



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 24, 2019

Mr. Michael Gallagher
Vice President, License Renewal
and Decommissioning
Exelon Generation Company, LLC
200 Exelon Way
Kennett Square, PA 19348

SUBJECT: PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3 – REPORT
FOR THE IN-OFFICE REGULATORY AUDIT REGARDING THE SUBSEQUENT
LICENSE RENEWAL APPLICATION REVIEW (EPID NO. L-2018-RNW-0012)

Dear Mr. Gallagher:

By letter dated July 10, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18193A689), Exelon Generation Company, LLC, (Exelon) submitted to the U.S. Nuclear Regulatory Commission (NRC or staff) an application to renew the Renewed Facility Operating License Nos. DPR-44 and DPR-56 for the Peach Bottom Atomic Power Station, Units 2 and 3 (Peach Bottom), respectively. Exelon submitted the application pursuant to Title 10 of the *Code of Federal Regulations* Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants," for subsequent license renewal.

The NRC staff completed its in-office regulatory audit from November 13, 2018, to April 29, 2019, in accordance with the in-office regulatory audit plan (ADAMS Accession No. ML18282A029). The audit report is enclosed.

If you have any questions, please contact me by telephone at 301-415-2981 or by e-mail at Bennett.Brady@nrc.gov

Sincerely,

/RA/

Bennett Brady, Senior Project Manager
License Renewal Projects Branch
Division of Materials and License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-277 and 50-278

Enclosure:
Audit Report

cc w/encl: Listserv

SUBJECT: PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3 – REPORT
FOR THE IN-OFFICE REGULATORY AUDIT REGARDING THE SUBSEQUENT
LICENSE RENEWAL APPLICATION REVIEW (EPID NO. L-2018-RNW-0012)
DATED: September 24, 2019.

DISTRIBUTION:

E-MAIL:
PUBLIC
RidsNrrDmlr Resource
RidsNrrPM Peach Bottom Resource

Yvonne.Edmonds@nrc.gov NRR/DMLR
Bennett.Brady@nrc.gov NRR/DMLR
David.Drucker@nrc.gov NRR/DMLR
Lauren.Gibson@nrc.gov, NRR/DMLR
Angela.Buford@nrc.gov, NRR/DMLR
Steven.Bloom@nrc.gov, NRR/DMLR
David.Alley@nrc.gov, NRR/DMLR
Eric.Oesterle@nrc.gov NRR/DMLR
Benjamin.Beasley@nrc.gov NRR/DMLR
Meena.Khanna@nrc.gov NRR/DMLR
Joseph.Donoghue@nrc.gov NRR/DMLR
Jennifer.Tobin@nrc.gov NRR/DORL
Joshua.Borromeo@nrc.gov NRR/DSS
Justin.Heinly@nrc.gov RI/DRP

Brian.Smith2@nrc.gov RI/DRP
Mitzi.Young@nrc.gov OGC
Kayla.Gamin@nrc.gov OGC
Michael.McCoppin@nrc.gov OEDO
Scott.Burnell@nrc.gov; HQ/OPA
Diane.Screnci@nrc.gov RI/OPA
Neil.Sheehan@nrc.gov RI/OPA
Darrell.Adams@nrc.gov, OCA
David.Decker@nrc.gov, OCA
Brice.Bickett@nrc.gov RI/ORA
Justin.Heinly@nrc.gov RI/DPR
Jonathan.Greives@nrc.gov RI/DPR
Kevin.Mangan@nrc.gov RI/DRS

David.Distel@exeloncorp.com
Paul.Weyhmuller@exeloncorp.com
John.Hilditch@exeloncorp.com
Donald.Warfel@exeloncorp.com

ADAMS Accession No: ML19205A206

***concurring by email**

OFFICE	LA:MRPB:DMLR*	PM:MRPB:DMLR*	BC:MRPB:DMLR	PM:MRPB:DMLR*
NAME	SLent	BRogers	EOesterle	BBrady
DATE	9/23/19	9/24/19	9/24/19	9/24/19

OFFICIAL RECORD COPY



Audit Report

In-Office Regulatory Audit Regarding the Peach Bottom Atomic Power Station, Units 2 and 3, Subsequent License Renewal Application November 13, 2018 – April 29, 2019

**Division of Materials and License Renewal
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission**

Enclosure

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION, DIVISION OF LICENSE RENEWAL

Docket Nos: 50-277 and 50-278

License No: DPR-44 and DPR-56

Licensee: Exelon Generation Company, LLC

Facility: Peach Bottom Atomic Power Station, Units 2 and 3

Location: Rockville, Maryland

Dates: November 13, 2018 – April 29, 2019

Reviewers: Allik B., Materials Engineer, Division of Materials and License Renewal (DMLR)
Brimfield T., Reactor Systems Engineer, Division of Safety Systems (DSS)
Buford A., Structural Engineer, Division of Engineering (DE)
Chereskin A., Chemical Engineer, DMLR
Cheruvenci G., Materials Engineer, DMLR
Cuadrado de Jesus S., Structural Engineer, DE
Fitzpatrick R., Electrical Engineer, DE
Fu B., Materials Engineer, DMLR
Gardner W., Physical Scientist, DMLR
Gavula J., Mechanical Engineer, DMLR
Heida B., Reactor Systems Engineer, DSS
Hoang D., Structural Engineer, DE
Hoffman K., Materials Engineer, DMLR
Holston W., Senior Mechanical Engineer, DMLR
Huynh A., Materials Engineer, DMLR
Jenkins J., Materials, Engineer, DMLR
Medoff J., Senior Materials Engineer, DMLR
Johnson A., Materials Engineer, DMLR
Jones S., Senior Reactor Systems Engineer, DE
Khan N., Electrical Engineer, DE
Lehman B., Structural Engineer, DE
Lopez J., Structural Engineer, DE
Min S., Materials Engineer, DMLR
Nguyen D., Electrical Engineer, DE
Nold D., Reactor Systems Engineer, DSS
Patel A., Reactor Engineer, DSS
Prinaris A., Structural Engineer, DE
Rezai A., Materials Engineer, DMLR
Rogers B., Senior Reactor Engineer, DMLR
Sadollah M., Electrical Engineer, DE
Thomas G., Senior Structural Engineer, DE

Approved By:

David Alley, Chief
Vessels & Internals Branch
Division of Materials and License Renewal

Steve Bloom, Chief
Chemical, Corrosion, & Steam Generator Branch
Division of Materials and License Renewal

Eric Oesterle, Chief
License Renewal Projects Branch
Division of Materials and License Renewal

Angela Buford, Acting Chief
Piping & Head Penetration Branch
Division of Materials and License Renewal

Steve Jones, Acting Chief
Balance of Plant Branch
Division of Safety Systems

Jennifer Whitman, Chief
Reactor Systems Branch
Division of Safety Systems

Tania Martinez-Navedo, Chief
Electrical Engineering, New Reactors, & License
Renewal Branch
Division of Engineering

Joseph Colaccino, Chief
Structural Engineering Branch
Division of Engineering

**Report for the In-Office Regulatory Audit
Peach Bottom Atomic Power Station, Units 2 and 3
Subsequent License Renewal Application**

1. Introduction

The U.S. Nuclear Regulatory Commission (NRC) staff conducted an in-office audit of Exelon Generation Company, LLC (Exelon, the applicant) Peach Bottom Atomic Power Station (PBAPS) Units 2 and 3 (1) methodology to identify the systems, structures, and components (SSCs) to be included within the scope of subsequent license renewal (SLR) and subject to an aging management review (AMR) (Scoping and Screening Portion); and (2) aging management programs (AMPs), AMR items, time-limited aging analyses (TLAAs) and associated bases and documentation as applicable (AMP and TLAA Portion) for the subsequent license renewal of Renewed Facility Operating License Nos. DPR-44 and DPR-56 for the Exelon PBAPS, Units 2 and 3.

The purpose of the scoping and screening portion of the audit is to evaluate the scoping and screening process as documented in the license renewal application, implementing procedures, reports, and drawings, such that the NRC staff:

- obtains an understanding of the process used to identify the SSCs within the scope of license renewal and to identify the structures and components subject to an aging management review; and
- has sufficient docketed information to allow the staff to reach a conclusion on the adequacy of the scoping and screening methodology as documented and applied.

The purpose of the AMP and TLAA portion of the audit is to:

- examine Exelon's AMPs, AMR items, and TLAAs
- verify the applicant's claims of consistency with the corresponding NUREG-2191, Rev. 0, "Generic Aging Lessons Learned for Subsequent License Renewal (GALL-SLR) Report," issued in July 2017, AMPs, and AMR items; and
- assess the adequacy of the TLAAs.

Enhancements and exceptions will be evaluated on a case-by-case basis. The NRC staff's review of enhancements and exceptions will be documented in the safety evaluation report (SER).

Guidance document NUREG-2192, Rev. 0, "Standard Review Plan for Review of Subsequent License Renewal Applications for Nuclear Power Plants" (SRP-SLR), issued in July 2017, provides staff guidance for reviewing an SLR application (SLRA). The SRP-SLR allows an applicant to reference in its license renewal application the AMPs described in the GALL-SLR Report. By referencing the GALL-SLR Report AMPs, the applicant concludes that its AMPs correspond to those AMPs reviewed and approved in the GALL-SLR Report and that no further staff review is required. If an applicant credits an AMP for being consistent with a GALL-SLR Report program, it is incumbent on the applicant to ensure that the plant program contains all of

the elements of the referenced GALL-SLR Report program. The applicant should document this determination in an auditable form and maintain the documentation onsite.

2. Audit Activities

A regulatory audit is a planned, license-related activity that includes the examination and evaluation of primarily non-docketed information. A regulatory audit is conducted with the intent to gain greater understanding of an application, to verify information, and/or to identify information that will require docketing to support the staff's conclusions that form the basis of the licensing or regulatory decision.

Licensing conclusions or staff findings should not be made in the audit reports since licensing and regulatory decisions cannot be made solely based on an audit. Therefore, items identified but not resolved within the scope of the audit will be followed using other NRC processes, such as requests for additional information (RAIs), requests for confirmation of information, and conducting public meetings. Licensing conclusions, staff findings, and resolution of audit items will be documented in the staff's SER.

The following sections discuss the subsequent license renewal application (SLRA) areas reviewed by the staff.

2.1 Aging Management Programs (AMPs)

SLRA AMP B2.1.1, "ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD"

Summary of Information in the Application. The SLRA states that AMP B.2.1.1, "ASME [American Society of Mechanical Engineers] Section XI Inservice Inspection, Subsections IWB, IWC, and IWD," is an existing program that is consistent with the program elements in GALL-SLR Report AMP XI.M1, "ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD." To verify this claim of consistency, the staff audited the SLRA AMP.

Audit Activities. During its audit, the staff interviewed Exelon's staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.M1	Program Basis Document ASME Section VI Inservice Inspection, Subsections IWB, IWC, and IWD	Revision 2 4/24/2018
PBT05.G03	PBAPS Units 2 and 3 ISI Program Plan. 4 th 10-Year Inspection Interval	Revision 4 Sept. 16, 2014
Passport IR 2677063	Pen and Ink Change to ISI Program Interval Dates	June 1, 2016
ER-AA-330	Conduct of Inservice Inspection Activities	Revision 13

Document	Title	Revision / Date
ER-AA-330-001	Section XI Pressure Testing	Revision 14
ER-AA-330-002	Inservice Inspection of Section XI Welds and Components	Revision 14
ER-AA-330-009	ASME Section XI Repair/Replacement Program	Revision 13
Passport IR 2685419	ISI Feedwater Nozzle Inspection Frequency Change	8/27/2016
AR 04034949	SLR. RX Internals Inspection Documentation Inconsistencies	7/24/2017
AR 04003429	SLR. ISI Database Discrepancies	4/24/2017
AR 02433243	ISI Program Limited Exams P2R20	1/5/2015
AR 04086591	SLR. Clarify Documentation for ISI Exams of MC Supports	12/21/2017
AR 00823657	Inaccurate Weld Category for ISI Exam	9/29/2008
AR 00811174	P2R17 3 ISI weld Inspections not Scheduled	8/26/2008

During the audit, the staff verified Exelon's claim that the "scope of program," "preventive actions," "parameters monitored or inspected," "detection of aging effects," "monitoring and trending," "acceptance criteria," and "corrective actions" program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

During the audit of the "operating experience" program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects.

The staff also audited the description of the SLRA AMP provided in the Updated Final Safety Analyses Report (UFSAR) supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.2, "Water Chemistry"

Summary of Information in the Application. The SLRA states that AMP XI.M2, "Water Chemistry," is an existing program with an exception that will be consistent with the program elements in GALL-SLR Report AMP XI.M2, "Water Chemistry." To verify this claim of consistency, the staff audited the SLRA AMP. Issues identified but not resolved in this report will be addressed in the SER. During the audit, the staff reviewed the exception associated with this AMP. The staff will document its review of the exception to the GALL-SLR Report in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
N/A	Peach Bottom Atomic Power Station Units 2 and 3 Updated Safety Analysis Report (UFSAR)	Revision 26
PB-PBD-AMP-XI.M2	Program Basis Document – Water Chemistry	Revision 2
CY-AB-120-1000	BWR Strategic Water Chemistry Plan	Revision 13
CY-AB-120-0001	Chemistry Action Level Impact Assessments, Engineering Evaluations and Cleanup Projections	Revision 2
ASME ISBN-0-7918-1204-9	Consensus on Operating Practices for the Control of Feedwater and Boiler Water Chemistry in Modern Industrial Boilers	1994 Version
CH-10	Chemistry Goals	Revision 19
CY-AB-120-100	Reactor Water Chemistry	Revision 18
CY-AB-120-110	Condensate and Feedwater Chemistry	Revision 24
CY-AB-120-120	BWR Startup Chemistry	Revision 10
CY-AB-120-130	BWR Shutdown Chemistry	Revision 12
CY-AB-120-200	Storage Tanks Chemistry	Revision 12
CY-AB-120-300	Spent Fuel Pool	Revision 17
CY-AB-120-310	Suppression Pool/Torus Chemistry	Revision 10
CY-AB-120-320	Control Rod Drive Water Chemistry	Revision 8
CY-AA-120-420	Auxiliary Boiler Chemistry	Revision 13
CY-AB-120-1100	Reactor Water Hydrogen Water Chemistry, Noble Chem and Zinc Injection	Revision 13
CY-AA-110-200	Sampling	Revision 13

The staff also verified that aspects of the “scope of program,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements not associated with the exception identified in the SLRA

or by the staff during the audit are consistent with the corresponding program elements in the GALL-SLR Report AMP.

In addition, the staff found that for the “preventive actions,” program element, sufficient information was not available to determine whether it was consistent with the corresponding program elements of the GALL-SLR Report AMP. The staff will consider issuing RAIs in order to obtain the information necessary to verify whether this program element is consistent with the corresponding program elements of the GALL-SLR Report AMP. The staff will document its evaluation of the potential RAI in the SER.

During the audit, the staff made the following observations:

- The staff reviewed AR 1511681 and noted that “flags” were created in the plant chemistry database to alert plant personnel to adverse water chemistry trends.
- The staff reviewed UFSAR Table 11.3.1, “Main Condenser,” and noted that the main condenser has titanium tubes. The staff also noted that AMR Item 3.4.1-111 for titanium heat exchanger tubes exposed to treated water is listed as “NA.” This discrepancy was discussed during the audit and will be documented.
- The staff reviewed the water chemistry parameters in procedure CY-AA-120-420 for the Auxiliary Boiler System and noted the parameters are based on the ASME ISBN-0-7918-1204-9 standard and are not included in the Electric Power Research Institute (EPRI) Guidelines referenced by the GALL-SLR.
- The staff reviewed procedure CY-AB-120-1100 and noted that when reactor power is greater than 10 percent there is a monitoring parameter to maintain measured reactor coolant excess dissolved hydrogen >20 ppb.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will document its evaluation of the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA Water Chemistry program provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.3, “Reactor Head Closure Stud Bolting”

Summary of Information in the Application. The SLRA states that AMP B.2.1.3, “Reactor Head Closure Stud Bolting,” is an existing program that will be consistent, with an exception and an enhancement, with the program elements in GALL-SLR Report AMP XI.M3, “Reactor Head Closure Stud Bolting.” To verify this claim of consistency, the staff audited the SLRA AMP.

Audit Activities. During its audit, the staff discussed with the applicant’s staff and reviewed onsite documentation provided by the applicant.

The table below lists documents that were reviewed by the staff and were found relevant to the audit.

Relevant Documents Reviewed

Document	Title	Revision / Date
PI-AA-115-1003	Processing OE Evaluations	Rev. 4
M-004-400	Reactor Pressure Vessel Reassembly	Rev. 43
M-004-400	Reactor Pressure Vessel Disassembly	Rev. 38
P2R18-168976-HE2-ISI	In-Service Inspection Report for Peach Bottom Power Station	10/2010
P3R18-3Q11-NDE-2LO14H-ISI	In-Service Inspection Report for Peach Bottom Power Station	09/2011
H5814	Reactor Head Spare Stud CMTR	Rev. 0 11/08/1971
003N9506	Peach Bottom Units 2 and 3, Materials Properties and Test Results for Closure Studs, Nuts, Washers and Bushing	Rev. 0 12/2016
AR 00834915	Stuck Stud #80, Lessons Learned for Refuel Floor	09/15/2008

During the audit, the staff verified that the “scope of program,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” and “acceptance criteria” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP. The staff also verified that aspects of the “preventive actions” program element not associated with the exception are consistent with the corresponding element of the GALL-SLR Report AMP. The staff’s evaluation of the exception and enhancement to the AMP is documented in the SER.

During the audit of the “operating experience” program element, the staff’s independent database search did not identify any operating experience that would indicate that the AMP may not be adequate to manage the associated aging effects.

The staff also audited the description of the SLRA AMP provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SRP Report.

SLRA AMP B.2.1.4, “BWR Vessel ID Attachment Welds”

Summary of Information in the Application. The SLRA states that AMP B.2.1.4, “BWR Vessel ID Attachment Welds,” is an existing program that is consistent with the program elements in GALL-SLR Report AMP XI.M4, “BWR Vessel ID Attachment Welds.” To verify this claim of consistency, the staff audited the SLRA AMP.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.M4	GALL-SLR PROGRAM XI.M4 – BWR Vessel ID Attachment Welds	Rev. 1 5/6/2018
AR 2735052	2R21 Exam of Steam Dryer Support Brackets	10/31/2016

During the audit, the staff verified Exelon’s claim that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

During the audit, the staff made the following observations:

- The staff reviewed AR02735052 and noted that new wear was found on the top surface for all support brackets, but the licensee did not identify any linear indications. The licensee did not identify any indications that would impact the integrity of the attachment weld or the reactor vessel.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will document its evaluation of the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA BWR Vessel ID Attachment Welds AMP provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.5, “BWR Stress Corrosion Cracking Program”

Summary of Information in the Application. The SLRA states that AMP B.2.1.5, “BWR Stress Corrosion Cracking” is an existing program that is consistent with the program elements in “GALL-SLR Report AMP XI.M7,” “BWR Stress Corrosion Cracking.” To verify this claim of consistency, the staff audited the SLRA AMP.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
Exelon Program Basis Document No. PB-PDB-AMP-XI.7	Program Basis Document, BWR Stress Corrosion Cracking	Revision 1

Document	Title	Revision / Date
AMEC AES Report No. PBT05.G03	ISI Program Plan, Fourth Ten-Year Inspection Interval, Peach Bottom Atomic Power Station, Units 2 and 3	Revision 4, August 6, 2014
General Electric-Hitachi Report No. PB-ISI-14-183901	Fall 2014, ISI/CISI Final Report (ISI Report for P2R20)	Fall 2014
General Electric-Hitachi Report No. 7480-1-24432V-HE3-ISI	Peach Bottom Atomic Power Station (P3R17), In-Service Inspection (ISI) Final Report Summary, 2009 Fall Outage	September 2009
Exelon Confidential/Proprietary Procedure No. LS-AA-117-1004	10 CFR 50.55a Relief Requests	Revision 7

During the audit, the staff verified that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements in the GALL-SLR AMP.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA’s BWR Penetrations Program provided in the UFSAR supplement. The staff verified that this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.6, “BWR Penetrations”

Summary of Information in the Application. The SLRA states that AMP B.2.1.6, “BWR Penetrations” is an existing program that is consistent with the program elements in GALL-SLR Report AMP XI.M8, “BWR Penetrations.” To verify this claim of consistency, the staff audited the SLRA AMP.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
Exelon Program Basis Document No. PB-PDB-AMP-XI.MB	Program Basis Document, BWR Penetrations	Revision 2
General Electric-Hitachi Report No. P2R18-168976-HE2-ISI	Inservice Inspection Report (ISI) for Peach Bottom Atomic Power Station, Refuel Outage 2R18, Fall 2010	October 2010
EPRI Report No. 1007279	BWRVIP-27-A: BWR Vessel and Internals Project, BWR Standby Liquid Control and Core Plate ΔP Inspection and Flaw Evaluation Guidelines	August 2003
EPRI Report No. 1006602	BWRVIP-49-A: BWR Vessel and Internals Project, Instrumentation Penetration Inspection and Flaw Evaluation Guidelines	March 2002
UFSAR Section 3.8	Standby Liquid Control System	Revision 26, April 2017

During the audit, the staff verified that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements in the GALL-SLR AMP.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER. The staff also audited the description of the SLRA’s BWR Penetrations Program provided in the UFSAR supplement. The staff verified that this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.7, “BWR Vessel Internals”

Summary of Information in the Application. The SLRA states that AMP B2.1.7, “BWR Vessel Internals,” is an existing program with three enhancements and one exception that is consistent with the program elements in GALL-SLR Report AMP XI.M9, “BWR Vessel Internals.” To verify this claim of consistency, the staff audited the SLRA AMP.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.M9	GALL-SLR Program XI.M9 – BWR Vessel Internals	Rev. 1 (undated)
AR 02734507	2R21 IVVI Replacement Steam Dryer	10/30/2016
AR 04069252	P3R21 IVVI – Repl. Steam Dryer Lifting Rods Indications	10/31/2017
EC# 621912	Technical Evaluation for P3R21 Replacement Steam Dryer Lifting Rod to Ring Weld Indications	11/03/2017
AR 02570717	3R20 Core Shroud UT Exam	10/14/2015
IR 2573102-03	Technical Evaluation for P320 Core Shroud Weld Examinations Rev. 1	12/01/2015
Structural Integrity Associates (SIA) Calc. Pkg. 1400870.301	Flaw Evaluation for PBAPS U3 Core Shroud Circumferential Welds H1 through H7 and Vertical Welds V3 through V6	Revision 1 11/25/2015
SIA Calc. Pkg. 1400870.302	Core Shroud Off-Axis Flaw Evaluation	10/18/2015
IR 1404300-01	P2R19 Core Shroud R2-SIA Plant Specific Eval	3/15/2013

During the audit, the staff verified Exelon's claim that for the program elements that Exelon declared were consistent, the "scope of program," "preventive actions," "parameters monitored or inspected," "detection of aging effects," "monitoring and trending," "acceptance criteria," and "corrective actions" program elements of the SLRA AMP are consistent with the corresponding

During the audit, the staff made the following observations:

- The staff reviewed AR02734507, AR04069252, and EC#621912 and verified that, in accordance with the exception and enhancements to the AMP, inspection of the replacement steam dryers has been performed consistent with requirements of WCAP-17635-P. The staff noted that cracks were found in some of the non-structural welds which maintained position of the hold down rods and lifting rods during construction. But staff verified that positioning of these rods is guaranteed by the threaded portions and structural welds of these components.
- The staff reviewed AR 02570717 and IR 2573102-03 and noted that numerous indications (one of which extended through-wall) had been documented during the inspection of the Unit 3 core barrel H4 weld. The staff also reviewed SIA Calculation Packages 1400870.301 and 1400870.302. elements of the GALL-SLR Report AMP.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA BWR Vessel Internals provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.8, “Thermal Aging Embrittlement of Cast Austenitic Stainless Steel” (CASS)

Summary of Information in the Application. The SLRA states that AMP B.2.1.8, “Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS),” is a new program that will be consistent with the program elements in GALL-SLR Report AMP XI.M12, “Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS).” To verify this claim of consistency, the staff audited the SLRA AMP.

At the time of the audit, Exelon had not yet fully developed the documents necessary to implement this new program, and the staff’s audit addressed only the program elements described in the applicant’s basis document. The staff will address issues identified but not resolved in this report in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.M12	Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS)	Revision 1
AR 2671601-07	PBAPS CASS Delta Ferrite Screening Technical Evaluation	2/4/2018
GEH 004N3349	Exelon Nuclear LLC, Peach Bottom Atomic Power Stations Units 2 and 3 Material Properties and Test Results for Recirculation Pump Casing and Cover	Revision 0
ER-AA-330-013	Thermal Aging Embrittlement of Cast Aging Management Program	Revision 2
ER-AA-330-009	ASME Section XI Repair/Replacement Program	Revision 13
AR 2455499	PBAPS CASS Delta Ferrite Screening Technical Evaluation	2/18/2015

During the audit, the staff verified that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “monitoring and trending,” “acceptance criteria,” and “corrective

actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

In addition, the staff found that for the “detection of aging effects” program element, sufficient information was not available to determine whether it was consistent with the corresponding program element of the GALL-SLR Report AMP. The staff will consider issuing an RAI in order to obtain the information necessary to verify whether this program element is consistent with the corresponding program element of the GALL-SLR Report AMP. The staff will document its evaluation of this potential RAI in the SER.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the thermal aging embrittlement of cast austenitic stainless steel (CASS) provided in the SLRA UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.9, “Flow-Accelerated Corrosion”

Summary of Information in the Application. The SLRA states that AMP B.2.1.9, “Flow-Accelerated Corrosion,” is an existing program with an enhancement that will be consistent with the program elements in GALL-SLR Report AMP XI.M17, “Flow-Accelerated Corrosion.” To verify this claim of consistency, the staff audited the SLRA AMP. Issues identified but not resolved in this report will be addressed in the SER. During the audit, the staff reviewed the enhancement associated with this AMP and will document its review in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The table below lists the documents that were reviewed by the staff and were found to be relevant to the audit.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.M17	Program Basis Document -Flow-Accelerated Corrosion	Revision 1
ER-AA-430	Conduct of Flow-Accelerated Corrosion Activities	Revision 8
ER-AA-430-1001	Guidelines for Flow-Accelerated Corrosion Activities	Revision 12
ER-AA-430-1004	Erosion in Piping and Components Guide	Revision 2
6200.100-02	Peach Bottom Atomic Power Station Unit 2, FAC Susceptibility Non-Modeled Evaluation (SNM)	Revision 0
6200-100-05	Peach Bottom Atomic Power Station Unit 3, FAC Susceptibility Non-Modeled Evaluation (SNM)	Revision 0

Document	Title	Revision / Date
EP-2016-0079-01-TR	Unit 2 Erosion Susceptibility Evaluation (ESE)	Revision 0
EP-2016-0079-01-TR	Unit 3 Erosion Susceptibility Evaluation (ESE)	Revision 0

During the audit, the staff verified that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP. However, for the “detection of aging effects” program element, sufficient information was not available for the staff to determine whether it was consistent with the corresponding program element of the GALL-SLR Report AMP. The staff will consider issuing RAIs to obtain the information necessary to verify whether this program element is consistent with the corresponding program element of the GALL-SLR Report AMP. The staff will document its evaluation of the potential RAIs in the SER.

