Exelon Nuclear
200 Exelon Way
Kennett Square, PA 19348

www.exeloncorp.com

Exelon Nuclear

10CFR54
10CFR50

January 14, 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 Related to License Renewal

Reference:
1. Conference calls between Exelon and NRC staff on December 30, 2002, January 2, 2003 and January 6, 2003
2. Letter from David L. Solorio (USNRC) to Michael P. Gallagher dated November 26, 2002

Dear Sir/Madam:

Exelon Generation Company, LLC (Exelon) hereby submits the following responses to the request for additional information from the above referenced letter and conference call. Attachment 1P is a separately bound proprietary addendum to this letter. Exelon is requesting that Attachment 1P be withheld from public disclosure, as described in the Affidavit of Ronald J. DeGregorio, under 10CFR2.790 and 10CFR9.17. A redacted version, suitable for public disclosure, is provided with the responses in Attachment 1. Attachment 1 provides the requested additional financial information. Attachment 2 provides a revised response to the SER confirmatory item on fuse holders. Attachment 3 provides the revised response to SER open item 4.5.2-1 on the top guide. Attachment 4 provides additional information for an SER confirmatory item response.

If you have any questions or require additional information, please do not hesitate to call.

I declare under penalty of perjury that the foregoing is true and correct.

Respectfully,

Executed on 1-14-03

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

Enclosures: Affidavit
Attachments 1P, 1, 2, 3 & 4

cc: H. J. Miller, Administrator, Region I, USNRC
A. C. McMurtray, USNRC Senior Resident Inspector, PBAPS

A001

Affidavit of Ronald J. DeGregorio

I, Ronald J. DeGregorio, Vice President, do hereby affirm and state:

1. I am authorized to execute this affidavit on behalf of Exelon Generation Company, LLC ("EGC").

2. EGC is providing this information in support of its Application for License Renewal for the Peach Bottom Atomic Power Station Units 2 and 3 ("PBAPS," NRC Facility Operating License Nos. DPR-44 and DPR-56; Docket Nos. 50-277 and 50-278. The documents contained in Attachment 1P contain EGC's financial projections related to the continued operation of PBAPS and other generating facilities. These documents constitute proprietary commercial and financial information that should be held in confidence by the NRC under 10 C.F.R. 2.790(a)(4) and 10 C.F.R. 9.17(a)(4), because:

   i. This information is and has been held in confidence by EGC.
   ii. This information is of a type that is held in confidence by EGC and there is a rational basis for doing so because it is sensitive financial and commercial information concerning EGC's projected operating revenues and expenses.
   iii. This information is being transmitted to the NRC in confidence.
   iv. This information is not available in public sources and could not be gathered readily from other publicly available information.
   v. Public disclosure of this information would create substantial harm to the competitive position of EGC by disclosing EGC's internal financial projections.

3. Accordingly, EGC requests that Attachment 1P be withheld from public disclosure under 10 C.F.R. 2.790 (a)(4) and 10 C.F.R. 9.17 (a)(4).

Ronald J. DeGregorio
Vice President

Commonwealth of Pennsylvania
County of Chester

Subscribed and sworn to before me, a Notary Public, in and for the County and Commonwealth above named, this 14th day of January, 2003.

Vivia V. Gallimore
Notary Public

My Commission Expires:
10-6-03

Notarial Seal
Vivia V. Gallimore, Notary Public
Kennett Square Boro, Chester County
My Commission Expires Oct. 6, 2003
Member, Pennsylvania Association of Notaries

ATTACHMENT 1

Exelon Generation Company, LLC (Exelon)
License Renewal Application (LRA)
Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3

Request for Additional Information

Exelon is requested to provide the following financial qualification information, pursuant to 10 CFR 54.19(a) and 50.33:

1. Annual cost and revenue information for Exelon Generation Company, LLC for 2007 and 2008, in accordance with 50.33(f)(2). The licensee previously submitted the requisite information for the years 2001 thru 2006. The staff has determined that, until such time as the proposed rule to eliminate these financial requirements for license renewal becomes final, applicants should submit five years of annual cost and revenue information for the full five-year period (July 2003 to July 2008) immediately following the expected date of issuance of the renewed licenses, if approved (July 2003).

