry and plant experience to assess whether these aging effects are applicable for closure bolting. If such aging effects are applicable, the applicant should submit an aging management program to manage these aging effects in the closure bolting.

RAI 3.1-2

(1) In Table 3.1-1 of the LRA, the applicant has identified cumulative fatigue damage as an aging effect for "other nozzles." According to Table 4.3.1-1 of the LRA, "other nozzles" appears to include RPV recirculation inlet and outlet nozzles. Verify that "other nozzles" includes the RPV recirculation inlet and outlet nozzles. Provide justification for not identifying cumulative fatigue damage as an aging effect for the remaining RPV nozzles (e.g., core spray nozzle)

(2) In Table 3.1-1 of the LRA, the applicant does not identify cumulative fatigue damage as an aging effect for nozzle safe-ends. However, BWRVIP-74 states that fatigue usage factors for safe-ends follow the same pattern as nozzles. Table 4.3.1-1 of the LRA includes RPV core spray nozzle safe-end as a fatigue monitoring program location. Provide technical justification for not including cumulative fatigue damage of safe-ends as an aging effect in Table 3.1-1.

(3) Table 3-1 of BWRVIP-74, "BWR Reactor Pressure Vessel Inspection and Flaw Evaluation Guidelines," identifies cumulative fatigue as an aging effect for vessel flanges and stabilizer brackets. But Table 3.1-1 of the LRA does not identify cumulative fatigue damage as an aging effect for these two components. Provide the technical basis for excluding cumulative fatigue damage as an aging effect for these two components.

RAI 3.1-3

Void swelling is not identified as an aging effect for any component of the reactor pressure vessel and internals. The applicant is requested to supply the peak neutron fluence for the

reactor internals at the end of the license renewal term. Using this neutron fluence as basis, provide data that indicates void swelling is not an aging effect during the license renewal term. If it is an aging effect, identify the aging management program that will ensure the function of the internals is not degraded (result in cracking or change in critical dimensions) during the license renewal term.

RAI 3.1-4

Table 3.1-1 of the LRA indicates that the CASS components in jet pump assemblies and CASS fuel supports have no aging effects requiring management because the ferrite content is less than 20 vol.%. However, according to the criteria stated in the May 19, 2000, NRC letter from C. I. Grimes to D. Walters, if the molybdenum content of these components is not low (0.5 wt.%) and the ferrite content is greater than 14 vol.%, these components are considered susceptible to thermal embrittlement. CASS components with niobium are also considered susceptible to thermal embrittlement.

For all CASS components that are susceptible to significant thermal embrittlement, the applicant may perform a flaw tolerance analysis. The flaw tolerance analysis should follow the methodology and criteria in Code Case N-481. Piping and reactor vessel internals that are potentially susceptible to thermal embrittlement and can not satisfy the flaw tolerance criteria must be inspected with a technique that is capable of detecting a quarter thickness crack with a 6-to-1 aspect ratio in the CASS component.

Describe which CASS components are susceptible to thermal embrittlement and will require a flaw tolerance analysis? Describe the proposed aging management program for components that are susceptible to thermal embrittlement and cannot demonstrate adequate flaw tolerance?

RAI 3.1-5

The CASS components in the jet pump assemblies and CASS fuel supports may experience neutron fluence greater than 10^{17} n/cm^2 and become susceptible to neutron irradiation embrittlement. Irradiation embrittlement of CASS components becomes a concern only if cracks are present in the components. Industry wide experience shows that significant cracking has not been observed in CASS jet pump assembly components. Please describe an aging management program to confirm that the CASS jet pump assembly components and fuel supports are not susceptible to cracking.

RAI 3.1-6

The applicant identifies cracking as an aging effect for stainless steel components in the reactor coolant system exposed to reactor coolant environment. Identify whether the cracking results from stress corrosion or thermal fatigue, identify the butt weld locations within the system and the pipe size for all effected components. For components less than 4 inches in diameter, identify whether the components are susceptible to stress corrosion cracking or thermal fatigue resulting from turbulent penetration or thermal stratification, and identify the aging management program for detecting cracking.

RAI 3.1-7

The applicant identifies loss of material as an aging effect for stainless and carbon steel components in the reactor pressure vessel instrumentation system. The applicant identifies (a) RCS Chemistry Program to mitigate this aging effect and (b) ISI Program, which includes periodic hydrostatic pressure tests, to confirm the integrity of these components. These pressure tests are not adequate to confirm the effectiveness of the RCS Chemistry Program to prevent loss of material. Please describe an aging management program to confirm the effectiveness of the RCS Chemistry Program, i.e., to confirm that the stainless steel and carbon steel components in the reactor pressure vessel instrumentation system are not susceptible to loss of material.