During the audit of the “operating experience” program element, the staff conducted an independent search of the plant-specific operating experience database as discussed in the operating experience audit report. The staff will document its evaluation of the identified plant-specific operating experience in the SER.

The staff also audited the description of the Flow-Accelerated Corrosion program provided in SLRA Section A.2.1.9. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.10, “Bolting Integrity”

Summary of Information in the Application. The SLRA states that AMP B.2.1.10, “Bolting Integrity,” is an existing program with enhancements and an exception that will be consistent with the program elements in GALL-SLR Report AMP XI.M18, “Bolting Integrity.” To verify this consistency, the staff audited the SLRA AMP. Issues identified but not resolved in this report will be addressed in the SER. During the audit, the staff reviewed the exception and enhancements associated with this AMP. The staff will document its review of the exception and enhancements in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.M18	Program Basis Document Bolting Integrity	Revision 1
ER-AA-2030	Conduct of Plant Engineering Manual	Revision 18
MA-AA-410	Bolting Integrity Aging Management Program	Revision 1
ER-AA-335-017	VT-3 Visual Examination of Pump and Valve Internals	Revision 8
MA-AA-736-600	Torquing and Tightening of Bolted Connections	Revision 5
ER-AA-330-001	Section XI Pressure Testing	Revision 14
MA-PB-716-1000	Control of Bolting/Torquing/Tensioning	Revision 0
M-032-001	High Pressure Service Water (HPSW) Pump Maintenance	Revision 6
M-033-001	Emergency Service Water Pump Maintenance	Revision 3
M-037-002	Diesel Driven Fire Pump Maintenance	Revision 2
M-037-004	Motor Driven Fire Pump Maintenance	Revision 2
PMID 00223102-01	Diver Inspection Intake Structure (Unit 2)	N/A
PMID 00222819-01	Diver Inspection Intake Structure (Unit 3)	N/A
PMID 00201232-01	00P186: Diver Inspection, Mud Sample & Depth	N/A

During the audit, the staff verified that for the program elements that Exelon declared were consistent, the “parameters monitored or inspected,” “monitoring and trending,” “detection of aging effects” and “acceptance criteria” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP. The staff also verified Exelon’s claim that aspects of the “scope of program” program element not associated with the exception identified in the SLRA are consistent with the corresponding program elements in the GALL-SLR Report AMP. In addition, the staff found that for the “preventive actions” program element, sufficient information was not available to verify whether this program element is consistent with the corresponding program element of the GALL-SLR Report AMP. The staff will document its evaluation of this potential RAI in the SER.

During the audit, the staff made the following observations:

- The staff reviewed the applicant’s program basis document PB-PBD-AMP-XI.M18 and noted that it states “Aging Management Reviews have determined that high strength bolting

material with actual yield strength of 150 ksi or greater (high strength) bolting are [sic] used for closure bolting, with 2 inches or less diameters, on pressure-retaining components within the scope of license renewal. Corporate level procedures require engineering approval to use high strength bolting material in system components within the scope of license renewal. Existing site procedures will be revised to minimize the use of high strength closure bolting material in portions of systems within the scope of license renewal.” The staff notes that this is not consistent with the “preventive actions” program element of GALL-SLR Report AMP XI.M18 which recommends that preventive measures include using bolting material that has an actual measured yield strength less than 150 kilo-pounds per square inch (ksi) or 1,034 mega pascals (MPa).

During the audit of the “operating experience” program element, the staff independently searched for plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA AMP provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.11, “Open-Cycle Cooling Water System”

Summary of Information in the Application. The SLRA states that the AMP B.2.1.11, “Open-Cycle Cooling Water System” is an existing program with an enhancement that will be consistent with the program elements in GALL-SLR Report AMP XI.M20, “Open-Cycle Cooling Water System.” To verify this claim of consistency, the staff audited the SLRA AMP. During the audit, the staff reviewed the enhancement associated with this AMP. The staff will document its review of the enhancement in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.M20	Program Basis Document, Open-Cycle Cooling Water System	Revision 1
ER-AA-340	Generic Letter 89-13 Implementing Procedure	Revision 8
ER-AA-340-1001	Generic Letter 89-13 Program Implementation Instructional Guide	Revision 10
ER-AA-340-1002	Service Water Heat Exchanger Inspection Guide	Revision 6
ER-AA-2001	2016 Raw Water Integrity Update	09/21/2016
ER-AA-340-2000	Balance-of-Plant Heat Exchanger Inspection, Testing and Maintenance Guide	Revision 8

Document	Title	Revision / Date
ER-AA-5400-1001	Raw Water Piping Integrity Management Guide	Revision 11
CY-AA-120-410	Circulating/Service Water Chemistry	Revision 6
CY-AA-120-4110	Raw Water Chemistry Strategic Plan	Revision 10
CY-AA-120-4110-F-08	Peach Bottom Raw Water Treatment and Control	Revision 2
CY-PB-120-707	High Pressure Service Water System Monitoring	Revision 0
CY-PB-190-9003	Cooling Water Chemistry Monitoring Program	Revision 1
AO 33.5.A	Residual Heat Removal, Core Spray, High Pressure Coolant Injection, Reactor Core Isolation Cooling Flush	Revision 2
NA	Generic Letter 89-13 Program Basis Document	10/03/2016
NA	Peach Bottom Atomic Power Station, Units 2 and 3, Response to Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment"	01/29/1990
NA	Peach Bottom Atomic Power Station, Units 2 and 3, Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment" Implementation of Actions	06/01/1992
IR 01541900-02	Technical Evaluation for Peach Bottom Atomic Power Station Raw Water Corrosion Rate and Remaining Life Basis	03/26/2014
02734068-04	Technical Evaluation for Peach Bottom Atomic Power Station High Pressure Service Water Non-Destructive Examination and Integrity Basis	01/18/2017
PVP2014-28781	Piping Corrosion Rate and Remaining Life Basis: Commercializing Conservatism in First Time Inspections	07/20/2014
M-010-002	Residual Heat Removal Heat Exchanger Maintenance	Revision 17
RT-I-033-631-2 RT-I-033-631-3	Residual Heat Removal Room Cooler Emergency Service Water Heat Transfer Test	Revision 12 Revision 11

Document	Title	Revision / Date
RT-I-033-632-2 RT-I-033-632-3	Core Spray Room Cooler Emergency Service Water Heat Transfer Test	Revision 11 Revision 12
RT-M-033-675-2 RT-M-033-675-3	Pump Intake Structure Inspection and Cleaning	Revision 5 Revision 6
RT-O-010-660-2 RT-O-010-660-2	Residual Heat Removal Heat Exchanger Performance Test	Revision 15 Revision 14
RT-O-095-827-2	Chlorination of Circulating and Service Water	Revision 12

During the audit, the staff verified that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects.

The staff also audited the description of the SLRA Open-Cycle Cooling Water System program provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.12, “Closed Treated Water Systems”

Summary of Information in the Application. The SLRA states that AMP B.2.1.12, “Closed Treated Water Systems,” is an existing program with an enhancement that, other than a stated exception, will be consistent with the program elements in GALL-SLR Report AMP XI.M21A, “Closed Treated Water Systems.” To verify this claim of consistency, the staff audited the SLRA AMP. During the audit, the staff reviewed the exception to the GALL-SLR Report AMP and the enhancement associated with this AMP. The staff will document its reviews of the exception and the enhancement in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The table below lists the documents that were reviewed by the staff and were found to be relevant to the audit.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP- XI.M21A	Program Basis Document – Closed Treated Water Systems	Revision 1
CH-10	Chemistry Goals	Revision 20

Document	Title	Revision / Date
CY-AA-120-400	Closed Treated Water Chemistry	Revision 19
CY-AA-120-4000	Closed Treated Water Chemistry Strategic Plan	Revision 8
ER-AA-700-NEW	Inspection of Components Within the Scope of the Closed Treated Water Systems Aging Management Program	Revision 0
EPRI 3002000590	Closed Cooling Water Chemistry Guideline	Revision 2

During the audit, the staff verified that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP. The staff also verified the portions of the “parameters monitored or inspected” program element that are not associated with the exception identified in the SLRA are consistent with the corresponding program element in the GALL-SLR Report AMP.

During the audit of the “operating experience” program element, the staff conducted an independent search of the plant-specific operating experience database as discussed in the operating experience audit report. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the Closed Treated Water Systems program provided in SLRA Section A.2.1.12. The staff verified it is consistent with the description provided in the GALL-SLR Report Table XI-01.

SLRA AMP B.2.3.13, “Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems”

Summary of Information in the Application. The SLRA states that AMP B.2.3.13, “Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems,” is an existing program with enhancements that will be consistent with the program elements in GALL-SLR Report AMP XI.M23, “Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems.” To verify this claim of consistency, the staff audited the SLRA AMP. Issues identified but not resolved in this report will be addressed in the SER. During the audit, the staff reviewed enhancements associated with this AMP. The staff will document its review of the enhancements in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.M23	Program Basis Document Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems	Revision 1
MA-PB-716-021-1000	Guideline for Rigging and Handling Heavy Loads	Revision 10
MA-AA-716-021	Rigging and Lifting Program	Revision 27
M-017-001	Periodic Inspection of Reactor Building Crane	Revision 3
M-C-700-327	Periodic Inspection of Electric an Air Operated Hoisting Devices	Revision 7
M-017-007	Periodic Inspection of the Turbine Building Cranes	Revision 5
M-C-797-008	Fuel Preparation Machine Maintenance	Revision 11
M-C-797-014	Refueling Platform Main Hoist Mechanical and Electrical Inspection and Maintenance	Revision 10
M-C-797-015	Refueling Platform Auxiliary Hoists Mechanical and Electrical Inspection and Maintenance	Revision 4
M-C-797-017	Refueling Platform Bridge Drive and Components Mechanical and Electrical Maintenance/Inspections	Revision 6
M-C-797-018	Refueling Platform Trolley Mechanical and Electrical Maintenance/Inspections	Revision 4
WC-AA-120-F02	System 17 New PM for PB-SLR Crane Inspections	Revision 0

During the audit, the staff verified that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” and “acceptance criteria” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

During the audit, the staff made the following observations:

- The staff reviewed the SRP-SLR and respective SLRA AMR item 3.5.1-100 and noted that this item addresses cracking due to stress corrosion cracking (SCC) of stainless steel bolting components/connections. In addition to item 3.5.1-100, the staff also noted that for item 3.3.1-199, Table 3.3.2-15, “Fuel Handling System,” AMR item VII.B.A-730, high strength low alloy steel bolting with yield strength of 150 ksi, the SLRA states that the Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (AMP B.2.3.13) will be used to manage cranes’ structural bolting for the aging effect of cracking due to SCC. The staff notes that the GALL-SLR Report recommends managing the aging effects of cracking due to SCC, but those recommendations are under other AMPs, such as GALL-SLR Report AMP XI.S3, “ASME Section XI, Subsection IWF” and GALL-SLR Report AMP XI.S6, “Structures Monitoring.” The GALL-SLR Report AMPs XI.S3 and XI.S6 recommendation regarding the detection of cracking due to SCC is that structural bolting with actual measured yield strength greater

than or equal to 150 ksi in sizes greater than 1 inch nominal diameter be subject to volumetric examination comparable to that of ASME Code Section XI, Table IWB-2500-1, Examination Category B-G-1. For the aging effects of cracking due to SCC for bolts with actual measured yield strength greater than or equal to 150 ksi and a diameter greater than 1 inch, the staff notes that the GALL-SLR Report AMP XI.M23 does not include surface or volumetric examination recommendations for the applicant's AMP B.2.3.13 to address this aging effect. Therefore, the staff may submit an RAI to ascertain how the applicant's AMP B.2.3.13 is adequate to manage this aging effect for the subject bolted connections.

During the audit of the "operating experience" program element, the staff independently searched for plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA AMP provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.14, "Compressed Air Monitoring"

Summary of Information in the Application. The SLRA states that AMP B.2.1.14, "Compressed Air Monitoring," is an existing program with enhancements that will be consistent with the program elements in GALL-SLR Report AMP XI.M24, "Compressed Air Monitoring." To verify this claim of consistency, the staff audited the SLRA AMP.

Audit Activities. During its audit, the staff interviewed Exelon's staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.M24	Program Basis Document- Compressed Air Monitoring	Revision 01
TQ-AA-161	Maintenance Training Program	Revision 08
TQ-AA-161-J010	Maintenance Initial Training Matrix Job Aid	Revision 02
ACAD 92-008	Guidelines for the Training and Qualification of Maintenance Personnel	09/1992
SLR-PB-M-333	License Renewal Drawings, Instrument Nitrogen	Revision 0
SLR-PB-M-320	License Renewal Drawings, Compressed Air System	Revision 0
SLR-PB-M-351	License Renewal Drawings, Nuclear Boiler	Revision 0

Document	Title	Revision / Date
SLR-PB-M-367	License Renewal Drawings, Containment Atmospheric Control	Revision 0
SLR-PB-M-372	License Renewal Drawings, Containment Atmospheric Dilution	Revision 0

During the audit, the staff verified that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

During the audit, the staff made the following observation:

- The staff reviewed TQ-AA-161 and confirmed that the applicant is using qualified inspectors to inspect components that are associated with the Compressed Air Monitoring program.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA AMP provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.15, “BWR Reactor Water Cleanup System”

Summary of Information in the Application. The SLRA states that AMP B.2.1.15, “BWR Reactor Water Cleanup System,” is an existing program that is consistent with the program elements in GALL-SLR Report AMP XI.M25, “BWR Reactor Water Cleanup System.” To verify this claim of consistency, the staff audited the SLRA AMP.

Audit Activities. During its audit, the staff reviewed onsite documentation provided by Exelon. The table below lists the documents that were reviewed by the staff and were found relevant to the audit.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.M25	“Program Basic Document - BWR Reactor Water Cleanup System	Revision 2
ML090930466	NRC letter dated September 15, 1995, “Reactor Water Cleanup (RWCU) System Weld Inspections at Peach Bottom Atomic Power Station, Units 2 and 3 (TAC Nos. M92442 and M92443)”	September 15, 1995

Document	Title	Revision / Date
Plant OE - XI.M25	Plant OE - XI.M25 BWR Reactor Water Cleanup System Aging Management Program	
Implementing Documents - XI.M25	Implementing Documents - XI.M25 BWR Reactor Water Cleanup System Aging Management Program	
Plant Operating Experience – X1.M2	Water Chemistry – Plant Operating Experience – XI.M2 Water Chemistry Program	

During the audit, the staff verified that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

During the audit, the staff made the following observations:

- The staff reviewed the program basis document and noted that the document provides supporting evidence that the augmented ISI performed as part of this AMP has been effective in both detecting cracks in piping welds susceptible to the intergranular stress corrosion cracking (IGSCC) and managing aging effects of the reactor water cleanup (RWCU) system piping. As an example, the operating experience reviews revealed detection of the IGSCC cracks in the Peach Bottom RWCU piping welds in 2017 and 1996 by the volumetric examinations. The corrective actions and sample expansions were taken and reported to the NRC.
- The staff verified from review of NRC letter dated September 15, 1995, the program basis document, and NRC GL 88-01 that the volumetric examinations have been performed on the RWCU system piping welds identified in SLRA in accordance with the NRC approved alternative. The NRC-approved alternative includes 2 percent of the IGSCC susceptible welds to be inspected each refueling outage.
- The staff noted that this provides sufficient demonstration that the effects of aging have been and will be adequately managed so that the intended function will be maintained for the subsequent period of extended operation, as required by 10 CFR 54.21(a)(3). This staff determination will be reflected in the staff’s SER for the Peach Bottom SLRA.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects.

The staff also audited the description of the SLRA BWR Reactor Water Cleanup System provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR for AMPs.

SLRA AMP B.2.1.16, “Fire Protection”

Summary of Information in the Application. The SLRA states that AMP B.2.1.16, “Fire Protection,” is an existing program with enhancements that will be consistent with the program

elements in GALL-SLR Report AMP XI.M26, “Fire Protection.” To verify this claim of consistency, the staff audited the SLRA AMP. Issues identified but not resolved in this report will be addressed in the SER. During the audit, the staff reviewed the enhancements associated with this AMP. The staff will document its review of the enhancements in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.M26	Program Basis Document Fire Protection	Revision 1
CC-AA-211	Fire Protection Program	Revision 8
ER-AA-2030	Conduct of Plant Engineering Manual	Revision 18
ST-M-037-399-2	Fire Damper Inspection	Revision 11
ST-M-037-395-2	U/2 Fire Damper Inspection	Revision 2
ST-M-037-395-3	U/3 Fire Damper Inspection	Revision 2
ST-M-037-350-2	Safety Related Door Inspection	Revision 7
N/A	List of Doors That Require Replacement	N/A
N/A	List of Doors That Have Been Replaced	N/A
ST-M-037-311-2	Detailed Visual Inspection of Penetration Seals and Difficult to View Fire Barriers	Revision 10
ST-M-037-311-3	Detailed Visual Inspection of Penetration Seals and Difficult to View Fire Barriers	Revision 11
ST-M-037-313-2	Visual Inspection of Fire Protective Steel Beam Coating and Cable Tray Covers	Revision 3
ST-M-037-314-2	Visual Inspection of Encapsulated Electrical Raceways	Revision 6
Drawing A-484	Barrier Plans Drawing at Elevation 91 Feet 6 Inches	Revision 8
Drawing A-485	Barrier Plans Drawing at Elevation 116 Feet 0 Inches	Revision 4

Document	Title	Revision / Date
Drawing A-486	Barrier Plans Drawing at Elevation 135 Feet 0 Inches	Revision 11
Drawing A-487	Barrier Plans Drawing at Elevation 165 Feet 0 Inches	Revision 1
Drawing A-488	Barrier Plans Drawing at Elevation 195 Feet 0 Inches	Revision 7
Drawing A-489	Barrier Plans Drawing at Elevation 234 Feet 0 Inches	Revision 4
Drawing A-490	Barrier Plans Cooling Water Pump Structure, Emergency Cooling Tower, and Diesel Generator Building	Revision 5
NE-075	Penetration Seals in Hazard Barriers at Peach Bottom Atomic Power Station and Limerick Generating Station	Revision 4

During the audit, the staff verified that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects.

The staff also audited the description of the SLRA Fire Protection program provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.17, “Fire Water System”

Summary of Information in the Application. The SLRA states that AMP B.2.1.17, “Fire Water System,” is an existing program with an exception and enhancements that will be consistent with the program elements in GALL-SLR Report AMP XI.M27 “Fire Water System.” To verify this claim of consistency, the staff audited the SLRA AMP. Issues identified but not resolved in this report will be addressed in the SER. During the audit, the staff reviewed the exception and enhancements associated with this AMP. The staff will document its review of the exception to the GALL-SLR Report AMP and the enhancements in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.M27	Program Basis Document – Fire Water System	Revision 1
NA	Technical Reviewer Manual – Fire Water System	Revision 9
NA	Fire Protection Program	Revision 17
P-S-51	Design Baseline Document – Fire Protection System	Revision 12
ST-O-37B-313-2	Hose Station Block Valve Operability and Blockage Check	Revision 7
ST-O-37B-322-2	13KV Switchgear Area Sprinkler System Actuation [with marked up changes]	Revision 6
ST-O-37B-323-2	Unit 2 Battery Room, 4KV Switchgear Rooms, and Rad Waste Corridor Area Sprinkler System Actuation [with marked up changes]	Revision 9
RT-O-37B-326-2	Reactor Feedpump Turbine Area Sprinkler System Actuation	Revision 4
RT-O-37B-326-3	Reactor Feedpump Turbine Area Sprinkler System Actuation	Revision 5
RT-O-37B-327-3	Turbine Bearing Sprinkler System Actuation	Revision 6
RT-O-37B-328-2	Sprinkler Alarm Valve Test Potentially Hi-Rad	Revision 4
RT-O-37B-329-2	Common Systems Sprinkler Alarm Valve Test in Non Hi-Rad Areas	Revision 7
RT-O-37B-351-2	2AX001 A Main Transformer Deluge System Functional Test	Revision 8
RT-O-37B-353-3	3cx001 C MAIN Transformer Deluge System Functional Test	Revision 7
RT-O-37B-358-2	Hydrogen Seal Oil Unit Sprinkler Flooding Valve Actuation Test	Revision 8
ST-O-37B-381-2	Underground Fire Main Flow Test	Revision 13
RT-O-37B-382-2	Fire Hydrant Inspection and Flush	Revision 8

Document	Title	Revision / Date
RT-O-37B-383-2	Wet Pipe Sprinkler System Non-ACV Functional Test	Revision 0
ER-AA-5400-1001	Raw Water Corrosion Program Guide	Revision 10
IR 1275720-04-08	Verify Slope and Drainage Points	04/30/2012
IR 1275720-05-08	Verify Flow Testing Procedure Adequacy	04/30/2012
IR 1275720-09-08	Site Check of Dry Pipe System Susceptibility	06/27/2014
IR IR02512545	Unsatisfactory Flow Test Results During Performance of ST-O-37B-381-2	06/10/2015
AR 04163257	First License Renewal Sprinkler Head 50 Year Test – Unit 3 Main Stop Valve/Bypass Valve Platform	08/10/2018
AR 04163262	First License Renewal Sprinkler Head 50 Year Test – Unit 3 Feedwater Heater West Service Platform	08/10/2018
AR 04163273	First License Renewal Sprinkler Head 50 Year Test – Unit 3 Feedwater Heater East Service Platform	08/10/2018
AR 04135918	50 Year Sprinkler Test Plan for First License Renewal	05/09/2018
AR 04131892	Unsatisfactory Flow Test Results During Performance of ST-O-37B-381-2	04/28/2018
AR 04189276	Revise ST-O-37B-381-2 to Utilize Ultrasonic Flow Meters	10/30/2018
WO 04274779	Preventive Maintenance: Clean/Inspect/Rework BS-0421 Internals	02/22/2016
6280-M-318	P&I [Piping and Instrumentation] Diagram Fire Protection System	Revision 48
AR 01153311	Water on Unit 3 M/S Floor [provided by Exelon in relation to questions on leaking sprinklers – 10 drops per minute]	12/16/2010
AR 01343009	Sprinkler Head Leaking in MCU Rebuild Area 165 Elevation Turbine Building [32 props per minute]	03/20/2012

Document	Title	Revision / Date
AR 01663767	Leak from Fire System Sprinkler Unit 2 Main Turbine Lube Oil Sprinkler Alarm Valve Network [3 drops per minute]	05/23/2014
AR 04055356	Two Fire System Sprinkler Heads Leaking in the Main Turbine Lube Oil Room Walkway	09/24/2017
NA	Letter to USNRC Response to Request for Additional Information Related to License Renewal	01/31/2003

During the audit, the staff verified for the program elements that Exelon declared consistent, the “scope of program” and “monitoring and trending” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

The staff also verified Exelon’s claim that aspects of the “preventive actions” and “detection of aging effects” “program elements” not associated with the exceptions identified in the SLRA or by the staff during the audit are consistent with the corresponding program elements in the GALL-SLR Report AMP.

In addition, the staff found that for the “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “acceptance criteria,” and “corrective actions” program elements, sufficient information was not available to determine whether they were consistent with the corresponding program elements of the GALL-SLR Report AMP. The staff will consider issuing RAIs in order to obtain the information necessary to verify whether these program elements are consistent with the corresponding program elements of the GALL-SLR Report AMP.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER. The staff will consider issuing an RAI in order to obtain the information necessary to determine whether Exelon’s SLRA can be adequate to manage the associated aging effects.

The staff also audited the description of the SLRA Fire Water System program provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.18, “Outdoor and Large Atmospheric Metallic Storage Tanks”

Summary of Information in the Application. The SLRA states that SLRA Section B.2.1.18, “Outdoor and Large Atmospheric Metallic Storage Tanks,” is an existing program with enhancements that will be consistent with the program elements in GALL-SLR Report AMP XI.M29, “Outdoor and Large Atmospheric Metallic Storage Tanks.” To verify this claim of consistency, the staff audited the SLRA AMP. During the audit, the staff reviewed enhancements associated with this AMP. The staff will document its review of the enhancements in the SER.

Audit Activities. During its audit, the staff interviewed Exelon's staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.M29	Program Basis Document, Outdoor and Large Atmospheric Metallic Storage Tanks	Revision 1
ER-AA-700-404	Aging Management Program for Aboveground Metallic Tanks	Revision 2
Drawing C-60	Field Erected Tank Foundations Fuel Oil, Clarified Water and Demineralized Storage Tanks	Revision 14
Drawing C-61	Field Erected Tank Foundations Refueling and Condensate Storage Tanks	Revision 16
Drawing C-24-33	Elevation 44-0 Diameter by 42-0 Height Refueling Water Tank	October 6, 1969
Drawing C-24-39	Orientation and Bottom Plan Refueling Water Tank	N/A
Drawing C-24-41	Elevation 30-0 Diameter by 42-0 Height Condensate Storage Tank	October 7, 1969
RT-O-100-911-2	Inspection of Aboveground Storage Tanks	Revision 10
WC-AA-120-F-02 (212845)	Project Manager Annotations for Peach Bottom Subsequent License Renewal Refueling Water Storage Tank Inspections	Revision 0
WC-AA-120-F-02 (227500)	Project Manager Annotations for Peach Bottom Subsequent License Renewal Unit 2 Condensate Storage Tank Inspections	Revision 0
WC-AA-120-F-02 (227501)	Project Manager Annotations for Peach Bottom Subsequent License Renewal Unit 3 Condensate Storage Tank Inspections	Revision 0
RT-O-100-911-2	Inspection of Aboveground Tanks	Revision 9
Report No. NUC2014134	Condition Assessment of Coatings Applied to the Exterior of Tanks	Revision 0
LTAM	Long Term Asset Management Strategy for Tanks	Revision 3

During the audit, the staff verified that for the program elements that Exelon declared were consistent, the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects.