Response:

Exelon has updated the financial qualification information to extend the financial projections from January 1, 2003 through December 31, 2008 in response to your request. A redacted version of the financial qualification information is provided below. A proprietary version of the financial qualification information is provided in Attachment 1P. The updated financial qualification information continues to demonstrate that Exelon possesses the financial qualifications to meet the applicable requirements of 10CFR50.33(f), "Contents of Applications; General Information," for non-electric utility businesses. Specifically, Exelon possesses, or has reasonable assurance of obtaining, the funds necessary to cover the estimated operating costs for the period of the facility operating licenses, including the period of operation under renewed licenses, in accordance with 10CFR50.33(f)(2).

EXELON GENERATION, LLC
Projected Income Statement
($ Millions)

	2003	2004	2005	2006	2007	2008
Operating Revenue	$	$	$	$	$	$
Operating Expenses						
Fuel & Purchased Power						
Operation & Maintenance						
Depreciation & Amortization						
Administrative & Other						
Decommissioning Expense						
Decommissioning Recoveries						
Total Operating Expenses						
Operating Income (Loss)						
Other Income (Deductions)						
Net Interest Expense						
Income before Income Taxes						
Income Taxes						
Extraordinary Item						
Minority Interest						
Net Income	$	$	$	$	$	$

EXELON GENERATION, LLC
Key Assumptions

	2003	2004	2005	2006	2007	2008
Generation (GWh)						
Nuclear						
Fossil and Net Hydro						
Purchases from AmerGen Sales						
Purchases from Other Suppliers						
Total Supply (GWh)						
Market Sales (GWh)						
Average Market Price ($/MWh)						
Total Generation Revenue ($ Thousands)						
Nuclear Capacity Factor						

ATTACHMENT 2

SER Confirmatory Item 3.6.2.2.2-1

The applicant proposed an aging management program, "Non-EQ Accessible Cable Aging Management Activity," for connectors, splices, and terminal blocks in a letter dated April 29, 2002. This program applies to electrical connectors, splices, and terminal blocks within the scope of license renewal that are installed in adverse localized environments caused by heat or radiation in the presence of oxygen. The staff found that the submitted aging management activity is essentially a visual inspection that addresses age-related degradation of connections that can result from exposure to high values of heat or radiation. In addition, fuse holders/blocks are classified as specialized type of terminal block because of the similarity in design and construction. Terminal blocks are passive components subject to an AMR for license renewal and so are fuse holders. During a conference call on September 5, 2002, the applicant stated that it will include fuse holders in the scope of the proposed AMP, Non-EQ accessible Cable Aging Management Activity (B.3.3), and this AMP will manage the aging effects for fuse connectors, splices, and terminal blocks as well as fuse holders. This is Confirmatory Item 3.6.2.2.2-1.

Response to SER Confirmatory Item 3.6.2.2.2-1

On May 16, 2002, the NRC issued "Proposed Staff Guidance on the Identification and Treatment of Electrical Fuse Holders for License Renewal" to the industry for comment. The proposed staff position is that fuse holders (including fuse clips and fuse blocks) are considered to be passive electrical components and should be included in the aging management review (AMR) process. As indicated in the proposed guidance stated below, the staff position only applies to fuse holders that are not part of a larger assembly:

"However, fuse holders inside the enclosure of an active component, such as switchgear, power supplies, power inverters, battery chargers, and circuit boards, are considered to be piece parts of the larger assembly. Since piece parts and subcomponents in such an enclosure are inspected regularly and maintained as part of the plant's normal maintenance and surveillance activities, they are not subject to AMR."

Based on a conference call on 9/5/2002, and a clarification conference call on 9/23/2002, Exelon agrees with the above position that fuse holders are passive, long-lived electrical components within the scope of license renewal, and that only those fuse holders that are not part of a larger assembly are subject to an AMR. Exelon also agrees with the statement in the May 16, 2002 letter that, for the purpose of license renewal, fuse holders/blocks are classified as a specialized type of terminal block because of the similarity in design and construction.

Section 3.6.2, Table 3.6-2 of the License Renewal Application (LRA) provides the aging management review results for connectors, splices, and terminal blocks based on environment and material of construction. Since fuse holders are classified as a specialized type of terminal block because of similarity of design and material of construction, there are no additional aging effects requiring management for the phenolic portion of the fuse holder.

The applicant disagrees with the NRC position that the metallic portion of fuse holders require aging management. However, the applicant agrees to perform a fuse inspection activity for the aging effects due to fuse holder metallic clip fatigue damage and corrosion for those fuse holders within the scope of license renewal.

Attached is the revised LRA Table 3.6-2 and fuse inspection activity.

