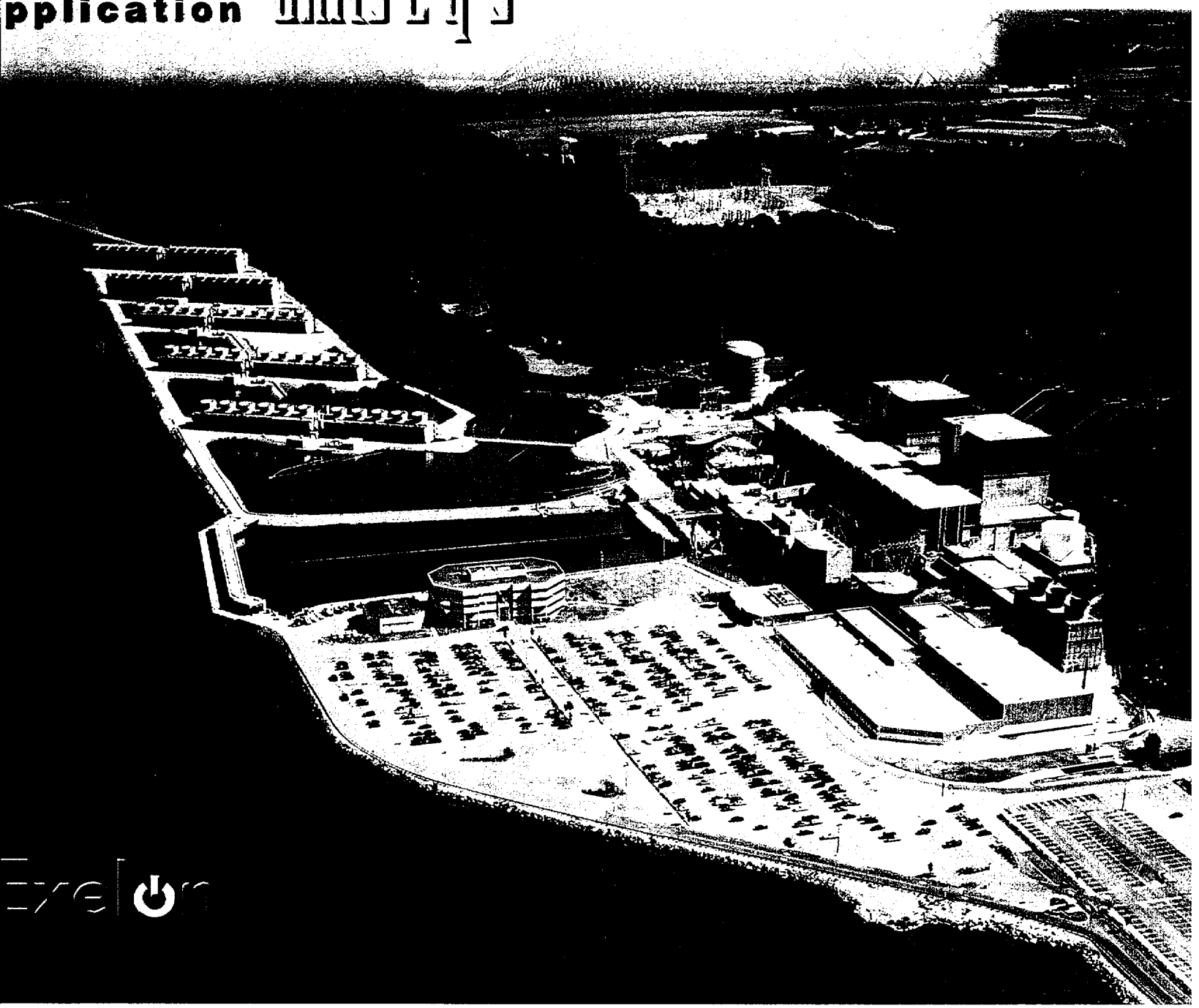
Peach Bottom Atomic Power Station Units 2 & 3

Operating License Renewal Application



STATE OF ILLINOIS	)	
COUNTY OF DUPAGE	)	
IN THE MATTER OF	)	
EXELON GENERATION COMPANY, LLC	)	**Docket Number**
PEACH BOTTOM ATOMIC POWER STATION - UNITS 2 and 3	)	**50- 277 and 50-278**

SUBJECT: Application for Renewed Operating Licenses for Peach Bottom Atomic Power Station, Units 2 and 3

AFFIDAVIT

I affirm that the content of this transmittal is true and correct to the best of my knowledge, information and belief.

John B. Cotton
Sr. Vice President,
Operations Suppport
Exelon Generation Company, LLC

Subscribed and sworn to before me, a Notary Public in and for the State above named, this 18th day of June, 2001.

"OFFICIAL SEAL"
V. LYNN BERNHAGEN
Notary Public, State of Illinois
My Commission Exp. 05/30/2004

Notary Public

ATTACHMENT 1

EXELON GENERATION, LLC
PROJECTED INCOME STATEMENT
($ Thousands)

	2001	2002	2003	2004	2005
Operating Revenues	$	$	$	$	$
Operating Expenses					
Fuel / Purchased Power	-	-	-	-	-
Operation & Maintenance	-	-	-	-	-
Depreciation & Amortization	-	-	-	-	-
Administrative & Other	-	-	-	-	-
Decommissioning Expense	-	-	-	-	-
Decommissioning Recoveries	-	-	-	-	-
Total Operating Expenses	-	-	-	-	-
Operating Income (Loss)	-	-	-	-	-
Other Income (Deductions)	-	-	-	-	-
Income before Income Taxes	-	-	-	-	-
Income Taxes	-	-	-	-	-
Net Income	$	$	$	$	$

Exelon Generation Company, LLC and Subsidiary Companies
Consolidated Balance Sheet
As of March 31, 2001
(Dollars in Millions)
Unaudited

Assets

Current assets		
Cash and cash equivalents	$	
Accounts receivable, net		
Customer		
Other		
Receivables from affiliates		
Inventories, at average cost		
Fossil fuel		
Materials and supplies		
Deferred income taxes		
Other		
Total current assets		
Property, plant and equipment, net		
Nuclear fuel, net of accumulated amortization of $1,550		
Deferred debits and other assets		
Deferred income taxes		
Nuclear decommissioning trust funds		
Emission Allowances		
Investments		
Receivables from affiliate		
Other		
Total deferred debits and other assets		
Total assets		$

Liabilities and Member's equity

Current liabilities		
Note payable to affiliates	$	
Long-term debt due within one year		
Accounts payable		
Accrued expenses		
Other		
Total current liabilities		
Long-term debt		
Deferred credits and other liabilities		
Unamortized investment tax credits		
Nuclear decommissioning liability		
Pension obligations		
Non-pension postretirement benefits obligation		
Spent nuclear fuel liability		
Other		
Total deferred credits and other liabilities		
Commitments and contingencies		
Member's equity		
Membership interest		
Retained earnings		
Accumulated other comprehensive income		
Total member's equity		
Total liabilities and member's equity		$

EXELON GENERATION, LLC
Key Assumptions

Generation (Gwh)	2001	2002	2003	2004	2005
Nuclear					
Fossil					
Purchases from AmerGen Sales					
Purchases from Other Suppliers					
Total Supply (Gwh)					
Market Sales (Gwh)					
Average Market Price ($/MWh)	$	$	$	$	$
Total Generation Revenue ($ Thousands)	$	$	$	$	$
Nuclear Capacity Factor	%	%	%	%	%

LICENSE RENEWAL APPLICATION

PEACH BOTTOM ATOMIC POWER STATION
UNITS 2 AND 3

DOCKET Nos. 50-277 AND 50-278

July 2001

SECTION 1.0 ADMINISTRATIVE INFORMATION

1.0 ADMINISTRATIVE INFORMATION

1.1 GENERAL INFORMATION - 10 CFR 54.19

1.1.1 Names of Applicant and Co-Owners

Exelon Generation Company, LLC hereby applies for renewed operating licenses for Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3. Exelon Generation Company, LLC submits this application individually and as agent for the co-owner licensees named on the operating license. The co-owner licensees are:

- PSEG Nuclear LLC
- Atlantic City Electric Company

1.1.2 Addresses of Applicant and Co-Owners

Exelon Generation Company, LLC
200 Exelon Way
Kennett Square, PA 19348

PSEG Nuclear LLC
80 Park Plaza
Newark, NJ 07102

Atlantic City Electric Company
800 King Street
P.O. Box 231
Wilmington, DE 19899-0231

1.1.3 Descriptions of Business or Occupation of Applicant and Co-Owners

Exelon Generation Company, LLC is a limited liability company formed to own, operate, and acquire nuclear and other electric generating stations; to engage in the sale of electrical energy; and to perform other business activities. Exelon

Generation Company, LLC is a wholly-owned corporate subsidiary of Exelon Ventures Company, which in turn is wholly owned by Exelon Corporation, a corporation formed under the laws of the Commonwealth of Pennsylvania. Exelon Generation Company, LLC is the exclusive licensed operator of PBAPS Units 2 and 3, which is the subject of this application. The current Unit 2 license (Facility Operating License No. DPR-44) expires on August 8, 2013, and the current Unit 3 license (Facility Operating License No. DPR-56) expires on July 2, 2014. Exelon Generation Company, LLC will be named as the exclusive licensed operator on the renewed operating licenses.

PSEG Nuclear LLC is engaged principally in the nuclear generation of electricity as an exempt wholesale generator, authorized to sell electricity at market-based rates. PSEG Nuclear LLC is the licensed operator of the Salem Nuclear Generating Station and the Hope Creek Nuclear Generating Station in the State of New Jersey. PSEG Nuclear is also a co-owner and licensee of the Peach Bottom Atomic Power Station in the Commonwealth of Pennsylvania, and will be named as a co-owner licensee on the renewed operating licenses.

Atlantic City Electric Company (ACE) is engaged in the generation and transmission of electricity and the distribution and sale of such electricity within the State of New Jersey. ACE serves approximately 500,000 customers. ACE has rated capability in excess of 1718 MW and currently provides retail electric service in the southern third of New Jersey. ACE is a co-owner and licensee of Peach Bottom Units 2 and 3 and will be named as a co-owner licensee on the renewal licenses.

1.1.4 Descriptions of Organization and Management of Applicant and Co-Owners

Exelon Generation Company, LLC

Exelon Generation Company, LLC is organized under the laws of the Commonwealth of Pennsylvania. Exelon Generation Company, LLC's principal place of business will be in the Commonwealth of Pennsylvania.

Exelon Ventures Company and Exelon Corporation are corporations organized under the laws of the Commonwealth of Pennsylvania with their headquarters and principal places of business in Chicago. Exelon Corporation is a publicly-traded corporation whose shares are widely traded on the New York Stock Exchange. Exelon Ventures Company is a wholly-owned subsidiary of Exelon Corporation. All of the directors, management committee members, and principal officers of Exelon Generation Company, LLC, Exelon Ventures Company, and Exelon Corporation are U.S. citizens. Neither Exelon Generation Company, LLC nor its parents, Exelon Ventures Company or Exelon

Corporation, are owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government.

The principal officers of Exelon Generation Company, LLC, and their addresses, are presented below:

Principal Officers (Exelon Generation Company, LLC)		
Name	**Title**	**Address**
Corbin A. McNeill, Jr.	Chief Executive Officer and President	300 Exelon Way Kennett Square, PA 19348
Oliver D. Kingsley, Jr.	President and Chief Nuclear Officer, Exelon Nuclear	4300 Winfield Road Warrenville, IL 60555
John L. Skolds,	Sr. Vice President and Chief Operating Officer, Exelon Nuclear	4300 Winfield Road Warrenville, IL 60555
William H. Bohlke	Sr. Vice President, Nuclear Services, Exelon Nuclear	4300 Winfield Road Warrenville, IL 60555
John B. Cotton	Sr. Vice President, Nuclear Operations Support, Exelon Nuclear	4300 Winfield Road Warrenville, IL 60555
Christopher M. Crane	Sr. Vice President, MidWest Regional Operating Group, Exelon Nuclear	4300 Winfield Road Warrenville, IL 60555
Joseph J. Hagan	Sr. Vice President, MidAtlantic Regional Operating Group, Exelon Nuclear	200 Exelon Way Kennett Square, PA 19348
Christine A. Jacobs	President, Exelon Power	200 Exelon Way Kennett Square, PA 19348
Ian P. McLean	President, Exelon Power Team	300 Exelon Way Kennett Square, PA 19348
David W. Woods	Sr. Vice President, Communications & Public Affairs	300 Exelon Way Kennett Square, PA 19348
Jeffrey A. Benjamin	Vice President, Licensing and Regulatory Affairs, Exelon Nuclear	4300 Winfield Road Warrenville, IL 60555
Bruce C. Williams	Vice President, Nuclear Oversight, Exelon Nuclear	4300 Winfield Road Warrenville, IL 60555
Kenneth W. Cornew	Vice President, Long-Term Transactions, Exelon Power Team	300 Exelon Way Kennett Square, PA 19348
Edward J. Cullen, Jr.	Vice President, General Counsel and Secretary	300 Exelon Way Kennett Square, PA 19348

Principal Officers (Exelon Generation Company, LLC)		
Name	**Title**	**Address**
Michael Erdlen	Vice President, Information Technology, Exelon Power Team	300 Exelon Way Kennett Square, PA 19348
Jan H. Freeman	Vice President, Public Affairs, Exelon Generation	300 Exelon Way Kennett Square, PA 19348
James D. Guerra	Vice President, Business Operations, Exelon Nuclear	4300 Winfield Road Warrenville, IL 60555
Susan O. Ivey	Vice President, Short-Term Transactions, Exelon Power Team	300 Exelon Way Kennett Square, PA 19348
Theodore E. Jennings	Vice President, Supply & Project Management, Exelon Nuclear	4300 Winfield Road Warrenville, IL 60555
Marilyn C. Kray	Vice President, Acquisition Support and Integration, Exelon Nuclear	200 Exelon Way Kennett Square, PA 19348
Richard J. Landy	Vice President, Human Resources & Administration, Exelon Nuclear	4300 Winfield Road Warrenville, IL 60555
Charles P. Lewis	Vice President, Strategy & Development, Exelon Generation	300 Exelon Way Kennett Square, PA 19348
James P. Malone	Vice President, Nuclear Fuel Management, Exelon Nuclear	4300 Winfield Road Warrenville, IL 60555
Cornelius J. McDermott	Vice President, Communications, Exelon Generation	300 Exelon Way Kennett Square, PA 19348
James R. Meister	Vice President, Engineering, Exelon Nuclear	4300 Winfield Road Warrenville, IL 60555
Michael Metzner	Vice President, Finance/Analytics/Risk, Exelon Power Team	300 Exelon Way Kennett Square, PA 19348
James A. Muntz	Vice President, Special Projects, Exelon Generation	200 Exelon Way Kennett Square, PA 19348
John L. Settelen	Vice President and Controller, Exelon Generation	300 Exelon Way Kennett Square, PA 19348
H. Gene Stanley	Vice President, MidWest Operations, Exelon Nuclear	4300 Winfield Road Warrenville, IL 60555
Timothy Tulon	Site Vice President - Quad Cities Nuclear Power Station	Quad Cities Nuclear Power Station 22710 206th Avenue North Cordova, IL 61242

Principal Officers (Exelon Generation Company, LLC)		
Name	**Title**	**Address**
John Doering, Jr.	Site Vice President - Peach Bottom Atomic Power Station	Peach Bottom Atomic Power Station 1848 Lay Road Delta, PA 17314
Richard LoPriore	Site Vice President – Byron Station	Byron Station 4450 North German Church Road Byron, IL 61010
Charles G. Pardee	Site Vice President – LaSalle County Station	LaSalle County Station 2601 North 21st Road Marseilles, IL 61341
Preston D. Swafford	Site Vice President – Dresden Nuclear Power Station	Dresden Nuclear Power Station 6500 North Dresden Road Morris, IL 60450
James D. von Suskil	Site Vice President – Braidwood Station	Braidwood Station 35100 South Rte 53 (Suite 84) Braceville, IL 60407
William Levis	Site Vice President - Limerick Generating Station	Limerick Generating Station Evergreen & Sanatoga Roads Pottstown, PA 19464
Mark E. Warner	Site Vice President – Three Mile Island	Three Mile Island Route 441 South P. O. Box 480 Middletown, PA 17057
Ronald J. DeGregorio	Site Vice President – Oyster Creek	Oyster Creek Route 9 South P. O. Box 388 Forked River, NJ 08731-0388
J. Michael Heffley	Site Vice President – Clinton Power Station	Clinton Power Station P. O. Box 678 Clinton, IL 61726
Robert E. Berdelle	Vice President, Generation	One Financial Place 440 S. LaSalle Street, Suite 3300 Chicago, IL
Robert K. McDonald	Vice President, Generation	Bank One Building 10 S. Dearborn St, 37th Floor Chicago, IL 60647
Steven L. Spencer	Vice President, Business Services, Financial Services	AT&T Building, Room 1055 P. O. Box 805379 Chicago, IL 60680
J. Barry Mitchell	Vice President and Treasurer	10 S. Dearborn St., 37th Floor Chicago, IL 60603
George R. Shicora	Assistant Treasurer	2301 Market Street Philadelphia, PA 19101
Charles S. Walls	Assistant Treasurer	10 S. Dearborn St., 36th Floor Chicago, IL 60603
Todd D. Cutler	Assistant Secretary	2301 Market Street Philadelphia, PA 19101
Scott N. Peters	Assistant Secretary	10 S. Dearborn St., 38th Floor Chicago, IL 60603

PSEG Nuclear LLC

PSEG Nuclear LLC is a limited liability company organized under the laws of the State of Delaware. PSEG Nuclear LLC is a wholly-owned subsidiary of PSEG Power, which is a wholly-owned subsidiary of Public Service Enterprise Group, Inc., with its principal office in Newark, New Jersey.