RAI 3.1-8

(a) Loss of material due to galvanic corrosion can occur when two dissimilar metals (i.e., carbon steel and stainless steel) are in contact in the presence of oxygenated water. The applicant is requested to identify whether the carbon steel piping of the reactor pressure vessel instrumentation system is connected to stainless steel components. If so, then does the aging effect of loss of material include damage due to galvanic corrosion? The applicant has identified the RCS Chemistry Program to mitigate this aging effect. Please describe an aging management program to confirm the effectiveness of the RCS Chemistry Program to prevent loss of material from galvanic corrosion.

(b) The applicant is requested to identify whether the carbon steel piping of the reactor recirculation recirculation system is connected to stainless steel components. If so, then does the aging effect of loss of material include galvanic corrosion? The applicant has identified the RCS Chemistry Program to mitigate this aging effect. Please describe an aging management program to confirm the effectiveness of the RCS Chemistry to prevent loss of material from galvanic corrosion.

RAI 3.1-9

The valve bodies, valve bonnets, and valve closure bolting in the reactor pressure vessel instrumentation system are subject to ASME Code fatigue analysis. But the applicant has not identified cumulative fatigue damage as an aging effect for these components. Provide the technical basis for not considering cumulative fatigue damage as an aging effect for these components.

RAI 3.1-10

According to NUREG-0313, Rev. 2, a CASS component is susceptible to stress corrosion cracking if the carbon content is greater than 0.035 wt% or ferrite content less than 7.5 vol.%. In a statically cast CASS component (i.e., pump casing), the ferrite distribution is not uniform and could be below 7.5 vol.% at some locations on the inside surface of the component. In addition, if the ferrite content of the weld metal used to perform repair at the inside surface of the pump casing is less than 7.5 vol.%, the pump casing is susceptible to stress corrosion cracking. The applicant is requested to present technical justification for not including cracking as an aging effect for the CASS pump casings in the reactor recirculation system.

RAI 3.1-11

The applicant is requested to present an evaluation of the BWR industry-wide response to NRC Bulletin 88-08, "Thermal Stresses in Piping Connected to Reactor Coolant Systems." The staff would specifically like to know whether the applicant, in response to the NRC Bulletin, identified any unisolable sections of piping connected to the Peach Bottom RCS that can be subjected to stresses from turbulent penetration, temperature stratification, or temperature oscillations induced by leaking valves. The staff needs this information to assess the effectiveness of the ISI Program, presented in Section B.1.8 of the LRA, to manage cracking of the reactor coolant system components.

RAI 3.1-12

Components of the reactor recirculation system, such as piping and recirculation pump subcomponents (casing, cover, seal flange and closure bolting, valve bodies, bonnets and closure bolting) are subject to cumulative fatigue damage due to plant heatup, cooldown, and other operational transients. Cumulative fatigue damage has not been identified as an aging effect for any of the component in the reactor recirculation system. Provide the technical basis for excluding cumulative fatigue damage as an aging effect for the reactor recirculation system components that are within the scope of license renewal.

RAI 3.1-13

a) The applicant's reactor coolant system chemistry program is based on the guidance presented in EPRI TR-103515, "BWR Water Chemistry Guidelines, 2000 Revision." The reviewers note that the staff has not approved EPRI TR-103515, 2000 Revision, for generic use. The latest revision reviewed by the staff is the 1996 revision (Reference: September 18, 1998 letter from D.S. Hood, NRC to J.H. Mueller, Niagara Mohawk Power Corporation). Therefore, the applicant is requested to identify the changes in the water chemistry program that result from the use of the guidelines from the1996 Revision to the 2000 Revision of EPRI TR-103515.

b) To determine the effectiveness of the EPRI TR-103515 BWR water chemistry guidelines, identify components at Peach Bottom that have had stress corrosion cracking or loss of material since the EPRI TR-103515 water chemistry guidelines were instituted at Peach Bottom. Identify the changes in water chemistry that have been instituted to eliminate or mitigate cracking or loss of material in these components.