Table 3.6-2 Aging Management Review Results for Connectors, Splices, and Terminal Blocks

Component Group	Component Intended Function	Environment	Materials of Construction	Aging Effect	Aging Management Activity
Electrical Connectors - Insulation	Electrical Continuity	Sheltered	Various organic insulation types (discussed in Section 2.5.1)	Loss of Material Properties	Non-EQ Accessible Cable Aging Management Activity (B.3.3)
Electrical Connectors - Metallic Connector	Electrical Continuity	Sheltered	Copper, tinned copper, and aluminum.	None (1)	Not Applicable.
Electrical Splices - Insulation	Electrical Continuity	Sheltered	Modified Polyolefin (XLPO, XLPE)	Loss of Material Properties	Non-EQ Accessible Cable Aging Management Activity (B.3.3)
Electrical Terminal Blocks (Fuse Holders)- Insulation	Electrical Continuity	Sheltered	Phenolic and nylon insulation	Loss of Material Properties	Non-EQ Accessible Cable Aging Management Activity (B.3.3)
Electrical Terminal Blocks- Metallic	Electrical Continuity	Sheltered	Copper, tinned copper, brass, bronze & aluminum	None (1)	Not Applicable
Fuse Holders	**Electrical Continuity**	**Sheltered**	**Copper, tinned copper, brass, bronze & aluminum**	**Fatigue Damage and Corrosion**	**Fuse Inspection Activity (B.1.18)**

(1) No aging effect for PBAPS

B.1.18 Fuse Inspection Activity

Activity Description

The PBAPS fuse inspection activity provides for the managing of the aging effects of fatigue damage and corrosion of the metallic portion of fuse holders. This activity provides for the condition monitoring of the fuse holder whenever a fuse is installed in the clip.

Evaluation and Technical Basis

(1) ***Scope of Activity:*** The PBAPS fuse inspection activity will include inspection of the metallic portion of fuse holders for fatigue damage and corrosion. This inspection activity is limited to the population of fuse holders external to the enclosure of an "active assembly" such as load centers, motor control centers, switchgear, relay panels, control panels, power supplies, power inverters, battery chargers, and circuit boards.

(2) ***Preventive Actions:*** The PBAPS fuse inspection activity is a condition monitoring activity. No preventive or mitigating actions are associated with the fuse inspection activity.

(3) ***Parameters Monitored/Inspected:*** The PBAPS fuse inspection activity provides for the inspection of the fuse holder for signs of corrosion, and verification that the fuse holders are tight and make firm contact with the fuse end caps.

(4) ***Detection of Aging Effects:*** The PBAPS fuse inspection activity provides for inspection of the metallic portion of the fuse holder for fatigue damage and corrosion. Verifying that the fuse clip makes firm contact with the fuse end caps provides assurance that fatigue damage has not occurred. This inspection is done whenever there is a reason to install a fuse in the fuse holder.

(5) ***Monitoring and Trending:*** The PBAPS fuse inspection activity provides for the monitoring of the metallic portion of the fuse holder for fatigue damage and corrosion.

(6) ***Acceptance Criteria:*** This inspection activity will verify that the metallic portions of the fuse holders do not contain corrosion, and make firm contact with the fuse end caps.

(7) ***Corrective Actions:*** Identified deviations are evaluated within the PBAPS corrective action process which includes provisions for root cause determinations and corrective actions to prevent recurrence as dictated by the significance of the deviation.

(8) ***Confirmation Process:*** The PBAPS corrective action process includes:
- Reviews to assure that proposed actions are adequate;
- Tracking and reporting of open corrective actions; and
- For root cause determinations, reviews of corrective action effectiveness.

(9) ***Administrative Controls:*** All credited aging management activities are subject to administrative controls, which require formal reviews and approvals.

(10) ***Operating Experience:*** Industry as well as PBAPS has experienced a small population of bent, loose, broken, or corroded fuse holders.

SUMMARY

The PBAPS fuse inspection program will be performed whenever a fuse is installed in the fuse holder. This inspection activity will provide reasonable assurance that the intended function of the metallic portion of the fuse holder will be maintained consistent with the current licensing basis through the period of extended operation.

APPENDIX A UPDATED FINAL SAFETY ANALYSIS REPORT (USFAR) SUPPLEMENT

A.1.18 Fuse Inspection Activity

The PBAPS fuse inspection activity provides for the managing of the aging effects of fatigue damage and corrosion of the metallic portion of fuse holders. This inspection activity provides for the condition monitoring of the fuse holder whenever a fuse is installed in the fuse holder. This inspection activity will provide reasonable assurance that the intended function of the fuse holder will be maintained consistent with the current licensing basis through the period of extended operation.