The staff also audited the description of the SLRA Outdoor and Large Atmospheric Metallic Storage Tanks program provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.19, “Fuel Oil Chemistry”

Summary of Information in the Application. The SLRA states that AMP B.2.1.19, “Fuel Oil Chemistry,” is an existing program with enhancements that will be consistent with the program elements in GALL-SLR Report AMP XI.M30, “Fuel Oil Chemistry.” To verify this claim of consistency, the staff audited the SLRA AMP. Issues identified but not resolved in this report will be addressed in the SER. During the audit, the staff reviewed the enhancements associated with this AMP. The staff will document its review of the enhancements in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.M30	Program Basis Document – Fuel Oil Chemistry	Revision 1
P&ID M-377	Diesel Fuel Oil System	09-17-2007
DWG E-5-36	EDG Day Tank	10-15-1973
DWG C-28-16	EDG Main Fuel Oil Tank	03-1970
ECR-PB-94-08147	Diesel Fire Pump Fuel Oil Storage Tank	Revision 0
DWG M-16-22	Diesel Fire Pump Day Tank	08/05/1977
PES-P-006	Diesel Fuel Oil	Revision 11
CY-PB-130-755	Determination of Particulate Contamination in Diesel Fuel Oil	Revision 0

During the audit, the staff verified that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “monitoring and trending,” “acceptance criteria,” and “corrective

actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP. In addition, the staff found that for the “detection of aging effects,” program element, sufficient information was not available to determine whether it was consistent with the corresponding program elements of the GALL-SLR Report AMP. The staff will consider issuing a RAI in order to obtain the information necessary to verify whether this program element is consistent with the corresponding program element of the GALL-SLR Report AMP. The staff will document its evaluation of this potential RAI in the SER.

During the audit, the staff made the following observation: The staff reviewed PB-PBD-AMP-XI.M30 and noted that the “detection of aging effects” portion of the document states that the samples for the diesel generator fuel oil storage tanks are withdrawn from the fuel oil transfer pump suction piping while the transfer pump is in service.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA AMP provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.20, “Reactor Vessel Material Surveillance Program”

Summary of Information in the Application. The SLRA states that AMP B.2.1.20, “Reactor Vessel Material Surveillance” Program (RVMSP) is an existing program that, with an enhancement, will be consistent with the program elements in GALL-SLR Report AMP XI.M31, “Reactor Vessel Material Surveillance.” To verify this claim of consistency, the staff audited the SLRA AMP. Issues identified but not resolved in this report will be addressed in the SER. During the audit, the staff reviewed the enhancement associated with this AMP. The staff will document its review of the enhancement in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.M31	Program Basis Document: Reactor Vessel Material Surveillance, GALL-SLR Program XI.M31 – Reactor Vessel Material Surveillance	Revision 1, 09/25/2018
PBAPS UFSAR Section, 4.2.6	Inspection and Testing	Rev. 14, April 2017
PBAPS UFSAR Appendix Q	License Renewal Aging Management UFSAR Supplement	Rev. 14, April 2017
EPRI Proprietary Report No. 1025144 ¹	BWR Vessel and Internals Project, Updated BWR Integrated Surveillance Program (ISP) Implementation Plan (BWRVIP-86 Revision 1-A)	Revision 1-A, October 2012
EPRI Report 1021553	BWRVIP-87NP, Revision 1: BWR Vessel and Internals Project, Testing and Evaluation of BWR	Revision 1, August 2010

Document	Title	Revision / Date
(ADAMS ML102420110)	Supplemental Surveillance Program Capsules D, G, and H	
EPRI Report 1021554 (ADAMS ML102720220)	BWRVIP-111NP, Revision 1: BWR Vessel and Internals Project, Testing and Evaluation of BWR Supplemental Surveillance Program Capsules E, F, and I	Revision 1, August 2010
EPRI Report 1021555 (ADAMS ML102580248)	BWRVIP-113NP: BWR Vessel and Internals Project, River Bend 183 Degree Surveillance Capsule Report	Revision 0, August 2010
EPRI Report 1021556 (ADAMS ML102590092)	BWRVIP-169NP: BWR Vessel and Internals Project, Testing and Evaluation of BWR Supplemental Surveillance Program Capsules A, B, and C	Revision 0, August 2010
GE Nuclear Energy (GE-Nuclear) Report No. GE-NE-B1100716-01 (ADAMS ML12242A007)	Duane Arnold RPV Surveillance Materials and Testing Analysis	Revision 0, July 1997
EPRI Correspondence Letter (ADAMS ML18352A752)	Peach Bottom Unit 2 Surveillance Test Results Report ²	Dec. 14, 2018
GE-Nuclear Report No. SASR 88-24 (ADAMS ML12242A122)	Peach Bottom Atomic Power Station, Unit 2 Vessel Surveillance Materials Testing and Fracture Toughness Analysis	May 1988
GE-Nuclear Report No. SASR 90-50 (ADAMS ML12242A123)	Peach Bottom Atomic Power Station, Unit 3 Vessel Surveillance Materials Testing and Fracture Toughness Analysis	June 1990
NUREG-2191, Volume 2 (GALL-SLR) Section XI, Chapter XI.M31	Reactor Vessel Materials Surveillance (GALL-SLR AMP XI.M31)	December 2017

- Notes: 1. The proprietary report, as referenced in ADAMS, is addressed in the following ADAMS Accession Numbers: ML13176A096, ML13176A098, ML13176A099, and ML13176A100. A non-proprietary version of the report is available for access by members of the general public at ADAMS ML13176A097.
2. The EPRI correspondence letter alerts the NRC that the Peach Bottom Unit 2 30° surveillance capsule was removed for testing on October 22, 2018, but that submittal of the summary report for the capsule will be delayed, with a reporting date not to exceed April 30, 2020.

During the audit, the staff verified Exelon's claim that the "preventive actions," "parameters monitored or inspected," "detection of aging effects," "acceptance criteria," and "corrective actions" program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

During the audit, the staff made the following observations:

- The staff noted that in relation to the “*scope of program*” and “*monitoring and trending*” elements, Exelon’s RVMSP is an intergraded surveillance program (ISP) that is: (a) designed and implemented by the Electric Power Research Institute (EPRI) Boiling Water Reactor Vessel and Internals Project (BWRVIP), and (b) defined in BWRVIP-86, Revision 1-A. The staff also noted the version of the ISP in BWRVIP-86, Revision 1-A, only covers EPRI’s proposed implementation of the ISP and EPRI-defined surveillance capsule removals through the completion of the initial renewed operating periods. To account for this, Exelon has proposed an enhancement to the AMP (refer to Commitment #20 in SLRA UFSAR Supplement Table A.5) that calls for the applicant to pull a supplemental capsule in each unit during the subsequent period of extended operation.
- The staff reviewed information in GALL-SLR AMP XI.M31; PBAPS Site-Specific Document No. PB-PBD-AMP-XI.M31, Revision 1; EPRI Report No. BWRVIP-86, Revision 1-A; General Electric Nuclear (GE-Nuclear) Report No. SASR 88-24; UFSAR Section 4.2.6; and UFSAR Appendix Q, Section Q.1.2. The staff observed that the “*monitoring and trending*” element in GALL-SLR AMP XI.M31 includes the following programmatic criteria: (a) the plant-specific surveillance program or ISP will have at least one capsule that has attained or will attain a neutron fluence between one and two times the peak reactor vessel wall location neutron fluence of interest at the end of the subsequent period of extended operation, and (b) if a capsule meeting this criterion has not been tested previously, then the program includes withdrawal and testing (or alternatively the retrieval from storage, reinsertion for additional neutron fluence accumulation, if necessary, and testing) of one capsule addressing the subsequent period of extended operation.
- The staff noted that, to be consistent with these programmatic criteria, the applicant provided its lead factors and capsule removal times for the specified Unit 2 and 3 capsules that are subject to the enhancement in the enhancement tables that were included in SLRA AMP B.2.1.20. The staff also noted that the validity of the lead factor values and the proposed removal times for these capsules was supported by relevant information contained in GE-Nuclear Report No. SASR 88-24, Revision 0.

The staff will evaluate the basis for this programmatic enhancement in the staff’s evaluation of the AMP, as provided in the final safety evaluation report for the application.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects.

The staff also audited the description of the RVMSP provided in the UFSAR supplement, Section A.2.1.20. The staff verified that the UFSAR supplement summary description for the RVMSP is consistent with the summary description provided for these types of AMPs in the Table XI-01 of the GALL-SLR Report. The staff also verified that the UFSAR supplement summary description for the AMP includes the programmatic enhancement of the AMP defined in SLRA Section B.2.1.20 and that this enhancement is reflected in Commitment No. 20 of SLRA UFSAR Supplement Table A.5, “Second License Renewal Commitment List.”

SLRA AMP B.2.1.21, “One-Time Inspection”

Summary of Information in the Application. The SLRA states that AMP B.2.1.21, “One-Time Inspection,” is a new condition monitoring program that will be consistent with the program elements in GALL-SLR Report AMP XI.M32, “One-Time Inspection.” To verify this claim of consistency, the staff audited the SLRA AMP. At the time of the audit, Exelon had not yet fully developed the documents necessary to implement this new program, and the staff’s audit addressed only the program elements described in the applicant’s basis document. The staff will address issues identified but not resolved in this report in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.M32	Program Basis Document – One-Time Inspection	Revision 2
NRC Integrated Inspection Reports 05000277/2014002 and 05000278/2014002	Peach Bottom Atomic Power Station – NRC Integrated Inspection Report 05000277/2014002 and 05000278/2014002	May 1, 2014
NRC License Renewal Inspection Report 05000277/2013007	Peach Bottom Atomic Power Station – NRC License Renewal Inspection Report 05000277/2013007	Mar 12, 2013
ER-AA-700-301	License Renewal One-Time Inspection Program	Revision 1
PB-AMPBD-OTI	DRAFT One-Time Inspection Sample Basis Document	Revision 0

During the audit, the staff verified Exelon’s claim that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of the SLRA One-Time Inspection AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

In addition, the staff found that for the “detection of aging effects,” program element, sufficient information was not available to verify whether it was consistent with the corresponding program elements of the GALL-SLR Report AMP. The staff will consider issuing an RAI in order to obtain the information necessary to verify whether this program element is consistent with the corresponding program element of the GALL-SLR Report AMP. The staff will document its evaluation of this potential RAI in the SER.

During the audit, the staff made the following observations:

- The staff reviewed NRC Integrated Inspection Reports 05000277/2014002 and 05000278/2014002 and noted that, in the reports, no findings were identified.
- The staff reviewed NRC License Renewal Inspection Report 05000277/2013007 and noted that, in the report, no findings were identified.
- The staff reviewed PB-AMPBD-OTI, “One-Time Inspection Sample Basis Document” and noted that the draft document provided the plant-specific technical bases for the various sample selections used in the One-Time Inspection program at Peach Bottom.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff will consider issuing an RAI to obtain the information necessary to determine whether Exelon’s SLRA AMP for One-Time Inspection can adequately manage the associated aging effects. The staff will document its evaluation of the potential RAI in the SER.

The staff also audited the description of the SLRA AMP for One-Time Inspection provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.22, “Selective Leaching”

Summary of Information in the Application. The SLRA states that AMP B.2.1.22, “Selective Leaching,” is a new program that will be consistent with the program elements in GALL-SLR Report AMP XI.M33, “Selective Leaching.” To verify this claim of consistency, the staff audited the SLRA AMP. At the time of the audit, Exelon had not yet fully developed the documents necessary to implement this new program, and the staff’s audit addressed the program elements described in the applicant’s basis document. The staff will address issues identified but not resolved in this report in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.M33	Program Basis Document Selective Leaching	Revision 1
ER-AA-700-401	Selective Leaching Aging Management	Revision 1
AR 01501324	Lessons Learned from Turbine Building Closed Cooling Water (TBCCW) System Heat Exchanger Eddy Current Testing	04/12/2013

During the audit, the staff verified that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” and “acceptance criteria” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

In addition, the staff found that for the “corrective actions” program element, sufficient information was not available to determine whether it was consistent with the corresponding program elements of the GALL-SLR Report AMP. The staff will consider issuing an RAI in order to obtain the information necessary to verify whether this program element is consistent with the corresponding program element of the GALL-SLR Report AMP. The staff will document its evaluation of this potential RAI in the SER.

During the audit, the staff made the following observations:

- The staff reviewed ER-AA-700-401 and noted that Section 4.9.4.4 states (a) the number of additional inspections is equal to the number of failed inspections for each material and environment population with a minimum of five additional visual and mechanical inspections when visual and mechanical inspections did not meet acceptance criteria, or 20 percent of each applicable material and environment combination is inspected, whichever is less, and a minimum of one additional destructive examination when destruction examinations did not meet acceptance criteria; and (b) for expanded inspections on difficult to access surfaces, such as heat exchanger tubes, industry proven technologies found capable of detecting degradation may be used as an initial indicator of the existence of imperfections. If imperfections are identified, then direct visual inspection or destructive examination should be performed to fully assess the material condition.
- The staff reviewed AR 01257959 and noted that during an initial license renewal inspection, two fire protection valves exposed to raw water showed signs of graphitic corrosion ranging in depths from approximately 0.11 to 0.33 inches. The staff also noted that the remaining wall thickness in areas showing the most severe depths of selective leaching attack ranged from approximately 0.95 to 0.98 inches.
- The staff reviewed AR 01501324, which states, “[e]ddy current testing can no longer be used to effectively predict tube leaks in the TBCCW heat exchanger. All TBCCW heat exchangers have severe tube end erosion that has resulted in eddy current testing under calling the severity of the thru wall indications.”

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA AMP provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.23, “ASME Code Class 1 Small-Bore Piping”

Summary of Information in the Application. The SLRA states that AMP B.2.1.23, “ASME Code Class 1 Small-Bore Piping,” is an existing condition monitoring program that will be consistent with the program elements in GALL-SLR Report AMP XI.M35, “ASME Code Class 1 Small-Bore Piping.” To verify this claim of consistency, the staff audited the SLRA AMP. During the audit, the staff reviewed the enhancement associated with this AMP. The enhancement to the GALL-SLR Report AMP is evaluated in the SER.

Audit Activities. During its audit, the staff discussed with the applicant’s staff and reviewed onsite documentation provided by the applicant.

The table below lists documents that were reviewed by the staff and were found relevant to the audit.

Relevant Documents Reviewed

Document	Title	Revision / Date
XI.M35 References Part 1	Basis for Weld Counts, Second License Renewal Project	Rev. 0
AR 04065691	Steam Leak at Weld	10/23/2017
AR 04067473	EOC Review for Failed Weld	10/26/2017
AR 00856352	Inspection of RI-ISI Piping Socket Welds	12/15/2008
AR 04078978	Maintenance Rule System 04 Recommendation	11/29/2017
AR 00479492	Maintenance Rule System 04-1-1 Performance Criteria Exceeded	11/30/2017
AR 02732688	Main Steam D Flow Instrument Lines Small-Bore Piping	10/25/2016

During the audit, the staff verified that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” and “acceptance criteria” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects.

The staff also audited the description of the SLRA AMP provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SRP Report.

SLRA AMP B.2.1.24, “External Surfaces Monitoring of Mechanical Components”

Summary of Information in the Application. The SLRA states that AMP B.2.1.24, “External Surfaces Monitoring of Mechanical Components,” is a new program that will be consistent with the program elements in GALL-SLR Report AMP XI.M36, “External Surfaces Monitoring of Mechanical Components.” To verify this claim of consistency, the staff audited the SLRA AMP. During the audit, the staff reviewed the exception to the GALL-SLR Report AMP and the enhancement associated with this AMP. The staff will document its reviews of the exception and the enhancement in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The table below lists the documents that were reviewed by the staff and were found to be relevant to the audit.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.M36	Program Basis Document – External Surfaces Monitoring of Mechanical Components	Revision 1
ER-AA-335-1005	Standard Approach on How to Evaluate and Inspect Outside Diameter Corrosion on Piping	Revision 4
ER-AA-700-402	External Surfaces Monitoring of Mechanical Components AMP	Revision 1
ER-AA-2030	Conduct of Plant Engineering	Revision 18

During the audit, the staff verified that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

During the audit of the “operating experience” program element, the staff conducted an independent search of the plant-specific operating experience database as discussed in the operating experience audit report. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the External Surfaces Monitoring of Mechanical Components program provided in SLRA Section A.2.1.24. The staff verified that it is consistent with the description provided in the GALL-SLR Report Table XI-01.

SLRA AMP B.2.1.25, “Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components”

Summary of Information in the Application. The SLRA states that AMP B.2.1.25, “Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components,” is a new program that will be consistent with the program elements in GALL-SLR Report AMP XI.M38, “Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components.” To verify this claim of consistency, the staff audited the SLRA AMP. At the time of the audit, Exelon had not yet fully developed the documents necessary to implement this new program, and the staff’s audit addressed only the program elements described in the applicant’s basis document. The staff will address issues identified but not resolved in this report in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.M38	Program Basis Document Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components	Revision 1
ER-AA-700-403	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Aging Management Program	Revision 0
PB-AMRBD-MEAE	Materials, Environments, and Aging Effects Aging Management Review Basis Document	Revision 2

During the audit, the staff verified that the “scope of program,” “preventive actions,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

In addition, the staff found that for the “parameters monitored or inspected” and “detection of aging effects” program elements, sufficient information was not available to determine whether they were consistent with the corresponding program elements of the GALL-SLR Report AMP. The staff will consider issuing RAIs in order to obtain the information necessary to verify whether these program elements are consistent with the corresponding program elements of the GALL-SLR Report AMP. The staff will document its evaluation of these potential RAIs in the SER.

During the audit, the staff made the following observations:

- The staff reviewed ER-AA-700-403 and noted that Section 4.7.3.2 states the number of additional inspections to be performed, if a component does not meet acceptance criteria, is no fewer than five additional inspections for each inspection that did not meet acceptance criteria, or 20 percent of each applicable material, environment, and aging effect combination, whichever is less.
- The staff reviewed PB-AMRBD-MEAE and noted that (a) Section 4.3.12, “PBAPS Internal and External Environment Summary,” states that raw water (potable) has been filtered and chlorinated and is therefore not susceptible to MIC; and (b) Section 4.5.1, “Treated Water (EPRI Mechanical Tools Appendix A),” states that MIC is only a potential aging mechanism for treated water where contamination with microbes has occurred.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA AMP provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.26, “Lubricating Oil Analysis”

Summary of Information in the Application. The SLRA states that AMP B.2.1.26, Lubricating Oil Analysis,” is an existing program that is consistent with the program elements in GALL-SLR Report AMP XI.M39, “Lubricating Oil Analysis.” To verify this claim of consistency, the staff audited the SLRA AMP.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.M39	Lubricating Oil Analysis	Revision 1
MA-AA-716-006	Control of Lubricants Program	Revision 14
MA-AA716-230	Predictive Maintenance Program	Revision 11
MA-AA-716-230-1001	Oil Analysis Interpretation Guideline	Revision 20

During the audit, the staff verified that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA AMP Lubricating Oil Analysis provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.27, “Monitoring of Neutron-Absorbing Materials Other Than Boraflex”

Summary of Information in the Application. The SLRA states that AMP XI.M40, “Monitoring of Neutron-Absorbing Materials Other Than Boraflex,” is an existing program that is consistent with the program elements in GALL-SLR Report AMP XI.M40, “Monitoring of Neutron-Absorbing Materials Other Than Boraflex.” To verify this claim of consistency, the staff audited the SLRA AMP.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
N/A	Peach Bottom Atomic Power Station Units 2 and 3 Updated Final Safety Analysis Report (UFSAR)	Revision 26
PB-PBD-AMP-XI.M40	Program Basis Document – Monitoring of Neutron-Absorbing Materials Other Than Boraflex	Revision 0
RT-R-004-971-2	Two-Year Surveillance Program for Netco Snap-In Alcan Neutron Absorbing Material, for the first Ten Year Interval (Unit 2)	Revision 2
RT-R-004-971-3	Two-Year Surveillance Program for Netco Snap-In Alcan Neutron Absorbing Material, for the first Ten Year Interval (Unit 3)	Revision 2
RT-R-004-972-2	Ten Year Surveillance Program for NETCO Snap-In Alcan Neutron Absorbing Material (Unit 2)	Revision 0
RT-R-004-972-3	Ten Year Surveillance Program for NETCO Snap-In Alcan Neutron Absorbing Material (Unit 2)	Revision 0
NF-AA-610	On-Site Wet Storage of Spent Nuclear Fuel	Revision 15
N/A	Peach Bottom Atomic Power Station Units 2 and 3 Updated Safety Analysis Report (UFSAR)	Revision 26

During the audit, the staff verified that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

During the audit, the staff made the following observation:

- The staff reviewed fleet procedure NF-AA-610 and noted that there is a procedural requirement to trend coupon test results if projected degradation of the neutron absorbing material is unable to maintain the required 5 percent sub-criticality margin. This procedural requirement is “[f]or stations that had their renewed licenses approved to GALL Report Revision 2...”; however, it was not clear whether this would also apply to plants licensed under GALL-SLR.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA AMP/TLAA title provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.28, “Buried and Underground Piping and Tanks”

Summary of Information in the Application. The SLRA states that AMP B.2.1.28, “Buried and Underground Piping and Tanks,” is an existing program with enhancements that will be consistent with the program elements in GALL-SLR Report AMP XI.M41, “Buried and Underground Piping and Tanks.” To verify this claim of consistency, the staff audited the SLRA AMP. Issues identified but not resolved in this report will be addressed in the SER. During the audit, the staff reviewed the enhancements associated with this AMP. The staff will document its review of the enhancements in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.M41	Buried and Underground Piping and Tanks Program Basis Document	Revision 2
EC-622830	2018 PBAPS (Peach Bottom Atomic Power Station) Cathodic Protection Improvements	04/25/2018
RT-O-57F-910-2	Cathodic Protection System Inspection	02/28/2018
RT-O-57F-910-2	Cathodic Protection System Inspection	01/29/2018
6280-C-16	Specification for Installation of Underground Piping for the PBAPS Units 2 and 3 Philadelphia Electric Company	07/31/1968
6280-C-28	Specification for Underground Tanks for the PBAPS Units 2 and 3 for the Philadelphia Electric Company	10/08/1969
6280-M-306	Specification for External Surface Treatment of Underground Metallic Pipe for the PBAPS Units 2 and 3 for the Philadelphia Electric Company	07/18/1968
ER-AA-5400-1002	Underground Piping and Tank Examination Guide	Revision 8

During the audit, the staff verified that the “scope of program,” “monitoring and trending,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

In addition, the staff found that for the “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” and “acceptance criteria” program elements, sufficient information was not available to determine whether they were consistent with the corresponding

program elements of the GALL-SLR Report AMP. The staff will consider issuing RAIs in order to obtain the information necessary to verify whether these program elements are consistent with the corresponding program elements of the GALL-SLR Report AMP. The staff will document its evaluation of these potential RAIs in the SER.

During the audit, the staff made the following observations:

- The staff reviewed PB-PBD-AMP-XI.M41 and noted that (a) buried stainless steel piping is coated with either a coal tar based somastic coating or a coal tar enamel with felt wrap coating (with the exception of the 10-inch diameter stainless steel line from the torus dewatering tank to the condensate transfer pump suction line); (b) buried and underground carbon steel piping and tanks are coated with either a coal tar based somastic coating or a coal tar enamel with felt wrap coating; (c) the emergency diesel generator fuel oil tanks are coated with coal tar based bituminous coating; (d) original design specifications specified that bedding material be installed within six inches of buried steel and stainless steel coated pipe and comprised of sound well graded granular material with aggregate size less than 3/8-inch; and (e) soil samples have shown relatively low levels of chlorides (less than 15 ppb (parts per billion)).
- The staff reviewed EC-622830, Attachment 1, Appendix I, and noted that the results of twenty soil corrosivity samples show that (a) soil resistivity ranged from 3,000 to 145,000 ohm-cm with an average value of 40,521 ohm-cm; (b) oxygen reduction values ranged from 263 to 390 millivolts; (c) none of the samples had detectable sulfides; (d) soil pH ranged from 7.1 to 9.8; (e) all observed samples were moist to wet; (f) anaerobic sulfate reducing bacteria were identified in thirteen of twenty tested samples; and (g) chlorides ranged from approximately one to 100 ppm (parts per million).
- The staff reviewed AR 04055916 and noted that (a) the buried 6 to 8 foot portion of the 10-inch diameter stainless steel cross-tie line between the torus dewatering tank and the Unit 3 condensate storage tank was found to be uncoated; (b) one to two feet of the subject piping is exposed to native fill; (c) five to six feet of the subject piping is exposed to cementitious fill; and (d) in order to meet subsequent license requirements, the subject piping should be coated 10 years prior to the subsequent period of extended operation.
- The staff reviewed AR 01137854 and noted that a pinhole leak was identified on top of a weld on the 20-inch emergency service water (ESW) supply buried piping. The leak was due to internal corrosion as the external surfaces of the piping did not show signs of external corrosion.
- The staff reviewed AR 01255154 and noted that during buried piping inspections the most severe external corrosion was 3/32-inch, which did not threaten the minimal wall thickness of 0.245-inch for 0.5-inch nominal wall thickness pipe.
- The staff reviewed AR 02513031 and noted that during buried fire protection piping inspections (a) no external corrosion was identified; and (b) as found coatings were well bonded to the piping.
- The staff reviewed RT-O-57F-910-2 (both January and February 2018) and noted that 15 out of 16 rectifiers met voltage and current limit acceptance criteria.
- The staff reviewed ER-AA-5400-1002 and noted that specific details on the installation and use of electrical resistance corrosion rate probes will be in accordance with the vendor, manufacturer, and NACE qualified cathodic protection expert (i.e., NACE CP4, "Cathodic Protection Specialist" qualification) recommendations.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA AMP provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.29, “Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks”

Summary of Information in the Application. SLRA states that AMP B.2.1.29, “Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks,” is a new program with exceptions that will be consistent with the program elements in GALL-SLR Report AMP XI.M42, “Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks.” To verify this claim of consistency, the staff audited the SLRA AMP. At the time of the audit, Exelon had not yet fully developed the documents necessary to implement this new program, and the staff’s audit addressed only the program elements described in the applicant’s basis document. Issues identified but not resolved in this report will be addressed in the SER. During the audit, the staff reviewed the exceptions associated with this AMP. The staff will document its review of the exceptions to the GALL-SLR Report AMP in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.M42	Program Basis Document Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks	Revision 2
ER-AA-330-014	Exelon Safety-Related (Service Level III) Coatings	Revision 2
M-010-002	Residual Heat Removal (RHR) Heat Exchanger Maintenance	Revision 17
M-C-756-001	High Pressure Coolant Injection (HPCI) Turbine Inspection	Revision 32

During the audit, the staff verified that the “preventive actions,” “parameters monitored or inspected,” “monitoring and trending,” and “acceptance criteria” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

The staff also verified that aspects of the “detection of aging effects” and “corrective actions” program elements not associated with the exceptions identified in the SLRA or by the staff during the audit are consistent with the corresponding program elements in the GALL-SLR Report AMP.