c) The reactor coolant system chemistry AMP, presented in Section B.1.2 of the LRA, continuously monitors coolant conductivity, and measures the impurities such as chlorides and sulfates only when the conductivity measurements indicate presence of abnormal conditions. Does EPRI TR 103515, 2000 Revision guidelines require that the sulfates and chlorides be measured daily and continuous monitoring of the desolved oxygen concentration in the reactor feedwater/condensate system and the control rod drive water?

d) The applicant is requested to provide information about whether Peach Bottom Units 1 and 2 employ hydrogen water chemistry with NMCA (noble metal chemical application) applied? If so, then according to EPRI TR-103515, 2000 Revision guidelines, which parameters should be monitored to assess the effectiveness of this water chemistry? How often these parameters should be measured and what are the required limits for them? Note that BWRVIP-62, "BWR Vessel and Internals Project, Technical Basis for Inspection Relief for BWR Internal Components with Hydrogen Injection." recommends monitoring of electrochemical potential and hydrogen-to-oxygen molar ratio for assessing the effectiveness of HWC with NMAC applied.

e) What changes in the PBAPS Technical Specifications are made to account for the use of EPRI TR-103515, 2000 Revision guidelines?

RAI 3.1-14

In Section B.2.7, "Reactor Pressure Vessel and Internals ISI Program, of the LRA, the applicant stated that the vessel internals requiring aging management within the scope of license renewal are shroud, shroud supports, access hole covers, core support plate, core P/SLC line, top guide, core spray piping and spargers, control rod guide tubes, jet pump assemblies, CRDH guide tubes, in-core housing guide tubes, and dry tubes. The applicant has not submitted information about any repair to core shroud or other internals, but NUREG-1544, "Status Report: Intergranular Stress Corrosion Cracking of BWR Core Shrouds and Other Internal Components," published in 1994, refers to the PECO Energy Company's submittal of the Peach Bottom core shroud repair designs to NRC for review. The applicant is requested to provide information about whether the Peach Bottom core shrouds and other internals have been repaired, and if so then whether the repair hardware for those components is within the scope of the reactor pressure vessel and internals ISI program.

RAI 3.1-15

To evaluate whether the reactor materials surveillance program presented in Section B.1.12 of the LRA provides sufficient data for monitoring the extent of neutron irradiation embrittlement during the license renewal period, the staff requests that the applicant determine whether the existing Peach Bottom reactor surveillance program or the integrated surveillance program would be revised to satisfy the following attributes:

> Capsules shall be removed periodically to determine the rate of embrittlement and at least one capsule with a neutron fluence not less than once or greater than twice the peak beltline neutron fluence must be removed before the expiration of the license renewal period.

Capsules shall contain material to monitor the impact of irradiation on the limiting beltline materials and must contain dosimetry to monitor neutron fluence.

If capsules are not being removed from Peach Bottom during the license renewal period, the applicant shall supply operating restrictions (i.e., inlet temperature, neutron spectrum and flux) to ensure that the RPV is operating within the environment of the surveillance capsules, and must supply ex-vessel dosimetry for monitoring neutron fluence.

The applicant has indicated in Section B.1.12 of the LRA that it plans to implement the provisions of the Integrated Surveillance Program (ISP) as described in BWRVIP-78. The staff requests that the applicant provide the schedule for implementing the ISP at Peach Bottom. The staff also request that the applicant indicate how the proposed ISP would satisfy the ISP criteria in Appendix H, 10 CFR Part 50 and the attributes discussed above.

RAI 3.1-16 - UFSAR Update

The reviewers found that the summary of the reactor coolant system chemistry program in Section A.1.2 of the LRA is adequate, except that it does not identify the supporting documents (e.g., EPRI water chemistry guidelines). The applicant is requested to include in the UFSAR update the supporting documents by reference in Section A.1.2. The revision of the water chemistry guidelines need not be included in the UFSAR update.

RAI 3.1-17 - UFSAR Update

The applicant describes the Reactor Materials Surveillance Program as an existing program in Section A.1.12 of the LRA, but does not include a summary of the BWR Integrated Surveillance Program, which the applicant intends to use at Peach Bottom. The applicant is requested to include in the UFSAR update a summary of the BWR Integrated Surveillance Program, which should include reference to BWRVIP reports.