ATTACHMENT 3

SER Open Item 4.5.2-1 Request for Additional Information dated 11-26-02

BWRVIP-26, BWR Top Guide Inspection and Flaw Evaluation Guidelines, states that the threshold fluence beyond which the components will be significantly affected is 5×10^{20} n/cm2 (neutrons per centimeter squared). At neutron fluences above this threshold, components would be susceptible to irradiation-assisted stress corrosion cracking (IASCC). Appendix C to BWRVIP-26 states that the generic fluence on the top guide for 60 years is 6×10^{21} n/cm2, which exceeds the 5×10^{20} n/cm2 damage threshold.

The applicant further stated that the location on the top guide that will see this high fluence is the grid beam. This is location 1, as identified in BWRVIP-26, Table 3-2, "Matrix of Inspection Options." In their evaluation of the top guide assembly, including the grid beam, General Electric (GE) assumed a lower allowable stress value, acknowledging the high fluence value at this location. The conclusion from this analysis was no inspection was necessary because there was no safety consequence of single failure at this location.

BWRVIP-26, Section 6.3, Core Configuration Distortion, indicates multiple ruptures of adjacent beam segments could lead to displacements of fuel assemblies at the top guide elevation on the order of five inches, and could inhibit the insertion of control rods during seismic events.

The staff is concerned that multiple failures of top guide beams are possible when the threshold fluence for IASCC is exceeded. According to Topical Report, "BWRVIP-26A: BWR Vessel and Internals Project, BWR Top Guide Inspection and Flaw Evaluation Guidelines," February 2002, multiple cracks have been observed in top guide beams at Oyster Creek. In addition, baffle former bolts on PWRs that exceeded the threshold fluence have had multiple failures of baffle former bolts. The staff agrees with the BWRVIP-26 conclusion for top guide beams that no inspection is required when a single failure is postulated. However, when the neutron fluence for the top guide beam exceeds the IASCC damage threshold, the staff believes that multiple failures from IASCC are possible and an inspection program is necessary to ensure that multiple failures do not result in the loss of the ability of control rods to be inserted. In order to ensure that this issue was addressed during the license renewal term, the staff identified this as a TLAA in its SER, which is documented in a December 7, 2000, letter to C. Terry. Section 3.5 of the staff□s SER indicates that accumulated neutron fluence is a TLAA issue and must be identified and evaluated by individual applicants considering license renewal.

With this background, how have you considered the impact of multiple cracks resulting from IASCC on the ability to insert control rods during design basis events? If multiple cracks resulting from IASCC could impact the ability to insert control rods during design basis events, how will this aging effect be managed during the license renewal period?

Response to SER Open Item 4.5.2-1:

BWRVIP-26 does not have a section 6.3 – Core Configuration Distortion. However, an EPRI Report NP-4767 dated November 1986, Evaluation of BWR Top-Guide Integrity, has a section 6.3, Core Configuration Distortion. This is a pre-BWRVIP report. When the industry formed the BWR Vessel Internals program and generated individual BWRVIP guideline documents, previously generated EPRI documents were either incorporated into the BWRVIP reports or were superceded. Thus, BWRVIP-26 addressed the top guide and is a stand-alone document. The PBAPS LRA considered the fluence at the top guide as a TLAA and used the NRC accepted BWRVIP-26 as an aging management program to address the TLAA.

Moreover, plant operating experience based on VT and UT inspections performed on the top guide at various locations from 1991 to 1997 confirm that there is no degradation of the top guide. Based on BWRVIP-26 conclusions and plant operating experience, the applicant concluded that multiple cracks resulting from IASCC would not adversely impact the insertion of control rods during design basis events and therefore the conclusion of BWRVIP-26 that no inspection is required for location 1 is still valid.

However, the applicant agrees to perform inspection of the top guide similar to the inspection of the Control Rod Drive Housing (CRDH) guide tube. The inspection of the CRDH guide tube is performed in accordance with BWRVIP-47, BWR Lower Plenum Inspection and Flaw Evaluation Guidelines. The sample size and frequency are identified in Table 3.2-1, Inspection Recommendation Summary. The examination extent and frequency is a 10% sample of the total population within 12 years; one-half (5%) to be completed within six years. The method of examination is EVT-1. LRA Appendix B.2.7, Reactor Pressure Vessel and Internals ISI Program will be enhanced to include inspection of top guide with examination extent and frequency similar to CRDH guide tube. The program enhancements will be implemented prior to the end of the initial operating license term for PBAPS.