In addition, the staff found that for the “scope of program” program element, sufficient information was not available to determine whether it was consistent with the corresponding program elements of the GALL-SLR Report AMP. The staff will consider issuing an RAI in order to obtain the information necessary to verify whether this program element is consistent with the corresponding program element of the GALL-SLR Report AMP. The staff will document its evaluation of this potential RAI in the SER.

During the audit, the staff made the following observations:

- The staff reviewed AR 04049466 and noted that during development of the Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks aging management program, it was identified that the high-pressure service water side of the RHR heat exchanger water box did not appear to be coated.
- The staff reviewed ER-AA-330-014 Section 4.8.5, “Service Level (III) ISG Periodic Inspection Requirements,” which states “[t]he training and qualification of individuals involved in coating inspections and evaluating degraded conditions is conducted in accordance with an ASTM International standard endorsed in RG 1.54 (such as ASTM D7167-05) including staff guidance associated with a particular standard. For cementitious coatings/linings inspectors should have a minimum of 5 years of experience inspecting or testing concrete structures or cementitious coatings/linings or a degree in the civil/structural discipline and a minimum of 1 year of experience.”

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER. The staff will consider issuing an RAI in order to obtain the information necessary to determine whether Exelon’s SLRA AMP can be adequate to manage the associated aging effects. The staff will document its evaluation of the potential RAI in the SER.

The staff also audited the description of the SLRA AMP provided in the UFSAR supplement. The staff found that sufficient information was not available to determine whether the description provided in the UFSAR supplement was an adequate description of the SLRA AMP. The staff will consider issuing an RAI in order to obtain the information necessary to verify the sufficiency of the UFSAR supplement program description. The staff will document its evaluation of the potential RAI in the SER.

SLRA AMP B.2.1.30, “ASME Section XI, Subsection IWE”

Summary of Information in the Application. The SLRA states that AMP B.2.1.30, “ASME Section XI, Subsection IWE,” is an existing program, with enhancements and exception, that will be consistent with the program elements in GALL-SLR Report AMP XI.S1, “ASME Section XI, Subsection IWE.” To verify this claim of consistency, the staff audited the SLRA AMP. Issues identified but not resolved in this report will be addressed in the SER. During the audit, the staff reviewed the exception and enhancements associated with this AMP. The staff will document its review of the exceptions to the GALL-SLR Report AMP and the enhancements in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.S1	Program Basis Document: ASME Section XI, Subsection IWE	Revision 1
ER-AA-330	Conduct of Inservice Inspection Activities	Revision 13
ER-AA-330-007	Visual Examination of Section XI Class MC Surfaces and Class CC Liners	Revision 11
ER-AA-330-009	ASME Section XI Repair/Replacement Program	Revision 13
CC-AA-102	Design Input and Configuration Change Impact Screening	Revision 30
CC-MA-102-1001	Design Input and Impact Screening: Implementation	Revision 14
MA-AA-736-600	Torqueing and Tightening of Bolted Connections	Revision 5
PES-S-010	Standard: Fasteners	Revision 0 (Rev 1 markup)
FPSA-02	Fastener Procurement Standard for ASME Section III Fasteners	Revision 0
FPSB-02	Fastener Procurement Standard for ASTM Safety Related Fasteners	Revision 0
FPSD-02	Fastener Procurement Standard for Dedicated Safety Related Fasteners	Revision 0
ST-M-007-900-2 & ST-M-007-900-3	Drywell Airgap Drains Flow Test (Once/Operating Cycle) – Peach Bottom Unit 2/3 Surveillance Test (verifies drywell airgap drain liners are clear)	Revision 2
PBT05.G06	Augmented Inspection Plan – Fourth Ten-Year Inspection Interval, PBAPS Unit 2 and Unit 3: Augmented Containment Inspection Program No. AUG-C3 - Monitor Sludge Accumulation on Torus Floor	Revision 5
EXLNPB113-REPT-001	Review of Containment Fatigue Analyses for Peach Bottom Second License Renewal (Non-Safety-Related)	Revision 0, 12/7/2016

Document	Title	Revision / Date
1400630.304	Fatigue Exemption of the Peach Bottom Drywell (including mechanical and electrical penetrations) – Structural Integrity Associates Calculation	Revision 0, 10/16/2017
GEH-7480-316805-HE2-ISI	Peach Bottom Atomic Power Station – P3R19 (Sept 2013) ISI Final Report	10/16/2013
7480-191304-HE2-ISI	Peach Bottom Atomic Power Station – P2R21 (Oct 2016) ISI Final Report	October 2016
GEH-REPORT-PB-ISI-14-183901	Peach Bottom Atomic Power Station – P2R20 (Nov 2014) ISI Final Report	November 2014
7480-189821-HE3-ISI	Peach Bottom Atomic Power Station – P3R20 (Oct 2015) ISI Final Report	10/16/2015
RCN-043	Sept-Oct 2015 P3R20 Torus Project: Underwater Cleaning, Coating Inspection and Repair, Peach Bottom Unit 3, Underwater Construction Corporation	November 2015
RCN-036	Oct-Nov 2014 P2R20 Torus Project: Underwater Cleaning, Coating Inspection and Repair, Peach Bottom Unit 3, Underwater Construction Corporation	December 2014
MA-PB-793-001	Visual Examination of Containment Vessels and Internals	Revision 3
RT-M-007-901-2 & RT-M-007-901-3	Debris Loading Measurement and Computation in Torus	Revision 2

During the audit, the staff verified that for the program elements that Exelon declared were consistent, the “scope of program,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

The staff also verified Exelon’s claim that aspects of the “parameters monitored or inspected” program element not associated with the exception identified by Exelon are consistent with the corresponding program element in the GALL-SLR Report AMP.

In addition, the staff found that for the “preventive actions” and “detection of aging effects” program elements, sufficient information was not available to determine whether they were consistent with the corresponding program elements of the GALL-SLR Report AMP. The staff will use the voluntary SLRA supplement information committed to by Exelon during the audit, or the staff will consider issuing RAIs in order to obtain the information necessary to verify whether these program elements are consistent with the corresponding program elements of the GALL-SLR Report AMP. The staff will document its evaluation of the supplemental information or potential RAIs in the SER.

During the audit, the staff noted that the SLRA has credited the ASME Section XI, Subsection IWE AMP to manage flow blockage due to fouling for the stainless steel ECCS suction strainers exposed to treated water in the torus. This component, material, environment, and aging effect/mechanism combination is not included in the GALL-SLR Report. The staff will use voluntary SLRA supplement information provided by Exelon or consider issuing an RAI to assess the capability of the AMP for aging management of this component, material, environment and aging effect/mechanism combination. The staff will document its evaluation of the supplemental information or potential RAI in the SER.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA AMP “ASME Section XI, Subsection IWE,” provided in the UFSAR supplement. The staff found that sufficient information was not available to determine whether the description provided in the UFSAR supplement was an adequate description of the SLRA AMP “ASME Section XI, Subsection IWE.” The staff will use voluntary SLRA supplement information provided by Exelon or consider issuing an RAI in order to obtain the information necessary to verify the sufficiency of the UFSAR supplement program description. The staff will document its evaluation of the supplemental information or potential RAI in the SER.

SLRA AMP B.2.1.31, “ASME Section XI, Subsection IWF”

Summary of Information in the Application. The SLRA states that AMP B.2.1.31, “ASME Section XI, Subsection IWF,” is an existing program with enhancements that will be consistent with the program elements in GALL-SLR Report AMP XI.S3, “ASME Section XI, Subsection IWF.” To verify this claim of consistency, the staff audited the SLRA AMP. Issues identified but not resolved in this report will be addressed in the SER. During the audit, the staff reviewed the enhancements associated with this AMP. The staff will document its review of the enhancements in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
ER-AA-330	Conduct of Inservice Inspection Activities	Revision 013
ER-AA-330-003	Inservice Inspection of Section XI Component Supports	Revision 013
ER-AA-335-016	VT-3 Visual Examination of Component Supports, Attachments, and Interiors of Reactor Vessels	Revision 10
ER-AA-330	ISI Classification Basis Document, Fourth Ten-Year Inspection Interval	09/02/2014
PB-PBD-AMP-XI.S3	Program Basis Document – ASME Section XI, Subsection IWF	Revision 1
M-3403-1, -2, and -3	Drawing M-3403-1, -2, and -3	N/A

Document	Title	Revision / Date
ER-AA-330-009	ASME Section XI Repair/Replacement Program	Revision 14
ER-AA-335-016	VT-3 Visual Examination of Component Supports, Attachments, and Interiors of Reactor Vessels	Revision 11
N/A	ISI Program Plan Fourth Ten-Year Inspection Interval	09/16/2014

During the audit, the staff verified that for the program elements that Exelon declared were consistent, the “scope of program,” “parameters monitored or inspected,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP. In addition, the staff found that for the “preventive actions,” “detection of aging effects,” and “monitoring and trending,” program elements sufficient information was not available to determine whether they were consistent with the corresponding program elements of the GALL-SLR Report AMP. The staff will consider issuing RAs in order to obtain the information necessary to verify whether these program elements are consistent with the corresponding program elements of the GALL-SLR Report AMP. The staff will document its evaluation of these potential RAs in the SER.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA AMP “ASME Section XI, Subsection IWF” provided in the UFSAR supplement. The staff found that sufficient information was not available to determine whether the description provided in the UFSAR supplement was an adequate description of the SLRA AMP “ASME Section XI, Subsection IWF.” The staff will consider issuing an RA in order to obtain the information necessary to verify the sufficiency of the UFSAR supplement program description. The staff will document its evaluation of these potential RAs in the SER.

SLRA AMP B.2.1.32, “10 CFR Part 50, Appendix J”

Summary of Information in the Application. The Peach Bottom Atomic Power Station (PBAPS) Units 2 and 3 SLRA states that AMP B.2.1.32, “10 CFR Part 50, Appendix J,” is an existing program that is consistent with the program elements in GALL-SLR Report AMP XI.S4, “10 CFR Part 50, Appendix J.” To verify this claim of consistency, the staff audited the SLRA AMP.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP XI.S4	10 CFR Part 50, Appendix J Peach Bottom Atomic Power Station, Second License Renewal Project (AMP Basis Document)	Revision 2

Document	Title	Revision / Date
PBAPS UFSAR	Sections 4.6 and 5.2, Main Steam Line Isolation (MSIV) Valves, Primary Containment (respectively)	Revision 26
PBAPS Technical Specifications (TS)	Sections 3.6 and 5.5.12, Containment Systems, Primary Containment Leak Rate Testing Program (respectively)	N/A*
Annual, U2 & U3	PBAPS; Appendix J Program Health Report; Control Doc.: ER-AA-380	2016
1 st Tri-Annual, U2 & U3	PBAPS; Appendix J Program Health Report; Control Doc.: ER-AA-380	2015
2 nd Tri-Annual, U2 & U3	PBAPS; Appendix J Program Health Report; Control Doc.: ER-AA-380	2014
2 nd Tri-Annual, U2 & U3	PBAPS; Appendix J Program Health Report; Control Doc.: ER-AA-380	2015
3 rd Tri-Annual, U2 & U3	PBAPS; Appendix J Program Health Report; Control Doc.: ER-AA-380	2014
ST-J-07A-600-2	R1174669-2014 ILRT Excerpts	Revision 8
ST-J-07A-600-3	R0333868-2015 ILRT Excerpts	Revision 4
ECR 15-00314	LLRT Scope Reduction (RHR/Low Pressure Coolant Injection, Core Spray, and Standby Liquid Control Systems)	09/18/201
N/A*	Exclusions from LRT (Penetrations/associated Components: N-12; N-13A/B; N-16A/B; N-35E, F, G; N-37A-D; N-38A-D; N-39A/B, N-210A/B, N-211A/B, N-212, N-213A/B, N-214, N-216, N-221, N-223, N-224 U2, N-226A-D, N-227, N-228A-D, N-229 U2, N-230, N-233 U2, N-234 U2, N-234A/B U3, N-235 U3, N-236A/B u3)	N/A*
ML15196A559	Peach Bottom Atomic Power Station, Units 2 and 3 – Issuance of Amendments; Re: Extension of Type A and Type C LRT Frequencies	09/08/2015
ECR 16-00346	MSIV Poppet Skirt Modification	10/31/2016
ER-AA-380	Primary Containment LRT Program (Implementing Document)	Revision 11
2 nd Half	Appendix J Program Health Metric	2017

Document	Title	Revision / Date
XI.S4 Industry OpE	PBAPS U2, U3 License Renewal Project: 10 CFR 50, Appendix J AMP	N/A*
ER-AA-380-1002**	PBAPS U2, U3 License Renewal Project: 10 CFR 50, Appendix J AMP	N/A*
R1003365**	Integrated Leakage Rate Test – Planning and Implementation Guide	Revision 4
MA-AA-716-017**	Replace Resilient Parts (Plunger, Disc, & “O” Ring)	04/23/2015
S-188**	Station Rework Reduction Program	Revision 8
PBAPS SLRA	Drywell Vessel Pour Sequence	1975
	Section B.2.1.32 and Sections B.2.1.1, B.2.1.2, B.2.1.5, B.2.1.9, B.2.1.14, B.2.1.21, B.2.1.23, B.2.1.24, B.2.1.25, B.2.1.30	Revision 0

*N/A not available

**Requested by Staff following the OE Audit

During the audit, the staff verified that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program element(s) of the SLRA AMP are consistent with the corresponding element(s) of the GALL-SLR Report AMP.

During the audit, the staff made the following observations:

- The staff reviewed PBAPS SLRA and confirmed that Sections B.2.1.1, B.2.1.2, B.2.1.5, B.2.1.9, B.2.1.14, B.2.1.21, B.2.1.23, B.2.1.24, B.2.1.25, B.2.1.30 referenced by PBAPS SLRA Section B.2.1.32 are also listed in PB-PBD-AMP XI.S4, planned to be used as the relevant Aging Management Programs (AMPs) to manage the effects of aging for the components excluded from 10 CFR Part 50 Appendix J, local leakage rate tests (LLRTs). The excluded components are identified in UFSAR Table 5.2.2, “Containment Penetrations, Compliance with 10 CFR50, Appendix J.” The staff’s individual AMR line item audit reviews, based on listings in Table 2 system sections and associated Table 1 references for components excluded from the 10 CFR Part 50, Appendix J LLRTs, are documented in the appropriate “In Office Audit Report” sections.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA AMP 10 CFR Part 50, Appendix J provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.33, “Masonry Walls”

Summary of Information in the Application. SLRA states that AMP B.2.1.33, “Masonry Walls,” is an existing condition monitoring program with enhancements that will be consistent with the program elements in GALL-SLR Report AMP XI.S5, “Masonry Walls.” To verify this claim of consistency, the staff audited the SLRA AMP.

During the audit, the staff reviewed the enhancements associated with this AMP. The staff will document its review of the enhancements in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.S5	Aging Management Program Basis Document – Masonry Walls	Revision 1 8/2/2017
ER-AA-450	Structures Monitoring	Revision 6
ER-PB-450	Peach Bottom Structures Monitoring	Revision 0
ER-PB-450-1006	Peach Bottom Structures Monitoring Instructions	Revision 4
AR 02657801	Large cracks in masonry wall TB 3 135 ELEV	4/19/2016
AR 02657343	Large cracks in the floor and walls	4/18/2016
AR 04134239-03	Revise ER-AA-450 Section 6.1.5	11/28/2018

During the audit, the staff verified that for the program elements that Exelon declared were consistent, the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA AMP provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.34, Structures Monitoring

Summary of Information in the Application. The SLRA states that AMP B.2.1.34, “Structures Monitoring,” is an existing program with enhancements that will be consistent with the program elements in GALL-SLR Report AMP XI.S6, “Structures Monitoring.” To verify this claim of consistency, the staff audited the SLRA AMP. Issues identified but not resolved in this report will be addressed in the SER. During the audit, the staff reviewed the enhancements associated with this AMP. The staff will document its review of the enhancements in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.S6	Program Basis Document: Structures Monitoring	Revision 1
ER-PB-450	Peach Bottom Structures Monitoring Program (New)	Revision 0
ER-PB-450-1006	Peach Bottom Structures Monitoring Instruction	Revision 4
ER-PB-716-1000	Control of Bolting/Torqueing/Tensioning	Revision 0
PES-S-003	In-Storage Maintenance of Nuclear Material	Revision 10
Specification C-41	Structural Steel	Revision 0
ER-AA-450	Structures Monitoring	Revision 6
SA-AA-117	Excavation, Training, Shoring	Revision 21
MA-AA-736-600	Torqueing and Tightening of Bolted Connections	Revision 8
P-T-01	Structural: Design Baseline Document (incl. Sec. 3.3)	Revision 9
Dwg. Figure 1	Groundwater Monitoring Locations	February 2010
17D0989	Report of Groundwater Sampler Spring 2017	04/27/17
17L0736	Report of Groundwater Sampler Winter 2017	12/27/17
18B1256	Report of Groundwater Sampler Early 2018	03/09/18
UFSAR	PBAPS Unit 2 and 3 Updated Safety Analysis Report	Revision 26 April 2017

During the audit, the staff verified that, for the program elements that Exelon declared were consistent, the “parameters monitored or inspected,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the

corresponding elements of the GALL-SLR Report AMP. In addition, the staff found that, for the “scope of program,” “preventive actions,” and “detection of aging effects” program elements, sufficient information was not available to determine whether they were consistent with the corresponding program elements of the GALL-SLR Report AMP. The staff will consider issuing RAIs in order to obtain the information necessary to verify whether these program elements are consistent with the corresponding program elements of the GALL-SLR Report AMP. The staff will document its evaluation of these potential RAIs in the SER.

During the audit the staff made the following observation:

- The staff reviewed Report No(s). 17L0736, 17D0989 and 18B1256, and noted that several monitoring wells have recorded chlorides level above the GALL-SLR Report threshold for aggressive groundwater/soil; thus, structures near these locations may be exposed to a non-seasonal aggressive groundwater/soil environment. The staff will consider issuing an RAI and document its evaluation in the SER.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA Structures Monitoring Program provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.35, “Inspection of Water Control Structures Associated with Nuclear Power Plants”

Summary of Information in the Application. The SLRA states that AMP B.2.1.5, “Inspection of Water Control Structures Associated with Nuclear Power Plants,” is an existing program with enhancements. To verify this claim of consistency, the staff audited the SLRA AMP. Issues identified but not resolved in this report will be addressed in the SER. During the audit, the staff reviewed the enhancements associated with this AMP. The enhancements are evaluated in the SER.

Audit Activities. During its audit, the staff reviewed onsite documentation provided by the applicant. The table below lists the documents that were reviewed by the staff and were found relevant to the audit.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.S7	GALL-SLR Program XI.S7- Inspection of Water Control Structures Associated with Nuclear Power Plants	Revision 1 06/19/2018
Inspection Report	Conowingo –FERC Dam Inspection Report	03/08/2016

During the audit, the staff verified that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” and “acceptance criteria” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff’s evaluation of the identified plant-specific operating experience will be addressed in the SER. In light of the plant-specific operating experience, in order to obtain the information necessary to determine whether the applicant’s SLRA AMP can be adequate to manage the associated aging effects, the staff will consider issuing an RAI. The staff’s evaluation of the potential RAI will be documented in the Safety Evaluation Report.

The staff also audited the description of the SLRA AMP provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.36, “Protective Coating Monitoring and Maintenance”

Summary of Information in the Application. The SLRA states that AMP XI.S8, “Protective Coating Monitoring and Maintenance,” is an existing program with an enhancement that will be consistent with the program elements in GALL-SLR Report AMP XI.S8, “Protective Coating Monitoring and Maintenance.” To verify this claim of consistency, the staff audited the SLRA AMP. Issues identified but not resolved in this report will be addressed in the SER. During the audit, the staff reviewed an enhancement associated with this AMP. The staff will document its review of the enhancement in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.S8	Program Basis Document - Protective Coating Monitoring and Maintenance	Revision 1
CC-AA-205	Control of Undocumented/Unqualified Coatings Inside the Containment	Revision 10
ER-AA-330-008	Exelon Safety-Related (Service Level I) Protective Coatings	Revision 12
MA-PB-793-001	Visual Examination of Containment Vessels and Internals	Revision 3
NE-00047	Specification for Torus Underwater Inspection and Repair at Peach Bottom Atomic Power Station	Revision 7
PMRQ 234247-01	20S019: Torus Dewatering/Cleaning/Inspection	N/A
PMRQ 234248-01	30S019: Torus Dewatering/Cleaning/Inspection	N/A
ST-N-080-900-2	Visual Examination of Drywell and Torus Surfaces	Revision 4

Document	Title	Revision / Date
ST-N-080-900-3	Visual Examination of Drywell and Torus Surfaces	Revision 4
ER-AA-330-007	Visual Examination of Section XI Class MC Surfaces and Class CC Liners	Revision 11
ER-AA-335-018	Visual Examination of ASME IWE Class MC and Metallic Liners of IWL Class CC Components	Revision 12
ER-AA-330-007	Visual Examination of Section XI Class MC Surfaces and Class CC Liners	Revision 11

During the audit, the staff verified that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

In addition, the staff found that for the “detection of aging effects,” “monitoring and trending,” program elements sufficient information was not available to determine whether they were consistent with the corresponding program elements of the GALL-SLR Report AMP. The staff will consider issuing RAIs in order to obtain the information necessary to verify whether these program elements are consistent with the corresponding program elements of the GALL-SLR Report AMP. The staff will document its evaluation of these potential RAIs in the SER.

During the audit, the staff made the following observations:

- The staff reviewed AR 2413128 and noted that degraded coating along the “belly band” region of the torus extends from 1 inch above to 6 inches into the waterline.
- The staff reviewed AR 1691387 and noted that the measured total organic carbon (TOC) in the Unit 2 torus water had increased after re-coating the Unit 2 torus. The staff also noted that the suspected cause for the rise in TOC was the curing agent used to apply the new coating to the Unit 2 torus.
- The staff reviewed AR 1192421 and noted that the main steam safety relief valve (MSSRV) discharge temperature is greater than the coatings qualified temperature. If the MSSRVs lift, they could result in approximately 100 additional pounds of unqualified coatings in containment.
- The staff reviewed PMID RQ 234247-01 and noted that the inspection frequency for coatings in the torus are at least every 4 years/2 refueling outages for above and below the waterline.
- The staff reviewed the proposed UFSAR supplement in the SLRA, and noted that it did not state the program would be based on Regulatory Guide 1.54, “Service Level I, II, III, and In-Scope License Renewal Protective Coatings Applied to Nuclear Power Plants.”
- The staff reviewed the proposed enhancement to the program and noted that it did not specify the standard to which coatings inspection personnel will be certified.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER. The staff will consider issuing an RAI in order to obtain the information necessary to determine whether Exelon’s SLRA Protective Coating Monitoring and Maintenance program can be

adequate to manage the associated aging effects. The staff will document its evaluation of the potential RAI in the SER.

The staff also audited the description of the SLRA Protective Coatings Monitoring and Maintenance program provided in the UFSAR supplement. The staff found that sufficient information was not available to determine whether the description provided in the UFSAR supplement was an adequate description of the SLRA Protective Coating Monitoring and Maintenance program. The staff will consider issuing an RAI in order to obtain the information necessary to verify the sufficiency of the UFSAR supplement program description. The staff will document its evaluation of the potential RAI in the SER.

SLRA AMP B.2.1.37, “Electrical Insulation for Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements”

Summary of Information in the Application. The SLRA states that AMP B.2.1.37, “Electrical Insulation for Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements” is an existing program with enhancements that will be consistent with the program elements in GALL-SLR Report AMP XI.E1, “Electrical Insulation for Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements.” In addition, the SLRA stated that no exceptions were taken to the GALL-SLR Report AMP XI.E1. To verify this claim of consistency, the staff audited the SLRA AMP.

During the audit, the staff reviewed the enhancements associated with this AMP. The staff will document its review of the enhancements in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.E1	Electrical Insulation for Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Revision 1/July 6, 2018
XI.E1 Plant OpE		August 10, 2018
IEPSON Report No. NE-11-32-1	Cable and Connection Inspection Summary Report	Revision 0
M-C-700 209	Cleaning and Inspection of Control Panels	Revision 1
M-C-700-220	480 Volt Load Center Inspection and Cleaning	Revision 7

During the audit, the staff verified that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” “acceptance

criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA AMP provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report Table XI-01.

SLRA AMP B.2.1.38, “Electrical Insulation for Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits”

Summary of Information in the Application. The SLRA states that AMP B.2.1.38, “Electrical Insulation for Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits,” is an existing program with enhancements that will be consistent with the program elements in GALL-SLR Report AMP XI.E2, “Electrical Insulation for Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits.” To verify this claim of consistency, the staff audited the SLRA AMP. During the audit, the staff reviewed the enhancements associated with this AMP. The staff will document its review of the enhancements in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.E2	Electrical Insulation for Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits	Revision 1
ER-AA-300-150	Cable Condition Monitoring Program	Revision 5
ER-AA-2030	Conduct of Equipment Reliability Manual	Revision 20
SI2R-63F-050-A1CE	Main Stack Rad Monitor RY-0-17-050A Electronic Calibration Check	Revision 11
ST-I-063-201-2	RX BLDG Vent Exhaust RAD Monitor Calibration and Functional Test for RIS-2-17-452A and C	Revision 6

During the audit, the staff verified that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” “acceptance

criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects.