The names and business addresses of PSEG Nuclear LLC's directors and principal officers, all of whom are citizens of the United States, are as follows:

PSEG Nuclear LLC	
Director	**Address**
Frank Cassidy	80 Park Plaza Newark, New Jersey 07102
Harold W. Keiser	P. O. Box 236 Hancocks Bridge, New Jersey 08308
Thomas R. Smith	80 Park Plaza Newark, New Jersey 07102
Steven R. Teitelman	80 Park Plaza Newark, New Jersey 07102

The principal officers of PSEG Nuclear LLC, and their addresses, are presented below:

Principal Officers (PSEG Nuclear LLC)		
Name	**Title**	**Address**
Harold W. Keiser	President and Chief Nuclear Officer (CNO)	P. O. Box 236 Hancocks Bridge, New Jersey 08308
Elbert C. Simpson	Senior Vice President and Chief Administrative Officer	P. O. Box 236 Hancocks Bridge, New Jersey 08308
Mark B. Bezilla	Vice President - Technical Support	P. O. Box 236 Hancocks Bridge, New Jersey 08308
Harold W. Borden, Jr.	Vice President	80 Park Plaza Newark, New Jersey 07102
David F. Garchow	Vice President - Operations	P. O. Box 236 Hancocks Bridge, New Jersey 08308
Timothy J. O'Connor	Vice President - Nuclear Plant Support and Maintenance	P. O. Box 236 Hancocks Bridge, New Jersey 08308
Martin J. Trum	Vice President - Nuclear Reliability	P. O. Box 236 Hancocks Bridge, New Jersey 08308

Principal Officers (PSEG Nuclear LLC)		
Name	**Title**	**Address**
Morton A. Plawner	Treasurer	80 Park Plaza Newark, New Jersey 07102
Ardeshir Rostami	Assistant Treasurer	80 Park Plaza Newark, New Jersey 07102
Fred F. Saunders	Assistant Treasurer	80 Park Plaza Newark, New Jersey 07102
Edward J. Biggins, Jr.	Secretary	80 Park Plaza Newark, New Jersey 07102
Patrick M. Burke	Assistant Secretary	80 Park Plaza Newark, New Jersey 07102

PSEG Nuclear, PSEG Power and Public Service Enterprise Group, Inc. are neither owned, controlled, nor dominated by an alien, foreign corporation or foreign government.

Atlantic City Electric Company

Atlantic City Electric Company (ACE) is a New Jersey corporation with its principal office in Wilmington, Delaware. It is a wholly-owned subsidiary of Conectiv, a company registered under the Public Utility Holding Company Act of 1935, having its principal place of business in Wilmington, Delaware. Other direct subsidiaries of Conectiv include: Delmarva Power & Light Company, Conectiv Properties and Investments, Inc., Conectiv Solutions LLC, Atlantic Generation, Inc., Conectiv Communications, Inc., Conectiv Resource Partners, Inc., Conectiv Mid-Merit, Inc., Atlantic Southern Properties, Inc., Enerval, L.L.C. and Conectiv Energy Holding Company. Atlantic City Electric Company's direct subsidiaries are Atlantic Capital I and Atlantic Capital II.

Neither ACE nor its parent, Conectiv, is owned, controlled or dominated by an alien, a foreign corporation, or a foreign government.

The names and business addresses of ACE's directors, all of whom are citizens of the United States, are as follows:

Atlantic City Electric	
Director	**Address**
Howard E. Cosgrove	800 King Street Wilmington, DE 19801
Thomas S. Shaw	800 King Street Wilmington, DE 19801
Barbara S. Graham	800 King Street Wilmington, DE 19801
John C. van Roden, Jr.	800 King Street Wilmington, DE 19801

The names and business addresses of ACE's principal officers, all of whom are citizens of the United States, are as follows:

Principal Officers (Atlantic City Electric)		
Name	**Title**	**Address**
Joseph M. Rigby	President	800 King Street Wilmington, DE 19801
John C. van Roden, Jr.	CFO	800 King Street Wilmington, DE 19801
Robert H. Fiedler	Vice President,	800 King Street Wilmington, DE 19801
Skip M. Castaldi	Vice President	800 King Street Wilmington, DE 19801
Lonnie C. Scott	Vice President	800 King Street Wilmington, DE 19801
James C. Weller	Vice President	800 King Street Wilmington, DE 19801
John W. Land	Vice President	800 King Street Wilmington, DE 19801
Philip S. Reese	Vice President and Treasurer	800 King Street Wilmington, DE 19801
Donna Kinzel	Assistant Treasurer	800 King Street Wilmington, DE 19801
Peter F. Clark	Secretary and General Counsel	800 King Street Wilmington, DE 19801
Nina J. Clements	Assistant Secretary	800 King Street Wilmington, DE 19801
Diana C. DeAngelis	Assistant Secretary	800 King Street Wilmington, DE 19801
James P. Lavin	Controller	800 King Street Wilmington, DE 19801

1.1.5 Class of License, Use of the Facility, and Period of Time for Which the License Is Sought

Exelon Generation Company, LLC requests renewal of the Class 104 operating licenses for PBAPS Units 2 and 3 (License Nos. DPR-44 and DPR-56) for a period of 20 years beyond the expiration of the current licenses, midnight on August 8, 2013 for Unit 2 and midnight on July 2, 2014 for Unit 3.

Because the current licensing basis is carried forward with the possible exception of some aging issues, Exelon Generation Company, LLC expects the form and content of the licenses to be generally the same as they now exist. Exelon Generation Company, LLC, thus, also requires similar extensions of specific licenses under 10 CFR Parts 30, 40, and 70 that are contained in the current operating licenses.

1.1.6 Earliest and Latest Dates for Alterations, If Proposed

No physical plant alterations or modifications have been identified as necessary in order to implement the provisions of the application.

1.1.7 Restricted Data

With regard to the requirements of 10 CFR 54.17(f), this application does not contain any "Restricted Data," as that term is defined in the Atomic Energy Act of 1954, as amended, or other defense information, and it is not expected that any such information will become involved in these licensed activities.

In accordance with the requirements of 10 CFR 54.17(g), the applicants will not permit any individual to have access to, or any facility to possess restricted data or classified national security information until the individual and/or facility has been approved for such access under the provisions of 10 CFR Parts 25 and/or 95.

1.1.8 Regulatory Agencies

Exelon Generation Company, LLC recovers its share of the costs incurred from operating PBAPS Units 2 and 3 in its own wholesale rates, and recovers the remaining costs from PSEG Nuclear LLC and Atlantic City Electric Company in relation to their ownership interests in PBAPS Units 2 and 3. The rates charged and services provided by Exelon Generation Company, LLC are subject to

regulation by the Federal Energy Regulatory Commission under the Federal Power Act. Exelon Generation Company, LLC is also subject to regulation as a public utility company by the Securities and Exchange Commission under the Public Utility Holding Company Act of 1935, as amended.

Securities and Exchange Commission
450 Fifth Street, NW
Washington, DC 20549

Federal Energy Regulatory Commission
888 First St. N.E.
Washington, DC 20426

1.1.9 Local News Publications

News publications in circulation near PBAPS that are considered appropriate to give reasonable notice of the application are as follows:

Lancaster Intelligencer
Lancaster Newspapers, Inc.
8 West King Street
P.O. Box 1328
Lancaster, PA 17608-1328
(717) 291-8811
Fax (717) 291-6507

Lancaster New Era
Lancaster Newspapers, Inc.
8 West King Street
P.O. Box 1328
Lancaster, PA 17608-1328
(717) 291-8733
Fax (717) 399-6506

York Daily Record
P.O. Box 15122
York, PA 17405-7122
(717) 771-2000
Fax (717) 771-2009

York Dispatch
205 North George Street
York, PA 17401-2807
(717) 854-1575
Fax (717) 843-2814

The Star
Main Street
Delta, PA 17314
(717) 456-5692

The Aegis
P. O. Box 189
Bel Air, MD 21014
(410) 838-4451
Fax (410) 838-2843

Cecil Whig
P. O. Box 429
Elkton, MD 21922-0429
(410) 398-3311
(410) 398-4044

Rising Sun Herald
P. O. Box 998
Rising Sun, MD 21911
(410) 658-5614
Fax (410) 658-2679

1.1.10 Conforming Changes To Standard Indemnity Agreement

10 CFR 54.19(b) requires that "each application must include conforming changes to the standard indemnity agreement, 10 CFR 140.92, Appendix B, to account for the expiration term of the proposed renewed license." The current indemnity agreement for PBAPS states in Article VII that the agreement shall terminate at the time of expiration of the licenses specified in Item 3 of the Attachment to the agreement. Item 3 of the Attachment to the indemnity agreement, lists two license numbers, DPR-44 and DPR-56. Applicant requests that any necessary conforming changes be made to Article VII and Item 3 of the Attachment, and any other sections of the indemnity agreement as appropriate to ensure that the indemnity agreement continues to apply during both the terms of the current licenses and the terms of the renewed licenses. Applicant understands that no changes may be necessary for this purpose if the current license numbers for PBAPS Units 2 and 3 are retained.

1.2 GENERAL LICENSE INFORMATION

1.2.1 Application Updates, Renewed Licenses, and Renewal Term Operation

In accordance with 10 CFR 54.21(b), during NRC review of this application, an annual update to the application to reflect any change to the current licensing basis that materially affects the contents of the license renewal application will be provided.

In accordance with 10 CFR 54.37(b), Exelon Generation Company, LLC will maintain a summary list in the PBAPS Units 2 and 3 Updated Final Safety Analysis Report (UFSAR) of activities that are required to manage the effects of aging for the systems, structures or components in the scope of license renewal during the period of extended operation and summaries of the time-limited aging analyses evaluations.

1.2.2 Incorporation By Reference

There are no documents incorporated by reference as part of the application. Any document references, either in text or in Section 1.7 are listed for information only.

1.2.3 Contact Information

Any notices, questions, or correspondence in connection with this filing should be directed to:

Mr. James A. Hutton
Director -Licensing
Exelon Corporation
200 Exelon Way
Kennett Square, PA 19348

with copies to:

Mr. Frederick W. Polaski
Manager License Renewal
Exelon Corporation
200 Exelon Way
Kennett Square, PA 19348

1.3 PURPOSE

This document provides information required by 10 CFR 54 to support the application for renewed licenses for PBAPS Units 2 and 3. The application contains technical information required by 10 CFR 54.21 and environmental information required by 10 CFR 54.23. The information contained herein is intended to provide the NRC with an adequate basis to make the finding required by 10 CFR 54.29.

1.4 DESCRIPTION OF THE PLANT

PBAPS is a two-unit boiling water reactor (BWR) located partly in Peach Bottom Township, York County, partly in Drumore Township, Lancaster County, and partly in Fulton Township, Lancaster County, in southeastern Pennsylvania on the westerly shore of Conowingo Pond at the mouth of Rock Run Creek. Conowingo Pond is formed by the backwater of Conowingo Dam on the Susquehanna River; the dam is located about 9 miles downstream from the Unit 2 reactor. The plant is about 38 miles north-northeast of Baltimore, Maryland, and 63 miles west-southwest of Philadelphia, Pennsylvania. The reactor buildings are separate for each unit. The turbine building, control room, radwaste building, and diesel generator building house equipment used by both units. PBAPS Units 2 and 3 are BWR/4's designed and supplied by General Electric with 251 inch vessels and 764 fuel assemblies. The primary containment of each unit is of the Mark I design that consists of a drywell, a suppression chamber in the shape of a torus, and a connecting vent system between the drywell and the suppression chamber. Each unit is authorized to operate at steady state reactor core power levels not in excess of 3458 megawatts thermal.

1.5 APPLICATION STRUCTURE

The application is structured in accordance with the recommendations of Draft Regulatory Guide DG 1104, "Standard Format and Content for Applications to Renew Nuclear Plant Operating Licenses," and NEI 95-10, "Industry Guideline on Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule", Revision 2.

As an aid to the reviewer, electronic versions of the application contain marked hypertext which provide links to the referenced sections.

The application is divided into the following major sections and appendices:

Section 1 – Administrative Information

This section provides the administrative information required by 10 CFR 54.17 and 10 CFR 54.19. It describes the plant and states the purpose for this application. Included in this section are the names, addresses, business descriptions, and organization and management descriptions of the applicant, as well as other administrative information. This section also provides an overview of the structure of the application, general references, and a listing of acronyms used throughout the application.

Section 2 – Structures and Components Subject To Aging Management Review

This section describes and justifies the methods used in the integrated plant assessment to identify those structures and components subject to an aging management review in accordance with the requirements of 10 CFR 54.21(a)(2). These methods consist of: 1) scoping, which identifies the systems, structures, and components that are within the scope of 10 CFR 54.4(a), and 2) screening under 10 CFR 54.21(a)(1), which identifies those in-scope structures and components that perform their intended function without moving parts or a change in configuration or properties, and that are not subject to replacement based on a qualified life or specified time period.

Additionally, the results for systems and structures are described in this section. Scoping results are presented in Table 2.2-1 "Mechanical System Scoping Results", Table 2.2-2 "Structure Scoping Results", and Table 2.2-3 "Electrical and I&C System Scoping Results." Screening results are presented in Sections 2.3, 2.4, and 2.5.

The screening results consist of lists of components or component groups that require aging management review. Brief descriptions of mechanical systems

and structures within the scope of license renewal are provided as background information. Mechanical system and structure intended functions are provided for in-scope systems and structures. For each in-scope system and structure, components or component groups requiring an aging management review are identified.

Selected structural and electrical component groups, such as component supports and cables, were evaluated as commodities. Under the commodity approach, selected structural and electrical component groups were evaluated based upon common environments and materials. For each of these commodities, the components or component groups requiring aging management are presented in Sections 2.4 and 2.5.

Section 3 – Aging Management Review Results

10 CFR 54.21 (a)(3) requires a demonstration that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the current licensing basis throughout the period of extended operation. Section 3 presents the results of the aging management reviews. Section 3 is the link between the scoping and screening results provided in Section 2 and the aging management activities provided in Appendix B. Aging management review results are presented in tabular form, and arranged by the system or structure associated with one or more intended functions. These tables identify the aging effects and the activities credited with managing the aging effects for component groups within the scope of license renewal.

Selected structural and electrical component groups such as component supports and cables were evaluated as commodities based upon common environments and materials. Aging management review results for these commodities are presented in Sections 3.5 and 3.6.

Section 4 – Time-Limited Aging Analyses

Time-limited aging analyses (TLAAs), as defined by 10 CFR 54.3, are listed in this section. This section includes each of the TLAAs identified in the NRC Standard Review Plan for License Renewal Applications and in plant specific analyses. This section includes a summary of the time-dependent aspects of the analyses. A demonstration is provided to show that the analyses remain valid for the period of extended operation, the analyses have been projected to the end of the period of extended operation, or the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

Appendix A –Updated Final Safety Analysis Report Supplement

As required by 10 CFR 54.21(d), the Updated Final Safety Analysis Report (UFSAR) supplement contains a summary of activities credited for managing the effects of aging for the period of extended operation. In addition, summary descriptions of time-limited aging analyses evaluations are provided.

Appendix B – Aging Management Activities

Appendix B describes the program elements for all activities that are credited for managing aging effects for components or structures during the period of extended operation based upon the aging management review results provided in Section 3 and the time-limited aging analyses results provided in Section 4.

Appendix C – Commodity Groups (Optional)

Appendix C is not used.

Appendix D – Technical Specification Changes

This Appendix satisfies the requirement in 10 CFR 54.22 to identify technical specification changes or additions necessary to manage the effects of aging during the period of extended operation.