However, Exelon reserves the right to modify the above agreed upon inspection program should the BWRVIP-26 be revised in the future.

Appendix B.2.7, Reactor Pressure Vessel and Internals ISI Program is revised as shown below to include enhancement for the top guide inspection. Appendix A.2.7 is also revised.

B.2.7 Reactor Pressure Vessel and Internals ISI Program

ACTIVITY DESCRIPTION

The BWR Vessels and Internals Project (BWRVIP) guidelines are implemented through the reactor pressure vessel and internals ISI program. The reactor pressure vessel and internals ISI program is that part of the PBAPS ISI program that provides for condition monitoring of the reactor vessel and internals using guidance provided by the BWRVIP and the BWR Owners Group alternate BWR feedwater nozzle inspection requirements.

The PBAPS ISI program complies with requirements of 1989 Edition of the ASME Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components", and is implemented through a PBAPS specification. The PBAPS ISI program has been augmented to include various additional requirements, including those from the BWRVIP guidelines and the BWR Owners Group (BWROG) alternative to NUREG-0619 augmented inspection of feedwater nozzles for GL 81-11 thermal cycle cracking.

The BWRVIP program is an industry developed effort based on over 20 years of service and inspection experience and is focused on detecting evidence of component degradation well in advance of significant degradation. The BWRVIP inspection and evaluation reports for reactor pressure vessel and internals components were submitted to the NRC for review and approval. These inspection and evaluations reports address both the current and license renewal periods.

The BWRVIP program was reviewed for its applicability to PBAPS design, construction, and operating experience. The review determined that reactor pressure vessel and internals components, including the materials of construction, are addressed by the BWRVIP inspection and evaluation reports. PBAPS operating parameters, including temperature, pressure, and water chemistry, are consistent with those used for the development of the inspection and evaluation reports. The reactor vessel and internals components that require aging management review are covered by the BWRVIP inspection and evaluation reports. The BWRVIP inspection and evaluation reports cover the design of PBAPS reactor pressure vessel and internals components. Therefore, it was concluded that the BWRVIP inspection and evaluation reports bound PBAPS design and operation.

The reactor pressure vessel and internals ISI program employs the BWRVIP program criteria documented in the final NRC safety evaluation reports except where specific exception has been identified to the NRC.

The aging management review determined that the reactor pressure vessel and internals ISI program will be enhanced to assure that the inspections are consistent with BWRVIP program criteria and the NRC safety evaluation reports. **The Reactor Pressure Vessel and Internals ISI program will be enhanced to require inspection of top guide similar to the inspection of CRDH guide tubes.**

EVALUATION AND TECHNICAL BASIS

(1) Scope of Activity: The BWRVIP documents as implemented by the reactor pressure vessel and internals ISI program provide for examinations of reactor pressure vessel components and internals, for managing the aging effects of cracking and loss of material.

(2) Preventive Actions: The BWRVIP program and the reactor pressure vessel and internals ISI program consists of condition monitoring activities that utilize early detection, evaluation and corrective actions that address degradation of reactor pressure vessel components and internals before loss of intended function. No preventive or mitigating attributes are associated with these activities.

(3) Parameters Monitored/Inspected: The BWRVIP guidelines documents reviewed the function of each reactor pressure vessel and internals components. For those that could impact safety, the BWRVIP guidelines considered the mechanisms that might cause degradation of reactor pressure vessel and internals components and developed an inspection program that would enable degradation to be detected and evaluated before the components intended function is adversely affected. Details regarding inspection and evaluation are contained within the reactor pressure vessel and internals component-specific BWRVIP inspection and evaluation guidelines document. Additionally, the program provides for visual inspections of the top head for loss of material. **The augmented inspections for top guide will be enhanced to require inspection of top guide similar to the inspection of CRDH guide tubes.**

(4) Detection of Aging Effects: Reactor pressure vessel components and internals are inspected using ultrasonic, visual, and surface examinations as appropriate. The methods and the frequency of examination will be consistent with the applicable BWRVIP inspection and evaluation documents, and the BWROG "Alternate BWR Feedwater Nozzle Inspection Requirements", as incorporated in the ISI program specification.

(5) Monitoring and Trending: The reactor pressure vessel ISI program provides for monitoring for the presence of aging degradation per the guidance provided in the ASME Section XI schedules, the BWRVIP inspection and evaluation documents, and BWROG "Alternate BWR Feedwater Nozzle Inspection Requirements". The frequency of examination, as specified within these documents, varies for each component. The frequency is based on the component's design, flaw tolerance, susceptibility to degradation, and the method of examination used. Documentation that facilitates comparison with previous and subsequent inspection results is maintained.