The staff also audited the description of the SLRA AMP provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.39, “Electrical Insulation for Inaccessible Medium-Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements”

Summary of Information in the Application. The SLRA states that AMP B.2.1.39, “Electrical Insulation for Inaccessible Medium-Voltage Power Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements,” is an existing program with enhancements and exceptions that will be consistent with the program elements in GALL-SLR Report AMP XI.E3A, “Electrical Insulation for Inaccessible Medium-Voltage Power Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements.” To verify this claim of consistency, the staff audited the SLRA AMP. Issues identified but not resolved in this report will be addressed in the SER. During the audit, the staff reviewed the exceptions and enhancements associated with this AMP. The staff will document its review of the exceptions to the GALL-SLR Report AMP and the enhancements in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.3A	Electrical Insulation for Inaccessible Medium-Voltage Power Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements – Program Basis Document	Rev. 1
ER-AA-300-150	Cable Condition Monitoring Program	Rev.5
XI.E3A Plant OpE	Electrical Insulation for Inaccessible Medium-Voltage Power Cables Not Subject to 10 CFR 50.49 EQ Requirements	08/10/2018
PB-AMPBD-E3	Manhole Inspection Frequency Basis Document	Rev. 0
PNLOC 1605H	Storm Sewer / MySmartcovers	09/20/2018

During the audit, the staff verified that the “scope of program,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding

elements of the GALL-SLR Report AMP. The staff also verified Exelon's claim that aspects of the "preventive action" program element not associated with the exceptions identified in the SLRA are consistent with the corresponding program element in the GALL-SLR Report AMP. In addition, the staff found that sufficient information was not available to determine if the "preventive actions" program element, with the exceptions identified by the applicant, is consistent with the corresponding program element of the GALL-SLR Report AMP. The exceptions rely on level monitoring system to inspect water accumulation in manholes every 5 years, instead of annually as recommended in the GALL-SLR Report AMP XI.E3A. The staff will potentially issue an RAI in order to obtain the information necessary to determine if the exceptions will satisfy the criteria of 10 CFR 54.21(a)(3). The staff will document its evaluation of this potential RAI in the SER.

During the audit of the "operating experience" program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff also audited the description of the SLRA AMP provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.40, "Electrical Insulation for Inaccessible Instrument and Control Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements"

Summary of Information in the Application. The SLRA states that AMP B.2.1.40, "Electrical Insulation for Inaccessible Instrument and Control Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements," is a new program with exceptions that will be consistent with the program elements in GALL-SLR Report AMP XI.E3B, "Electrical Insulation for Inaccessible Instrument and Control Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements." To verify this claim of consistency, the staff audited the SLRA AMP. Issues identified but not resolved in this report will be addressed in the SER. During the audit, the staff reviewed the exceptions associated with this AMP. The staff will document its review of the exceptions to the GALL-SLR Report AMP in the SER.

Audit Activities. During its audit, the staff interviewed Exelon's staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
ER-AA-300-150	Cable Monitoring Program	Rev. 5
XI.E3B Plant OpE	Electrical Insulation for Inaccessible Instrumentation and Control Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements	08/10/2018
PNLOC 1605H	Storm Sewer / MySmartcovers	09/20/2018
PB-AMPBD-E3	Manhole Inspection Frequency Basis Document	Rev. 0

Document	Title	Revision / Date
PB-PBD-AMP-XI.E3B-PBD	Electrical Insulation for Inaccessible Instrumentation and Control Cables Not Subject to 10 CFR50.49 Environmental Qualification Requirements – Program Basis Document	Rev.1

During the audit, the staff verified that the “scope of program,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP. The staff also verified Exelon’s claim that aspects of the “preventive actions” program element not associated with the exceptions identified in the SLRA are consistent with the corresponding program elements in the GALL-SLR Report AMP. In addition, the staff found that sufficient information was not available to determine if the “preventive actions” program element, with the exceptions identified by the applicant, is consistent with the corresponding program element of the GALL-SLR Report AMP. The exceptions rely on a level monitoring system to inspect water accumulation in manholes every 5 years, instead of annually as recommended in the GALL-SLR Report AMP XI.E3A. The staff will potentially issue an RAI in order to obtain the information necessary to determine if the exceptions will satisfy the criteria of 10 CFR 54.21(a)(3). The staff will document its evaluation of this potential RAI in the SER.

During the audit of the “operating experience” program element, the staff’s independent database search did not identify any operating experience that would indicate that the AMP may not be adequate to manage the associated aging effects.

The staff also audited the description of the SLRA AMP provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.41, “Electrical Insulation for Inaccessible Low-Voltage Power Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements”

Summary of Information in the Application. The SLRA states that AMP B.2.1.41, “Electrical Insulation for Inaccessible Low-Voltage Power Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements,” is a new program with exceptions that will be consistent with the program elements in GALL-SLR Report AMP XI.E3C, “Electrical Insulation for Inaccessible Low-Voltage Power Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements.” To verify this claim of consistency, the staff audited the SLRA AMP. Issues identified but not resolved in this report will be addressed in the SER. During the audit, the staff reviewed the exceptions associated with this AMP. The staff will document its review of the exceptions to the GALL-SLR Report AMP in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.E3C	Electrical Insulation for Inaccessible Low-Voltage Power Cables Not Subject to 10 CFR50.49 Environmental Qualification Requirements – Program Basis Document	Rev. 1
XI.E3C Plant OpE	Electrical Insulation for Inaccessible Low-Voltage Power Cables Not Subject to 10 CFR50.49 Environmental Qualification Requirements Plant OpE	08/10/2018
ER-AA-300-150	Cable Monitoring Program	Rev. 5
PB-AMPBD-E3	Manhole Inspection Frequency Basis Document	Rev. 0
PNLOC 1605H	Storm Sewer / MySmartcovers	09/20/2018

During the audit, the staff verified that the “scope of program,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP. The staff also verified Exelon’s claim that aspects of the “preventive actions” program element not associated with the exceptions identified in the SLRA are consistent with the corresponding program elements in the GALL-SLR Report AMP. In addition, the staff found that sufficient information was not available to determine if the “preventive actions” program element, with the exceptions identified by the applicant, is consistent with the corresponding program element of the GALL-SLR Report AMP. The exceptions rely on a level monitoring system to inspect water accumulation in manholes every 5 years, instead of annually as recommended in the GALL-SLR Report AMP XI.E3A. The staff will potentially issue an RAI in order to obtain the information necessary to determine if the exceptions will satisfy the criteria of 10 CFR 54.21(a)(3). The staff will document its evaluation of this potential RAI in the SER.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects.

The staff also audited the description of the SLRA AMP provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.2.1.42, “Metal Enclosed Bus”

Summary of Information in the Application. The SLRA states that AMP B.2.1.42, “Metal Enclosed Bus,” is a new program that will be consistent with the program elements in GALL-SLR Report AMP XI.E4, “Metal Enclosed Bus.” To verify this claim of consistency, the staff audited the SLRA AMP. At the time of the audit, Exelon had not yet fully developed the

documents necessary to implement this new program, and the staff's audit addressed only program elements described in the applicant's basis document.

Audit Activities. During its audit, the staff interviewed Exelon's staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-XI.E4	Peach Bottom Atomic Power Station, Second License Renewal Project – Metal Enclosed Bus Program Basis Document	12/14/17
6280-E-7	Purchase Specification – Metal Enclosed Bus	08/13/1971
6280-E7-40-216-S	Drawing - Bus Duct Arrangement 15 kV 3000A CU	05/23/1974
6280-E7-40-8 (sh 2)	Drawing - Bus Duct Arrangement	01/10/1979
6280-E7-40-8 (sh 3)	Drawing - Bus Duct Arrangement	09/23/1974
M-054-003	4.16 kV/13.2 kV Non-Segmented Bus Inspection/Maintenance	Revision 3
ER-AA-300-140	License Renewal Metal Enclosed Bus Program	Revision 2

During the audit, the staff verified Exelon's claim that the "scope of program," "preventive actions," "parameters monitored or inspected," "detection of aging effects," "monitoring and trending," "acceptance criteria," and "corrective actions" program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

During the audit, the staff made the following observation:

- The staff reviewed the AMP basis document PB-PBD-AMP-XI.E4 and noted that this document, as well as the SLRA AMP B.2.1.42, "Metal Enclosed Bus," excluded elastomers from this program. The staff discussed this exclusion with Exelon personnel during breakout sessions and requested photos of these components. The staff confirmed lack of elastomers (gaskets) on the in-scope metal enclosed bus sections by reviewing drawings 6280-E7-40-216-S, 6280-E7-40-8 (sh 2), 6280-E7-40-8 (sh 3), as well as photos provided by Exelon in the portal.

During the audit of the "operating experience" program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA section A. 2.1.42, "Metal Enclosed Bus," provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report Table XI-01.

SLRA AMP B.2.1.43, “Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements”

Summary of Information in the Application. The SLRA states that AMP B.2.1.43, “Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements,” is a new program that will be consistent with the program elements in GALL-SLR Report AMP XI.E6, “Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements.” To verify this claim of consistency, the staff audited the SLRA AMP. At the time of the audit, Exelon had not yet fully developed the documents necessary to implement this new program, and the staff’s audit addressed only the program elements described in the applicant’s basis document.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
ER-AA-300-120	Electrical Cable Connections not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program – Implementation Document	Revision 4
PB-AMPBD-E6	Electrical Cable Connections not Subject to 10 CFR 50.49 Environmental Qualification Requirements – Sample Basis Document	Revision 0
PB-PBD-AMP-XI.E6	Peach Bottom Atomic Power Station Second License Renewal Project - Electrical Cable Connections not Subject to 10 CFR 50.49 Environmental Qualification Requirements	Revision 2
MA-AA-716-230-1003	Thermography Program Guide	Revision 5
S-8506-A	Standard - Electrical Bolted Connections	02/01/2009

During the audit, the staff verified Exelon’s claim that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” and “acceptance criteria” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

During the audit, the staff made the following observations:

- The staff reviewed AMP basis document PB-PBD-AMP-XI.E6 and noted that only two general types of connections were listed to be included in the program (bolted and crimped). The sample basis document PB-AMPBD-E6 lists more inclusive types, such as, splice, butt, bolted, crimp type, ring lugs, connectors, and terminal blocks. Subsequent to the breakout session discussions, Exelon revised PB-PBD-AMP-XI.E6 and PB-AMPBD-E6 to clarify that the program will encompass all connections types

utilized at the site and the sampling basis will include all connections such as, splice, butt, bolted, crimp type, ring lugs, connectors, and terminal blocks.

- The staff reviewed AMP basis document PB-PBD-AMP-XI.E6 and noted that although this is a one-time inspection program, trending is not included for tests that are trendable and may have to be repeated periodically based on the initial finding results. Subsequent to the breakout session discussions, Exelon revised PB-PBD-AMP-XI.E6 to include trending for tests that are trendable and are deemed necessary to be repeated as periodic tests.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA section A.2.1.43, “Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements,” provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report Table XI-01.

SLRA AMP B.2.2.1, “Wooden Pole”

Summary of Information in the Application. The SLRA states that AMP B.2.2.1, “Wooden Pole,” is an existing plant-specific program with enhancement. The staff audited the SLRA AMP to determine consistency with SRP-SLR Section A.1.2.3, “Aging Management Program Elements.”

Audit Activities. During its audit, the staff reviewed onsite documentation provided by the applicant. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-PS-1	GALL-SLR Program PS-1- Wooden Pole	Revision 1 09/13/2017
PS-1	Wooden Pole PS-1 References	-
ER-AA-700-1001	Susquehanna Substation Wooden Pole Inspection Activity	Revision 1 10/04/2013

During the audit, the staff verified Exelon’s stated consistency with SRP-SLR Section A.1.2.3 for the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA AMP provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B3.1.1, “Fatigue Monitoring Program”

Summary of Information in the Application. The SLRA states that AMP B3.1.1, “Fatigue Monitoring Program,” is an existing program with enhancements that will be consistent with the program elements in GALL-SLR Report AMP X.M1, “Fatigue Monitoring.” To verify this claim of consistency, the staff audited the SLRA AMP. During the audit, the staff reviewed the enhancements associated with this AMP. The staff will document its review of the enhancements in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-X.M1	Program Basis Document, Fatigue Monitoring	Revision 1
FP-PBAP-404	Cycle Counting and Cycle-Based Fatigue Report for the Transient and Fatigue Monitoring System for Peach Bottom Atomic Power Station Units 2 and 2 (SIR-99-122)	Revision 6, August 2017
FP-PBAP-405	SI:FatiguePro 4.0 SBF Transfer Functions for Peach Bottom Atomic Power Station Units 2 and 3 Environmental Fatigue Monitoring System	Revision 6, June 2017
FP-PBAP-406	Software Verification and Validation Report for Peach Bottom Plant-Specific SI:FatiguePro 4.0 Software	Revision 2, September 2017
ERC-PB-11-00367-000	Fatigue Program Updates for License Renewal	October 20, 2011
1400630.301	Peach Bottom Second License Renewal (SLR), 60 and 80 Year Cycle and Fatigue Projections	Revision 1
1400630.302	Peach Bottom Second License Renewal (SLR), Peach Bottom Fatigue Usage Assessment	Revision 0
1400630.302	Peach Bottom Second License Renewal (SLR), Peach Bottom Environmentally-Assisted Fatigue Screening	Revision 0

During the audit, the staff verified that the “scope of program,” “preventive actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA Fatigue Monitoring Program provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA AMP B.3.1.2, “Neutron Fluence Monitoring”

Summary of Information in the Application. The SLRA states that AMP B.3.1.2, “Neutron Fluence Monitoring” is an existing program with an enhancement that will be consistent with the program elements in GALL-SLR Report AMP X.M2, “Neutron Fluence Monitoring.” To verify this claim of consistency, the staff audited the SLRA AMP. Issues identified but not resolved in this report will be addressed in the SER. During the audit, the staff reviewed the enhancement associated with this AMP. The staff will document its review of the enhancement in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-X.M2	Program Basis Document: Neutron Fluence Monitoring	Rev. 1, 01/10/2018
AR 02713499	Action Request Report, 2018 Withdrawal of Unit 2 120° RPV Surveillance Capsule	09/08/2016
AR 03962434	Action Request Report, 2018 Withdrawal of Unit 2 120° RPV Surveillance Capsule	01/12/2017
AR 01666001	Action Request Report, Duane Arnold ISP Surveillance Data Applicable to PBAPS Unit	05/30/2014
OE 302507 ¹	P-T Curves Non-Conservative Based on Integrated Surveillance Capsule Analysis Results	01/10/2013
OE 293244 ¹	Non-Conservative Fluence Inputs to Technical Specification P-T Limit Curves	01/19/2012
OE 252123 ¹	Non-Conservative Technical Specification P-T Limit Curves Identified During Thermal Power Optimization Project Review	12/06/2011
OE 234035 ¹	Reactor Coolant System P-T Limits	09/17/2008
CC-AA-102	Design Input and Configuration Change Impact Screening	
ER-AA-370	Reactor Coolant Pressure Boundary (RCPB) Integrity	

Document	Title	Revision / Date
NF-AB-105	Managing Cycle Design Inputs and Requirements	
General Electric-Hitachi Record: GE 003N7847	Peach Bottom Atomic Power Station Units 2 and 3, 80-Year Subsequent License Renewal, Task T0301: RPV Fracture Toughness Evaluation	Rev. 0, Dec. 2016
Transware Record: EXL-PB0-001-R-005 / EXL-PB0-002-R-005	Transware Fluence Evaluation Report: PBAPS Unit 3 Vessel Internal Components Fluence Evaluations	06/04/2014
Transware Record: EXL-PB0-001-R-003 / EXL-PB0-002-R-003	Transware Fluence Evaluation Report: PBAPS Unit 2 Vessel Internal Components Fluence Evaluations	06/04/2014
EPRI Proprietary Report No. 1019053	BWRVIP-145-A: BWR Vessel and Internals Project, Evaluation of Susquehanna Unit 2 Tope Guide and Core Shroud Materials Samples Using RAMA Fluence Methodology. ²	June 2009
General Electric-Hitachi Proprietary Report No. NEDC-32983-P-A ³	Licensing Topical Report: General Electric Methodology for Reactor Pressure Vessel Fast Neutron Flux Evaluations	Rev. 2, January 2006

Notes: 1. The record represents generic operating experience that was assessed for applicability to the units.
2. "-A" of the BWRVIP designation referenced in the title designates the report and methodology has been approved by the staff.
3. "-A" in the Report Number designates the report and methodology has been approved by the staff.

During the audit, the staff verified Exelon's claim that the "scope of program," "preventive actions," "parameters monitored or inspected," "detection of aging effects," "monitoring and trending," "acceptance criteria," and "corrective actions" program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

During the audit, the staff made the following observations:

- The staff reviewed General Electric-Hitachi Company Record No. GE 003N7847, and Transware, Enterprises, Inc. Record Nos. EXL-PB0-001-R-005 / EXL-PB0-002-R-005, and EXL-PB0-001-R-003 / EXL-PB0-002-R-003 and verified that Exelon is using two different vendors to perform fluence projections for RPV and RVI components in Unit 2 and Unit 3: (a) GE-Hitachi (GEH) for the neutron fluence projections for PBAPS RPV components, and (b) Transware Enterprises, Inc., use of EPRI's RAMA methodology for performance of the neutron fluence projections for the PBAPS RVI components. The staff did not have any inquiries in relation to the staff's review of these records or the contents of these records.
- The staff reviewed PBAPS Record Nos. CC-AA-102, ER-AA-370, and NF-AB-105, and verified the applicant has appropriate procedure controls in place to perform appropriate component design, core design, and operating characteristic and specification reviews for preparing design reports and providing appropriate design inputs to those vendors that may be contracted to perform neutron fluence evaluations of the RPV or RVI components in the PBAPS unit designs. The staff did not have any inquiries in relation to the staff's review of these records or the contents of these records.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff also reviewed generic operating experience that was identified by the applicant as being potentially applicable to this AMP. The staff will evaluate the identified plant-specific and generic operating experience in the SER.

The staff also audited the description of the SLRA Neutron Fluence Monitoring AMP provided in the SLRA UFSAR Supplement Section A.3.1.2. The staff verified this description is consistent with the description provided in the Table X-01 of GALL-SLR Report for GALL-SLR AMP X.M2, “Neutron Fluence Monitoring.”

SLRA AMP B.3.1.3, “Environmental Qualification of Electric Equipment”

Summary of Information in the Application. The SLRA states that AMP B.3.1.3, “Environmental Qualification of Electric Equipment,” is an existing program with enhancements that will be consistent with the program elements in GALL-SLR Report AMP X.E1, “Environmental Qualification of Electric Equipment.” To verify this claim of consistency, the staff audited the SLRA AMP. During the audit, the staff reviewed the enhancements associated with this AMP. The staff will document its review of the enhancements in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-X.E1	Environmental Qualification of Electric Equipment – Program Basis Document	Rev. 1
AR 4106712-09	Aging Management Program (AMP) Effectiveness Review - Peach Bottom Environmental Qualification Activities AMP	Rev. 1
CC-AA-203	Environmental Qualification Program	Rev.1
EQ-PB-011	Environmental Qualification - Okonite 600 V Power & Control Cable and 5 kV Power Cable	Rev. 1
EQ-PB-016	Environmental Qualification - Brand Rex Cable	Rev. 1

During the audit, the staff verified that for the program elements that Exelon declared were consistent, the “scope of program,” “preventive Actions,” “parameters monitored or inspected,” “detection of aging effects,” “monitoring and trending,” “acceptance criteria,” and “corrective actions” program elements of the SLRA AMP are consistent with the corresponding elements of the GALL-SLR Report AMP.

During the audit of the “operating experience” program element, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects.

The staff also audited the description of the SLRA AMP provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

2.2 Time Limited Aging Analyses (TLAAs)

SLRA TLAA Section 4.1, “Identification and Evaluation of Time-Limited Aging Analyses”

Summary of Information in the Application. SLRA Section 4.1, “Identification and Evaluation of Time-Limited Aging Analyses (TLAAs),” discusses the applicant’s methodology for identifying those plant analyses, evaluations, calculations, or assessments (AECAs) that qualify as TLAAs, consistent with the definition for TLAAs provided in 10 CFR 54.3(a), and for identifying those TLAAs that must be included and evaluated in the SLRA in accordance with 10 CFR 54.21(c)(1). SLRA Section 4.1 provides: (a) a list of those AECAs that qualify as TLAAs and have been identified as TLAAs in accordance with the requirement in 10 CFR 54.21(c)(1), and (b) a pointer to the sections or subsections in SLRA Chapter 4 that provides the applicant’s evaluation of the TLAAs and the basis for dispositioning the TLAAs in accordance with 10 CFR 54.21(c)(1)(i), (ii), or (iii).

Section 4.1 of the SLRA also summarizes the applicant’s review that was performed to identify any regulatory exemptions that have been granted for the current licensing basis (CLB) in accordance with the requirements in 10 CFR 50.12 and are based on a TLAA, and the results of its regulatory exemption review, as required by 10 CFR 54.21(c)(2).

The staff audited SLRA Section 4.1, applicable information in the UFSAR, and supporting information, documents, and records to verify that Exelon has provided a comprehensive list of AECAs that qualify as TLAAs in accordance with 10 CFR 54.3(a) and has identified these AECAs as TLAAs in accordance with 10 CFR 54.21(c)(1). The staff also audited this information to: (a) verify that the applicant has appropriately identified regulatory exemptions granted in the CLB under the requirements of 10 CFR 50.12 that are based on a TLAA, as required in accordance with 10 CFR 54.21(c)(2); and (b) verify, for those 50.12 exemptions that are based on a TLAA (if any), that the applicant has provided an appropriate evaluation of the exemptions in the SLRA justifying their continuation during the subsequent period of extended operation. As part of these efforts, the staff performed a search of the NRC’s ADAMS document control database for any regulatory exemptions that may have been granted in the CLB under the requirements of 10 CFR 50.12 for the reactor units that are within the scope of the SLRA. The staff will address any issues identified but not resolved in this audit report in the SER.

Audit Activities. During its audit, the staff interviewed the applicant’s staff and reviewed documentation provided by the applicant. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-TLAABD	Peach Bottom Atomic Power Station Units 2 and 3, License Renewal Project, TLAA Basis Document – Part 2 -TLAA Evaluation (Pages 4.1-1 through 4.1-9, and Attachment 6, “List of Reports Considered to PTLAAs)	Revision 0

Document	Title	Revision / Date
LR-P-007	Peach Bottom Plant-Specific Exemptions Granted Pursuant to 10 CFR 50.12	Revision 0

SLRA TLAA Section 4.1, “Identification and Evaluation of Time-Limited Aging Analyses”

Summary of Information in the Application. SLRA Section 4.1, “Identification and Evaluation of Time-Limited Aging Analyses (TLAAs),” discusses the applicant’s methodology for identifying those plant analyses, evaluations, calculations, or assessments (AECAs) that qualify as TLAAs, consistent with the definition for TLAAs provided in 10 CFR 54.3(a), and for identifying those TLAAs that must be included and evaluated in the SLRA in accordance with 10 CFR 54.21(c)(1). SLRA Section 4.1 provides: (a) a list of those AECAs that qualify as TLAAs and have been identified as TLAAs in accordance with the requirement in 10 CFR 54.21(c)(1), and (b) a pointer to the sections or subsections in SLRA Chapter 4 that provides the applicant’s evaluation of the TLAAs and the basis for dispositioning the TLAAs in accordance with 10 CFR 54.21(c)(1)(i), (ii), or (iii).

Section 4.1 of the SLRA also summarizes the applicant’s review that was performed to identify any regulatory exemptions that have been granted for the current licensing basis (CLB) in accordance with the requirements in 10 CFR 50.12 and are based on a TLAA, and the results of its regulatory exemption review, as required by 10 CFR 54.21(c)(2).

The staff audited SLRA Section 4.1, applicable information in the UFSAR, and supporting information, documents, and records to verify that Exelon has provided a comprehensive list of AECAs that qualify as TLAAs in accordance with 10 CFR 54.3(a) and has identified these AECAs as TLAAs in accordance with 10 CFR 54.21(c)(1). The staff also audited this information to: (a) verify that the applicant has appropriately identified regulatory exemptions granted in the CLB under the requirements of 10 CFR 50.12 that are based on a TLAA, as required in accordance with 10 CFR 54.21(c)(2), and (b) verify, for those 50.12 exemptions that are based on a TLAA (if any), that the applicant has provided an appropriate evaluation of the exemptions in the SLRA justifying their continuation during the subsequent period of extended operation. As part of these efforts, the staff performed a search of the NRC’s ADAMS document control database for any regulatory exemptions that may have been granted in the CLB under the requirements of 10 CFR 50.12 for the reactor units that are within the scope of the SLRA. The staff will address any issues identified but not resolved in this audit report in the SER.

Audit Activities. During its audit, the staff interviewed the applicant’s staff and reviewed documentation provided by the applicant. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-TLAABD	Peach Bottom Atomic Power Station Units 2 and 3, License Renewal Project, TLAA Basis Document – Part 2 - TLAA Evaluation (Pages 4.1-1 through 4.1-9, and Attachment 6, “List of Reports Considered to PTLAAs)	Revision 0

Document	Title	Revision / Date
LR-P-007	Peach Bottom Plant-Specific Exemptions Granted Pursuant to 10 CFR 50.12	Revision 0

Summary of Audit Review for Identified TLAAs

During the audit of the SLRA Section 4.1, relevant information in the UFSAR, and supporting information, the staff verified that Exelon may not have identified all AECAs that qualify as a TLAA in accordance with 10 CFR 54.3(a). The following items summarize the staff's observations relative to AECAs that required further discussions with the applicant:

- The staff noted that, in Basis Document PB-TLAABD, Revision 0, Appendix A, the applicant includes a reference to General Electric-Hitachi (GEH) Report No. GEH-0000-0151-0155). The report includes an analysis of 16 existing flaws that were detected in the upper reactor pressure vessel (RPV) head of Unit 2. The applicant identifies that the flaw analysis justifies crack stability of the flaws of a 60-year life but qualifies that the analysis does not need to be identified as a TLAA because the component will be re-inspected in the 5th 10-Year ISI internal for the impacted unit. The staff will seek further justification on why it would preclude identification of this analysis as a TLAA, particularly if the 60-year flaw analysis was being used as the basis for a safety decision to re-inspect the upper head at a particular time in the 5th 10-Year ISI interval. In contrast to the reference of this GEH report, row 158 of the Basis Document appendix identifies that an analogous year 2002 flaw evaluation of similar indications in Unit 3 RPV upper head is a TLAA for the LRA.
- The staff noted that, in Basis Document PB-TLAABD, Revision 0, Appendix A, the applicant includes a reference to site Record No. PEAM-MPLUS-9, Rev. 000 (a year 2013 record) and identifies that the neutron flux evaluation in the record for the RPV shell plates, nozzles, and welds in Units 2 and 3 qualifies as a TLAA for the units. However, later in the appendix, the applicant identifies that an updated fluence analysis (Record No. 349-1-VC-39, Sht. 0001, Rev. 000) was performed in 2015 for Unit 3. For the year 2015 fluence analysis for Unit 3 in Record No. 349-1-VC-39, Sht. 0001, Rev. 000, the applicant concluded the analysis is not a TLAA because it is not contained or incorporated by reference in the CLB. The staff will seek further clarification as to whether the more recent, Year 2015 fluence analysis for Unit 3, is superseding the previous Year-2013 fluence analysis referenced for Unit 3 RPV in site Record No. PEAM-MPLUS-9, Rev. 000 and, if so, why the 2015 analysis would not need to be identified as a TLAA for the SLRA.
- The staff noted that, in Basis Document PB-TLAABD, Revision 0, Appendix A, the applicant includes a reference to site Record 99-02244, Revision 1. Site Record 99-02244 includes a flaw evaluation of an indication that was detected in one of the unit's jet pump adapter welds. The applicant states that the evaluation in the site record does not qualify as TLAA because it does not meet Criterion 3 for defining TLAA's in 10 CFR 54.3(a). However, the applicant does not explain why the analysis does not meet Criterion 3 in 10 CFR 54.3(a). The staff will seek further justification as to why the evaluation in site Record 99-02244, Rev. 01, is not considered to meet Criterion 3 for TLAA identification in 10 CFR 54.3(a).