Appendix E – Environmental Information

This Appendix satisfies the requirements of 10 CFR 54.23 to provide a supplement to the environmental report that complies with the requirements of subpart A of 10 CFR Part 51.

1.6 ACRONYNMS

Acronym	Meaning
ADS	automatic depressurization system
AMR	aging management review
ARI	alternate rod insertion
ASME	American Society of Mechanical Engineers
ATWS	anticipated transients without scram
BWR	boiling water reactor
BWRVIP	Boiling Water Reactor Vessel and Internals Project
CAC	containment atmosphere control (system)
CAD	containment atmospheric dilution (system)
CASS	cast austenitic stainless steel
CCW	closed cooling water
CFR	Code of Federal Regulations
CLB	current licensing basis
CRD	control rod drive
CRL	component record list
CST	condensate storage tank
CUF	cumulative usage factor
DBD	design baseline document
DBE	design-basis event
ECCS	emergency core cooling systems
ECT	emergency cooling tower
ECW	emergency cooling water (system)
EDG	emergency diesel generator
EFPY	effective full-power years
EPRI	Electric Power Research Institute
EQ	environmental qualification
ESF	engineered safety feature
ESW	emergency service water (system)
FAC	flow accelerated corrosion
FPP	Fire Protection Program
FSSD	fire safe shutdown
GL	Generic Letter
HELB	high energy line break

Acronym	Meaning
HEPA	high efficiency particulate air
HPCI	high pressure coolant injection (system)
HPSW	high pressure service water (system)
HVAC	heating, ventilation, and air conditioning
I & C	instrumentation and controls
IGSCC	intergranular stress corrosion cracking
IN	Information Notice
INPO	Institute of Nuclear Power Operations
IPA	integrated plant assessment
ISI	inservice inspection
IST	inservice testing
LER	licensee event report
LOCA	loss of coolant accident
LPCI	low pressure coolant injection (system)
LPRM	local power range monitor
LRA	license renewal application
MCC	motor control center
MIC	microbiologically influenced corrosion
MOV	motor-operated valve
MSIV	main steam isolation valve
NCR	non conformance report
NDE	nondestructive examination
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
OE	operating experience
P&ID	piping and instrumentation diagram
PBAPS	Peach Bottom Atomic Power Station
PCIS	primary containment isolation system
PM	preventive maintenance
P-T curves	pressure-temperature limit curves
PUA	plant-unique analyses
RAI	request for additional information
RBM	rod block monitor
RCIC	reactor core isolation cooling (system)
RCS	reactor coolant system
RHR	residual heat removal (system)

Acronym	Meaning
RMS	radiation monitoring system
RPS	reactor protection system
RPV	reactor pressure vessel
RT_{NDT}	nil-ductility transition reference temperature
RWM	rod worth minimizer
RWST	refueling water storage tank
SBLC	standby liquid control (system)
SBO	station blackout
SCC	stress corrosion cracking
SGIG	safety grade instrument gas (system)
SGTS	standby gas treatment system
SPOTMOS	suppression pool temperature monitoring system
SRM	source range monitor
SRV	safety relief valve
SSCs	systems, structures, and components
SV	safety valve
TID	total integrated dose
TLAAs	time-limited aging analyses
UFSAR	updated final safety analysis report
USE	upper-shelf energy
WRNM	wide range neutron monitor

1.7 GENERAL REFERENCES

1. 10CFR50.48, "Fire Protection."
2. 10CFR50.49, "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants."
3. 10CFR50.62, "Requirements for Reduction of Risk From Anticipated Transients Without Scram (ATWS) Events for Light-Water-Cooled Nuclear Power Plants."
4. 10CFR50.63, "Loss of All Alternating Current Power."
5. 10CFR50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants."
6. 10CFR50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants."
7. 10CFR51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."
8. 10CFR54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants."
9. NEI 95-10, "Industry Guideline for Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule," Revision 3, April 16,2001.
10. NUREG-1800, "Standard Review Plan for the Review of License Renewal Applications for Nuclear Power Plants," Draft, August 2000.
11. Draft Regulatory Guide DG 1104 "Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses."

SECTION 2.0 STRUCTURES AND COMPONENTS SUBJECT TO AGING MANAGEMENT REVIEW

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2.0 STRUCTURES AND COMPONENTS SUBJECT TO AGING MANAGEMENT REVIEW

2.1 SCOPING AND SCREENING METHODOLOGY

2.1.1 Introduction

For those systems, structures and components (SSCs) within the scope of license renewal, 10 CFR 54.21(a)(1) requires the license renewal applicant in its integrated plant assessment to identify and list the structures and components subject to aging management review. 10 CFR 54.21(a)(2) further requires that the methods used to identify and list the structures and components be described and justified. Section 2 of this application satisfies these requirements.

The process of identifying the systems, structures, and components within the scope of 10 CFR Part 54, the license renewal rule (the rule) is called scoping. Scoping involves a review of plant systems, structures, and components to identify those that meet the scoping criteria of 10 CFR 54.4. As part of the scoping process, the intended functions are also identified. The intended functions are those functions that are the basis for including the system, structure or component within the scope of license renewal. Since plant components can be associated with a system or structure, scoping was initially performed at a system or structure level.

An aging management review (AMR) is required for those in-scope structures and components that perform an intended function without moving parts or without a change in configuration or properties, and that are not subject to replacement based on a qualified life or specified time frame. Structures and components that perform an intended function without moving parts or without a change in configuration or properties are called "passive." Structures and components that are not subject to replacement based on a qualified life or specified time frame are called "long-lived." The process of identifying the "passive," "long-lived" structures and components that are subject to an aging management review is called screening.

The Peach Bottom Atomic Power Station (PBAPS) scoping and screening methodology is based on the guidance provided in NEI 95-10, "Industry Guideline for Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule." Scoping, screening, and documentation of results were performed in accordance with an approved procedure. This methodology provides reasonable assurance that structures and components requiring aging management review have been identified.

The PBAPS scoping methodology is described in greater detail in Section 2.1.2. Scoping results are provided in Section 2.2. The screening methodology is described in Section 2.1.3. Screening results are provided in Sections 2.3, 2.4, and 2.5. An overview of the PBAPS scoping and screening process is presented in Figure 2.1-1.

2.1.2 Scoping Methodology

2.1.2.1 Systems, Structures and Components Within the Scope of License Renewal

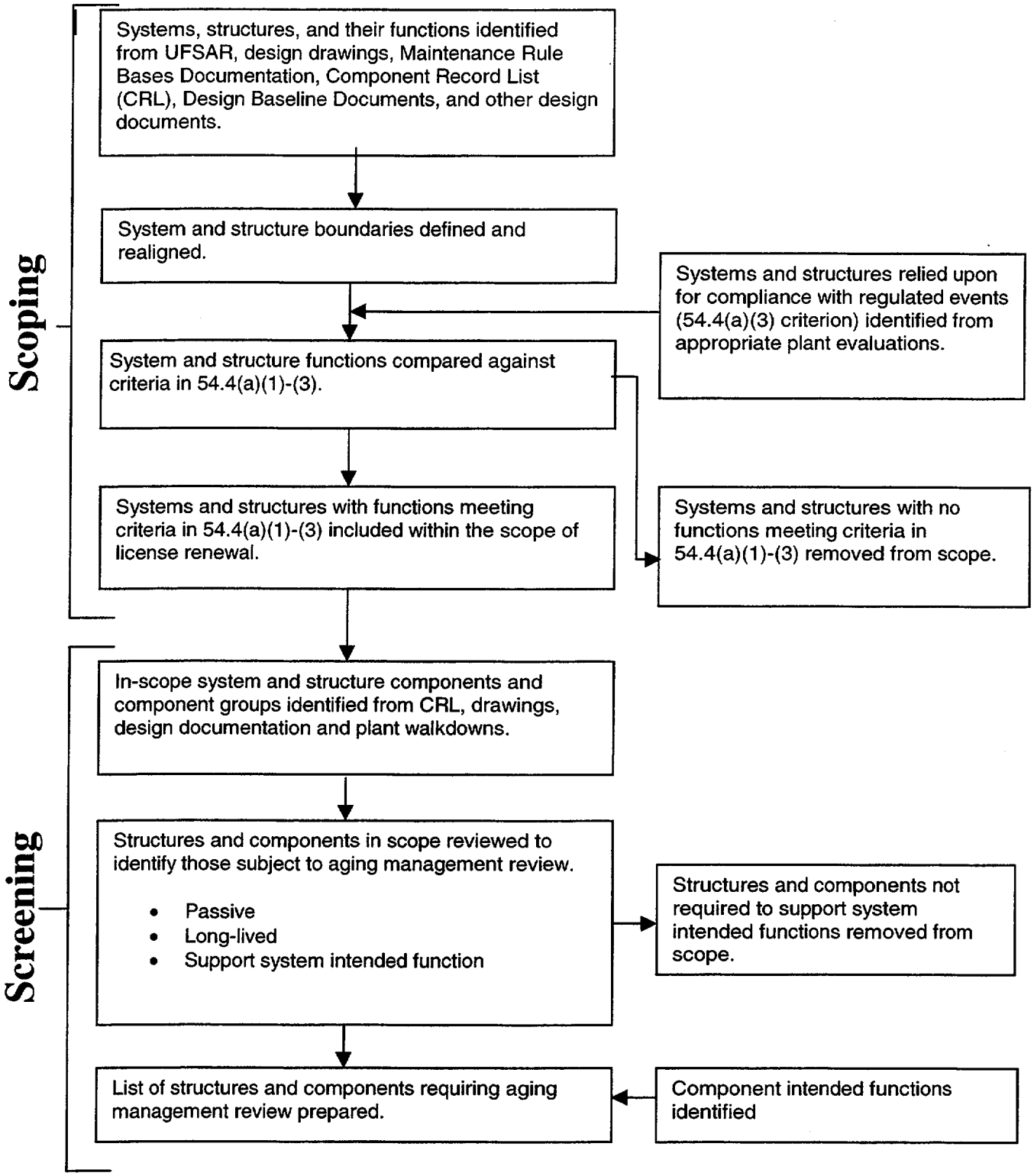
Scoping at the System and Structure Level

Identification of systems, structures and components that fall within the scope of the rule began by evaluating each system and structure in the plant. Plant systems and structures were identified through review of the PBAPS UFSAR, plant design drawings, Maintenance Rule Bases documents, plant equipment lists and other plant design documentation. System and structure functions were identified through review of the system Design Baseline Documents and the PBAPS UFSAR. System and structure boundaries were defined, and each system and structure was then evaluated against the criteria of 10 CFR 54.4(a)(1)-(3) for inclusion into the scope of the rule. This approach allowed for the components within a system or structure to be evaluated as a group against the license renewal scoping criteria.

System level scoping is an efficient method for identifying components in the scope of the rule at PBAPS. The plant is organized into systems, and each system is assigned a unique system number. These system numbers are used throughout the documents that govern the design and operation of the plant. Component identification procedures link individual components with the system to which they are physically connected or functionally support. Components associated with in-scope systems were identified and evaluated during the screening process as described in Section 2.1.3.

Plant structures were identified from the PBAPS UFSAR and plant design drawings, and were evaluated individually against the criteria of 10 CFR 54.4(a)(1)-(3) for inclusion into the scope of the rule. Components associated with in-scope structures were identified and evaluated during the screening process as described in Section 2.1.3.

Figure 2.1-1 - Scoping and Screening Process Overview



Scoping at the system and structure level is a conservative approach to scoping of plant components, since there may be components within a system or structure that are not required to support the system or structure intended functions. Components identified during the component level screening process (described in Section 2.1.3) that did not support the associated system or structure intended function were removed from the scope of license renewal at that point.

Use of the Component Record List

Plant components such as pumps, valves, tanks, heat exchangers, and instruments at PBAPS are assigned unique component numbers that are maintained in a controlled electronic database called the Component Record List (CRL). The system numbering convention at PBAPS assigns each system a unique system number, and each component in that system is assigned a unique CRL component identification number that contains the associated system number. This system numbering convention allows for easy identification of components in a given system.

The CRL system numbering convention encompasses more than just the traditional systems required to support plant operation. Certain groups of components that are not associated with a traditional plant system have been assigned component and system numbers for work control purposes. Examples of these nontraditional systems include snubbers, cranes and fuel handling equipment. These nontraditional systems were reviewed during system scoping to identify components potentially requiring aging management review.

Plant equipment items that are not assigned unique component numbers and may not be included in the CRL are typically commodities such as piping, flexible hoses, electrical cable, and ventilation ductwork. As described in Section 2.1.3, evaluation of design drawings and walkdowns of the physical plant were used to identify those additional commodities or groups of items potentially requiring aging management review that were not assigned unique CRL component numbers.

System and Structure Boundary Drawings

A combination of the CRL system component listing and the plant design drawings were used to establish the boundaries of systems and structures within the scope of license renewal. License renewal boundary drawings were prepared, documenting the boundaries of systems and structures in the scope of license renewal. Although not a requirement of the rule, the development of boundary drawings provided additional confirmation of correct system and structure scoping.

For mechanical systems, Piping and Instrumentation Diagrams (P&IDs) were used to establish evaluation boundaries of systems and components in scope. For structures, physical plant arrangement drawings were used to establish evaluation boundaries of structures in scope. For electrical systems, a simplified single line drawing was prepared to show the interfaces with the outside electrical distribution system.

System Boundary Realignment

Interfaces between systems were examined and realigned, as necessary, to ensure that interfacing components were associated with the appropriate system for license renewal. For example, a valve in an out-of-scope system that provides an isolation boundary interface with an in-scope system would be considered in the scope of license renewal. This is an example of system boundary realignment. The valve is "realigned" to the in-scope system, and the remainder of the out-of-scope system remains out-of-scope. Similar realignments are used to address out-of-scope systems that interface with the primary containment boundary.

Electrical distribution systems interface with many systems, including many mechanical systems, and the interface point is often an electrical isolation device such as a fuse or circuit breaker. These electrical isolation devices are typically considered as part of the mechanical system because they functionally provide electrical isolation of these systems. These interfaces were examined to confirm interfacing components had been identified in the correct system for license renewal. For example, a fuse in an out-of-scope mechanical system that provides an isolation boundary interface with an in-scope electrical system would be considered in the scope of license renewal. The fuse would be "realigned" to the in-scope electrical system, and the out-of-scope mechanical system would remain out-of-scope.

In some cases, components were realigned to support specific intended functions. For example, at PBAPS the main steam isolation valves (MSIVs) are air-operated valves and require compressed gas to perform their intended function. These valves do not rely on the instrument air distribution system, but instead utilize a dedicated instrument air accumulator. Accordingly, the MSIVs instrument air accumulators are required to support the intended function of the MSIVs. For purposes of system scoping, these instrument air accumulators were realigned from the instrument air system to the main steam system.

License renewal component realignments can modify system boundaries from those defined by the CRL and P&IDs. Component realignments are evaluated for impact on system functions and corresponding impact on system level scoping criteria. Significant boundary realignments are identified in Section 2.2, "Plant Level Scoping Results."

System and Structure Scoping Criteria

Each plant system and structure was reviewed to determine whether it is within the scope of license renewal. The scoping criteria from 10 CFR 54.4 define the license renewal scope as:

> (1) Safety-related systems, structures, and components which are those relied upon to remain functional during and following design-basis events (as defined in 10 CFR 50.49(b)(1)) to ensure the following functions:
>
> (i) The integrity of the reactor coolant pressure boundary;
>
> (ii) The capability to shut down the reactor and maintain it in a safe shutdown condition; or
>
> (iii) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to those referred to in 10 CFR 50.34 (a)(1), 10 CFR 50.67(b)(2), or 10 CFR 100.11.
>
> (2) All nonsafety-related systems, structures, and components whose failure could prevent satisfactory accomplishment of any of the functions identified in (1)(i), (ii), or (iii) above.
>
> (3) All systems, structures, and components relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49), pressurized thermal shock (10 CFR 50.61), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

The term "design basis events" in scoping criterion (1) refers to the abnormal operational transients and postulated design basis accidents that have been analyzed in the PBAPS UFSAR. The PBAPS systems relied upon to perform a required safety action following an abnormal operational transient or design basis accident have been included within the scope of the PBAPS license renewal application.

Scoping criterion (1) is the definition of nuclear safety related as applied to systems, structures and components at PBAPS. The CRL includes a "component classification" field for each component, and the components that meet this criterion are classified as safety-related. Individual structures are not identified in the CRL. The UFSAR is relied upon to identify seismic classification of structures and structural components. Seismic Class I structures and structural components are considered safety-related.

Scoping criterion (1) also appears in other sections of 10 CFR Part 50, including 10 CFR 50.65(b)(1). This section defines, in part, the scope of the monitoring programs specified in 10 CFR 50.65, Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants (maintenance rule).