(6) Acceptance Criteria: BWRVIP inspection and evaluation documents provide the basis for reactor vessel and internals inspection requirements, acceptance criteria, and corrective actions. Any degradation in reactor pressure vessel components is evaluated in accordance with Section XI required inspections. In addition, the BWROG "Alternate BWR Feedwater Nozzle Inspection Requirements" provide additional bases for acceptance criteria contained in the ISI program specification. BWRVIP inspection and evaluation documents applicable to PBAPS reactor pressure vessel and internals components are as follows:

Reactor Pressure Vessel And Internals BWRVIP Document Applicability

Reactor Pressure Vessel Components	**Reference**
Reactor pressure vessel components	BWRVIP-74
Vessel shells	BWRVIP-05
Shroud support attachments	BWRVIP-38
Nozzle safe ends	BWRVIP-74
Core support plate	BWRVIP-25
Core ΔP / SLC nozzle	BWRVIP-27
Core spray attachments	BWRVIP-48
Jet pump riser brace attachments	BWRVIP-48
Other attachments	BWRVIP-48
CRDH stub tubes	BWRVIP-47
ICM Housing penetrations	BWRVIP-47
Instrument penetrations	BWRVIP-49
Reactor Internals Components	
Shroud support	BWRVIP-38
Shroud	BWRVIP-76
Core support plate	BWRVIP-25
Core ΔP / SLC line	BWRVIP-27
Access hole covers	(Note 1)
Top guide **(Note 2)**	BWRVIP-26
Core spray lines	BWRVIP-18
Core spray spargers	BWRVIP-18
Jet pump assembly	BWRVIP-41
CRDH stub tubes	BWRVIP-47
CRDH guide tubes	BWRVIP-47
In-core housing guide tubes, LPRM & WRNMS dry tubes	BWRVIP-47

Note 1. GE SIL 462 for Unit 2 only.

Note 2: Will be enhanced to require inspection of top guide similar to the inspection of CRDH guide tubes per BWRVIP- 47

(7) Corrective Actions: Identified deviations are evaluated within the PBAPS corrective action process, which includes provisions for root cause determinations and corrective actions to prevent recurrence as dictated by the significance of the deviation.

(8) Confirmation Process: The PBAPS corrective action process includes:

- Reviews to assure that proposed actions are adequate;
- Tracking and reporting of open corrective actions; and
- For root cause determinations, reviews of corrective action effectiveness.

(9) Administrative Controls: All credited aging management activities are subject to administrative controls, which require formal reviews and approvals.

(10) Operating Experience: A review of operating experience at PBAPS was conducted on degradations in water systems. The degradations mirrored that of the industry, in that most were attributed to cracking. The PBAPS reactor pressure vessel and internals ISI program provides for early detection, evaluation and corrective actions that are based on industry practice and experience, and are considered adequate to address degradation of reactor pressure vessel components and internals prior to loss of intended function.

SUMMARY

The reactor pressure vessel and internals ISI program activities manage cracking and loss of material for the reactor vessel and internals using guidance provided by the BWRVIP and the BWR Owners Group alternate BWR feedwater nozzle inspection requirements. These activities are implemented through the PBAPS ISI program specification. They utilize early detection, evaluation and corrective actions that address degradation of reactor pressure vessel components and internals.

Based on the use of industry guidelines and PBAPS operating experience, there is reasonable assurance that the PBAPS reactor pressure vessel and internals ISI program will continue to adequately manage the identified aging effects for the reactor vessel and internals to maintain the intended functions consistent with the current licensing basis for the period of extended operation.

REFERENCES

(1) GE NE-523-A71-0594, BWROG "Alternate BWR Feedwater Nozzle Inspection Requirements," Rev. 1, May 2000.

(2) NUREG-0619, "BWR Feedwater Nozzle and Control Rod Drive Return Line Nozzle Cracking," U.S. Nuclear Regulatory Commission, November 1980.

(3) NRC Generic Letter, GL 81-11, "BWR Feedwater Nozzle and Control Rod Drive Return Line Nozzle Cracking (NUREG-0619)," U.S. Nuclear Regulatory Commission, 02/29/1981.

(4) ASME Boiler and Pressure Vessel Code, Section XI, "Rules for In-service Inspection of Nuclear Plant Components," American Society of Mechanical Engineers, New York, NY, 1989.