During the audit, the staff discussed these AECAs with the applicant during a scheduled audit breakout teleconference conducted on December 13, 2018. These matters will be reflected in one or more potential RAls to the applicant and in the staff's evaluation of SLRA Section 4.1.

Summary of Audit Review of Exemptions that May Meet the Criteria in 10 CFR 54.21(c)(2)

During the audit of the SLRA Section 4.1, information in the UFSAR, and supporting information, the staff verified that the CLB does not include any regulatory exemptions granted in accordance with 10 CFR 50.12 that are based on a TLAA, such that the exemptions would need to be identified in the SLRA and evaluated in accordance with the requirements of 10 CFR 54.21(c)(2).

SLRA TLAA Section 4.2.2, "Reactor Vessel Upper Shelf Energy Analyses"

Summary of Information in the Application. SLRA Section 4.2.2, "Reactor Vessel Upper Shelf Energy (USE) Analyses" (henceforth the TLAA on USE), discusses the neutron fluence-dependent analyses that are included in the current licensing basis (CLB) to evaluate potential drops in the upper shelf energy fracture toughness properties of ferritic steel components that were used to fabricate the reactor pressure vessels (RPVs). Exelon identified that, collectively, these analyses constitute a TLAA for the subsequent license renewal application (SLRA) and dispositioned the analyses in accordance with 10 CFR 54.21(c)(1)(ii).

To verify that Exelon provided a basis to support its disposition of the TLAA, the staff audited the TLAA. The staff will address issues identified but not resolved in this report in the SER.

Audit Activities. During its audit, the staff interviewed Exelon's staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
SLRA Section 4.2.1	Reactor Vessel and Internals Neutron Fluence Analyses	Revision 0
SLRA Section 4.2.2	Reactor Vessel Upper Shelf Energy (USE) Analyses	Revision 0
PB-TLAABD	Peach Bottom Atomic Power Station Units 2 and 3, License Renewal Project, TLAA Basis Document – Part 1 – TLAA Identification, Attachment 7, PBAPS First LRA TLAA and SLRA TLAA Comparison	Revision 0
PB-TLAABD	Peach Bottom Atomic Power Station Units 2 and 3, License Renewal Project, TLAA Basis Document – Part 2 – TLAA Evaluation, Section 4.2, Reactor Vessel and Internals Neutron Embrittlement Analyses	Revision 0
EPRI BWRVIP Report No. 1008872	BWRVIP-74-A: BWR Vessel and Internals Project, BWR Reactor Pressure Vessel Inspection and Flaw Evaluation Guidelines for License Renewal	Revision 0, June 2003
PECO Energy Correspondence Letter	Peach Bottom Atomic Power Station, Units 2 and 3, Limerick Generating Station, Units 1 and 2, Response to Generic Letter 92-01, Revision 1, Supplement 1, "Reactor Vessel Structural Integrity"	August 15, 1995

Document	Title	Revision / Date
NRC Correspondence Letter to PECO Energy Company	Closeout for PECO Energy Company (PECO) Response to Generic Letter 92-01, Revision 1, Supplement 1, Peach Bottom Atomic Power Plant, Units 2 and 3"	September 25, 1996
GE-Hitachi Nuclear Energy Proprietary Report No. 003N7847 (Class II Report)	Project Task Report, Exelon Nuclear, LLC, Peach Bottom Atomic Power Station, Units 2 and 3, 80-Yer Subsequent License Renewal, Task T0301: RPV Fracture Toughness Evaluation	Revision 0, December 2016
GE-Nuclear Report No. SASR 88-24 (ADAMS ML12242A122)	Peach Bottom Atomic Power Station, Unit 2 Vessel Surveillance Materials Testing and Fracture Toughness Analysis	May 1988
GE-Nuclear Report No. SASR 90-50 (ADAMS ML12242A123)	Peach Bottom Atomic Power Station, Unit 3 Vessel Surveillance Materials Testing and Fracture Toughness Analysis	June 1990
GE-Nuclear Proprietary Report No. NEDC-33556P	Safety Analysis Report for Exelon Peach Bottom Atomic Power Station, Units 2 and 3, Constant Pressure Power Uprate	Revision 0, September 2012
NRC Correspondence Letter and Safety Evaluation to Exelon Nuclear (ADAMS ML14133A046)	Peach Bottom Atomic Power Station, Units 2 and 3 – Issuance of Amendments RE: Extended Power Uprate (TAC Nos. ME9631 and ME9632)	August 25, 2014
GE-Nuclear Proprietary Report No. NEDC-33873P	Safety Analysis Report for Exelon Peach Bottom Atomic Power Station, Units 2 and 3, Thermal Power Optimization	Revision 0 February 2017
NRC Correspondence Letter and Safety Evaluation to Exelon Nuclear (ADAMS ML17286A013)	Peach Bottom Atomic Power Station, Units 2 and 3 – Issuance of Amendments RE: Measurement Uncertainty Recapture Power Uprate (CAC Nos. MF9289 and MF9290; EPID L-2017-LLS-0001)	November 15, 2017

During the audit of the TLAA, the staff verified that Exelon has provided its basis that supports its disposition of 10 CFR 54.21(c)(1)(ii).

During the audit, the staff made the following observations based on its in-house audit review of relevant information in SLRA Sections 4.2.1 and 4.2.2, Basis Document Report PB-TLAA-BD, Parts 1 and 2, the applicant's previous responses to Generic Letters (GLs) 92-01, Revision 1, and 92-01, Revision 1, Supplement 1, and GE-Hitachi Nuclear Energy (GE) Proprietary Class II Report Nos. 003N7847, Revision 0, and 004N6849, Revision 0.

- The staff observed that GE Proprietary Report No. 003N7847, Revision 0, serves as the licensing basis document for the applicant's TLAA on USE. The staff observed that GE Proprietary Report No. 004N6849, Revision 0, is used only to address potential uncertainties in the neutron fluence values that were reported for the RPV beltline components in SLRA Section 4.2.1.1. The staff observed that the 004N6849 report does not serve as the licensing basis document for the TLAA on USE. Based on these observations, the staff noted that GE Proprietary Report No. 003N7847, Revision 0, establishes the Unit 2-specific and Unit 3-specific RPV components that need to be included in the scope of the TLAA on USE.
- The staff observed that the scope of the TLAA on USE covers the following RPV components in Unit 2 that are made from ferritic steel materials: (a) RPV shell plates located in the RPV lower and lower intermediate shells, (b) RPV axial welds located in the lower and lower intermediate shells, and (c) the RPV circumferential weld adjoining the lower shell course to the lower intermediate shell. The staff observed that, based on the design of the Unit 2 RPV and information reviewed by the staff, the TLAA on USE does not include any upper intermediate shell plates or welds as extended beltline components within the scope of the TLAA.¹
- The staff observed that the scope of the TLAA on USE covers the following RPV components in Unit 3 that are made from ferritic steel materials: (a) RPV shell plates located in the RPV lower and lower intermediate shells, (b) RPV axial welds located in the lower and lower intermediate shells, (c) the RPV circumferential weld adjoining the lower shell course to the lower intermediate shell, (d) RPV shell plates in the intermediate shell, which are extended beltline components for the Unit 3 assessment, (e) RPV axial welds in the intermediate shell, which are extended beltline components for the Unit 3 assessment, and (f) the lower intermediate shell-to-intermediate shell circumferential weld, which is an extended beltline component for the Unit 3 assessment.
- The staff observed that, in the SLRA, the applicant only provided end-of-second-renewed-life USE or equivalent margins analysis (EMA) values for those Unit-specific RPV base metal and weld components which are considered to be the most limiting for the TLAA on USE assessment. Based on its review of the applicant's response to Generic Letter 92-01, Revision 1, Supplement, and supporting EPRI BWRVIP records, the staff observed that Exelon's original licensing basis did not have a sufficient amount of Charpy-impact test data to establish the un-irradiated upper shelf energy plateaus for all RPV beltline base metal and weld materials. The staff will reference this observation in its evaluation of the TLAA on USE, as documented in the SER.
- The staff observed that the EMA input parameter values listed in SLRA Tables 4.2.2-3 – 4.2.2-6 for specified Unit 2 and 3 RPV and ISP surveillance materials were consistent with those provided in GE-Nuclear Proprietary Report No. NEDC-33873P. The staff also

¹ For Unit 3, Exelon's corresponding nomenclature of this shell in the Unit 3 RPV design is referred to as the intermediate shell.

observed that these EMA input parameters were approved in the staff's November 15, 2017, safety evaluation for the license amendment granting the measurement uncertainty recapture power uprates for the reactor units (ADAMS Accession No. ML17286A013).

During the audit of the operating experience associated with the TLAA, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff did not identify any additional aging effects or mechanisms (i.e., other than loss of fracture toughness due to neutron irradiation embrittlement) that would have an impact on the applicant's evaluation of the TLAA.

The staff also audited the description of the SLRA TLAA on USE provided in the UFSAR supplement. The staff verified this description provided an adequate description of why a limiting BWRVIP-74-A equivalent margins analysis (EMA) was needed as the basis for meeting the USE requirements in 10 CFR Part 50, Appendix G, and how the EMAs for the reactor units have been projected to the end of the subsequent period of extended operation in accordance with the requirement in 10 CFR 54.21(c)(1)(ii).

SLRA TLAA Section 4.2.3, "Reactor Vessel Adjusted Reference Temperature (ART) Analyses"

Summary of Information in the Application. SLRA Section 4.2.3, "Reactor Vessel Adjusted Reference Temperature (ART) Analyses," discusses the analyses for the reactor vessel. Exelon dispositioned the TLAA in accordance with 10 CFR 54.21(c)(1)(ii). To verify that Exelon provided a basis to support its disposition of the TLAA, the staff audited the TLAA.

Audit Activities. During its audit, the staff interviewed Exelon's staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-TLAABD, Part 1	Time-Limited Aging Analysis (TLAA) Basis Document – Part 1 – TLAA Identification	Revision 0
PB-TLAABD, Part 2	Time-Limited Aging Analysis (TLAA) Basis Document – Part 2 – TLAA Evaluation, Section 4.2.3, Reactor Vessel Adjusted Reference Temperature (ART) Analyses	Revision 0

During the audit of the TLAA, the staff verified that Exelon has provided its basis that supports its disposition of 10 CFR 54.21(c)(1)(ii).

During the audit of the operating experience associated with the TLAA, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects.

The staff also audited the description of the SLRA Reactor Vessel Adjusted Reference Temperature (ART) Analyses provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA TLAA Section 4.2.4, “Reactor Vessel Pressure-Temperature (P-T) Limits”

Summary of Information in the Application. SLRA Section 4.2.4, “Reactor Vessel Pressure-Temperature (P-T) Limits,” discusses the analyses for the reactor pressure vessel (RPV) P-T limit curves. Exelon dispositioned the TLAA in accordance with 10 CFR 54.21(c)(1)(iii).

To verify that Exelon provided a basis to support its disposition of the TLAA, the staff audited the TLAA.

Audit Activities. During its audit, the staff reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
Renewed License No. DPR-44; Appendix A	Technical Specifications for Peach Bottom Atomic Power Station Unit 2; Section 5.6.7, “Reactor Coolant System (RCS) Pressure and Temperature Limits Report (PTLR)”	Amendment No. 305
Renewed License No. DPR-56; Appendix A	Technical Specifications for Peach Bottom Atomic Power Station Unit 3; Section 5.6.7, “Reactor Coolant System (RCS) Pressure and Temperature Limits Report (PTLR)”	Amendment No. 309

During the audit of the TLAA, the staff verified that Exelon has provided its basis that supports its disposition of 10 CFR 54.21(c)(1)(iii).

During the audit of the operating experience associated with the TLAA, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. No significant plant specific operating experience associated with TLAA Section 4.2.4 was noted by the staff during its review.

The staff also audited the description of the “SLRA Reactor Vessel Pressure-Temperature (P-T) Limits” TLAA provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the SRP-SLR.

SLRA TLAA Section 4.2.5, “Reactor Vessel Circumferential Weld Failure Probability Analyses”

Summary of Information in the Application. SLRA Section 4.2.5, “Reactor Vessel Circumferential Weld Failure Probability Analyses,” discusses the analyses for the reactor pressure vessel (RPV) circumferential welds. Exelon dispositioned the TLAA in accordance with 10 CFR 54.21(c)(1)(iii).

To verify that Exelon provided a basis to support its disposition of the TLAA, the staff audited the TLAA.

Audit Activities. During its audit, the staff interviewed Exelon's staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
GE Hitachi Nuclear Energy 003N7847	Project Task Report Exelon Nuclear, LLC Peach Bottom Atomic Power Stations Units 2 and 3 80-Year Subsequent License Renewal Task T0301: PRP Fracture Toughness Evaluation	Revision 0, December 2016

During the audit of the TLAA, the staff verified that Exelon has provided its basis that supports its disposition of 10 CFR 54.21(c)(1)(iii).

During the audit of the operating experience associated with the TLAA, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. No significant plant specific operating experience associated with TLAA Section 4.2.5 was noted by the staff during its review.

The staff also audited the description of the SLRA "Reactor Vessel Circumferential Weld Failure Probability Analyses" TLAA provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the SRP-SLR.

SLRA TLAA Section 4.2.6, "Reactor Vessel Axial Weld Failure Probability Analyses"

Summary of Information in the Application. SLRA Section 4.2.6, "Reactor Vessel Axial Weld Failure Probability Analyses," discusses the analyses for the reactor pressure vessel (RPV) axial welds. Exelon dispositioned the TLAA in accordance with 10 CFR 54.21(c)(1)(ii).

To verify that Exelon provided a basis to support its disposition of the TLAA, the staff audited the TLAA.

Audit Activities. During its audit, the staff interviewed Exelon's staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
GE Hitachi Nuclear Energy 003N7847	Project Task Report Exelon Nuclear, LLC Peach Bottom Atomic Power Stations Units 2 and 3 80-Year Subsequent License Renewal Task T0301: PRP Fracture Toughness Evaluation	Revision 0, December 2016

During the audit of the TLAA, the staff verified that Exelon has provided its basis that supports its disposition of 10 CFR 54.21(c)(1)(ii).

During the audit of the operating experience associated with the TLAA, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will document its review of relevant operating experience in the SER.

The staff also audited the description of the SLRA “Reactor Vessel Axial Weld Failure Probability Analyses” TLAA provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the SRP-SLR.

SLRA TLAA Section 4.2.7, “Reactor Vessel Reflood Thermal Shock Analysis”

Summary of Information in the Application. SLRA Section 4.2.7, “Reactor Vessel Reflood Thermal Shock Analysis,” discusses the analysis for the reactor vessel. Exelon dispositioned the TLAA in accordance with 10 CFR 54.21(c)(1)(ii).

To verify that Exelon provided a basis to support its disposition of the TLAA, the staff audited the TLAA.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-TLAABD, Part 1	Time-Limited Aging Analysis (TLAA) Basis Document – Part 1 – TLAA Identification	Revision 0
PB-TLAABD, Part 2	Time-Limited Aging Analysis (TLAA) Basis Document – Part 2 – TLAA Evaluation, Section 4.2.7, Reactor Vessel Reflood Thermal Shock Analysis	Revision 0

During the audit of the TLAA, the staff verified that Exelon has provided its basis that supports its disposition of 10 CFR 54.21(c)(1)(ii).

During the audit of the operating experience associated with the TLAA, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects.

The staff also audited the description of the SLRA Reactor Vessel Reflood Thermal Shock Analysis provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA TLAA Section 4.2.8, “Core Shroud Reflood Thermal Shock Analysis”

Summary of Information in the Application. SLRA Section 4.2.8, “Core Shroud Reflood Thermal Shock Analysis,” discusses the analysis for the core shroud. Exelon dispositioned the TLAA in accordance with 10 CFR 54.21(c)(1)(i).

To verify that Exelon provided a basis to support its disposition of the TLAA, the staff audited the TLAA.

Audit Activities. During its audit, the staff interviewed Exelon's staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-TLAABD, Part 1	Time-Limited Aging Analysis (TLAA) Basis Document – Part 1 – TLAA Identification	Revision 0
PB-TLAABD, Part 2	Time-Limited Aging Analysis (TLAA) Basis Document – Part 2 – TLAA Evaluation, Section 4.2.8, Core Shroud Reflood Thermal Shock Analysis	Revision 0

During the audit of the TLAA, the staff verified that Exelon has provided its basis that supports its disposition of 10 CFR 54.21(c)(1)(i).

During the audit of the operating experience associated with the TLAA, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects.

The staff also audited the description of the SLRA Core Shroud Reflood Thermal Shock Analysis provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA TLAA Section 4.2.9, “Core Plate Rim Hold-Down Bolt Loss of Preload Analysis”

Summary of Information in the Application. SLRA Section 4.2.9, “Core Plate Rim Hold-Down Bolt Loss of Preload Analyses,” discusses the applicant's analyses for evaluating loss of preload in the tensioning force used to secure the core plate rim hold-down bolts (CPRH-DBs) used in the core plate assembly designs. Exelon dispositioned these analyses as TLAA and dispositioned the TLAAs in accordance with 10 CFR 54.21(c)(1)(i).

To verify that Exelon provided a basis to support its disposition of the TLAA (henceforth referred to as the CPRH-DB TLAA), the staff audited the TLAAs. The staff will address issues identified but not resolved in this report in the SER.

Audit Activities. During its audit, the staff interviewed Exelon's staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
SLRA Section 4.2.1.2	Reactor Vessel Internals Neutron Fluence Analyses TLAA	Revision 0
SLRA Sections 4.2.9	Core Plate Rim Hold-Down Bolt Loss of	Revision 0

Document	Title	Revision / Date
and A.4.2.9	Preload Analysis	
General Electric Letter (from Brian Frew) to the EPRI BWRVIP (Randy Stark)	Relaxation of Core Plate Rim Hold-down Bolts	June 26, 2006
EPRI Proprietary Report No. 107284	BWR Vessel and Internals Project, BWR Core Plate Inspection and Evaluation Guidelines (BWRVIP-25)	December 1996
NRC Letter and Safety Evaluation	Final Safety Evaluation of BWRVIP Vessel and Internals Project, "BWR Vessel and Internals Project, BWR Core Plate Inspection and Flaw Evaluation Guideline (BWRVIP-25," EPRI Report TR-107284, December 1996 (TAC No. M97802)	Dec. 19, 1999
NRC Letter and Safety Evaluation	Safety Evaluation for Referencing of BWR Vessel and Internals Project, BWR Core Plate Inspection and Flaw Evaluation Guidelines (BWRVIP-25) Report for Compliance with the License Renewal Rule (10 CFR Part 54) and Appendix B, BWR Core Plate Demonstration of Compliance with the Technical Requirements of the License Renewal Rule (10 CFR 54.21)	Dec. 7, 2000
GE Energy Nuclear Correspondence Letter	Relaxation of Core Plate Rim Hold-down Bolts	June 29, 2006
EPRI Proprietary Report No. 3002005594	BWRVIP-25, Revision 1: BWR Vessel and Internals Project, BWR Core Plate Inspection and Evaluation Guidelines ¹	December 1996

Notes: 1. Electric Power Research Institute (EPRI) Proprietary Report 3002005594 (BWRVIP-25, Revision 1) was submitted for staff review and approval in a letter to the NRC document control desk dated September 26, 2016. EPRI's proprietary responses to the requests for additional information (RAIs) issued on the BWRVIP-25, Revision 1, methodology were submitted to the staff October 12, 2018. At the time of the staff's audit of the TLAA, the methodology in the report and the responses to the RAIs on the methodology were still pending approval by the staff.

During the audit of the TLAA, the staff verified that Exelon has provided its basis that supports its disposition of 10 CFR 54.21(1)(i). However, the staff found that sufficient information was not available to complete its review of Exelon's basis for its TLAA disposition. In order to obtain the necessary information, the staff will consider issuing one or more requests for additional information (RAIs). The staff will document its evaluation of any potential RAIs issued on the topic of this TLAA in the SER.

During the audit the staff made the following observations:

- During the staff's review of SLRA Sections 4.2.1.2 and 4.2.9, and information in EPRI Proprietary Report BWRVIP-25, Revision 1, the staff observed that the applicant is basing its 10 CFR 54.21(c)(1)(i) disposition of the TLAA on a comparison to the proprietary CP-RHDB stress relaxation methodology specified in Appendix I of the EPRI BWRVIP-25, Revision 1, report and use of an CP-RHDB fluence value that has been averaged over the entire length of the bolts. The staff noted that the methodology in BWRVIP-25, Revision 1, is currently undergoing a staff review and has yet to receive staff approval or endorsement. Therefore, the staff observed that it may need further justification from the applicant as to why BWRVIP-25, Revision 1, provides an acceptable methodology and basis for projecting the analysis to the end of the subsequent period of extended operation.

During the audit of the operating experience associated with the TLAA, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff did not identify any additional aging effects (i.e., other than loss of preload due to neutron irradiation enhanced creep) that would impact the applicant's TLAA for the core plate rim hold-down bolts.

The staff also audited the description of the SLRA TLAA provided in the UFSAR supplement. The staff will evaluate the adequacy of the UFSAR supplement summary description of the TLAA in the staff's safety evaluation report for the application. This will include the staff evaluation of the applicant's basis for using an average neutron fluence value as the basis for dispositioning the TLAA under 10 CFR 54.21(c)(1)(i), rather than the peak 70 effective full power years (EFPY) fluence value reported for the bolts in SLRA Section 4.2.1.

SLRA TLAA Section 4.2.10, "Jet Pump Slip Joint Repair Clamp Loss of Preload Analysis"

Summary of Information in the Application. SLRA Section 4.2.10, "Jet Pump Slip Joint Repair Clamp Loss of Preload Analysis," discusses the analysis that was performed to assess potential drops in the preloaded tensioning forces of jet pump slip joint repair clamps (JPSJRCs) that were installed in Unit 2 in either 2004, 2008, or 2014. Exelon dispositioned the TLAA (henceforth referred to as the JPSJRC Preload TLAA) in accordance with 10 CFR 54.21(c)(1)(i).

To verify that Exelon provided a basis to support its disposition of the TLAA, the staff audited the TLAA.

Audit Activities. During its audit, the staff interviewed Exelon's staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
SLRA Section 4.2.1.2	Reactor Vessel Internals Neutron Fluence Analyses TLAA	Revision 0
SLRA Sections 4.2.10 and A.4.2.10	Jet Pump Slip Joint Repair Clamp Loss of Preload Analysis	Revision 0
EPRI Proprietary Report No.	BWRVIP-41, Revision 4: BWR Vessel and Internals Project, BWR Jet Pump Assembly Inspection and	Revision 4, September 2014

Document	Title	Revision / Date
3002003093	Evaluation Guidelines (BWRVIP-41)	
NRC Letter (ADAMS ML18130A050)	Transmittal Letter Regarding Final Proprietary Safety Evaluation for Electric Power Research Institute Topical Report BWRVIP-41, Revision 4, "BWR Jet Pump Assembly Inspection and Flaw Evaluation Guidelines (CAC No. MF4887; EPID L-2014-TOP-0008)	June 26, 2018
NRC Proprietary Safety Evaluation (ADAMS ML18129A054; Non-proprietary SE is given in ML18130A024)	Final Proprietary Safety Evaluation for BWRVIP-41, Revision 4, "BWRVIP Jet Pump Assembly Inspection and Flaw Evaluation Guidelines	June 26, 2018
GE Nuclear Energy Proprietary Class III Report No. GENE-0000-0031-1507-01	Jet Pump Slip Joint Clamp Repair, Structural Evaluation, Peach Bottom 2 & 3 and Limerick 1 & 2 Nuclear Power Stations	Revision 0, September 2004
Transware Enterprises Inc. Proprietary Report No. EXL-PB0-002-R-003	Peach Bottom Atomic Power Station Unit 2 Vessel Internal Components Fluence Evaluation Projection to 70 EFPY	Revision 1, March 2018

During the audit of the TLAA, the staff verified that Exelon has provided its basis that supports its disposition of 10 CFR 54.21(c)(1)(i).

During the audit the staff made the following observations:

- The staff reviewed SLRA Sections 4.2.1.2 and 4.2.10. The staff noted that, in SLRA Section 4.2.10, the applicant identifies that the TLAA is only applicable to JPSJRCs (i.e., a total of 11 repair clamps) that were installed in the Unit 2 jet pump assembly in either 2004, 2008, or 2014. The staff verified that the applicant has yet to install any JPSJRCs in the jet pump assembly of Unit 3.
- The staff verified that the applicant's neutron fluence value for the JPSJRCs was calculated using EPRI BWRVIP's RAMA software. The staff's review of the neutron fluence TLAA for reactor internals in SLRA Section 4.2.1.2 will be performed, in part, to confirm whether the application of RAMA software technology is valid for calculating the neutron fluence values for these components at the end of the subsequent period of extended operation (i.e., at 70 EFPY).

During the audit of the operating experience associated with the TLAA, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff did not identify any additional aging effects or mechanisms (i.e., other than loss of preload due to neutron irradiation-enhanced stress relaxation) that would have an impact on the applicant's evaluation of the TLAA.

The staff also audited the description of the SLRA's JPSJRC Preload TLAA provided in the UFSAR supplement. The staff noted that the UFSAR supplement summary description for the TLAA is consistent with the UFSAR supplement criteria provided in the SRP-SLR Section 4.7.2.2 for analyses that qualify as plant-specific TLAAs.