Scoping criterion (2) is similar to the maintenance rule scoping criterion 10 CFR 50.65(b)(2)(ii):

> Nonsafety related structures, systems or components whose failure could prevent safety-related structures, systems and components from fulfilling their safety-related function.

The maintenance rule wording is slightly different than that used in license renewal. The wording of the license renewal criterion describes SSC failures that could prevent safety-related functions, while the maintenance rule wording describes SSC failures that could prevent structures, systems and components from fulfilling safety-related functions. The difference is not considered significant for PBAPS license renewal scoping. At PBAPS, any system, structure, or component that is needed for satisfactory accomplishment of any of the functions in 10 CFR 54.4(a)(1)(i), (ii), or (iii) is considered safety related.

Recognizing the similarities in the license renewal and maintenance rule scoping criteria, the PBAPS license renewal methodology used the results of maintenance rule system scoping as one input into the evaluation of systems and structures against license renewal scoping criteria 10 CFR 54.4(a)(1) and (2).

An evaluation was performed to identify any supporting systems whose failure could prevent satisfactory accomplishment of any intended function of systems and structures in the scope of the rule under 10 CFR 54.4(a)(1). This evaluation was performed to confirm that the scoping for 10 CFR 54.4(a)(2) did not miss any support systems needed to maintain intended functions of systems in scope based on 10 CFR 54.4(a)(1). For systems determined to be in scope, the supporting systems required to support an intended function were identified. The result of this supporting system evaluation is that supporting systems, or portions thereof, whose failure could impact a system intended function, had been previously included in the scope of license renewal based on evaluations performed against the criteria of 10 CFR 54.4(a)(1) and (2).

In evaluating supporting systems, hypothetical failures that could result from system interdependencies that are not part of the current licensing bases and that have not been previously experienced at PBAPS were not considered.

In accordance with the PBAPS UFSAR, SSCs are classified as seismic Class I or seismic Class II. Seismic Class I SSCs are those required to remain functional and/or protect vital equipment and systems during and following

postulated design basis events. Seismic Class II SSCs are those whose failure would not result in the release of significant radioactivity and would not prevent reactor shutdown. Seismic Class I structures were included within the scope of license renewal under scoping criterion (1).

In responding to scoping criterion (2), consideration is also given to the following:

- Structural integrity of non-safety related piping systems whose failure could adversely impact a safety related SSC function.

- Structural integrity of non-safety related SSCs whose failure during a seismic event could cause an interaction with safety related SSCs and potentially result in the failure of the safety related SSCs to perform their intended function(s). This is generally referred to as "Seismic II/I".

With respect to the structural integrity of non-safety related piping, the PBAPS scoping process identified non-safety related piping, which is an extension of the safety related piping beyond the functional boundary (pressure boundary valves). In cases where the non-safety related system is required to structurally support the safety related piping, the non-safety related piping segments and supports, up to the seismic anchor (or equivalent), are categorized as in scope for license renewal.

With respect to seismic II/I, the scoping process involved a systematic review of potential non-safety related/safety related interactions. The UFSAR, licensing correspondence, and design basis documents were relied upon in addressing these interactions. It is important to note that PBAPS, Units 2 & 3 were not originally licensed for "seismic II/I". However seismic II/I concerns were addressed as a result of Unresolved Safety Issue USI A-46, "Seismic Qualification of Equipment in Operating Plants" and considered for license renewal scoping.

For seismic II/I, PBAPS has chosen an area-based approach to scoping. Seismic Class II structural components, mechanical and electrical system supports, foundation, and anchorage located in structures containing safety related systems and components, including the Safe Shutdown Equipment List (SSEL) credited for USI A-46 resolution, are included in the scope of license renewal pursuant to 10CFR54.4 (a)(2).

Scoping criteria (3) requires an evaluation to identify systems, structures, and components relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the listed NRC regulations. The methodology used to address scoping for each of the five regulated events is as follows:

SSCs Required to Demonstrate Compliance With 10 CFR 50.48 (Fire Protection)

Included are systems and structures associated with plant fire detection and suppression, and also systems and structures required to assure safe shutdown capability during postulated fire events. Compliance with 10 CFR 50.48 is documented in the Fire Protection Program (FPP) that is part of the PBAPS UFSAR.

Fire detection and suppression equipment is included in the plant fire protection systems. Plant fire protection systems relied upon to demonstrate compliance with 10 CFR 50.48 are included in the scope of license renewal.

Plant systems and structures required to assure safe shutdown capability during postulated fire events were identified from a review of the safe shutdown analysis. The safe shutdown analysis for PBAPS includes the identification of plant fire areas, with a demonstration of safe shutdown capability for postulated fire scenarios in each fire area. Safe shutdown capability is demonstrated by assuring fires will be contained to the analyzed fire area, and by assuring availability of one or more of the defined safe shutdown methods. Systems and structures required to maintain credited fire barriers or support credited safe shutdown methods are included in the scope of license renewal.

SSCs Required to Demonstrate Compliance With 10 CFR50.49 (Environmental Qualification)

The qualified life of equipment in PBAPS environmental qualification (EQ) program is based on the normal ambient temperature, radiation exposure and cyclical aging with appropriate margins added. The qualified life calculations consider the effects of aging over time and therefore meet the definition of time limited aging analyses (TLAA) as defined in paragraph 54.3 of the rule. A controlled data field in the CRL identifies components required to demonstrate compliance with EQ (10 CFR 50.49). Components included in the EQ program are in the scope of license renewal. The detailed discussion of the EQ program and the components covered by the EQ program is contained in Section 4.4 of the application.

SSCs Required to Demonstrate Compliance With 10 CFR 50.61 (Pressurized Thermal Shock)

Pressurized thermal shock is an issue for pressurized water reactors. PBAPS, Units 2 and 3 are boiling water reactors. Therefore, evaluation to this criterion is not applicable.

SSCs Required to Demonstrate Compliance With 10 CFR 50.62 (Anticipated Transient Without Scram)

Components required to demonstrate compliance with Anticipated Transient Without Scram (ATWS) are identified in the CRL. ATWS component level data was extracted from the CRL, and summarized at the system level. The system level list was reviewed to determine which systems and structures are relied upon to demonstrate compliance with the ATWS requirements. Systems and structures relied upon to demonstrate compliance with 10 CFR 50.62 were included in the scope of license renewal.

SSCs Relied on to Demonstrate Compliance With 10 CFR 50.63 (Station Blackout)

For PBAPS, compliance with the station blackout (SBO) rule involves the use of an Alternate AC power source in accordance with NUMARC 87-00 "Guidelines and Technical Basis for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors." Therefore, the Alternate AC power source is considered to be within the scope of license renewal. The design of the SBO Alternate AC power source is such that it is not available immediately after SBO occurs, but will be available prior to one hour after SBO occurs. Therefore, the scope of systems and structures required to demonstrate compliance with the station blackout rule also includes the systems and structures necessary to cope with the station blackout for up to the one-hour duration before the Alternate AC power source is available. Systems and structures relied upon to demonstrate compliance with 10 CFR 50.63 are included in the scope of license renewal.

2.1.2.2 Intended Functions of SSCs Within the Scope of License Renewal

As described in Section 2.1.2.1, scoping was performed at the system or structure level. As part of the scoping process, intended functions were also identified. The system and structure intended functions are those functions that are the basis for including them within the scope of license renewal as specified in 10CFR54.4(a)(1) through (3).

In many cases, the intended functions are a subset of all the functions of a system or structure. Most systems and structures perform other functions that do not meet the criteria of 10 CFR 54.4(a). Only those portions of the systems or structures needed to support the intended functions are required to be included within the scope of license renewal. As described in Section 2.1.3, components that were identified as not required to support a system or structure intended function were removed from the scope of license renewal.

The term "component intended function" refers to the specific component, component group or commodity intended function needed to support a system or

structure intended function. Component intended functions are identified during the screening process. See Section 2.1.3 for additional information on component intended functions.

The PBAPS UFSAR and the design baseline documents (DBD) were reviewed to identify the intended functions for each system and structure determined to fall within the scope of the rule. The system, structure and component intended functions are provided in Sections 2.3, 2.4, and 2.5 for each of the systems and structures within the scope of the rule.

Stored Equipment

Equipment that is stored on site for installation in response to a design basis event is considered to be within the scope of license renewal. At PBAPS, the only stored equipment that falls within the scope of license renewal is equipment that may be required to facilitate repairs following an Appendix R fire scenario. The stored equipment credited for Appendix R repairs are fuses, test switches and bypass air jumper assemblies. Each bypass air jumper assembly consists of stainless steel flexible hose and two stainless steel check valves. These components are confirmed available and in good operating condition by periodic surveillance inspections. Tools and supplies used to place the stored equipment in service are not in the scope of license renewal.

Excluded Systems and Structures

Certain structures and equipment were excluded at the outset based on engineering judgment. These include: driveways and parking lots, temporary equipment, health physics equipment, portable radios, portable measuring and testing equipment, tools, spare parts, and motor vehicles. In addition, structures and equipment for emergency preparedness and security were excluded from the scope of license renewal.

Conclusion

Systems, structures and components within the scope of license renewal were identified using the methodology described in Section 2.1.2. The scoping methodology meets the requirements of 10 CFR 54.4 and is based on the guidance provided in NEI 95-10. Current Licensing Basis (CLB) information used in the scoping evaluations was obtained from controlled sources, including the PBAPS UFSAR, the Component Record List, Design Baseline Documents (DBD), Maintenance Rule Program documentation, and plant design drawings.

2.1.3 Screening Methodology

Identification of Structures and Components Subject to an Aging Management Review

For each mechanical and electrical and I&C system determined to be within the scope of the rule, a listing of components within the system was extracted from the CRL. Plant equipment items that are not assigned component numbers and are not included in the CRL, typically commodity items, were identified and added to this component listing as commodity items. These additional items were identified by evaluation of design drawings and documents, and by plant walkdowns.

For each structure determined to be within the scope of the rule, a listing of included structural components was developed based upon information contained in the CRL, information contained in design documents, information contained in the FPP, and information obtained during plant walkdowns.

Each listed structural component, mechanical component and electrical/I&C component was then evaluated to assess whether it should be considered passive for license renewal. Passive structures and components are those that perform an intended function without moving parts or without a change in configuration or properties. Appendix B of NEI 95-10 was used as a basis for identifying the passive components.

The passive structures and components were then reviewed to determine whether they are subject to replacement based on a qualified life or specified time period. Structures and components not subject to such replacement, or with qualified lives or replacement intervals 40 years or greater, are considered to be "long-lived." Structures and components subject to replacement based on a qualified life or specified time period less than 40 years are identified as "short-lived" and are not subject to an aging management review in accordance with 10 CFR 54.21(a)(1)(ii).

All components of systems and structures within the scope of the rule were reviewed to identify the passive, long-lived components subject to an aging management review. During this screening review process, individual components or portions of systems were identified that were not required to support the associated system or structure intended functions. If the decision was made to delete such components from the scope of license renewal, the component listings and boundary drawings were revised as appropriate.

The majority of electrical components in the CRL were determined to be active for license renewal, and therefore do not require an aging management review. The passive, long-lived electrical components subject to aging management review are commodities such as cable or electrical connectors and are not

uniquely identified in the CRL. The PBAPS screening process identified the passive, long-lived electrical commodities used in the plant without regard for system intended functions. The guidance provided in NEI 95-10, Appendix B was used to define electrical commodities subject to aging management review.

Some of the ventilation systems in the scope of license renewal include system filters such as fiberglass prefilter elements, HEPA filters and charcoal filters. These system filters are also in the scope of license renewal, but are replaced on condition and are not subject to aging management review. Periodic testing and inspection programs are in place to monitor filter performance such that system intended functions are maintained. System filters are replaced as conditions warrant, therefore an aging management review is not required.

Fire extinguishers, self-contained breathing air packs and fire hoses are within the scope of license renewal, but are not subject to aging management because they are replaced on condition. These components are periodically inspected in accordance with National Fire Protection Association (NFPA) standards. These standards require replacement of equipment based on their condition or performance during testing and inspection. These components are not long-lived and are subject to replacement based on NFPA standards, therefore an aging management review is not required.

Component Groups

To facilitate the aging management reviews, the passive, long-lived structures and components were organized into component groups. In addition to electrical commodities discussed above, the component groups also include commodities such as piping or ventilation duct. The component groups subject to aging management review are listed in Sections 2.3, 2.4, and 2.5.

Component Intended Functions

Component intended functions were identified for each of the passive, long-lived structural, mechanical and electrical components within the scope of the rule. Table 2.1-1 "Component Intended Functions" is a listing of mechanical, structural and electrical component intended functions. One or more of these intended functions were identified for each passive, long-lived mechanical, structural and electrical component. The intended function associated with a component is based on the type of component, and how it is relied upon to support the associated system or structure intended function. For example, a restricting orifice would have intended functions of "throttling" and "pressure boundary" if the throttling function is required to support the system intended function. If the throttling function is not required to support the system intended function, the restricting orifice intended function would be "pressure boundary" only.

Conclusion

The structure and component screening results are provided in Sections 2.3, 2.4, and 2.5 for the mechanical systems, structures and electrical and instrument and controls systems, respectively. These sections list the structures and components requiring an aging management review as part of the Integrated Plant Assessment (IPA).

The screening methodology is consistent with the guidance provided in NEI 95-10. This screening process provides reasonable assurance that the passive, long-lived structures and components that are subject to aging management review have been identified in accordance with the rule.

Table 2.1-1 Component Intended Functions

List of Mechanical Component Intended Functions

Label [1]	Description of Component Intended Function
Pressure Boundary	Provide pressure-retaining boundary so that sufficient flow at adequate pressure is delivered, provide fission product barrier for reactor coolant pressure boundary piping and components, or provide containment isolation for fission product retention.
Throttle	Provide flow restriction
Spray	Convert fluid flow into a spray
Filter	Provide filtration
Heat Transfer	Provide heat transfer
Structural Support	Provide structural support to safety-related components
Containment, Holdup and Plateout	Provide post-accident containment, holdup and plateout of MSIV bypass leakage.
Structural Support to Non-S/R Components	Provide structural support to non-safety related components whose failure could prevent satisfactory accomplishment of any of the required safety-related functions

List of Structural Component Intended Functions

Label[1]	Description of Intended Function
Structural Support	Provide structural support to safety-related components
Fire Barrier	Provide fire rated barrier to confine or retard a fire from spreading to or from adjacent areas of the plant
Shelter, Protection, and/or Shielding	Provide shelter, protection, or radiation shielding
Flood Barrier	Provide flood protection barrier
Fission Product Barrier	Provide fission product barrier
Missile Barrier	Provide missile barrier
HELB Shielding	Provide HELB shielding
Structural Support to Non-S/R Components	Provide structural support to non-safety related components whose failure could prevent satisfactory accomplishment of any of the required safety-related functions
Pipe Whip Restraint	Provide pipe whip restraint
Over-pressure Protection	Provide over-pressure protection
Pressure Boundary	Provide pressure-retaining boundary
Contain Fluid	Contain fluid leaks or spills within an area
Absorb Neutrons	Absorb neutrons
Insulating Characteristics	Control heat loss
Insulation Jacket Integrity	Prevent moisture absorption of insulation

List of Electrical Component Intended Functions

Label[1]	Description of Component Function
Electrical Continuity	Provide electrical connections to specified sections of an electrical circuit to deliver voltage, current, or signals.
Insulate	Insulate and support an electrical conductor.

(1) These "labels" provide a concise description of the component intended functions, for use in the tables in application Sections 2.3, 2.4, 2.5 and Section 3.

2.2 PLANT LEVEL SCOPING RESULTS

Table 2.2-1 "Mechanical System Scoping Results" provides the results of the plant level scoping for each of the mechanical systems at PBAPS. Table 2.2-2 "Structure Scoping Results" provides the results of the plant level scoping for each of the structures at PBAPS. Table 2.2-3 "Electrical System Scoping Results" provides the results of the plant level scoping for each of the electrical systems.

Included in each of the tables with the mechanical system and structure names are references to the appropriate sections in the application that provide system and structure descriptions, system and structure intended functions, and identification of the component groups requiring aging management review. For electrical systems, these references are not provided, except for the station blackout system, because aging management review of electrical components and commodities was performed using a 'spaces' approach.