(5) "BWR Vessel and Internals Project, BWR Reactor Pressure Vessel Shell Weld Inspection Recommendations (BWRVIP-05)," EPRI, Palo Alto, CA, September 1995 (EPRI Report TR-105697).

(6) "BWR Vessel and Internals Project, BWR Standby Liquid Control System/Core Plate Delta-P Inspection and Flaw Evaluation Guidelines (BWRVIP-27)," EPRI, Palo Alto, CA,

April 1997, (EPRI Report TR-107286).
(7) "BWR Vessel and Internals Project, Shroud Support Inspection and Flaw Evaluation Guidelines (BWRVIP-38)," EPRI, Palo Alto, CA, September 1997, (EPRI Report TR-108823).
(8) "BWR Vessel and Internals Project, BWR Lower Plenum Inspection and Flaw Evaluation Guidelines (BWRVIP-47)," EPRI, Palo Alto, CA, December 1997, (EPRI Report TR-108727).
(9) "BWR Vessel and Internals Project, Vessel ID Attachment Weld Inspection and Evaluation Guidelines (BWRVIP-48)," EPRI, Palo Alto CA, February 1998, (EPRI Report TR-108724).
(10) "BWR Vessel and Internals Project, Instrument Penetration Inspection and Flaw Evaluation Guidelines (BWRVIP-49)," EPRI, Palo Alto, CA, March 1998 (EPRI Report TR-108695).
(12) "BWR Vessel and Internals Project, BWR Reactor Pressure Vessel Inspection and Evaluation Guidelines (BWRVIP-74)," EPRI, Palo Alto, CA, September 1999, (EPRI Report TR-113596).
(13) "BWR Vessel and Internals Project, Technical Basis for Revisions to Generic Letter 88-01 Inspection Schedules (BWRVIP-75)," EPRI, San Jose, CA, October 1999, (EPRI Report TR-113932).
(14) "BWR Core Spray Internals Inspection and Flaw Evaluation Guidelines (BWRVIP-18)," EPRI Report TR-106740, July 1996.
(15) "BWR Core Plate Inspection and Flaw Evaluation Guideline (BWRVIP-25)," EPRI Report TR-107284, December 1996.
(16) "BWR Top Guide Inspection and Flaw Evaluation Guidelines (BWRVIP-26), " EPRI Report TR-107285, December 1996.
(17) "BWR Jet Pump Assembly Inspection and Flaw Evaluation Guidelines (BWRVIP-41), " EPRI Report TR-108728, October 1997.
(18) "BWR Core Shrouds Inspection and Flaw Evaluation Guidelines (BWRVIP-76), " EPRI Report TR-114232, November 1999.
(19) General Electric Service Information Letter, SIL 462.

A.2.7 Reactor Pressure Vessel and Internals ISI Program

The BWR Vessels and Internals Project (BWRVIP) guidelines are implemented through the reactor pressure vessel and internals ISI program. The reactor pressure vessel and internals ISI program is that part of the PBAPS ISI program that provides for condition monitoring of the reactor vessel and internals using guidance provided by the BWRVIP and the BWR Owners Group alternate BWR feedwater nozzle inspection requirements. The PBAPS ISI program complies with requirements of an NRC approved Edition of the ASME Section XI Code, or approved alternative, and is implemented through a PBAPS specification. The PBAPS ISI program has been augmented to include various additional requirements, including those from the BWRVIP guidelines and the BWR Owners Group (BWROG) alternative to NUREG-0619 augmented inspection of feedwater nozzles for GL 81-11 thermal cycle cracking. The reactor pressure vessel and internals ISI program will be enhanced to assure that inspections are consistent with the relevant BWRVIP program criteria and NRC safety evaluation reports. **The Reactor Pressure Vessel and Internals ISI program will be enhanced to require inspection of top guide similar to the inspection of CRDH guide tubes.** The program utilizes early detection, evaluation and corrective actions that provide reasonable assurance that aging effects of reactor vessel components and internals will be detected and addressed prior to loss of intended function. Program enhancements will be implemented prior to the end of the initial operating license term for PBAPS.

ATTACHMENT 4

Clarification to SER Open Item 2.3.3.19.2-1:

In the response to this open item, a six-column table was added to provide the aging management review results for component groups in the reactor recirculation system that were added to the scope of license renewal as a result of non-safety-related to safety-related spatial interaction of SSC. For all of these component groups, the Reactor Coolant System Chemistry Program is the aging management activity that is relied upon to manage cracking and loss of material aging effects. For other portions of the reactor recirculation system in the scope of license renewal, a combination of the Reactor Coolant System Chemistry Program and the Inservice Inspection Program are the aging management activities relied upon to manage cracking and loss of material aging effects. For the portion of the reactor recirculation system that was added to the scope of license renewal as a result of non-safety-related to safety-related spatial interaction of SSC, why is there no inspection activity?