SLRA TLAA Section 4.2.11, "Jet Pump Auxiliary Spring Wedge Loss of Preload Analysis"

Summary of Information in the Application. SLRA Section 4.2.11, "Jet Pump Auxiliary Spring Wedge Loss of Preload Analysis," discusses the analysis that was performed to assess potential drops in the preloaded tensioning forces of jet pump auxiliary spring wedges (JPASWs) that were installed to provide lateral support for specified jet pump mixers whose design was modified to include the spring wedges. Exelon dispositioned the TLAA (henceforth referred to as the JPASW Preload TLAA) in accordance with 10 CFR 54.21(c)(1)(i).

To verify that Exelon provided a basis to support its disposition of the TLAA, the staff audited the TLAA.

Audit Activities. During its audit, the staff interviewed Exelon's staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
SLRA Section 4.2.1.2	Reactor Vessel Internals Neutron Fluence Analyses TLAA	Revision 0
SLRA Sections 4.2.11 and A.4.2.11	Jet Pump Auxiliary Spring Wedge Loss of Preload Analysis	Revision 0
EPRI Proprietary Report No. 3002003093	BWRVIP-41, Revision 4: BWR Vessel and Internals Project, BWR Jet Pump Assembly Inspection and Evaluation Guidelines (BWRVIP-41)	Revision 4, September 2014
NRC Letter (ADAMS ML18130A050)	Transmittal Letter Regarding Final Proprietary Safety Evaluation for Electric Power Research Institute Topical Report BWRVIP-41, Revision 4, "BWR Jet Pump Assembly Inspection and Flaw Evaluation Guidelines (CAC No. MF4887; EPID L-2014-TOP-0008)	June 26, 2018
NRC Proprietary Safety Evaluation (ADAMS ML18129A054; Non-proprietary SE is given in ML18130A024)	Final Proprietary Safety Evaluation for BWRVIP-41, Revision 4, "BWRVIP Jet Pump Assembly Inspection and Flaw Evaluation Guidelines	June 26, 2018
GE Nuclear Energy Proprietary Class III Report No. GENE-B13-02317-00-01	Peach Bottom 2, 3: Jet Pump Auxiliary Spring Wedge Stress Analysis	Revision 0, September 2001
Transware Enterprises Inc.	Peach Bottom Atomic Power Station Unit 2 Vessel Internal Components Fluence Evaluation	Revision 1, March 2018

Document	Title	Revision / Date
Proprietary Report No. EXL-PB0-002- R-003	Projection to 70 EFPY	

During the audit of the TLAA, the staff verified that Exelon has provided its basis that supports its disposition of 10 CFR 54.21(c)(1)(i).

During the audit the staff made the following observations:

- The staff reviewed SLRA Sections 4.2.1.2 and 4.2.11. The staff noted that, in SLRA Section 4.2.11, the applicant identifies that the TLAA is only applicable to the following JPAFWs that were installed and remain in service as part of the inlet mixer assembly of the jet pumps: (a) Unit 2 jet pumps 10, 12, 14, 18, and 19, and (b) Unit 3 jet pumps 14.²
- The staff verified that the applicant's neutron fluence value for the JPASWs was calculated using EPRI BWRVIP's RAMA software. The staff's review of the neutron fluence TLAA for reactor internals in SLRA Section 4.2.1.2 will be performed, in part, to confirm whether the application of RAMA software technology is valid for calculating the neutron fluence values for these components at the end of the subsequent period of extended operation (i.e., at 70 effective full power years EFPY).

During the audit of the operating experience associated with the TLAA, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff did not identify any additional aging effects or mechanisms (i.e., other than loss of preload due to neutron irradiation-enhanced stress relaxation) that would have an impact on the applicant's evaluation of the TLAA.

The staff also audited the description of the SLRA's JASW Preload TLAA provided in the UFSAR supplement. The staff noted that the UFSAR supplement summary description for the TLAA is consistent with the UFSAR supplement criteria provided in the SRP-SLR Section 4.7.2.2 for analyses that qualify as plant-specific TLAAs.

SLRA TLAA Section 4.2.12, "Jet Pump Riser Repair Clamp Loss of Preload Analysis"

Summary of Information in the Application. SLRA Section 4.2.12, "Jet Pump Riser Repair Clamp Loss of Preload Analysis," discusses the analysis that was performed to assess potential drops in the preloaded tensioning forces of jet pump riser repair clamps (JPRRCs) that were installed on the risers of two jet pump assemblies in 1998. Exelon dispositioned the TLAA (henceforth referred to as the JPRRC Preload TLAA) in accordance with 10 CFR 54.21(c)(1)(i). To verify that Exelon provided a basis to support its disposition of the TLAA, the staff audited the TLAA.

Audit Activities. During its audit, the staff interviewed Exelon's staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

² The Unit 2 JPASWs were installed in either 2004, 2006, or replaced in 2014. A JPASW was installed on Unit 2 jet pump 20 in 2006 but removed in 2014. The specified Unit 3 JPASW was installed in year 2001. An additional JPASW was installed on Unit 3 jet pump 09 in 2011, but was removed from the jet pump in 2017.

Relevant Documents Reviewed

Document	Title	Revision / Date
SLRA Section 4.2.1.2	Reactor Vessel Internals Neutron Fluence Analyses TLAA	Revision 0
SLRA Sections 4.2.12 and A.4.2.12	Jet Pump Riser Repair Clamp Loss of Preload Analysis	Revision 0
EPRI Proprietary Report No. 3002003093	BWRVIP-41, Revision 4: BWR Vessel and Internals Project, BWR Jet Pump Assembly Inspection and Evaluation Guidelines (BWRVIP-41)	Revision 4, September 2014
NRC Letter (ADAMS ML18130A050)	Transmittal Letter Regarding Final Proprietary Safety Evaluation for Electric Power Research Institute Topical Report BWRVIP-41, Revision 4, "BWR Jet Pump Assembly Inspection and Flaw Evaluation Guidelines (CAC No. MF4887; EPID L-2014-TOP-0008)	June 26, 2018
NRC Proprietary Safety Evaluation (ADAMS ML18129A054; Non-proprietary SE is given in ML18130A024)	Final Proprietary Safety Evaluation for BWRVIP-41, Revision 4, "BWRVIP Jet Pump Assembly Inspection and Flaw Evaluation Guidelines	June 26, 2018
GE Nuclear Energy Proprietary Class III Report No. GENE-B13-01915-01	PECo Nuclear, Peach Bottom Atomic Power Station Unit 3, Structural Analysis, Jet Pump Riser Structural Enhancement	Revision 0, March 6, 1998
Transware Enterprises Inc. Proprietary Report No. EXL-PB0-002-R-003	Peach Bottom Atomic Power Station Unit 2 Vessel Internal Components Fluence Evaluation Projection to 70 EFPY	Revision 1, March 2018

During the audit of the TLAA, the staff verified that Exelon has provided its basis that supports the disposition of the TLAA in accordance 10 CFR 54.21(c)(1)(i).

During the audit the staff made the following observations:

- The staff reviewed SLRA Sections 4.2.1.2 and 4.2.12. The staff noted that, in SLRA Section 4.2.12, the applicant identifies that the TLAA is only applicable to JPRRCs that were installed on two jet pumps in Unit 3 in 1998 and remain in service: (a) the riser for Unit 3 jet pump pair 01/02, and (b) the riser for jet pump pair 13/14. The staff noted that these JPRRCs were installed to repair and structurally replace specific jet pump riser elbow-to-thermal sleeve welds that are known by the applicant to have applicable defects in them. The staff also noted that, in its TLAA, the applicant reports that these defects were detected as a result of in-service inspections that were performed on the specified jet pump riser welds in 1997.

- The staff verified that the applicant's neutron fluence value for the JPRRCs was calculated using EPRI BWRVIP's RAMA software. The staff's review of the neutron fluence TLAA for reactor internals in SLRA Section 4.2.1.2 will be performed, in part, to confirm whether the application of RAMA software technology is valid for calculating the neutron fluence values for these components at the end of the subsequent period of extended operation (i.e., at 70 effective full power years (EFPY)).

During the audit of the operating experience associated with the TLAA, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff did not identify any additional aging effects or mechanisms (i.e., other than loss of preload due to neutron irradiation-enhanced stress relaxation) that would have an impact on the applicant's evaluation of the TLAA.

The staff also audited the description of the SLRA's JRRC Preload TLAA provided in the UFSAR supplement. The staff noted that the UFSAR supplement summary description for the TLAA is consistent with the UFSAR supplement criteria provided in the SRP-SLR Section 4.7.2.2 for analyses that qualify as plant-specific TLAAs.

SLRA TLAA Section 4.2.13, "Replacement Core Plate Plug Extended Life Irradiation – Enhanced Stress Relaxation"

Summary of Information in the Application. SLRA Section 4.2.13, "Replacement Core Plate Plug Extended Life Irradiation –Enhanced Stress Relaxation," discusses the analyses for the extended life core support plugs. Exelon dispositioned the TLAA in accordance with 10 CFR 54.21(c)(1)(ii). To verify that Exelon provided a basis to support its disposition of the TLAA, the staff audited the TLAA. The staff will address issues identified but not resolved in this report in the SER.

Audit Activities. During its audit, the staff interviewed Exelon's staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
GE-NE-B13-02100-00-02	Stress Analysis for Extended Life Core Support Plugs for Exelon Nuclear Peach Bottom Atomic Power Station Units 2 & 3	Revision 0, June 2001
ER-PB-331-1001	Peach Bottom Reactor Pressure Vessel & Internals Program Basis and Implementation Document	Revision 6
GEH-004N2986	Peach Bottom Core Plate Plug Life Extension to 55 Years	Revision 1, June 07, 2017

During the audit of the TLAA, the staff verified that Exelon has provided its basis that supports its disposition of 10 CFR 54.21(c)(1)(ii). However, the staff found that sufficient information was not available to complete its review of Exelon's basis for its TLAA disposition. In order to obtain the necessary information, the staff will consider issuing an RAI. The staff will document its evaluation of this potential RAI in the SER.

During the audit, the staff made the following observations:

- The staff reviewed GE-NE-B13-02100-00-02 and noted that the document contains a description of the extended life core support plugs and mandrel spring.
- The staff reviewed GEH-004N2986 and noted that the document provides the initial installation pre-load and a reference used to determine the reduction in preload at 55 effective full power years (EFPY).

During the audit of the operating experience associated with the TLAA, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. No significant plant specific operating experience associated with TLAA Section 4.2.13 was noted by the staff during its review.

The staff also audited the description of the SLRA “Replacement Core Plate Plug Extended Life Irradiation – Enhanced Stress Relaxation” TLAA provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the SRP-SLR.

SLRA TLAA Section 4.2.14, “First License Renewal Application Core Shroud IASCC and Embrittlement Analysis”

Summary of Information in the Application. SLRA Section 4.2.14, “First License Renewal Application Core Shroud IASCC and Embrittlement Analysis,” discusses the analyses for the core shroud. Exelon dispositioned the TLAA in accordance with 10 CFR 54.21(c)(1)(iii).

To verify that Exelon provided a basis to support its disposition of the TLAA, the staff audited the TLAA.

Audit Activities. During its audit, the staff reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PBAPS TLAA Technical Report	Peach Bottom Atomic Power Station Units 2 & 3 License Renewal Project, TLAA Technical Report	Revision 1
PB-PBD-AMP-XI.M9	Program Basis Document, BWR Vessel Internals	Revision 1
N/A	Potential TLAA – From Section 4.3.2.2 of First LRA	N/A

During the audit of the TLAA, the staff verified that Exelon has provided its basis that supports its disposition of 10 CFR 54.21(c)(1)(iii).

During the audit of the operating experience associated with the TLAA, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will document its review of relevant operating experience in the SER.

The staff also audited the description of the SLRA “First License Renewal Application Core Shroud IASCC and Embrittlement Analysis” TLAA provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the SRP-SLR.

SLRA TLAA Section 4.2.15, “Unit 3 Core Spray Replacement Piping Bolting Loss of Preload Evaluation”

Summary of Information in the Application. SLRA Section 4.2.15, “Unit 3 Core Spray Replacement Piping Bolting Loss of Preload Evaluation,” discusses the analysis for the Unit 3 Core Spray Replacement Piping Bolting. Exelon dispositioned the TLAA in accordance with 10 CFR 54.21(c)(1)(ii).

To verify that Exelon provided a basis to support its disposition of the TLAA, the staff audited the TLAA.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-TLAABD, Part 1	Time-Limited Aging Analysis (TLAA) Basis Document – Part 1 – TLAA Identification	Revision 0
PB-TLAABD, Part 2	Time-Limited Aging Analysis (TLAA) Basis Document – Part 2 – TLAA Evaluation, Section 4.2.15, Unit 3 Core Spray Replacement Piping Bolting Loss of Preload Evaluation	Revision 0

During the audit of the TLAA, the staff verified that Exelon has provided its basis that supports its disposition of 10 CFR 54.21(c)(1)(ii).

During the audit of the operating experience associated with the TLAA, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects.

The staff also audited the description of the SLRA Unit 3 Core Spray Replacement Piping Bolting Loss of Preload Evaluation provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the GALL-SLR Report.

SLRA TLAA Section 4.3.5, “Environmental Fatigue Analyses for RPV and Class 1 Piping”

Summary of Information in the Application. SLRA Section 4.3.5, “Environmental Fatigue Analyses for RPV and Class 1 Piping,” discusses the environmental fatigue analyses for reactor pressure vessel (RPV) and ASME Code Class 1 piping components. Exelon dispositioned the TLAA in accordance with 10 CFR 54.21(c)(1)(iii).

To verify that Exelon provided a basis to support its disposition of the TLAA, the staff audited the TLAA. The staff will address issues identified but not resolved in this report in the SER.

Audit Activities. During its audit, the staff interviewed Exelon's staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-TLAABD, Part 1	Time-Limited Aging Analysis (TLAA) Basis Document – Part 1 – TLAA Identification	Revision 0
PB-TLAABD, Part 2	Time-Limited Aging Analysis (TLAA) Basis Document – Part 2 – TLAA Evaluation, Section 4.3.5, Environmental Fatigue analysis for RPV and Class 1 Piping	Revision 0
SIR-99-091	Report on System Review and Recommendations or a Transient and Fatigue Monitoring System at Peach Bottom Atomic Power Station	Revision 0
602-S-VC-23	Fatigue Analysis for Limiting Piping Components	Revision 0
1400630.301	60- and 80-Year Fatigue Projections	Revision 1
1400630.302	Peach Bottom Fatigue Usage Assessment	Revision 0
1400630.303	Peach Bottom Environmentally-Assisted Fatigue Screening	Revision 0
ER-AA-470	Fatigue and Transient Monitoring Program	Revision 7
ST-J-080-940-2	Reactor Pressure Vessel Fatigue Monitoring Record	Revision 9
SIR-99-122	Cycle Counting and Cycle-based Fatigue Report for the Transient and Fatigue Monitoring System for Peach Bottom Atomic Power Station Units 2 and 3	Revision 6

During the audit of the TLAA, the staff verified that Exelon has provided its basis that supports its disposition of 10 CFR 54.21(c)(1)(iii). However, the staff found that sufficient information was not available to complete its review of Exelon's basis for its TLAA disposition. In order to obtain the necessary information, the staff will consider issuing RAIs. The staff will document its evaluation of these potential RAIs in the SER.

During the audit of the operating experience associated with the TLAA, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff did not identify any additional aging effects that would have an impact on the Exelon's evaluation of the TLAA.

The staff also audited the description of the SLRA environmental fatigue analyses for RPV and Class 1 piping provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the SRP-SLR.

SLRA TLAA Section 4.3.6.1 “Generic BWR Fatigue Analyses for Various Reactor Vessel Internal Components”

Summary of Information in the Application. SLRA Section 4.3.6.1, “Generic BWR Fatigue Analyses for Various Reactor Vessel Internal Components,” discusses the generic BWR fatigue analyses for reactor vessel internals. Exelon dispositioned the TLAA in accordance with 10 CFR 54.21(c)(1)(ii). To verify that Exelon provided a basis to support its disposition of the TLAA, the staff audited the TLAA. The staff will address issues identified but not resolved in this report in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-TLAABD, Part 1	Time-Limited Aging Analysis (TLAA) Basis Document – Part 1 – TLAA Identification	Revision 0
PB-TLAABD, Part 2	Time-Limited Aging Analysis (TLAA) Basis Document – Part 2 – TLAA Evaluation, Section 4.3.6.1, Generic BWR Fatigue Analyses for Various Reactor Vessel Internal Components	Revision 0
NEDC-33566P	GE Hitachi Nuclear Energy Safety Analysis Report for Exelon Peach Bottom Atomic Power Station Units 2 and 3 Constant Pressure Power Uprate	Revision 0
NEDC-33873P	GE Hitachi Nuclear Energy Safety Analysis Report for Peach Bottom Atomic Power Station Units 2 and 3 Thermal Power Optimization	Revision 0

During the audit of the TLAA, the staff verified that Exelon has provided its basis that supports its disposition of 10 CFR 54.21(c)(1)(ii). However, the staff found that sufficient information was not available to complete its review of Exelon’s basis for its TLAA disposition. In order to obtain the necessary information, the staff will consider issuing an RAI. The staff will document its evaluation of this potential RAI in the SER.

During the audit of the operating experience associated with the TLAA, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff did not identify any additional aging effects that would have an impact on the Exelon’s evaluation of the TLAA.

The staff also audited the description of the SLRA generic BWR fatigue analyses for various reactor vessel internal components provided in the UFSAR supplement. The staff verified this description is consistent with the guidance in the SRP-SLR.

SLRA TLAA Section 4.3.6.2, “Generic BWR Fatigue Analyses for the Core Shroud”

Summary of Information in the Application. SLRA Section 4.3.6.2, “Generic BWR Fatigue Analyses for the Core Shroud,” discusses the generic BWR fatigue analyses for the core shroud. Exelon dispositioned the TLAA in accordance with 10 CFR 54.21(c)(1)(i). To verify that Exelon provided a basis to support its disposition of the TLAA, the staff audited the TLAA.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-TLAABD, Part 1	Time-Limited Aging Analysis (TLAA) Basis Document - Part 1 - TLAA Identification	Revision 0
PB-TLAABD, Part 2	Time-Limited Aging Analysis (TLAA) Basis Document - Part 2 - TLAA Evaluation, Section 4.3.6.2, Generic BWR Fatigue Analyses for the Core Shroud	Revision 0
NEDC-33566P	GE Hitachi Safety Analysis Report for Exelon Peach Bottom Atomic Power Station Units 2 and 3 Constant Pressure Power Uprate	Revision 0
NEDC-33873P	GE Hitachi Safety Analysis Report for Peach Bottom Atomic Power Station Units 2 and 3 Thermal Power Optimization	Revision 0
004N2968	GE Hitachi Report on Peach Bottom Atomic Power Station Units 2 and 3 Shroud Fatigue Information	Revision 1

During the audit of the TLAA, the staff verified that Exelon has provided its basis that supports its disposition of 10 CFR 54.21(c)(1)(i).

During the audit of the operating experience associated with the TLAA, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff did not identify any additional aging effects that would have an impact on the Exelon’s evaluation of the TLAA.

The staff also audited the description of the SLRA generic BWR fatigue analyses for the core shroud provided in the UFSAR supplement. The staff verified this description is consistent with the guidance in the SRP-SLR.

SLRA TLAA Section 4.3.6.3, “Core Shroud Support Fatigue Analysis Reevaluation”

Summary of Information in the Application. SLRA Section 4.3.6.3, “Core Shroud Support Fatigue Analysis Reevaluation,” discusses the fatigue analysis for the core shroud support. Exelon dispositioned the TLAA in accordance with 10 CFR 54.21(c)(1)(iii). To verify that Exelon provided a basis to support its disposition of the TLAA, the staff audited the TLAA. The staff will address issues identified but not resolved in this report in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-TLAABD, Part 1	Time-Limited Aging Analysis (TLAA) Basis Document - Part 1 - TLAA Identification	Revision 0
PB-TLAABD, Part 2	Time-Limited Aging Analysis (TLAA) Basis Document - Part 2 - TLAA Evaluation, Section 4.3.6.3, Core Shroud Support Fatigue Analysis Reevaluation	Revision 0
SIR-98-030	Thermal Events at Peach Bottom Atomic Power Station	4/3/1998
NEDC-33566P	GE Hitachi Safety Analysis Report for Exelon Peach Bottom Atomic Power Station Units 2 and 3 Constant Pressure Power Uprate	Revision 0
NEDC-33873P	GE Hitachi Safety Analysis Report for Peach Bottom Atomic Power Station Units 2 and 3 Thermal Power Optimization	Revision 0
1400630.303	Peach Bottom Environmentally-Assisted Fatigue Screening	Revision 0

During the audit of the TLAA, the staff verified that Exelon has provided its basis that supports its disposition of 10 CFR 54.21(c)(1)(iii). However, the staff found that sufficient information was not available to complete its review of Exelon’s basis for its TLAA disposition. In order to obtain the necessary information, the staff will consider issuing RAls. The staff will document its evaluation of the potential RAls in the SER.

During the audit of the operating experience associated with the TLAA, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff did not identify any additional aging effects that would have an impact on the Exelon’s evaluation of the TLAA.

The staff also audited the description of the SLRA fatigue analysis for the core shroud support provided in the UFSAR supplement. The staff verified this description is consistent with the guidance in the SRP-SLR.

SLRA TLAA Section 4.3.6.5, “Replacement Steam Dryer Stress Report and Fatigue Evaluation”

Summary of Information in the Application. SLRA Section 4.3.6.5 discusses Exelon’s TLAA for the fatigue analysis of the replacement reactor pressure vessel steam dryer. Exelon stated that the steam dryer at each Peach Bottom unit was replaced to support the extended power uprate (EPU) operation. Exelon stated that the replacement steam dryer was evaluated under the EPU condition in 2014 to ensure compliance with the structural design requirements of the 2007 Edition and 2008 Addenda of the ASME Code, Section III, Subsection NG. Exelon noted that, because the evaluation resulted in a calculated cumulative usage factor (CUF) value based on a specified number of design cycles and the number of cycles assumed for design transients over license term, this calculated CUF is considered as TLAA and that the re-evaluation is required for the subsequent period of extended operation. Exelon dispositioned this TLAA in accordance with 10 CFR 54.21(c)(1)(i). To verify that Exelon provided a basis to support its disposition of the TLAA, the staff audited the TLAA.

Audit Activities. During its audit, the staff reviewed onsite documentation provided by Exelon. The table below lists the documents that were reviewed by the staff and were found relevant to the audit.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-TLAABD, Part 1	TLAA Basis Document – Part 1 – TLAA Identification	Revision 0 / September 2017
PB-TLAABD, Part 2	TLAA Basis Document – Part 2 – TLAA Evaluation, Section 4.3.6.5, Replacement Steam Dryer Stress Report and Fatigue Evaluation	Revision 0
Package ADAMS Accession No. ML122860201	License Amendment Request (LAR) - Extended Power Uprate (EPU) for Peach Bottom, Units 2 and 3	09/28/2012
EPRI Report No. 3002010541	BWRVIP-139, Revision 1-A: BWR Vessel and Internals Project, Steam Dryer Inspection and Flaw Evaluation Guidelines	11/2017

During the audit of the TLAA, the staff verified that Exelon has provided its basis that supports its disposition of 10 CFR 54.21(c)(1)(i).

During the audit, the staff made the following observations:

- The staff reviewed the TLAA basis document including the LAR document associated with both the EPU operation and the steam dryers’ replacement activity at Peach

Bottom. The staff noted that the replacement steam dryers were evaluated for compliance with the structural design requirements of the ASME Code, Section NG, under the EPU condition. The staff verified that the CUF calculated using the assumed transient cycles met the ASME Code limit. The staff noted that, consistent with the acceptance criteria defined in Section 4.3.2.1.1.1 of SRP-SLR and the review procedures defined in Section 4.3.3.1.1.1 of the SRP-SLR, this provides sufficient demonstration that the TLAA is acceptable in accordance with the acceptance criterion defined in 10 CFR 54.21(c)(1)(i). This staff determination will be reflected in the staff's safety evaluation report for the Peach Bottom SLRA.

During the audit of the operating experience associated with the TLAA, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff did not identify any additional aging effects that would have an impact on the Exelon's evaluation of the TLAA.

The staff also audited the description of the SLRA Replacement Steam Dryer Stress Report and Fatigue Evaluation provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the SRP-SLR for TLAAs.

SLRA TLAA Section 4.4, "Environmental Qualification of Electric Equipment"

Summary of Information in the Application. SLRA Section 4.4, "Environmental Qualification of Electric Equipment," discusses the thermal, radiation, and cyclical analyses for plant electrical and I&C components. Exelon dispositioned the TLAAs in accordance with 10 CFR 54.21(c)(1)(iii). To verify that Exelon provided a basis to support its disposition of the TLAA, the staff audited the TLAA.

Audit Activities. During its audit, the staff interviewed Exelon's staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-PBD-AMP-X.E1	Environmental Qualification of Electric Equipment – Program Basis Document	Rev. 1
AR 4106712-09	Aging Management Program (AMP) Effectiveness Review - Peach Bottom Environmental Qualification Activities AMP	Rev. 1
CC-AA-203	Environmental Qualification Program	Rev.1
EQ-PB-011	Environmental Qualification - Okonite 600 V Power & Control Cable and 5 kV Power Cable	Rev. 1
EQ-PB-016	Environmental Qualification - Brand Rex Cable	Rev. 1
PB-TLAABD	Peach Bottom Atomic Power Station Units 2 and 3 License Renewal Project – TLAA Basis Document – Part 2 – TLAA Evaluation	Rev. 0

During the audit of the TLAA, the staff verified that Exelon has provided its basis that supports its disposition of 10 CFR 54.21(c)(1)(iii).

During the audit of the operating experience associated with the TLAA, the staff independently searched the plant specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA TLAA, “Environmental Qualification of Electric Equipment,” provided in the UFSAR Supplement A.4.4.1. The staff verified this description is consistent with the description provided in the SRP-SLR for TLAAs.