Table 2.2-1
Mechanical System Scoping Results

Description	Within Scope of License Renewal?	Comments
Reactor Coolant System		
Reactor Pressure Vessel and Internals (Section 2.3.1.1)	Yes	
Fuel Assemblies (Section 2.3.1.2)	Yes	
Reactor Pressure Vessel Instrumentation System (Section 2.3.1.3)	Yes	
Reactor Recirculation System (Section 2.3.1.4)	Yes	

Table 2.2-1
Mechanical System Scoping Results
(Continued)

Description	Within Scope of License Renewal?	Comments
Engineered Safety Features Systems		
High Pressure Coolant Injection System (Section 2.3.2.1)	Yes	
Core Spray System (Section 2.3.2.2)	Yes	
Primary Containment Isolation System (Section 2.3.2.3)	Yes	Includes containment boundary piping and components from out-of-scope systems which interface with the primary containment.
Reactor Core Isolation Cooling System (Section 2.3.2.4)	Yes	
Residual Heat Removal System (Section 2.3.2.5)	Yes	
Containment Atmosphere Control and Dilution System (Section 2.3.2.6)	Yes	
Standby Gas Treatment System (Section 2.3.2.7)	Yes	
Secondary Containment (Section 2.3.2.8)	Yes	
Drywell Ventilation System	No	Instrumentation credited for Fire Safe Shutdown is included in the Fire Safe Shutdown System. Piping and components associated with the primary containment boundary are included with primary containment isolation system (PCIS).
Primary Containment Leak Test System	No	Piping and components associated with the primary containment boundary are included with PCIS.
Reactor Building Ventilation System	No	Piping and components associated with RHR, Core Spray, HPCI, and RCIC pump room cooling are included with the associated systems. Components credited for secondary containment boundary are included in secondary containment system.

Table 2.2-1
Mechanical System Scoping Results
(Continued)

Description	Within Scope of License Renewal?	Comments
Auxiliary Systems		
Fuel Handling System (Section 2.3.3.1)	Yes	
Fuel Pool Cooling and Cleanup System (Section 2.3.3.2)	Yes	Piping and components required to support fuel pool makeup from the RHR system are the only part of the system in scope.
Control Rod Drive System (Section 2.3.3.3)	Yes	
Standby Liquid Control System (Section 2.3.3.4)	Yes	
High Pressure Service Water System (Section 2.3.3.5)	Yes	
Emergency Service Water System (Section 2.3.3.6)	Yes	
Fire Protection Systems (Section 2.3.3.7)	Yes	
Control Room Ventilation System (Section 2.3.3.8)	Yes	
Battery And Emergency Switchgear Ventilation System (Section 2.3.3.9)	Yes	
Diesel Generator Building Ventilation System (Section 2.3.3.10)	Yes	
Pump Structure Ventilation System (Section 2.3.3.11)	Yes	
Safety Grade Instrument Gas System (Section 2.3.3.12)	Yes	
Backup Instrument Nitrogen to ADS (Section 2.3.3.13)	Yes	
Emergency Cooling Water System (Section 2.3.3.14)	Yes	
Condensate Storage System (Section 2.3.3.15)	Yes	
Emergency Diesel Generator (Section 2.3.3.16)	Yes	

Table 2.2-1
Mechanical System Scoping Results
(Continued)

Description	Within Scope of License Renewal?	Comments
Auxiliary Systems (Continued)		
Suppression Pool Temperature Monitoring System (Section 2.3.3.17)	Yes	
Cranes and Hoists (Section 2.3.3.18)	Yes	Includes reactor building cranes.
Service Water System	No	
Service Water Bay Chemical Injection System	No	
Reactor Building Closed Cooling Water System	No	Piping and components associated with the primary containment boundary are included with PCIS.
Reactor Water Cleanup System	No	RWCU system piping and components inside containment are included with Reactor Recirculation System. RWCU containment penetration piping and components are included with PCIS.
Turbine Building Closed Cooling Water System	No	
Chilled Water System	No	Piping and components associated with the primary containment boundary are included with PCIS.
Turbine Building Ventilation System	No	
Radwaste Building Ventilation System	No	
Miscellaneous Ventilation Systems	No	
Water Treatment System	No	

Table 2.2-1
Mechanical System Scoping Results
(Continued)

Description	Within Scope of License Renewal?	Comments
Auxiliary Systems (Continued)		
Instrument Nitrogen System	No	Piping and components associated with the inboard main steam isolation valve nitrogen accumulator pressure boundary are included with the main steam system. Piping and components associated with the primary containment boundary are included with PCIS.
Instrument Air System	No	Piping and components associated with the outboard main steam isolation valve air accumulator pressure boundary are included with the main steam system. Piping and components associated with safety grade instrument gas system pressure boundary are included with the safety grade instrument gas system. Piping and components associated with nitrogen backup to the battery and emergency switchgear ventilation system are included with the battery and emergency switchgear ventilation system.
Service Air Systems	No	Piping and components associated with the primary containment boundary are included with PCIS.
Domestic Water System	No	
Sewage Treatment System	No	
Plant Equipment and Floor Drain System	No	Piping and components associated with the primary containment boundary are included with PCIS.
Process Sampling System	No	Piping and components associated with the primary containment boundary are included with PCIS.
Auxiliary Steam System	No	
Offgas and Recombiner System	No	
Circulating Water System and Cooling Towers	No	
Traveling Water Screen System	No	

Table 2.2-1
Mechanical System Scoping Results
(Continued)

Description	Within Scope of License Renewal?	Comments
Auxiliary Systems (Continued)		
Hypochlorite System	No	
Condensate System	No	
Condensate Transfer	No	
Refueling Water Storage and Transfer	No	
Torus Water Storage and Transfer	No	
Hydrogen Water Chemistry System	No	
Radwaste System	No	
Torus Water Cleanup System	No	Piping and components associated with the primary containment boundary are included with PCIS.
Post Accident Sampling System	No	Piping and components interfacing with in-scope systems are included with the in-scope system.
Traversing In Core Probe	No	Piping and components associated with the primary containment boundary are included with PCIS.
Security Systems	No	
Emergency Eyewash and Showers	No	

Table 2.2-1
Mechanical System Scoping Results
(Continued)

Description	Within Scope of License Renewal?	Comments
Steam and Power Conversion Systems		
Main Steam System (Section 2.3.4.1)	Yes	
Main Condenser (Section 2.3.4.2)	Yes	
Feedwater System (Section 2.3.4.3)	Yes	Portions of the system required to support HPCI and RCIC injection flowpaths, reactor coolant pressure boundary and primary containment boundary are the only parts of feedwater included in scope.
Turbine-Generator	No	

Table 2.2-2
Structure Scoping Results

Description	Within the Scope of License Renewal?
Containment Structure (Section 2.4.1)	Yes
Reactor Building Structure (Section 2.4.2)	Yes
Radwaste Building and Reactor Auxiliary Bay (Section 2.4.3)	Yes
Turbine Building and Main Control Room Complex (Section 2.4.4)	Yes
Emergency Cooling Tower and Reservoir (Section 2.4.5)	Yes
Station Blackout Structure and Foundations (Section 2.4.6)	Yes
Yard Structures (Manholes, Duct Banks, Valve Pits, etc.) (Section 2.4.7)	Yes
Stack (Section 2.4.8)	Yes
Nitrogen Storage Building (Section 2.4.9)	Yes
Diesel Generator Building (Section 2.4.10)	Yes
Circulating Water Pump Structure (Section 2.4.11)	Yes
Recombiner Building (Section 2.4.12)	Yes
Water Treatment Building	No
Outdoor Electric Switchgear, North Substation	No
Boiler House	No
Off-Gas Filter Station	No
Watertight Dikes	No
Cooling Towers	No
Intake Screen Structure	No
Cooling Tower Pump Structures	No
Discharge Control Structure	No
Bridge Structure	No
Administration Building and Shop	No
Plant Services Building	No
Site Management Building	No
Warehouse Complex	No
Secondary Alarm Station Building	No
Plant Entrance and Radiochemistry Laboratory	No
Radwaste Onsite Storage Facility	No
Guardhouse	No
Independent Spent Fuel Storage Installation	No
Dewatering Building	No

Table 2.2-3
Electrical and I&C System Scoping Results

Description	Within Scope of License Renewal?	Comments
Electrical and I&C Systems		
Radiation Monitoring System	Yes	
4 Kv	Yes	
480 Volt Emergency Load Centers	Yes	
480 Volt Emergency Motor Control Centers	Yes	
DC System	Yes	
Instrument AC System Panels	Yes	
Communications	Yes	
Station Lighting System	Yes	
Remote Shutdown Panel	Yes	
Neutron Monitoring System	Yes	
Reactor Protection System	Yes	
Station Blackout (Section 2.5.3)	Yes	
Fire Safe Shutdown	Yes	
Annunciators	No	
Substations & Transformers	No	Equipment credited for Fire Safe Shutdown and Station Blackout is included in those systems.
13 Kv	No	Equipment credited for Fire Safe Shutdown and Station Blackout is included in those systems.
480 Volt Load Centers	No	
480 Volt Motor Control Centers	No	
Computer	No	
RPS-MG Set And Alternate Feed	No	
Reactor Manual Control	No	
Cathodic Protection	No	
Electrical Heat Tracing System	No	
Seismic Monitoring System	No	
Meteorology	No	

2.3 SCOPING AND SCREENING RESULTS: MECHANICAL

The scoping and screening results for mechanical systems consist of lists of components and component groups that require aging management review, arranged by system. Brief descriptions of mechanical systems within the scope of license renewal are provided as background information. Mechanical system intended functions are provided for in-scope systems. For each in-scope system, components or component groups requiring an aging management review are provided.

Specifically, this section provides the results of the scoping and screening process for mechanical systems including:

- A general description of the system and its purpose,
- A reference to the applicable UFSAR section,
- A reference to the applicable license renewal boundary diagrams,
- The system intended functions,
- A listing of mechanical components or component groups that are subject to an aging management review, associated component intended functions, and environments.

A discussion of component groups, component intended functions, and environments is provided in Section 3.0.

For each system, the tables are sorted by component group and then by environment.

The mechanical scoping and screening results are provided in four subsections:

- Reactor Coolant Systems
- Engineered Safety Features Systems
- Auxiliary Systems
- Steam and Power Conversion Systems

2.3.1 Reactor Coolant System

2.3.1.1 Reactor Pressure Vessel and Internals

System Description

The reactor pressure vessel is a vertical, cylindrical pressure vessel with hemispherical heads and is of welded construction. The cylindrical shell and bottom hemispherical head of the reactor vessel are fabricated of low alloy steel plate. The shell is clad on the interior with a stainless steel overlay, and the bottom head with an inconel overlay. The major safety consideration for the reactor vessel is the ability of the vessel to function as a radioactive material barrier. The vessel also provides a floodable core volume, contains the moderator, and provides support for the reactor vessel internals.

The reactor vessel internals are installed to properly distribute the flow of coolant delivered to the vessel, to locate and support the fuel assemblies, and to provide an inner volume containing the core that can be flooded following a break in the nuclear system process barrier external to the reactor vessel.

The reactor pressure vessel and internals are discussed in UFSAR Sections 3.3 and 4.2. License renewal boundary diagram reference for the reactor pressure vessel is LR-M-351.

Intended Functions within the Scope of License Renewal

Containment - The reactor vessel and internals provide a fission product and pressure barrier.

Physical Support - The reactor vessel and internals provide vertical and horizontal support for the core and other reactor pressure vessel internal components.

Core Cooling - The reactor vessel and internals provide a means to distribute coolant to the fuel assemblies located in the central region and in the periphery of the core.

Floodable Volume - The reactor vessel and internals provide a means to flood the core to at least two-thirds core height following design basis accidents.

Component Groups Requiring Aging Management Review

Table 2.3.1-1 Component Groups Requiring Aging Management Review - Reactor Pressure Vessel and Internals

Component Group	Component Intended Function	Environment
Reactor Vessel		
Top Head	• Pressure Boundary	Steam
Bottom Head	• Structural Support • Pressure Boundary	Reactor Coolant
Shell courses	• Pressure Boundary	Reactor Coolant
Flanges	• Pressure Boundary	Reactor Coolant
Closure studs	• Pressure Boundary	Sheltered Reactor Coolant
Closure nuts	• Pressure Boundary	Sheltered, Reactor Coolant
Stabilizer bracket	• Structural Support	Sheltered
Support skirt	• Structural Support	Sheltered
Feedwater nozzle, other nozzles	• Pressure Boundary	Reactor Coolant
Nozzle safe ends (including Core ΔP/SLC nozzle safe end)	• Pressure Boundary	Reactor Coolant
Core spray attachments, jet pump riser brace attachments, shroud support attachment	• Structural Support	Reactor Coolant
Other attachments	• Structural Support	Steam, Reactor Coolant
CRD Stub tube penetrations, ICM housing penetrations, and instrument penetrations	• Pressure Boundary	Reactor Coolant
RPV Internals		
Shroud	• Structural Support • Pressure Boundary	Reactor Coolant
Shroud support	• Structural Support • Pressure Boundary	Reactor Coolant
Access Hole Cover	• Pressure Boundary	Reactor Coolant
Core Support Plate, Top Guide	• Structural Support	Reactor Coolant
Core ΔP/SLC Line, Core Spray Lines and Core Spray Spargers	• Pressure Boundary • Spray	Reactor Coolant
Jet Pump Assemblies	• Structural Support • Pressure Boundary	Reactor Coolant
Orificed Fuel Support, CRD Guide Tube Base	• Structural Support	Reactor Coolant
CRD Housing stub tubes	• Structural Support	Reactor Coolant
CRD Housing guide tubes	• Structural Support	Reactor Coolant
In-core housing guide tubes, LPRM and WRNMS dry tubes	• Pressure Boundary	Reactor Coolant

Aging management review results for the reactor pressure vessel and internals are provided in Section 3.1.1.

2.3.1.2 Fuel Assemblies

System Description

The fuel assemblies are high integrity assemblies of fissionable material that can be arranged in a critical array. Each assembly must be capable of transferring the generated fission heat to the circulating coolant water while maintaining structural integrity and containing the fission products.

The nuclear fuel is designed to assure that fuel damage limits will not be exceeded during either normal operation or anticipated operational occurrences. The nuclear fuel is utilized as the initial barrier for containment of fission products.

There are 764 fuel assemblies in each reactor, with each assembly consisting of a matrix of zircaloy fuel rods.

Fuel assemblies are discussed in UFSAR Sections 3.2 and 3.6.

Intended Functions within the Scope of License Renewal

Containment - The fuel cladding is the primary fission product barrier.

Component Groups Requiring Aging Management Review

Table 2.3.1-2 Component Groups Requiring Aging Management Review - Fuel Assemblies

Component Group	Component Intended Function	Environment
• None (Note 1)	• Not Applicable	Not Applicable

Note 1: Fuel assemblies do not require aging management review because they are short-lived. See Section 3.1.2.

2.3.1.3 Reactor Pressure Vessel Instrumentation System

System Description

The reactor pressure vessel instrumentation monitors and transmits information concerning key reactor vessel operating parameters during planned operations to ensure that sufficient control of these parameters is possible in order to avoid (1) release of radioactive material such that the limits of 10 CFR 20 are exceeded, (2) nuclear system stress in excess of that allowed by applicable industry codes, and (3) the existence of any operating conditions not considered by plant safety analyses.

The reactor pressure vessel instrumentation system consists of components utilized for flow, water level, pressure, and temperature measurements required for the operation of the reactor under various normal, transient, shutdown, and accident conditions.

Reactor vessel instrumentation is designed to provide the operator with sufficient indication of the following:

- Reactor core flow rate during planned operations to avoid operating conditions not considered by plant safety analyses.

- Reactor vessel water level during planned operations to determine that the core is adequately covered by the coolant inventory inside the reactor vessel to avoid the release of radioactive materials such that the limits of 10 CFR 20 are exceeded, and to avoid operating conditions not considered by plant safety analyses.

- Reactor vessel pressure and temperature during planned operations to avoid operating conditions not considered by plant safety analyses.

- Reactor vessel flange leakage during planned operations to avoid nuclear system stress in excess of that allowed by applicable industry codes and the release of radioactive material such that the limits of 10 CFR 20 are exceeded.

The reactor pressure vessel instrumentation is described in UFSAR Section 7.8. License renewal boundary diagram reference for the reactor pressure instrumentation system is LR-M-352.

Intended Functions within the Scope of License Renewal

Provide Signal Input - The reactor pressure vessel instrumentation provides trip signals to plant safety systems, signals to plant non-safety systems, and to provide plant process information.

Monitor Key Parameters - The reactor pressure vessel instrumentation monitors key water level, pressure, and temperature indications.

Component Groups Requiring Aging Management Review

Table 2.3.1-3 Component Groups Requiring Aging Management Review - Reactor Pressure Vessel Instrumentation

Component Group	Component Intended Function	Environment
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant, Sheltered
Piping • Pipe • Tubing	• Pressure Boundary	Reactor Coolant, Sheltered
Piping • Pipe	• Pressure Boundary	Steam
Piping Specialties • Condensing Chamber	• Pressure Boundary	Reactor Coolant
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Reactor Coolant
Piping Specialties • Condensing Chamber • Restricting Orifice	• Pressure Boundary	Sheltered
Piping Specialties • Condensing Chamber	• Pressure Boundary	Steam

Aging management review results for the reactor pressure vessel instrumentation are provided in Section 3.1.3.