Response to SER Open Item 2.3.3.19.2-1:

The portion of the reactor recirculation system that was added to the scope of license renewal as a result of non-safety-related to safety-related spatial interaction of SSC is associated with instrumentation piping. These components are not subject to the Inservice Inspection (ISI) Program because they are not safety-related. These components are exposed to reactor coolant beyond excess flow check valves, which are designed to prevent gross leakage. These instrument lines are less than one inch in diameter, are installed without butt welds, and are under reactor pressure. These lines, while not included in the ISI Program, are observed during hydrostatic pressure testing. Furthermore, the nuclear class 1 portion of the reactor recirculation system has components of similar size, material, and environment that rely upon the ISI Program as described in Appendix B.1.8 and Appendix A.1.8 for managing the aging effects of loss of material and cracking. The results of ISI Program inspections of the nuclear class 1 portion of the reactor recirculation system are representative of the condition of the non-safety-related reactor recirculation components and provide verification of the effectiveness of the Reactor Coolant System Chemistry activities. Any leakage would be identified and corrective actions taken in accordance with the corrective action program. Therefore, the aging effects for the portion of the reactor recirculation system that was added to the scope of license renewal as a result of non-safety-related to safety-related spatial interaction of SSC will be adequately managed. **The UFSAR Supplement description for the ISI Program (LRA Appendix A.1.8) is revised as shown below to reflect the aging management of the non-safety related portions of the reactor recirculation system.**

A.1.8 Inservice Inspection (ISI) Program

The inservice inspection (ISI) aging management program, as augmented to address the requirements of GL 88-01, consists of those portions of the PBAPS ISI program that are being utilized for managing aging in pressure retaining piping and components in the scope of license renewal. However, the reactor pressure vessel components and internals in the PBAPS ISI program are not included in the ISI aging management program. The PBAPS ISI program complies with the requirements of the 1989 edition of the ASME Section XI code and includes requirements for inspections of ASME Class 1, 2, and 3 pressure retaining components. Age **related degradation identified during inspections of Class 1 portions of the reactor recirculation system will be evaluated for applicability to the non-safety related portions of the reactor recirculation system that is included in the scope of license renewal.** In addition, the ISI program provides for condition monitoring of ASME Class 1,2 and 3 piping and

equipment supports and integral support anchors. The ISI program provides reasonable assurance that aging effects are detected and addressed prior to loss of intended function.

Clarification to SER Open Item 2.3.3.19.2-1:

In the response to this open item, a six-column table was added to provide the aging management review results for component groups in the emergency service water system that were added to the scope of license renewal as a result of non-safety-related to safety-related spatial interaction of SSC. For all of these component groups, the component intended function is pressure boundary; the environment is raw water; the material of construction is plastic; and there are no aging effects. What is the specific type of material for each of the components? What is the basis for no aging management required?

Response to SER Open Item 2.3.3.19.2-1:

The portion of the emergency service water (ESW) system that was added to the scope of license renewal as a result of non-safety-related to safety-related spatial interaction of SSC is associated with ESW corrosion monitoring. These components are located in the turbine building. The piping is made from polyvinyl chloride (PVC) schedule 80 to ASTM – D-1785 standards. The valves are made of chlorinated polyvinyl chloride (CPVC) and are rated at 225 psi. The piping is rated to 320 psi while the ESW system operating pressure is 150 psi. The portion of the ESW system that was added to the scope of license renewal as a result of non-safety-related to safety-related spatial interaction of SSC was installed in 1994.

The PVC and CPVC materials are thermoplastics and, unlike metals, do not display corrosion rates. Rather then depending on an oxide layer for protection, they depend on chemical resistance to the environment to which they are exposed. Polyvinyl chloride materials are relatively unaffected by a water environment. Industry operating experience indicates no aging effects for thermoplastic materials in a raw water environment. A technical evaluation of potential aging effects for non-metallic thermoplastic materials in a raw water environment can be found in Section 2.1 of Appendix B, EPRI Report 1003056, "Non-Class 1 Mechanical Implementation Guideline and Mechanical Tools, Revision 3 Final Report," November 2001. Aging of PVC and CPVC through the period of extended operation will not result in age related degradation that prevents performance of a safety function. Therefore, no aging management activity is required.