RAI 3.1-18

The applicant has identified two aging management programs (AMPs) that are dependent upon the BWRVIP's generic AMPs. These plant-specific AMPs are the "Reactor Pressure Vessel and Internals ISI Program" (Section B.2.7), and "Reactor Materials Surveillance Program" (Section B.1.12). In most instances, the staff's safety evaluations (SEs) of the applicable BWRVIP reports and their associated license renewal appendices, for which the applicant is referencing, contain generic open items and recommendations and applicant-specific license renewal action items. The staff requests that the applicant identify and discuss how the applicant is addressing, in a plant-specific manner, each generic open item and recommendation, and applicant-specific action items, in the staff's SEs for these BWRVIP reports and related license renewal appendices listed below. Specifically, but not necessarily limited to, the applicant should address the following open items from the referenced staff SEs:

A. As described in the open item in the safety evaluation for BWRVIP-18, when the applicant performs UT or VT inspection of BWR Core Spray Internals, the applicant should include the inspection uncertainties in measuring the flaw length by UT or VT and the value of the uncertainties used in the flaw evaluation should be demonstrated on a mock up.

B. The applicant should confirm that the hold down bolts will be inspected in accordance with the staff's safety evaluation for BWRVIP-25.

C. The applicant should confirm that, when the inspection tooling and methodologies are developed that allow the welds in the lower plenum to be accessible, the applicant will inspect these welds with the appropriate NDE method, in order to establish a baseline for these welds, and that an appropriate re-inspection schedule, based on appropriate safety considerations, as established by the BWRVIP in a revised BWRVIP-38 report, will be followed. Until this revision to the BWRVIP-38 report is made, the applicant is to commit to inspecting the supports and provide inspection guidance as discussed above.

D. Pending resolution of the open item in the BWRVIP-41 guidelines, the applicant should describe the type of inspection to be used for the thermal sleeve welds which are capable of detecting IGSCC, and to provide an inspection schedule and scope as discussed.

E. As discussed in the final safety evaluation for BWRVIP-47, the staff believes that an initial baseline inspection should be comprehensive, and include all safety-significant locations and components that are practicable to inspect, based on tooling available. Further, the staff believes that the re-inspection schedule and scope, based on the performance and results of the initial baseline inspections, should be addressed in the BWRVIP-47 report. Until BWRVIP-47 is resolved, the applicant is to describe the type of inspection and to provide an inspection schedule and scope as discussed.

F. The applicant should provide a response to the Action Items in the staff's SER for the BWRVIP-74.

G. The applicant should address all applicable plant-specific open items in the staff's BWRVIP-78/-86 SE.

In addition, the applicant should describe the BWRVIP generic and applicant-specific processes for ensuring that the BWRVIP generic AMPs, as modified to address the staff's SE's generic open items and recommendations and applicant-specific action items, will be implemented during the license renewal term. Further, the applicant should confirm whether all the BWRVIP reports, including all appendices and revisions that are referenced in Sections B.2.7 and B.1.12, will be included in the UFSAR supplement (Appendix A of the LRA).

3.2 Aging Management of Engineered Safety Feature Systems (ESF)

3.2.4 Reactor Core Isolation Cooling System (RCIC)

RAI 3.2.4-1

Given the potentially corrosive nature for wetted gas environments, discuss whether loss of material by pitting or general corrosion is an applicable effect for the surfaces of bronze RCIC valve bodies that are exposed to these environments. Provide your bases for your determination. If loss of material is an applicable aging effect for the bronze valve bodies exposed to wetted gas environments, an aging management program/activity must be proposed to manage the effect during the extended terms of operation for the PBAPS units.

3.3 Aging Management of Auxiliary Systems

RAI 3.3-1

Clarify whether any of the auxiliary systems discussed in Section 3.3 of the LRA are within the category of seismic II over I SSCs as described in position C.2 of Regulatory Guide 1.29. Based on the information provided in Section 2.1.2.1 of the LRA, it appears that the applicant has included the pipe supports for seismic II over I piping systems in the scope of license renewal. However, the seismic II over I piping segments are not included within the scope of license renewal. The staff's concern is that seismic II over I piping, though seismically supported, would be subjected to the same plausible aging effects as safety-related piping. For example, depending on piping material, geometrical configuration, operation condition such as water chemistry, temperature, flow velocity, and external environment, erosion and corrosion may be plausible aging effects for some seismic II over I piping. Those effects, if not properly managed, could result in age-related failures and adversely impact the safety functions of safety-related SSCs. The applicant is requested to provide justification for not including the seismic II over I piping segments within the scope of license renewal. Specifically, the applicant is requested to address how plausible aging effects associated with those piping systems, if any, will be appropriately managed.