2.3.1.4 Reactor Recirculation System

System Description

The reactor recirculation system is a reactivity control system that serves to control reactor power levels by varying the coolant rate through the core over a limited range so that greater versatility is available in making power adjustments without the use of control rods.

The recirculation system consists of two independent loops, external to the reactor pressure vessel, each with a motor driven centrifugal pump, suction and discharge valves, piping, piping supports, and restraints. The recirculation system is part of the reactor coolant pressure boundary, and functions to maintain the pressure boundary during normal operation, transients, and accident scenarios to prevent the release of radioactive liquid and gas. The system piping and pump design pressures are based on peak steam pressure in the reactor dome plus the static head above the lowest point in the recirculation loop.

The reactor recirculation system provides flow paths out of the reactor pressure vessel for residual heat removal (RHR) and reactor water cleanup systems and into the reactor vessel for RHR shutdown cooling and low pressure coolant injection.

The coolant rate through the reactor core is varied by using variable frequency motor-generator sets and flow control instrumentation to change the speed of the centrifugal pumps to control the recirculation system drive flow rate.

A recirculation pump trip on reactor high pressure or reactor low water level has been provided to limit the consequences of a failure to scram during a transient.

The reactor recirculation system is discussed in detail in UFSAR Sections 4.3 and 7.9. License renewal boundary diagram references for the reactor recirculation system are LR-M-351, LR-M-352, and LR-M-353.

Intended Functions within the Scope of License Renewal

Pressure Boundary - The reactor recirculation system maintains the integrity of the reactor coolant pressure boundary.

RHR Flow Path - The reactor recirculation system provides flow paths for RHR shutdown cooling and low pressure coolant injection.

Flow-Biased Neutron Monitoring - The reactor recirculation system supports average power range neutron monitor signal input.

Recirculation Pump Trip - The reactor recirculation pump motor-generator set supports anticipated transient without scram mitigation by recirculation pump trip.

Component Groups Requiring Aging Management Review

Table 2.3.1-4 Component Groups Requiring Aging Management Review - Reactor Recirculation System

Component Group	Component Intended Function	Environment
Casing and Forging • Valve Bodies • Pump Casings	• Pressure Boundary	Reactor Coolant, Sheltered
Piping • Pipe • Tubing	• Pressure Boundary	Reactor Coolant, Sheltered
Piping Specialties • Flow Elements • Thermowells	• Pressure Boundary	Reactor Coolant
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Reactor Coolant
Piping Specialties • Flow Elements • Thermowells • Restricting Orifice	• Pressure Boundary	Sheltered

Aging management review results for the reactor recirculation system are provided in Section 3.1.4.

2.3.2 Engineered Safety Features Systems

2.3.2.1 High Pressure Coolant Injection System

System Description

The high pressure coolant injection (HPCI) system is provided to assure that the reactor is adequately cooled to limit fuel clad temperature in the event of a small break in the nuclear system and loss of coolant which does not result in rapid depressurization of the reactor vessel. The system is designed to allow the plant to be shut down while maintaining sufficient reactor vessel water inventory until the reactor vessel is depressurized. The HPCI system continues to operate until reactor vessel pressure is below the pressure at which low pressure coolant injection (LPCI) operation or core spray system operation maintains core cooling.

The HPCI system consists of a turbine driven pump, piping, valves and controls which provide for a complete and independent emergency core cooling system. The primary water source is water from the condensate storage tank, with a backup supply of water available from the suppression pool. Delivery of water to the vessel occurs via the "A" feedwater line. Steam supply to the HPCI turbine is from the reactor via the "B" main steam line. The system is equipped with a test line shared with the reactor core isolation cooling system to permit functional testing and a minimum flow bypass line which directs flow to the suppression pool for pump protection purposes during periods of low system flow. The exhaust steam from the turbine is discharged to the suppression pool.

The HPCI system is described in detail in UFSAR section 6.4.1. License renewal boundary diagram references for the HPCI system are LR-M-303, LR-M-306, LR-M-309, LR-M-365, and LR-M-366.

Intended Functions within the Scope of License Renewal

Coolant Injection - The HPCI system provides sufficient coolant to the reactor vessel to limit fuel clad temperature in the event of a small break in the reactor coolant system and a subsequent loss of coolant which does not result in a rapid depressurization of the reactor vessel.

Component Groups Requiring Aging Management Review

Table 2.3.2-1 Component Groups Requiring Aging Management Review - High Pressure Coolant Injection System

Component Group	Component Intended Function	Environment
Casting and Forging • Valve Bodies • Pump Casings	• Pressure Boundary	Condensate Storage Water
Casting and Forging • Valve Bodies • Filter Bodies • Pump Casings	• Pressure Boundary	Lubricating Oil
Casting and Forging • Valves Bodies	• Pressure Boundary	Reactor Coolant
Casting and Forging • Valve Bodies • Pump Casings • Filter Bodies • Turbine Casing	• Pressure Boundary	Sheltered
Casting and Forging • Valve Bodies	• Pressure Boundary	Steam
Casting and Forging • Valve Bodies	• Pressure Boundary	Torus Grade Water
Casting and Forging • Valve Bodies • Pump Casings	• Pressure Boundary	Ventilation Atmosphere
Casting and Forging • Valve Bodies • Turbine Casing	• Pressure Boundary	Wetted Gas
Elastomer • Flexible Hoses	• Pressure Boundary	Lubricating Oil, Sheltered
Heat Exchanger • HPCI Gland Seal Condenser	• Pressure Boundary • Heat Transfer	Condensate Storage Water, Steam
Heat Exchanger • HPCI Turbine Lube Oil Cooler	• Pressure Boundary • Heat Transfer	Condensate Storage Water, Lubricating Oil
Heat Exchanger • HPCI Pump Rooms Cooling Coils	• Pressure Boundary	Raw Water, Sheltered
Heat Exchanger • HPCI Gland Seal Condenser • HPCI Turbine Lube Oil Cooler	• Pressure Boundary	Sheltered

Table 2.3.2-1 Component Groups Requiring Aging Management Review - High Pressure Coolant Injection System (Continued)

Component Group	Component Intended Function	Environment
Piping • Pipe • Tubing	• Pressure Boundary	Condensate Storage Water
Piping • Pipe • Tubing • Fittings	• Pressure Boundary	Lubricating Oil
Piping • Pipe	• Pressure Boundary	Reactor Coolant
Piping • Pipe • Tubing • Fittings	• Pressure Boundary	Sheltered
Piping • Pipe • Tubing	• Pressure Boundary	Steam
Piping • Pipe	• Pressure Boundary	Torus Grade Water (Gas Interface)
Piping • Pipe • Tubing	• Pressure Boundary	Torus Grade Water
Piping • Pipe	• Pressure Boundary	Ventilation Atmosphere
Piping • Pipe	• Pressure Boundary	Wetted Gas
Piping Specialties • Thermowell • Flow Elements • Restricting Orifice	• Pressure Boundary	Condensate Storage Water
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Condensate Storage Water
Piping Specialties • Steam Trap	• Pressure Boundary	Reactor Coolant
Piping Specialties • Thermowell • Flow Elements • Restricting Orifice • Steam Trap • Rupture Disc	• Pressure Boundary	Sheltered
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Steam
Piping Specialties • Sparger	• Spray	Torus Grade Water
Piping Specialties • Suction Strainers	• Filter	Torus Grade Water

Table 2.3.2-1 Component Groups Requiring Aging Management Review - High Pressure Coolant Injection System (Continued)

Component Group	Component Intended Function	Environment
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Ventilation Atmosphere
Piping Specialties • Steam Trap	• Pressure Boundary	Wetted Gas
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Wetted Gas
Piping Specialties • Rupture Disc	• Pressure Boundary	Wetted Gas
Vessel • Lubricating Oil Tanks	• Pressure Boundary	Lubricating Oil, Sheltered

Aging management review results for the high pressure coolant injection system are provided in Section 3.2.1.

2.3.2.2 Core Spray System

System Description

The core spray system provides a redundant means for removal of decay heat from the core following a postulated LOCA. The system also provides a means for flooding the reactor vessel to remove decay heat from the core to support alternate shutdown cooling.

The system consists of two independent loops per unit, each with two 50% capacity motor driven pumps and associate piping, valves and instrumentation necessary to perform the system intended functions. The core spray system automatically sprays water onto the top of the fuel assemblies upon receipt of signals indicative of a LOCA. The system delivers cooling water at a sufficient flow rate to cool the core and prevent excessive fuel clad temperature. The low pressure coolant injection system initiates on the same signal as the core spray system and operates independently to fulfill the same objective as the core spray system. The system is maintained in a standby condition, powered by independent safeguard buses in the electrical distribution system.

The core spray system provides protection to the core for large break scenarios with resultant low reactor pressure. In addition; protection can be afforded for small break scenarios in which the automatic depressurization system has initiated to lower reactor vessel pressure.

The core spray system is discussed in additional detail in UFSAR sections 6.1, 6.2, 6.3, 6.4, 6.5, and 6.6. License renewal boundary diagram reference for the core spray system is LR-M-362.

Intended functions within the Scope of License Renewal

Core Cooling - The core spray system provides water to spray onto the top of the fuel assemblies to cool the core and prevent excessive fuel clad temperature following a design basis accident.

Minimum Flow Bypass -The core spray system has a minimum flow bypass mode which is initiated for pump protection whenever a core spray pump is operating and flow through the pump is low.

Component Groups Requiring Aging Management Review

Table 2.3.2-2 Component Groups Requiring Aging Management Review - Core Spray System

Component Group	Component Intended Function	Environment
Casting and Forging • Valve Bodies	• Pressure Boundary	Condensate Storage Water
Casting and Forging • Valve Bodies	• Pressure Boundary	Dry Gas
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant
Casting and Forging • Valve Bodies • Pump Casings	• Pressure Boundary	Sheltered
Casting and Forging • Valve Bodies • Pump Casings	• Pressure Boundary	Torus Grade Water
Heat Exchanger • Core Spray Pump Motor Oil Cooler	• Pressure Boundary • Heat Transfer	Lubricating Oil, Raw Water
Heat Exchanger • Core Spray Pump Rooms Cooling Coils	• Pressure Boundary • Heat Transfer	Raw Water, Sheltered
Heat Exchanger • Core Spray Pump Motor Oil Cooler	• Pressure Boundary	Sheltered
Piping • Pipe	• Pressure Boundary	Condensate Storage Water
Piping • Pipe	• Pressure Boundary	Dry Gas
Piping • Pipe	• Pressure Boundary	Reactor Coolant
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered
Piping • Pipe	• Pressure Boundary	Torus Grade Water (Gas Interface)
Piping • Pipe • Tubing	• Pressure Boundary	Torus Grade Water
Piping Specialties • Restricting Orifices	• Pressure Boundary • Throttle	Dry Gas
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Reactor Coolant

Table 2.3.2-2 Component Groups Requiring Aging Management Review - Core Spray System (Continued)

Component Group	Component Intended Function	Environment
Piping Specialties • Flow Elements • Thermowells • Restricting Orifice • Cyclone Separators	• Pressure Boundary	Sheltered
Piping Specialties • Flow Elements • Thermowells • Restricting Orifices • Cyclone Separators	• Pressure Boundary	Torus Grade Water
Piping Specialties • Suction Strainers	• Filter	Torus Grade Water

Aging management review results for the core spray system are provided in Section 3.2.2.

2.3.2.3 Primary Containment Isolation System

System Description

The primary containment isolation system is a plant protection system and includes the steam leak detection system. The system provides timely protection against the onset and consequences of accidents involving the gross release of radioactive materials from the fuel and nuclear system process barrier. The primary containment and reactor vessel isolation control system initiates automatic isolation of appropriate lines that penetrate the primary containment whenever monitored variables exceed pre-selected operational limits.

The system initiates isolation of the reactor pressure vessel, isolation of piping which penetrate primary containment, and isolation of piping in selected balance of plant systems that provide potential paths for the release of radioactive materials coming from breaks in the reactor coolant pressure boundary.

The primary containment isolation system is discussed in additional detail in UFSAR Sections 5.1, 5.2, 7.3, 14.6, and Appendix M. License renewal boundary diagram references for the primary containment isolation system are LR-M-316, LR-M-320, LR-M-327, LR-M-332, LR-M-333, LR-M-351, LR-M-354, LR-M-353, LR-M-359, LR-M-361, LR-M-362, LR-M-365, LR-M-368, LR-M-369, LR-M-372, LR-M-373, LR-M-376, LR-M-390, and LR-M-391.

Intended functions within the Scope of License Renewal

Reactor Pressure Vessel Isolation - The primary containment isolation system initiates isolation of the reactor pressure vessel to contain released fission products in the event of gross fuel failure.

Primary Containment Isolation - The primary containment isolation system initiates automatic closure of isolation valves in piping that penetrates the primary containment whenever monitored parameters indicate a fluid loss from the reactor coolant pressure boundary or high leakage from the piping for selected nuclear steam supply or auxiliary systems.

Leak Detection - The steam leak detection system provides piping and equipment area high temperature signals when steam leaks from high energy piping cause unacceptably high temperatures.

Component Groups Requiring Aging Management Review

Table 2.3.2-3 Component Groups Requiring Aging Management Review - Primary Containment Isolation System

Component Group	Component Intended Function	Environment
Casting and Forging • Valve Bodies	• Pressure Boundary	Closed Cooling Water
Casting and Forging • Valve Bodies	• Pressure Boundary	Dry Gas
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant
Casting and Forgings • Valve Bodies	• Pressure Boundary	Wetted Gas
Castings and Forgings • Valve Bodies	• Pressure Boundary	Sheltered
Piping • Pipe	• Pressure Boundary	Closed Cooling Water
Piping • Pipe	• Pressure Boundary	Dry Gas
Piping • Pipe • Tubing	• Pressure Boundary	Reactor Coolant
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered
Piping • Pipe	• Pressure Boundary	Wetted Gas
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Reactor Coolant
Piping Specialties • Flow Elements	• Pressure Boundary	Reactor Coolant
Piping Specialties • Restricting Orifice • Flow Elements	• Pressure Boundary	Sheltered

Aging management review results for the primary containment isolation system are provided in Section 3.2.3.

2.3.2.4 Reactor Core Isolation Cooling System

System Description

The reactor core isolation cooling (RCIC) system is a high pressure coolant makeup system which supports safe shutdown of the reactor whenever the reactor is isolated from its heat sink at elevated temperatures and pressures. The system functions to prevent a release to the environs because of inadequate core cooling. The RCIC system has sufficient makeup capacity to accommodate decay heat boil-off during a normal shutdown when the reactor is isolated from its normal heat sink at elevated pressure. The system will facilitate depressurization of the reactor vessel to the point where the shutdown cooling mode of the residual heat removal (RHR) system can be placed in operation. The primary water source is demineralized water from the condensate storage tank, with a backup supply of treated water available from the suppression pool.

The RCIC system consists of a turbine driven pump, piping, valves and controls, which provide for delivery of makeup water to the reactor vessel. The system is equipped with a test line shared with the high pressure coolant injection system to permit functional testing and a minimum flow bypass line which directs flow to the suppression pool for pump protection purposes during periods of low system flow. The exhaust steam from the turbine is directed to the suppression pool.

The RCIC system is described in detail in UFSAR Section 4.7. License renewal boundary diagram references for the reactor core isolation cooling system are LR-M-303, LR-M-306, LR-M-309, LR-M-359 and LR-M-360.

Intended Functions within the Scope of License Renewal

Coolant Injection - The RCIC system provides makeup water to the reactor vessel during shutdown and reactor isolation in order to prevent excessive fuel cladding temperatures.

Reactor Vessel Level Control - The RCIC system provides reactor vessel level control to maintain water level in the reactor vessel above the top of the active fuel should the reactor vessel be isolated from normal feedwater flow.

Reactor Vessel Pressure Control - The RCIC system provides reactor pressure control by drawing off steam for turbine operation and directing the discharge to the suppression pool. The pressure will decay to the level suitable for operation of the shutdown cooling mode of the RHR system.