SLRA TLAA Subsection 4.6.1, “Primary Containment Structures, Penetrations, and Associated Components with Fatigue Analyses”

Summary of Information in the Application. SLRA Section 4.6, “Primary Containment Fatigue Analyses” and Subsection 4.6.1, “Primary Containment Structures, Penetrations, and Associated Components with Fatigue Analyses” discuss the analyses for the Peach Bottom Atomic Power Station (PBAPS) Units 2 and 3 Torus Shell, Torus Penetrations, Torus Vents, Safety Relief Valve (SRV) Discharge Piping, Other Piping Attached to the Torus, Drywell-to-Torus Vent Bellows, Replacement RHR and Core Spray Suction Strainers. Exelon dispositioned the TLAAs in accordance with 10 CFR 54.21(c)(1)(iii). To verify that Exelon provided a basis to support its disposition of the TLAA, the staff audited the TLAA. The staff will address issues identified but not resolved in this report in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-TLAABD, Part 1	PBAPS Time-Limited Aging Analysis (TLAA) Basis Document – Part 1 - TLAA Identification	Revision 0
PB-TLAABD, Part 2	PBAPS TLAA Basis Document – Part 2 - TLAA Evaluation SLRA Section 4.6, Primary Containment Fatigue Analyses	Revision 0
PBAPS SLRA	Section 4.6.1, Primary Containment Structures, Penetrations and Associated components with fatigue Analyses	Revision 0
PBAPS SLRA	Section B.3.1.1, Fatigue Monitoring	Revision 0
PBAPS SLRA	Section 3.5.2.2.1.5, Cumulative Fatigue Damage	Revision 0
PBAPS SLRA	Sections 3.5.2.2.1.3, Loss of Material Due to General, Pitting and Crevice Corrosion	Revision 0
PBAPS SLRA	Section B.2.1.30, ASME Section XI, Subsection IWE	Revision 0

Document	Title	Revision / Date
PBAPS UFSAR	Appendix Q.5.4.1, "Fatigue Analyses of Containment Pressure Boundaries: Analysis of Tori, Torus Vents, and Torus Penetrations	Revision 26
EXLNPB113-REPT-001	Review of Containment Fatigue Analyses for Peach Bottom Second License Renewal	Revision 0
Addendum 2 to Revision 1 to Spec No. NE-265	Nuclear Safety Related Specifications for ECCS Suction Strainers for the Limerick Generating Station Units 1 and 2 and Peach Bottom Atomic Power Station Units 2 and 3	February 1998
PM-1006	RHR Strainer Supports	Revision 2
PM-1004	Core Spray Strainer Supports	Revision 2
10104-22-0	Sargent and Lundy Design Report, Unit 2 ECCS Pump Suction Strainer – Ring Girder Stiffeners	December 1998
10104-22-01	Sargent and Lundy Design Report "ECCS Pump Suction Strainer Ring Girder	May 1998
PBM-040	CSC (Containment Suppression Chamber) Modification – Fatigue Evaluation of Torus	Revision 2
PBM-024	Fatigue Evaluation for Vent System for LOCA	December 1998
P-1-Q-614	Mark I Long-Term Program Plant Unique Analyses	Revision 1A and Revisions 0, 1, 2
MISC-ME-DR-040	PBAPS ECCS Suction Strainer Assemblies	Revision 5

During the audit of the TLAA, the staff verified that Exelon has provided its basis that supports disposition in accordance with 10 CFR 54.21(c)(1)(i), (ii), or (iii). However, the staff found that sufficient information was not available to complete its review of Exelon's basis for its TLAA disposition. In order to obtain the necessary information, the staff will use the voluntary SLRA supplement information committed to by Exelon during the audit or consider issuing RAIs. The staff will document its evaluation of the supplement and potential RAI(s) in the SER.

During the audit, the staff made the following observations:

- The staff reviewed PBAPS EXLNPB113-REPT-001, "Review of Containment Fatigue Analyses for Peach Bottom Second License Renewal," a document relevant to Section 4.6 of the PBAPS SLRA, and noted that it states that generic fatigue evaluations/waivers may be considered for the Torus Electrical Penetration Assemblies, Drywell Shell, and Drywell Head. The staff also reviewed PBAPS SLRA PB-TLAABD, Part 2, and noted that it references ASME Section III, Subsections A and B, 1965, which in its Subsection N-415.1 states that an analysis for cyclic operation is not required if specific operation conditions are met (e.g., the number of cycles related to the cycling of vessel pressure from atmospheric to

operating, the number of specified significant pressure fluctuations, temperature difference between any two points during normal, startup, and shutdown operations, etc.). The staff could not locate any applicable waivers for fatigue parameter evaluations for the noted plant operating conditions as discussed in PBAPS EXLNPB113-REPT-001. It is not clear how PBAPS would meet the evaluations of those activities for waiver of fatigue for Torus Electrical Penetration Assemblies, Drywell Shell, Drywell Head, or any other primary containment structure, penetration, and associated component subject to fatigue waiver conditions.

- The staff reviewed PBAPS SLRA Section 4.6.1 and noted that it states that two monitored locations (i.e., Torus (CS)/Torus Shell and Torus Penetrations (CS)/Torus Shell) are bounding the design CUFs. For the “SRV Discharge Piping” and “Other Piping Attached to the Torus,” with CUF 0.202 and the “Replacement RHR” and various subcomponents of “Core Spray Suction Strainers,” 0.193 and 0.367, Section 4.6.1 of the SLRA disposes these as 10 CFR 54.21(c)(1)(iii). The staff also reviewed Appendix Q.5.4.1, “Fatigue Analyses of Containment Pressure Boundaries: Analysis of Tori, Torus Vents, and Torus Penetrations,” Revision 26 of the UFSAR, which states that locations of low usage factor (< 0.4) are disposed per 10 CFR 54.21(c)(1)(i). It is unclear why these low CUF locations, disposed in the SLRA in accordance with 10 CFR 54.21(c)(1)(iii), are inconsistent with Appendix Q.5.4.1 of the UFSAR. It is also unclear how the two identified monitoring locations could adequately assess the number and severity of loading cycles from thermal, pressure, and seismic transients for the “SRV Discharge Piping” and “Other Piping Attached to the Torus” and “Replacement RHR” and various components of “Core Spray Suction Strainers” during the SPEO.

During the audit of the operating experience associated with the TLAA, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER. The staff will use the voluntary SLRA supplement information committed to by Exelon during the audit or consider issuing RAI(s) in order to obtain the information necessary to determine whether Exelon’s SLRA TLAA Section 4.6, “Primary Containment Fatigue Analyses,” and SLRA TLAA Subsection 4.6.1, “Primary Containment Structures, Penetrations, and Associated Components with Fatigue Analyses,” can be adequate to manage the associated aging effects. The staff will document its evaluation of the supplement and potential RAI(s) in the SER.

During the audit, the staff made the following observations:

- The staff reviewed Section 4.6 and Subsection 4.6.1 of the PBAPS SLRA and noted that the bounding design CUFs for PBAPS Torus Shell and Penetrations are 0.942 and 0.992 respectively. Table 4.3.1-3 of the SLRA assigns CUF values of 0.862 and 0.591 respectively for the two monitored locations. Section 4.3.1, “Transient Cycle and Cumulative Usage Projections for 80 Years,” of the SLRA, however, states that PBAPS has experienced a declining trend in transient accumulation over time, and the trend provides an accurate basis for future transient projections where each transient was evaluated to determine if the recent 15-year trend had a consistent cycle accumulation rate. It is not clear whether PBAPS used the 15-year declining rate for most transients to extrapolate the projected number of future occurrences beginning January 1, 2016, and ending at the end of the units’ 80-year life, and that then resulted in CUF reductions of 15 and 40 percent, respectively. In addition, Sections 3.5.2.2.1.3, “Loss of Material Due to General, Pitting and Crevice Corrosion,” and B.2.1.30, “ASME Section XI, Subsection IWE,” discuss an underwater examination that identified a local area of pitting/general corrosion with 0.126

inches of metal loss of the nominal 0.675-inch-thick torus shell plate. It is not clear whether loss of material (corrosion fatigue) was considered in the projected CUF evaluations for the selected location, and, if it occurs, what measures PBAPS plans to take for loss of material that potentially could reduce the fatigue life of affected components.

The staff also audited the description of the SLRA TLAA Section 4.6, "Primary Containment Fatigue Analyses," and Subsections 4.6.1 "Primary Containment Structures, Penetrations, and Associated Components with Fatigue Analyses," provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the SRP-SLR.

SLRA TLAA Subsection 4.6.2, "Containment Process Line Penetration Bellows"

Summary of Information in the Application. SLRA Section 4.6, "Primary Containment Fatigue Analyses," Subsection 4.6.2, "Containment Process Line Penetration Bellows" discusses the analyses for the PBAPS Units 2 and 3 containment penetration bellows. Exelon dispositioned the TLAAs in accordance with 10 CFR 54.21(c)(1)(i). To verify that Exelon provided a basis to support its disposition of the TLAA, the staff audited the TLAA. The staff will address issues identified but not resolved in this report in the SER.

Audit Activities. During its audit, the staff interviewed Exelon's staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-TLAABD, Part 1	PBAPS, Time-Limited Aging Analysis (TLAA) Basis Document - Part 1 - TLAA Identification	Revision 0
PB-TLAABD, Part 2	PBAPS TLAA Basis Document Basis Document - Part 2 - TLAA Evaluation SLRA Section 4.6, Primary Containment Fatigue Analyses	Revision 0
PBAPS SLRA	Section 4.6.2, Containment Process Line Penetration Bellows	Revision 0
PBAPS UFSAR	Appendix M, Containment Report	Revision 26
EXLNPB113-REPT-001	Review of Containment Fatigue Analyses for Peach Bottom Second License Renewal	Revision 0
1400630.301	PBAPS Second License Renewal (SLR), 60 and 80 year Cycle and fatigue Projections, Structural Integrity, Associates, Inc.	Revision 1
Design Specification 1187-P-314(Q)	Design Specification for Replacement Containment Expansion Joints for Nuclear Service for the PBAPS	Revision 6

Document	Title	Revision / Date
Specs 6280-M-122	Specification for Containment Expansion Joints for the PBAPS	Revision 5

During the audit of the TLAA, the staff verified that Exelon has provided its basis that supports disposition in accordance with 10 CFR 54.21(c)(1)(i), (ii), or (iii). However, the staff found that sufficient information was not available to complete its review of Exelon's basis for its TLAA disposition. In order to obtain the necessary information, the staff will use the voluntary SLRA supplement information committed to by Exelon during the audit or consider issuing RAI(s). The staff will document its evaluation of the supplement and potential RAI(s) in the SER.

- During the audit, the staff noted that Section 4.6, Subsection 4.6.2, of the PBAPS SLRA states that "[t]he design specification for the original bellows specified 200 'startup-shutdown' cycles (as defined in [ASME Code] Section III) and a minimum of 1,500 'normal operating' cycles (as defined in [ASME Code] Section III)." It also states that the Unit 3 RHR supply and return line penetration bellows were replaced during 1988 and 1989; however, "[t]he design specification for the [Unit 3] replacement penetration bellows specified 1,500 normal operating cycles" but did not specify 200 startup-shutdown cycles. In addition, it states that over an 80-year period Units 2 and 3 are projected to experience 186 and 140 "Heatup-Cooldown" transient cycles, respectively, "which are less than the specified 200 startup-shutdown transient cycles for the original containment bellows." It also states that for "both the original and replaced containment bellows, the specified 1500 'normal operating cycles' associated with a DBA is significantly greater than an assumed one DBA per unit." The section then concludes by stating that the "primary containment process line bellows fatigue analyses remain valid through the second period of extended operation" and dispositions these TLAAs per 10 CFR 54.21(c)(1)(i).
- The audited PB-TLAABD, Part 2, references "Specification 6280-M-122, Specification for Containment Expansion Joints for the Peach Bottom Atomic Power Station Units 2 and 3," dated January 6, 1969, and "Design Specification for Replacement Containment Expansion Joints for Nuclear Service," dated September 2, 1987, confirm PBAPS SLRA Section 4.6.2 statements for cyclic loading of bellows. The "Design Specification for Replacement Containment Expansion Joints for Nuclear Service," however, states the "effects of relative end point displacement[s] resulting from thermal and seismic movements shall be considered in the fatigue evaluation" of the bellows. It is not clear whether the applicant replaced the bellows assemblies at both units, or just at Unit 3. If only bellows at Unit 3 were replaced, it is not clear whether their design satisfies the design basis cyclic loading of anticipated severities and number of cycles. It is also not clear how "relative end point displacement[s] resulting from thermal [...] movements" would account for startup-shutdown cyclic loadings required in the original design consistent with ASME code Section III, Paragraph N-412 (n)(1) and (n)(3), noted in Specification 6280-M-122. In addition, it is not clear how PBAPS equivalences the severities and the numbers of cycles associates with DBAs to those of normal cycles of operation.

During the audit of the operating experience associated with the TLAA, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER.

The staff also audited the description of the SLRA TLAA Section 4.6, “Primary Containment Fatigue Analyses,” Subsection 4.6.2, “Containment Process Line Penetration Bellows,” provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the SRP-SLR.

TLAA Section 4.7.1, “Crane Cyclic Loading Analyses”

Summary of Information in the Application. SLRA Section 4.7.1, “Crane Cyclic Loading Analyses,” discusses the analyses for the following cranes:

- reactor building cranes
- emergency diesel generator bridge cranes
- turbine building cranes
- circulating water pump structure cranes

Exelon dispositioned the TLAAs in accordance with 10 CFR 54.21(c)(1)(i). To verify that Exelon provided a basis to support its disposition of the TLAA, the staff audited the TLAA. The staff will address issues identified but not resolved in this report in the SER.

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-TLAABD	TLAA Basis Document – Part 1 –TLAA Identification	Revision 0
PB-TLAABD	TLAA Basis Document – Part 2 –TLAA Identification	Revision 0
Specification 6280-M-13B	Specification for Reactor Building Cranes for PBAPS	Revision 1
Specification 6280-M-13A	Specification for Turbine Building Cranes for PBAPS	Revision 2
MA-PB-763-415	High Pressure Turbine Disassemble and Inspection	Revision 4
ANSI B30.2	Overhead and Gantry Cranes	1976
MA-PB-716-021	Rigging and Handling of Heavy Loads	Revision 0
Specification 6280-M-25	Specification for Miscellaneous Bridge and Jib Cranes for PBAPS Units 2 and 3	Revision 2
Specification 6280-M-24A	Intake Structure Crane for PBAPS Units 2 and 3	Revision 1
NUREG-1769	Safety Evaluation Report Related to the License Renewal of Peach Bottom Atomic Power Station, Units 2 and 3	March 2003
PBAPS UFSAR	Updated Final Safety Analysis Report	Revision 26
CMAA-70	Specification for Electric Overhead Traveling Cranes	1975

Document	Title	Revision / Date
CMAA-70	Specification for Top Running Bridge and Gantry Type Multiple Girder Electric Overhead Traveling Cranes	1999

During the audit of the TLAA, the staff verified that Exelon has provided its basis that supports its disposition of 10 CFR 54.21(c)(1)(i). However, the staff found that sufficient information was not available to complete its review of Exelon's basis for its TLAA disposition. In order to obtain the necessary information, the staff will consider issuing an RAI. The staff will document its evaluation of this potential RAI in the SER.

During the audit, the staff made the following observation:

- The staff reviewed the SRP-SLR Sections 4.7.1 and Table 4.7.1-2 and noted that, for the turbine building cranes, the number of cycles projected for 80 years of operation is 7,340 cycles. The staff reviewed table 4.7.1-2 and added the listed expected number of lifts over 80 years for each load, and it noted that the total number of lift cycles may be 1,140 instead of 7,340. The staff will consider issuing an RAI in order to obtain the information necessary to verify the correct number of total lift cycles for the turbine building cranes.

During the audit of the operating experience associated with the TLAA, the staff independently searched the plant-specific database to identify any previously unknown or recurring aging effects. The staff will evaluate the identified plant-specific operating experience in the SER. The staff also audited the description of the crane cyclic loading TLAAs provided in the UFSAR supplement. The staff verified this description is consistent with the description provided in the SRP-SLR.

SLRA TLAA 4.7.4, “Fracture Mechanics Analysis of ISI Reportable Indications For Group I Piping: As Forged Laminar Tear in a Unit 3 Main Steam Elbow Near Weld 1-B-3BC-LDO Discovered During Preservice UT”

Summary of Information in the Application. SLRA Section TLAA 4.7.4 describes the Fracture Mechanics Analysis of ISI-Reportable Indications for Group I Piping: As-Forged Laminar Tear in a Unit 3 Main Steam Elbow Near Weld 1-B-3BC-LDO Discovered During Preservice UT. The staff did not perform an in-house audit of this TLAA because the applicant's basis in SLRA Section 4.7.4 for dispositioning the TLAA in accordance with 10 CFR 54.21(c)(1)(ii) was sufficient for the staff's review without the need for an audit of background information on the TLAA basis.

SLRA TLAA 4.7.5, “Unit 3 Core Spray Replacement Piping Fatigue and Leakage Assessment”

Summary of Information in the Application. SLRA Section TLAA 4.7.5 describes the Unit 3 Core Spray Replacement Piping Fatigue and Leakage Assessment. The staff did not perform an in-house audit of this TLAA because the applicant's basis in SLRA Section 4.7.5 for dispositioning the TLAA in accordance with 10 CFR 54.21(c)(1)(i) was sufficient for the staff's review without the need for an audit of background information on the TLAA basis.

2.3 Further Evaluations

SLRA AMR Further Evaluation 3.5.2.2.2.6, “Reduction of Strength and Mechanical Properties of Concrete Due to Irradiation”

Summary of Information in the Application. During the audit, the staff reviewed plant documentation associated with the following:

- SLRA Section 3.5.2.2.2.6 (AMR 3.5.1-097) addresses the further evaluation for the aging effect of reduction of strength and mechanical properties of concrete due to irradiation.

The table below lists the documents that were reviewed by the staff and were found relevant to the review of this item. These documents were provided by Exelon.

Relevant Documents Reviewed

Document	Title	Revision / Date
PBAPS UFSAR	Updated Final Safety Analysis Report	Revision 26
EPRI Report 3002002676	Expected Condition of Reactor Cavity Concrete after 80 Years of Radiation Exposure	February 2014
EPRI Report 3002008128	Structural Disposition of Neutron Radiation Exposure in BWR Vessel Support Pedestals	July 2016
PM-0832	Radiation Through Bioshield Wall and Streaming Through Penetrations	February 24, 2015
Drawing S-191	Reactor Pedestal and Sacrificial Shield Development Unit 2	Revision 16
Drawing S-192	Reactor Pedestal and Sacrificial Shield Section Unit 2	Revision 14
Drawing S-199	Drywell Interior Platforms Plan Elevation 13'-0" & 154'-9"	Revision 25
EPRI Report 3002014882	An Assessment of the Integrity of BWR Vessel Structural Steel Supports for Long-Term Operations	December 2018

During the audit, the staff made the following observations:

The staff reviewed PBAPS UFSAR Section C.4.6, and noted that it states the following:

- The sacrificial shield was designed without considering the concrete for any structural purpose, except the lower 10 ft. of the wall. The forces considered were: seismic forces, pipe loading, pipe restraints, platform loads, and jet load reaction. The 27-in thick cylindrical structure consists of 12 steel columns equally spaced and continually tied by a 1/4-in thick steel plate on the inside and outside of the columns.

The staff notes that steel components near the reactor pressure vessel (RPV) could be subject to the aging effect of loss of fracture toughness due to embrittlement caused by radiation. Based on the information in the UFSAR stated above, a review of site drawings S-191, S-192, and S-199 and interviews with Exelon’s personnel, the staff noted that there are several steel

components, such as steel columns, steel plates, and RPV lateral restraints that are part of the shield wall structure. The staff notes that these structural steel components may be subject to the aging effect of loss of fracture toughness due to radiation embrittlement; however, the SLRA does not address this aging effect for these components. The staff may need additional information regarding the susceptibility of these components to this aging effect. During a teleconference on January 22, 2019, the applicant stated that it would supplement the SLRA to address this aging effect. The staff's review of the SLRA supplement will be documented in SER Section 3.5.2.2.2.6.

SLRA AMR Further Evaluation 3.6.2.2.3, “Loss of Material Due to Wind-Induced Abrasion, Loss of Conductor Strength Due to Corrosion, and Increased Resistance of Connection Due to Oxidation or Loss of Preload for Transmission Conductors, Switchyard Bus, and Connections”

Summary of Information in the Application. During the audit, the staff reviewed plant documentation associated with the following:

- SLRA Table 3.6.2 item corresponding to SLRA Table 3.6.1-004, “transmission conductors” composed of aluminum, and steel exposed to air-outdoor
- SLRA Table 3.6.2 item corresponding to SLRA Table 3.6.1-005, “transmission connectors” composed of aluminum, and steel exposed to air-outdoor
- SLRA Table 3.6.2 item corresponding to SLRA Table 3.6.1-006, “switchyard bus and connections” composed of aluminum, copper, bronze, stainless steel, and galvanized steel exposed to air-outdoor
- SLRA Table 3.6.2 item corresponding to SLRA Table 3.6.1-007, “transmission conductors” composed of aluminum, and steel exposed to air-outdoor

Audit Activities. During its audit, the staff interviewed Exelon's staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
N/A	Peach Bottom Atomic Power Station, Units 2 and 3 Screening Report – Electrical Commodities	Revision 1
R1272069	Recurring Task Work Order – Perform Thermography on Start Up	22/09/2015
PB-AMRBD-MEAE	Peach Bottom Atomic Power Station, Units 2 and 3 – Materials, Environments, and Aging Effects Aging Management Review Basis Document	Revision 2
6280 E-1	Single Line Diagram	Revision 57
EPP-4036	PECO Substation Rigid Bus	04/15/2009
EPP-2030	Engineering Practice –Overhead Transmission Line Weather and Mechanical Design Conditions	11/09/2004

The staff reviewed Exelon's further evaluation 3.6.2.2.3, “Transmission Conductors, Switchyard Bus, and Connections.” This input will be used in SER Section 3.6.2.2.3

SLRA AMR Further Evaluation 3.6.2.3.2, “High-Voltage Electrical Insulators”

Summary of Information in the Application. During the audit, the staff reviewed plant documentation associated with the following:

- SLRA Table 3.6.2, item corresponding to SLRA Table 3.6.1-002, “high-voltage electrical insulators” composed of porcelain, malleable iron, aluminum, galvanized steel, and cement exposed to air-outdoor
- SLRA Table 3.6.2, item corresponding to SLRA Table 3.6.1-003, “high-voltage electrical insulators” composed of porcelain, malleable iron, aluminum, galvanized steel, and cement exposed to air-outdoor

Audit Activities. During its audit, the staff interviewed Exelon’s staff and reviewed documentation provided by Exelon. The staff reviewed the following relevant documents.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-AMRBD-MEAE	Peach Bottom Atomic Power Station, Units 2 and 3 – Materials, Environments, and Aging Effects Aging Management Review Basis Document	Revision 2
6280 E-1	Single Line Diagram	Revision 57
N/A	Peach Bottom Atomic Power Station, Units 2 and 3 Screening Report – Electrical Commodities	Revision 1
R1272069	Recurring Task Work Order – Perform Thermography on Start Up	22/09/2015

During the audit, the staff made the following observation:

- The staff reviewed Exelon’s further evaluation 3.6.2.3.2 – High-Voltage Electrical Insulators and noted that SLRA concluded that no AMP is required for these components. During a breakout session with Exelon, the staff discussed the operating experience as well as predictive maintenance performed at Peach Bottom. Exelon subsequently revised the SLRA and added additional discussions for the technical basis of the conclusion. This input will be used in SER Section 3.6.2.3.2.

2.4 Scoping and Screening Methodology and Results

The following SLRA Sections were audited:

- 2.1 “Scoping and Screening Methodology
- 2.3 “Scoping and Screening Results: Mechanical
- 2.4 “Scoping and Screening Results: Structures
- 2.5 “Scoping and Screening Results: Electrical

Summary of Information in the Application. The SLRA Section 2.1 “Scoping and Screening Methodology” states in part:

The initial step in the scoping process was to define the entire plant in terms of systems and structures. Each of these systems and structures were evaluated

against the scoping criteria in 10 CFR 54.4(a)(1), (a)(2), and (a)(3), to determine if the system or structure performs or supports a safety-related intended function, if system or structure failure could prevent the satisfactory accomplishment of a safety-related function, or if the system or structure performs functions that demonstrate compliance with the requirement of one of the five second license renewal regulated events. The intended function(s) that are the bases for including systems and structures within the scope of second license renewal were also identified.

A mechanical system was included within the scope of second license renewal if any portion of the system met the scoping criteria of 10 CFR 54.4.

A structure was included within the scope of second license renewal if any portion of the structure met the scoping criteria of 10 CFR 54.4. Structures were then further evaluated to determine those structural components that are required to perform or support the identified structure intended function(s).

Electrical and Instrumentation and Control (I&C) systems were scoped like mechanical systems and structures per the scoping criteria in 10 CFR 54.4(a)(1), (a)(2), and (a)(3). Electrical and I&C components within the in scope electrical and I&C systems were included within the scope of second license renewal.

To verify this approach, the staff audited the above listed SLRA Sections.

Audit Activities. During the NRC audit of the scoping and screening methodology and results, the staff focused on those systems identified on the Peach Bottom PRA Risk Summary. The staff reviewed SLRI documentation provided by the applicant on the on-line portal.

The table below lists the documents that were reviewed by the staff and were found relevant to the audit.

Relevant Documents Reviewed

Document	Title	Revision / Date
PB-SSBD-A1	10 CFR 54.4(a)(1) Safety Related Systems	Rev. 2
PB-SSBD-A2	10 CFR 54.4(a)(2) System Scoping Criteria	Rev. 1
PB-SSBD-AOT	Abnormal Operational Transients	Rev. 2
PB-SSBD-ATWS	10 CFR 54.4(a)(3) ATWS Systems	Rev. 1
PB-SSBD-EQ	10 CFR 54.4(a)(3) Environmental Qualification Systems	Rev. 2
PB-SSBD-FP	Fire Protection	Rev. 1
PB-SSBD-SBO	Station Blackout	Rev. 2

During the audit, the staff reviewed the subsequent license renewal scoping and screening results, procedures and reports, and interviewed the applicant's staff during breakout sessions.

3. Applicant Personnel Contacted During Audit

Name	Affiliation
David Distel, PM	Exelon
Paul Weymuller	Exelon
Donald Warfel	Exelon
Peter Tamburro	Exelon
Leah Ritz	Exelon
Michael Baker	Exelon
James Annett (now retired)	Exelon
Scott Kauffman	Exelon
Mark Miller	Exelon
Michael Coakley	Exelon
John Hufnagel (now retired)	Exelon
Albert Piha	Exelon
Mary Kowalski	Exelon
Benjamin Jordan	Exelon

4. Exit Meeting

An exit meeting was held with the applicant on April 29, 2019, to discuss the results of the in-office regulatory audit. The staff is considering the issuance of RAIs and requests for confirmation of information to support the completion of the staff's SLRA review.