RAI 3.3-2

Numerous ventilation systems discussed in Section 3.3 of LRA include elastomer components in the system. Normally ventilation systems contain elastomer materials in duct seals, flexible collars between ducts and fans, rubber boots, etc. For some plant design, elastomer components are used as vibration isolators to prevent transmission of vibration and dynamic loading to the rest of the system. The aging effects of concern for those elastomer components are change in material properties such as hardening and loss of strength and loss of material due to wear. The applicant has identified the aging effect of change in material properties. To manage that aging effect, the applicant relies on the periodic visual inspection and testing activities included in the aging management program, ventilation system inspection and testing activities. The applicant stated that the inspection interval is dependent on the component and the system in which it resides. The

applicant also indicated that previous inspection and testing activities have detected damaged components and leakage in certain ventilation systems. The applicant is requested to clarify how it has considered the aging effect of loss of material due to wear for the applicable elastomer components. In addition, the applicant is requested to provide the frequency of the subject visual inspection and testing activities and to demonstrate the adequacy of the frequency of those inspection and testing activities to ensure that aging degradation will be detected before there is a loss of intended function.

RAI 3.3-3

In Sections 2.3.3.18 and 3.3.18 of the LRA, the applicant describes the scope and the intended functions of cranes and hoists and their associated aging management review. However, in Section 4.0 of the LRA, the applicant has not identified a crane load cycle limit as a TLAA for the cranes within the scope of license renewal. Normally based on its design code, there is a specified load cycle limit at rated capacity over the projected life for the applicable crane. Therefore, it may be necessary to perform an evaluation of TLAA relating to crane load cycles estimated to occur up to the end of the extended period of operation. The applicant is requested to provide justification for not including the crane load cycle limit as an applicable TLAA.

RAI 3.3-4

Section 3.3.16, Emergency Diesel Generator contains Table 3.3.16 that outlines the aging management review results. For various components (valve bodies, strainer screens, piping, and vessels) the applicant identifies loss of material as an aging effect of carbon steel in moist environments such as closed cooling water and wetted gas. However, the applicant does not identify cracking as an aging effect in these same moist environments or in the outdoor environment. For example, for valve bodies intended to function as a pressure boundary in the closed cooling water environment, the applicant identified loss of material and cracking as aging effects for stainless steel, but identified only loss of material as an aging effect for carbon steel. In addition, although the applicant identifies loss of material and cracking as aging effects for carbon steel piping in the lubricating and fuel oil environments, the applicant does not identify loss of material as an aging effect for lubricating oil vessels or cracking as aging effects for lubricating and fuel oil vessels. The staff requests the applicant to provide information that supports the exclusion of the aging effects as described. The table below summarizes the component groups that the staff requests the applicant to address.

Page	Component Group	Component Intended Function	Environment	Materials of Construction	Excluded Aging Effect(s)
3-97	Casting and Forging: Valve Bodies	Pressure Boundary	Closed Cooling Water	Carbon Steel	Cracking
3-99	Casting and Forging: Strainer Screens	Filter	Wetted Gas	Carbon Steel	Loss of Material
3-109	Piping: Pipe	Pressure Boundary	Buried	Carbon Steel	Cracking
3-109	Piping: Pipe	Pressure Boundary	Closed Cooling Water	Carbon Steel	Cracking
3-110	Piping:	Pressure	Outdoor	Carbon Steel	Loss of Material and/or

	Pipe	Boundary			Cracking
3-111	Piping Specialties: Drain Traps Expansion Joints	Pressure Boundary	Wetted Gas	Carbon Steel	Cracking
3-111	Vessel: Expansion Tank	Pressure Boundary	Closed Cooling Water	Carbon Steel	Cracking
3-111	Vessel: Fuel Oil Day Tank	Pressure Boundary	Fuel Oil, Buried	Carbon Steel	Cracking
3-111	Vessel: Lubricating Oil Tank	Pressure Boundary	Lubricating Oil	Carbon Steel	Cracking
3-112	Vessel: Air Receivers	Pressure Boundary	Wetted Gas	Carbon Steel	Cracking

3-112	Vessel: Silencers	Pressure Boundary	Wetted Gas	Carbon Steel	Cracking

RAI 3.3–5

Section 3.3.17, Suppression Pool Temperature Monitoring System of the application contains Table 3.3.17 that outlines the aging management review results. The applicant identifies loss of material as an aging effect for penetration sleeves in torus water. However, the applicant does not identify cracking as an aging effect for the penetration sleeves even though they provide a fission product barrier. The staff requests the applicant to provide information supporting the exclusion of cracking as an aging effect for penetration sleeves.