Component Groups Requiring Aging Management Review

Table 2.3.2-4 Component Groups Requiring Aging Management Review - Reactor Core Isolation Cooling System

Component Group	Component Intended Function	Environment
Casting and Forging • Valve Bodies • Pump Casings	• Pressure Boundary	Condensate Storage Water
Casting and Forging • Valve Bodies • Pump Casings • Strainer Bodies	• Pressure Boundary	Lubricating Oil
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant
Casting and Forging • Valve Bodies • Pump Casings • Strainer Bodies • Turbine Casing	• Pressure Boundary	Sheltered
Casting and Forging • Valve Bodies	• Pressure Boundary	Steam
Casting and Forging • Valve Bodies	• Pressure Boundary	Torus Grade Water
Casting and Forging • Valve Bodies • Turbine Casing	• Pressure Boundary	Wetted Gas
Heat Exchanger • RCIC Turbine Lube Oil Cooler	• Pressure Boundary • Heat Transfer	Condensate Storage Water, Lubricating Oil
Heat Exchanger • RCIC Pump Rooms Cooling Coils	• Pressure Boundary	Raw Water, Sheltered
Heat Exchanger • RCIC Turbine Lube Oil Cooler	• Pressure Boundary	Sheltered
Piping • Pipe • Tubing	• Pressure Boundary	Condensate Storage Water
Piping • Pipe • Tubing • Fittings	• Pressure Boundary	Lubricating Oil

Table 2.3.2-4 Component Groups Requiring Aging Management Review - Reactor Core Isolation Cooling System (Continued)

Component Group	Component Intended Function	Environment
Piping • Pipe	• Pressure Boundary	Reactor Coolant
Piping • Pipe • Tubing • Fittings	• Pressure Boundary	Sheltered
Piping • Pipe • Tubing	• Pressure Boundary	Steam
Piping • Pipe	• Pressure Boundary	Torus Grade Water
Piping • Pipe	• Pressure Boundary	Torus Grade Water (Gas Interface)
Piping • Pipe	• Pressure Boundary	Wetted Gas
Piping Specialties • Thermowell • Y-Strainer Body • Flow Element	• Pressure Boundary	Condensate Storage Water
Piping Specialties • Y-Strainer Screens	• Filter	Condensate Storage Water
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Condensate Storage Water
Piping Specialties • Restricting Orifice	• Pressure Boundary	Condensate Storage Water
Piping Specialties • Steam Trap	• Pressure Boundary	Reactor Coolant
Piping Specialties • Restricting Orifice • Thermowells • Y Strainer Bodies • Steam Trap • Rupture Disc	• Pressure Boundary	Sheltered
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Steam
Piping Specialties • Suction Strainers	• Filter	Torus Grade Water
Piping Specialties • Steam Trap • Restricting Orifices	• Pressure Boundary • Throttle	Wetted Gas
Piping Specialties • Rupture Disc	• Pressure Boundary	Wetted Gas
Vessel • Tank (Barometric Condenser)	• Pressure Boundary	Condensate Storage Water, Sheltered

Aging management review results for the reactor core isolation cooling system are provided in Section 3.2.4.

2.3.2.5 Residual Heat Removal System

System Description

The Residual Heat Removal (RHR) system is an emergency core cooling system and heat removal system. The RHR system restores and maintains the coolant inventory in the reactor vessel such that the core is adequately cooled after a LOCA. The system also provides containment cooling by condensing steam resulting from the blowdown due to a design basis accident.

The RHR system consists of two independent loops. Each loop consists of two heat exchangers, two parallel RHR pumps, plus the associated piping, valves, and instrumentation. The loops are located in different areas of the reactor building to minimize the possibility of a single physical event causing the loss of the entire system.

The RHR system is designed for three modes of operation: shutdown cooling, containment cooling, and low-pressure injection. Each mode of operation is defined as a subsystem of the RHR system, with each subsystem contributing toward satisfaction of all objectives and design bases of the system.

The shutdown cooling subsystem is placed in operation during a normal shutdown and cooldown. The subsystem uses one or more RHR heat exchangers to remove reactor core decay heat and sensible heat from the reactor core to achieve and maintain the reactor in a cold shutdown condition.

The containment cooling subsystem provides a means for cooling the containment when operating in either the suppression pool cooling or containment spray modes. The suppression pool cooling mode provides a means to remove the reactor core decay heat and sensible heat discharged to the suppression pool in the event of a design basis accident or event. The containment cooling subsystem also provides the ability to reduce containment pressure by using the spray headers in the drywell and above the suppression pool.

The low pressure coolant injection (LPCI) subsystem operates to restore and, if necessary, maintain the coolant inventory in the reactor vessel after a LOCA so that the core is sufficiently cooled to preclude excessive fuel clad temperature. The LPCI subsystem operates in conjunction with the high pressure coolant injection system, the automatic depressurization system, and the core spray system to achieve this goal. The LPCI subsystem is designed to reflood the reactor vessel to at least two-thirds core height and maintain this level. After the core has been flooded to this height, the capacity of one RHR pump is more than sufficient to maintain the level.

The RHR system is described in detail in UFSAR Section 4.8. License renewal boundary diagrams for the residual heat removal system are LR-M-353 and LR-M-361.

Intended functions within the Scope of License Renewal

Shutdown Cooling - the RHR system provides the shutdown cooling function to remove decay heat and sensible heat from the primary system following depressurization of the reactor.

Containment Cooling - The RHR system provides a means to cool the Containment when operating in the suppression pool cooling or containment spray modes.

Alternate Shutdown Cooling - The RHR system provides alternate heat removal capability to cool the core in the event that the shutdown cooling mode of the system cannot be established.

Low Pressure Coolant Injection (LPCI) - The LPCI subsystem operates to restore and maintain the coolant inventory in the vessel post-LOCA so that the core is sufficiently cooled to preclude excessive fuel clad temperatures.

Minimum Flow Bypass - The RHR system has a minimum flow bypass mode which is initiated for pump protection whenever an RHR pump is operating and flow through the pump is low.

Sample Isolation - The RHR sample valves isolate on a primary containment isolation system Group I signal.

Component Groups Requiring Aging Management Review

Table 2.3.2-5 Component Groups Requiring Aging Management Review - Residual Heat Removal System

Component Group	Component Intended Function	Environment
Casting and Forging • Valve Bodies	• Pressure Boundary	Dry Gas
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant
Casting and Forging • Pump Casing • Valve Bodies	• Pressure Boundary	Sheltered
Casting and Forging • Pump Casing • Valve Bodies	• Pressure Boundary	Torus Grade Water
Casting and Forging • Valve Bodies	• Pressure Boundary	Wetted Gas
Heat Exchanger • RHR Heat Exchangers	• Pressure Boundary • Heat Transfer	Raw Water, Torus Water
Heat Exchanger • RHR Pump Room Cooling Coils	• Pressure Boundary • Heat Transfer	Raw Water, Sheltered
Heat Exchanger • RHR Heat Exchangers	• Pressure Boundary	Sheltered
Piping • Pipe	• Pressure Boundary	Dry Gas
Piping • Pipe • Tubing	• Pressure Boundary	Reactor Coolant
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered
Piping • Pipe • Tubing	• Pressure Boundary	Torus Grade Water
Piping • Pipe	• Pressure Boundary	Torus Grade Water (Gas Interface)
Piping • Pipe	• Pressure Boundary	Wetted Gas

Table 2.3.2-5 Component Groups Requiring Aging Management Review - Residual Heat Removal System (Continued)

Component Group	Component Intended Function	Environment
Piping Specialties • Thermowells • Flow Elements • Cyclone Separators • Restricting Orifices	• Pressure Boundary	Sheltered
Piping Specialties • Thermowells • Flow Elements • Cyclone Separators	• Pressure Boundary	Torus Grade Water
Piping Specialties • Restricting Orifices	• Pressure Boundary • Throttle	Torus Grade Water
Piping Specialties • Suction Strainers	• Filter	Torus Grade Water

Aging management review results for the residual heat removal system are provided in Section 3.2.5.

2.3.2.6 Containment Atmosphere Control and Dilution System

System Description

The containment atmosphere control (CAC) system assures that the initial concentration of oxygen prior to a LOCA is maintained below the flammability limits of five (5) percent within primary containment. This is done by maintaining the primary containment atmosphere inert with nitrogen and ensuring that no external sources of oxygen are introduced into containment as part of normal and post accident operation.

During each startup, the primary containment is purged of air with nitrogen until the atmosphere contains less than four (4) percent oxygen. The containment inerting system is used during the initial purging of the primary containment and provides a supply of makeup nitrogen. The system consists of a liquid nitrogen storage tank; a water-bath vaporizer; ambient vaporizers; an electric heater; pressure-reducing valves and controller; instrumentation; valves; and piping.

The containment atmospheric dilution (CAD) system is a standby system during the normal operation of the plant. Following a beyond design basis LOCA, the CAD system is used instead of the normal nitrogen inerting system to maintain the oxygen concentration within the containment at less than five (5) percent by volume.

The CAD system is composed of a common liquid nitrogen storage tank, redundant nitrogen electrical vaporizers, a pressure reducing valve, isolation valves, flow indication instrumentation, and flow control devices. Two piping systems are routed to each unit to provide redundant nitrogen supplies.

The containment atmosphere is monitored by a combined CAD and CAC analyzer system. The CAD and CAC analyzer system consists of two redundant combustible gas analyzers subsystems. Each monitors torus and drywell oxygen and hydrogen for both the CAD and CAC systems.

A description of the CAC and CAD systems is provided in UFSAR Section 5.2. License renewal boundary diagram references for the CAC and CAD systems are LR-M-367, LR-M-372.

Intended Functions within the Scope of License Renewal

Containment Pressure Control - The CAD system provides a means of controlling containment pressure following a design basis event.

Nitrogen Source - The CAD liquid nitrogen storage tank is the source of nitrogen for the safety grade instrument gas system.

Combustible Gas Monitoring - The CAD and CAC analyzer system provides a means to monitor the oxygen and hydrogen concentration of the primary containment atmosphere.

Component Groups Requiring Aging Management Review

Table 2.3.2-6 Component Groups Requiring Aging Management Review - Containment Atmosphere Control and Dilution System

Component Group	Component Intended Function	Environment
Casting and Forging • Valve Bodies • Pump Casings	• Pressure Boundary	Dry Gas
Casting and Forging • Valve Bodies • Pump Casings	• Pressure Boundary	Sheltered
Casting and Forging • Valve Bodies	• Pressure Boundary	Wetted Gas
Piping • Pipe	• Pressure Boundary	Dry Gas
Piping • Pipe	• Pressure Boundary	Sheltered
Piping • Pipe	• Pressure Boundary	Wetted Gas
Piping Specialties • Nitrogen Electric Vaporizer	• Pressure Boundary	Dry Gas, Sheltered
Vessel • Nitrogen Storage Tanks • H_2 and O_2 Detection Chambers	• Pressure Boundary	Dry Gas, Sheltered

Aging management review results for the CAC and CAD systems are provided in Section 3.2.6.

2.3.2.7 Standby Gas Treatment System

System Description

The standby gas treatment system (SGTS) is an engineered safety feature system for limiting the ground level release from the reactor building. The system also provides for an elevated release of primary and secondary containment air at an elevated release point via the main stack.

The system is common to both Units 2 and 3 and is located in a shielded room in the radwaste building between the reactor buildings.

The SGTS consists of two parallel filter trains connected to three full capacity exhaust fans. Each filter train is made up of the following components: moisture separator, electric resistance heater, pre-filter, high-efficiency filter, charcoal filter, and another high efficiency filter downstream of the charcoal filter. A fire protection system is provided at the charcoal filter trays. Each fan is capable of exhausting the rated flow through either filter train and up through the main stack.

The system uses the normal reactor building ventilation system exhaust piping and ductwork. Two exhaust lines from each reactor building connect to the common filter train inlet plenum. One line is connected to the reactor building refueling floor ventilation exhaust duct. The second line is connected to the reactor building air spaces below the refuel floor, and also to the torus and drywell.

A detailed description of the standby gas treatment system is provided in detail in UFSAR Section 5.3.3. License renewal boundary diagram references for the SGTS are LR-M-391 and LR-M-397.

Intended functions within the Scope of License Renewal

Filtration - Following a design basis accident, the SGTS filters the exhaust air to remove radioactive gases and particulates that may be present in the secondary containment prior to discharge to the environment.

Containment - The SGTS maintains a negative pressure in the reactor building under normal atmospheric conditions.

Elevated Release - The SGTS provides for an elevated release of radioactive materials post-LOCA.

Component Groups Requiring Aging Management Review

Table 2.3.2-7 Component Groups Requiring Aging Management Review - Standby Gas Treatment System

Component Group	Component Intended Function	Environment
Casting and Forging • Valve Bodies	• Pressure Boundary	Ventilation Atmosphere, Sheltered
Elastomer • Fan Flex Connections • Filter Plenum Access Door Seals	• Pressure Boundary	Ventilation Atmosphere, Sheltered
Piping • Pipe	• Pressure Boundary	Buried
Piping • Pipe • Tubing • Fittings	• Pressure Boundary	Sheltered
Piping • Pipe • Tubing • Fittings	• Pressure Boundary	Ventilation Atmosphere
Piping Specialties • Flow Elements • Pressure Elements • Temperature Element Couplings	• Pressure Boundary	Ventilation Atmosphere, Sheltered
Sheet Metal • Ducting • Plenums • Fan Enclosures • Damper Enclosures	• Pressure Boundary	Ventilation Atmosphere, Sheltered
Sheet Metal • Louvers	• Throttle	Ventilation Atmosphere

Aging management review results for the SGTS are provided in Section 3.2.7.

2.3.2.8 Secondary Containment System

System Description

The reactor building, in conjunction with the reactor building heating and ventilating system and the standby gas treatment system (up to and including the second outboard isolation valve) constitutes the secondary containment. This includes penetrations of the reactor building. The penetrations for piping, ventilation ducts, electrical cables, and instrument leads are sealed. The ventilation ducts are provided with valves for automatic closure when reactor building isolation is required. Refer to Section 2.4.2 for a description of the reactor building structure.

The reactor building completely encloses the primary containment, and auxiliary systems of the nuclear steam supply system, and houses the associated spent fuel storage pool, dryer and separator storage pool, and reactor well. The secondary containment serves as the containment during reactor refueling when the primary containment is open, and as an additional barrier when the primary containment is functional.

The secondary containment is further discussed in UFSAR sections 5.1 and 5.3. License renewal boundary diagram reference for secondary containment is LR-M-391. There are no other system boundary drawings since penetrations are considered as part of the structure.

Intended Functions within the Scope of License Renewal

Containment - The secondary containment system provides a secondary containment boundary to contain any release of radioactive material outside the primary containment.

Component Groups Requiring Aging Management Review

Table 2.3.2-8 Component Groups Requiring Aging Management Review – Secondary Containment System

Component Group	Component Intended Function	Environment
Casting and Forging • Valve Bodies	• Pressure Boundary	Ventilation Atmosphere, Sheltered
Piping • Tubing	• Pressure Boundary	Ventilation Atmosphere, Sheltered
Sheet Metal • Ducting	• Pressure Boundary	Ventilation Atmosphere, Sheltered

Aging management review results for the secondary containment system are provided in Section 3.2.8.

2.3.3 Auxiliary Systems

2.3.3.1 Fuel Handling System

System Description

The fuel handling system consists of the refueling platform equipment assembly and the fuel preparation machines. The Units 2 and 3 refueling floors are physically separated. Each unit has its own fuel handling system and fuel pool.

The refueling platform includes a bridge structure that spans the spent fuel pool and the reactor well. The platform travels on rails that extend the length of the fuel storage pool and the reactor well. A working platform extends the width of the bridge structure, providing working access to the entire width of the pools and the reactor well area.

Two fuel preparation machines located in each fuel storage pool are used to strip the channels from spent fuel assemblies, and to install the used channels on new fuel assemblies.

Additional information pertaining to the fuel handling system is found in UFSAR Sections 10.3 and 10.4.

Intended Functions within the Scope of License Renewal

Maintain Structural Integrity - Maintain structural integrity of the refueling platform and the fuel preparation machines.

Component Groups Requiring Aging Management Review

Table 2.3.3-1 Component Groups Requiring Aging Management Review - Fuel Handling System

Component Group	Component Intended Function	Environment
Fuel Preparation Machines	• Structural Support	Fuel Pool Water
Refueling Platform (assembly)	• Structural Support	Sheltered
Refueling Platform (rails)	• Structural Support	Sheltered
Refueling Platform (mast)	• Structural Support	Fuel Pool Water

Aging management review results for the fuel handling system are provided in Section 3.3.1.

2.3.3.2 Fuel Pool Cooling and Cleanup System

System Description

The fuel pool cooling and cleanup system provides fuel pool water temperature control and is used to maintain fuel pool water clarity, purity, and level.

The fuel pool cooling and cleanup system cools the fuel storage pool by transferring decay heat through the heat exchangers to the service water system. Water purity and clarity in the fuel storage pool, reactor well, and steam dryer-separator storage pit are maintained by filtering and demineralizing the pool water.

The system consists of three fuel pool cooling pumps, three heat exchangers, filter demineralizer(s), two skimmer surge tanks, and associated piping and valves. The three fuel pool cooling pumps are connected in parallel, as are the three heat exchangers. The pumps and heat exchangers are located in the reactor building. An interconnection with the RHR system provides backup cooling and makeup water to the fuel storage pool.