RAI 3.3-6

In section 3.3.5, 3.3.6 and 3.3.14, internal surface of stainless steel, carbon steel and cast iron components are exposed to raw water environment. Typically, the aging effect, fouling, is associated with raw water environments. Explain why fouling is not identified as an applicable aging affect in pipe, pump casings, strainers, and valve bodies in a raw water environment. If it is identified, explain how this environment and the associated aging effect are managed in the LRA.

RAI 3.3-7

The following HVAC systems have been identified as being within the scope of license renewal:

Standby Gas Treatment System (section 2.3.2.7)
Control Room Ventilation System (section 2.3.3.8)
Battery and Emergency Switchgear Ventilation System (section 2.3.3.9)
Diesel Generator Building Ventilation System (section 2.3.3.10)
Pump Structure Ventilation System (section 2.3.3.11)

However, no aging effects were identified in Tables 3.2.7, 3.3.8, 3.3.9, 3.3.10, or 3.3.11 for the following component groups in sheltered or ventilation atmosphere environments:

Casting and Forging: Valve Bodies/ Pump Casings
Piping: Pipe, Tubing, Fittings
Piping Specialties: Flow Elements, Nitrogen Electric Vaporizer
Sheet Metal: Ducting, Damper Enclosures, Plenums, Fan Enclosures

Despite the statement in Section B.2.3 that "No physical degradation of metallic ventilation system components has been identified at PBAPS or by industry in general....", metallic HVAC system components at other nuclear power plant facilities have been identified as subject to aging effects. For example, the GALL Report, NUREG-1801 Chapter VII, Item F1-3 cites potential aging mechanisms for HVAC ducts as: Loss of material/General, pitting, crevice corrosion, and microbiologically influenced corrosion (for duct [drip-pan] and piping for moisture drainage). Please explain the basis for determining that no aging effects exist and no aging management activities are required for the systems identified above.

Fire Protection

RAI 3.3-8

Table 3.3-7 identifies black steel pipe and carbon steel pipe used in raw water service in fire protection systems and an aging effect of flow blockage. The design basis of sprinkler systems requires an assumption of a roughness coefficient, a “C” factor in the Hazen-Williams equation. This coefficient declines with age, causing a greater pressure drop and subsequent reduced delivery of water to the suppression system. Changes in the value of this coefficient can be determined by flow tests and used to verify, by calculation, the ability of the system to perform its intended function in terms of flow rate and pressure. Inherent in sprinkler systems are pipe networks which cannot be flow tested. Over an extended time, the interior of the pipe can deteriorate through scaling and tuberculation until the system cannot deliver the required flow with the available pressure. This condition cannot be observed by external visual inspection. Appendix B.2-9 addresses flow testing and visual inspection to monitor and detect blockage. For the piping described above, flow testing is not reasonably achievable. Identify how the internal condition of this piping will be verified to assure flow capability.

RAI 3.3-9

The aging effect of several materials referenced in Table 3.5-14 is listed as Change in Material Properties. Appendix B.2.9 states these changes in material properties will be monitored by visual inspection. Provide the acceptance criteria for required inspection which would identify unacceptable changes in material properties and the bases for these criteria.

RAI 3.3-10

Table 3.3.7 identifies sprinkler heads in four different locations and indicates aging effects as none in one case and three different aging effects in the other listing. It is unclear which heads have no aging effects. Identify by type and plant location which sprinkler heads are considered as having no aging effects. Provide the basis for the conclusion that there are no aging effects.

RAI 3.3-11

In Table 3.3.7 on page 3-77 of the LRA, the applicant does not identify an aging effect for bronze valve bodies in an outdoor environment. The staff requests that the applicant provide information supporting the exclusion of aging effects, such as loss of material, for these components.

3.4 Aging Management of Steam and Power Conversion Systems

RAI 3.4.1

Table 3.4-1 describes aging management review results for component groups in the Main Steam System. Provide definition of all aging effects and environments that are listed in Table 3.4-1. Describe the process that was used to identify the aging effect for each component listed in Table 3.4-1. Discuss how operating experiences impacted the process for identifying aging effects.

cc:

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