The fuel pool cooling and cleanup system is further discussed in UFSAR Section 10.5. License renewal boundary diagram reference for the fuel pool cooling and cleanup system is LR-M-363.

Intended Functions within the Scope of License Renewal

Emergency Make-up - The fuel pool cooling and cleanup system provides a safety related path for providing make-up water for the fuel pool in the event of a loss of fuel pool inventory when normal makeup is not available.

Component Groups Requiring Aging Management Review

Table 2.3.3-2 Component Groups Requiring Aging Management Review - Fuel Pool Cooling and Cleanup System

Component Group	Component Intended Function	Environment
Casting and Forging • Valve Bodies	• Pressure Boundary	Fuel Pool Water, Sheltered
Piping • Pipe	• Pressure Boundary	Fuel Pool Water, Sheltered
Piping Specialties • Vacuum Breakers • Restricting Orifice	• Pressure Boundary	Fuel Pool Water, Sheltered

Aging management review results for the fuel pool cooling and cleanup system are provided in Section 3.3.2.

2.3.3.3 Control Rod Drive System

System Description

The control rod drive (CRD) system is a reactivity control system that utilizes pressurized demineralized water to rapidly insert control rods in the core upon receipt of a scram signal. The system also provides control rod manipulation and positioning for power adjustments, and serves as a source of cooling water for the graphitar seals of the CRD mechanisms.

The CRD system serves as a source of purge water for the reactor water cleanup pumps and reactor recirculation pump seals. The system also serves as a source of injection water to reactor vessel level instrumentation reference legs to mitigate the accumulation of gases.

The alternate rod insertion (ARI) system is a subsystem of the CRD system and serves as a backup means to provide a reactor scram, independent of the reactor protection system, by venting off the scram air header. The ARI function serves to reduce the probability of an ATWS event and may be initiated automatically or manually.

The CRD system is described in detail in UFSAR Section 3.4. License renewal boundary diagram references for the control rod drive system are LR-M-356 and LR-M-357.

Intended Functions within the Scope of License Renewal

CRD Scram - The control rod drive system provides rapid control rod insertion in the core upon receipt of an automatic or manual scram signal.

Alternate Rod Insertion - The alternate rod insertion feature of the CRD system reduces the probability of an ATWS event by providing an alternate means to scram the reactor.

Component Groups Requiring Aging Management Review

Table 2.3.3-3 Component Groups Requiring Aging Management Review - Control Rod Drive System

Component Group	Component Intended Function	Environment
Casting and Forging • Valve Bodies	• Pressure Boundary	Condensate Storage Water
Casting and Forging • Valve Bodies	• Pressure Boundary	Dry Gas
Castings and Forgings • Valve Bodies	• Pressure Boundary	Sheltered
Castings and Forgings • Valve Bodies	• Pressure Boundary	Wetted Gas
Piping • Pipe • Tubing	• Pressure Boundary	Condensate Storage Water
Piping • Pipe	• Pressure Boundary	Dry Gas
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered
Piping • Pipe	• Pressure Boundary	Wetted Gas
Piping Specialties • Filter Bodies	• Pressure Boundary	Condensate Storage Water
Piping Specialties • Rupture Disc	• Pressure Boundary	Dry Gas
Piping Specialties • Filter Bodies • Rupture Disc	• Pressure Boundary	Sheltered
Vessel • Accumulators	• Pressure Boundary	Condensate Storage Water
Vessel • Accumulators	• Pressure Boundary	Dry Gas
Vessel • Accumulators	• Pressure Boundary	Sheltered

Aging management review results for the control rod drive system are provided in Section 3.3.3.

2.3.3.4 Standby Liquid Control System

System Description

The purpose of the standby liquid control system is to provide a backup method, which is redundant with, and independent of, the control rod drive system to shutdown the reactor and maintain it in a cold, subcritical condition. Maintaining subcriticality as the nuclear system cools assures that the fuel barrier is not threatened by overheating in the event that not enough of the control rods can be inserted to counteract the positive reactivity effects of a decrease in the moderator temperature. A neutron absorber consisting of enriched sodium pentaborate in solution is injected into the vessel and distributed throughout the core in sufficient quantity to achieve and maintain shutdown while allowing for margin due to leakage and imperfect mixing.

The system consists of a solution storage tank, a test tank, two 100% capacity positive displacement pumps with their associated relief valves and accumulators, two explosive valves installed in parallel, and associated controls and instrumentation. The system is manually initiated from the control room via a three-position key-locked selector switch.

The standby liquid control system is described in detail in UFSAR Section 3.8. License renewal boundary diagram references for the standby liquid control system are LR-M-351 and LR-M-358.

Intended Functions within the Scope of License Renewal

Reactivity Control - The standby liquid control system injects sodium pentaborate solution into the reactor vessel in sufficient quantity and concentration to bring the reactor from rated power to a cold shutdown at any time in core life.

Component Groups Requiring Aging Management Review

Table 2.3.3-4 Component Groups Requiring Aging Management Review - Standby Liquid Control System

Component Group	Component Intended Function	Environment
Casting and Forging • Pump Casing • Valve Bodies	• Pressure Boundary	Borated Water
Casting and Forging • Valve Bodies	• Pressure Boundary	Reactor Coolant
Casting and Forging • Pump Casing • Valve Bodies	• Pressure Boundary	Sheltered
Piping • Pipe • Tubing	• Pressure Boundary	Borated Water
Piping • Pipe	• Pressure Boundary	Reactor Coolant
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered
Piping Specialties • Thermowells	• Pressure Boundary	Borated Water, Sheltered
Vessel • Accumulators • Solution Tank	• Pressure Boundary	Borated Water
Vessel • Accumulators	• Pressure Boundary	Dry Gas
Vessel • Accumulators • Solution Tank	• Pressure Boundary	Sheltered

Aging management review results for the standby liquid control system are provided in Section 3.3.4.

2.3.3.5 High Pressure Service Water System

System Description

The high pressure service water (HPSW) system provides cooling water for the residual heat removal system (RHR) heat exchangers under normal, hot standby, refueling and post-accident conditions. The system provides core decay heat removal capability during shutdown periods, and containment cooling during normal operations and during post accident conditions. The HPSW pumps are located in the circulating water pump structure, central portion.

The system consists of four pumps and the necessary piping, valves and controls to provide cooling water from either the Conowingo Pond or the emergency cooling tower via the HPSW pump bay. The pumps deliver cooling water at a pressure greater than RHR system pressure. This ensures radioactive leakage from the RHR system to the environs is inhibited. Radioactivity in the HPSW system is monitored upstream and downstream of the RHR heat exchangers to detect activity in potential release paths. The HPSW system discharges through one pipe for each unit to the discharge pond.

The HPSW system is described in detail in UFSAR section 10.7. License renewal boundary diagram references for the high pressure service water system are LR-M-315, LR-M-330, and LR-M-361.

Intended Functions within the Scope of License Renewal

RHR Heat Sink - The HPSW system provides cooling water flow to transfer heat from the RHR heat exchangers for the normal operation, post accident shutdown, hot standby, or refueling modes of operation.

Component Groups Requiring Aging Management Review

Table 2.3.3-5 Component Groups Requiring Aging Management Review - High Pressure Service Water System

Component Group	Component Intended Function	Environment
Casting and Forging • Valve Bodies	• Pressure Boundary	Outdoor
Casting and Forging • Pump Casings • Strainer Bodies • Valve Bodies	• Pressure Boundary	Raw Water
Casting and Forging • Strainer Screens	• Filter	Raw Water
Casting and Forging • Pump Casings (External)	• Pressure Boundary	Raw Water
Casting and Forging • Strainer Bodies • Valve Bodies	• Pressure Boundary	Sheltered
Heat Exchanger • HPSW Pump Motor Oil Cooler	• Pressure Boundary • Heat Transfer	Lubricating Oil, Raw Water
Heat Exchanger • HPSW Pump Motor Oil Cooler	• Pressure Boundary	Sheltered
Piping • Pipe	• Pressure Boundary	Buried
Piping • Pipe • Tubing	• Pressure Boundary	Raw Water
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Raw Water
Piping Specialties • Flow Elements	• Pressure Boundary	Raw Water
Piping Specialties • Flow Elements • Restricting Orifice	• Pressure Boundary	Sheltered

Aging management review results for the high pressure service water system are provided in Section 3.3.5.

2.3.3.6 Emergency Service Water System

System Description

The emergency service water (ESW) system provides a reliable supply of cooling to diesel generator coolers, emergency core cooling system and reactor core isolation cooling compartment air coolers, core spray pump motor oil coolers and other selected equipment during a loss of offsite power or during a loss of normal station service water.

The system consists of two 100% capacity ESW pumps, associated discharge and distribution piping, piping components, valves and instrumentation and controls. The two ESW pumps take suction from individual pump bays within the circulating water pump structure. A return header in each unit returns the water to the discharge pond or the emergency cooling water system. During normal operations, all system loads with the exception of the emergency diesel generator heat exchangers are supplied with cooling water from the service water system. The ESW system provides the cooling water whenever the pumps are operating and the ESW system pressure is greater than service water system pressure or the service water system is manually isolated from the ESW system. In the event of extreme high or low Conowingo Pond level, the ESW system can be shifted to closed cycle operation through the use of the emergency cooling water system.

The ESW system is described in UFSAR section 10.9. License renewal boundary diagram references for the emergency service water system are LR-M-315 and LR-M-330.

Intended Functions within the Scope of License Renewal

Component Cooling - The ESW system provides cooling water flow to transfer heat from certain safety related equipment during a loss of offsite power or maximum credible accident via either an open loop or a closed loop configuration.

Component Groups Requiring Aging Management Review

Table 2.3.3-6 Component Groups Requiring Aging Management Review - Emergency Service Water System

Component Group	Component Intended Function	Environment
Casting and Forging • Valve Bodies	• Pressure Boundary	Outdoor
Casting and Forging • Valve Bodies • Pump Casings	• Pressure Boundary	Raw Water
Casting and Forging • Pump Casings (External)	• Pressure Boundary	Raw Water
Casting and Forging • Valve Bodies	• Pressure Boundary	Sheltered
Piping • Pipe	• Pressure Boundary	Buried
Piping • Pipe • Tubing	• Pressure Boundary	Raw Water
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered
Piping Specialties • Thermowells • Flow Elements • Expansion Joints	• Pressure Boundary	Raw Water
Piping Specialties • Thermowells • Flow Elements • Expansion Joints	• Pressure Boundary	Sheltered

Aging management review results for the emergency service water system are provided in Section 3.3.6

2.3.3.7 Fire Protection System

System Description

The term "fire protection system" refers to the integrated complex of components and equipment provided for detection and suppression of fires. In addition to this system, the "fire protection program" includes the concepts of design and layout implemented to prevent or mitigate fires, administrative controls and procedures, and personnel training. The fire protection program uses a defense-in-depth approach aimed at preventing fires, minimizing the effect of any fires that occur, providing appropriate fire detection and suppression equipment, and training personnel in fire prevention and fire fighting.

The fire protection system detects the presence of smoke or excessive heat in designated plant areas, provides local alarms, control room annunciation horn and printed record, and suppression system activation. The fire protection system includes various types of water, foam, and carbon dioxide suppression systems. Additionally, the fire protection system includes active and passive features such as fire doors, fire dampers, penetration seals, fire wraps, combustible free zones, and water curtains which retard fires from spreading from one area of the plant to another.

Heat and smoke detection is accomplished by the appropriate detectors installed in areas where fire potential exists and in all areas containing safety related equipment except where a specific exemption was granted by the NRC. The circuits of these installations go directly to local system panels. The local panels contain detector circuits for supervisory and alarm functions and trouble circuits for remote indication.

Circuits for annunciation are physically separated from those circuits that actuate the fire suppression systems. Detection of fire by any smoke or heat detector will activate an audible control room alarm with visual annunciation and printed record of event.

The source of water for the PBAPS fire protection system is Conowingo Pond. This source allows continuous operation of either pump as long as required. The fire pumps take suction from independent, isolatable intake wells. Check valves are installed at the pump discharges to prevent water from one source from being pumped into the other source.

There are two vertical turbine fire pumps, each rated for 2,500 gpm at 125 psig total head. The lead pump is electric-motor-driven, and the 100 percent capacity backup pump is diesel-engine-driven. The pumps and their controllers are UL-listed.

The system is capable of supplying water at the required pressure for the largest sprinkler flow plus 500 gpm.

The fire protection system is described in detail in PBAPS Fire Protection Program (FPP). License renewal boundary diagram references for the fire protection are LR-M-318 and LR-M-323.

Intended Functions within the Scope of License Renewal

Fire Protection (detection, suppression, containment, standby) - The fire protection system provides methods to detect, suppress, contain, and monitor fire events.

Component Groups Requiring Aging Management Review

Table 2.3.3-7 Component Groups Requiring Aging Management Review - Fire Protection System

Component Group	Component Intended Function	Environment
Casting and Forging • Valve Bodies	• Pressure Boundary	Buried
Casting and Forging • Sprinkler Heads	• Pressure Boundary • Spray	Dry Gas
Casting and Forging • Valve Bodies	• Pressure Boundary	Dry Gas
Casting and Forging • Valve Bodies • Pump Casings • Strainer Bodies • Strainer Screens	• Pressure Boundary • Filter (Strainer Screens Only)	Fuel Oil
Casting and Forging • Valve Bodies	• Pressure Boundary	Outdoor
Casting and Forging • Hydrants	• Pressure Boundary	Outdoor
Casting and Forging • Sprinkler Heads	• Pressure Boundary • Spray	Raw Water
Casting and Forging • Valve Bodies • Pump Casings • Strainer Bodies • Hydrants	• Pressure Boundary	Raw Water
Casting and Forging • Pump Casings (External)	• Pressure Boundary	Raw Water
Casting and Forging • Strainer Screens	• Filter	Raw Water
Casting and Forging • Valve Bodies • Pump Casings • Strainer Bodies	• Pressure Boundary	Sheltered

Table 2.3.3-7 Component Groups Requiring Aging Management Review - Fire Protection System (Continued)

Component Group	Component Intended Function	Environment
• Sprinkler Heads		
Elastomer • Flexible Hoses	• Pressure Boundary	Fuel Oil
Piping • Pipe	• Pressure Boundary	Buried
Piping • Pipe	• Pressure Boundary	Dry Gas
Piping • Pipe • Tubing • Fittings	• Pressure Boundary	Fuel Oil
Piping • Pipe	• Pressure Boundary	Outdoor
Piping • Pipe • Tubing	• Pressure Boundary	Raw Water
Piping • Pipe • Tubing • Fittings	• Pressure Boundary	Sheltered
Piping • Pipe	• Pressure Boundary	Wetted Gas
Piping Specialties • Discharge Nozzles	• Pressure Boundary • Spray	Dry Gas
Piping Specialties • Strainer Bodies • Y Strainer Body	• Pressure Boundary	Dry Gas
Piping Specialties • Strainer Screens	• Filter	Dry Gas
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Raw Water
Piping Specialties • Flow Elements	• Pressure Boundary	Raw Water
Piping Specialties • Strainer Bodies • Y Strainer Body • Discharge Nozzles • Restricting Orifice • Flow Elements • Metal Flex Connection	• Pressure Boundary	Sheltered
Piping Specialties • Metal Flex Connection	• Pressure Boundary	Wetted Gas
Vessel • Cardox Tank	• Pressure Boundary	Dry Gas

Table 2.3.3-7 Component Groups Requiring Aging Management Review - Fire Protection System (Continued)

Component Group	Component Intended Function	Environment
Vessel • Fuel Tank	• Pressure Boundary	Fuel Oil
Vessel • Cardox Tank • Fuel Tank • Muffler	• Pressure Boundary	Sheltered
Vessels • Muffler	• Pressure Boundary	Wetted Gas

Aging management review results for the fire protection system are provided in Section 3.3.7.

2.3.3.8 Control Room Ventilation System

System Description

The control room ventilation system is a safety-related system that is common to PBAPS, Units 2 and 3. The system consists of several subsystems: control room fresh air supply, control room emergency ventilation filter, control room air conditioning ventilation supply, and the control room return air system.

The system ensures the habitability of the control room even under the design basis events. The fresh air portion of the system is operable during the loss of offsite power. The fresh air intake is filtered when control room emergency ventilation is initiated to prevent iodine and particulate contamination of the control room air.

The system consists of normal and emergency ventilation supply fans, air conditioning supply and return fans, filters, heating coils and cooling coils, refrigerant water chillers, chilled water pumps, dampers, ductwork, instrumentation, and controls.

The control room fresh air supply system consists of two 100% capacity, redundant supply fans, roll filter, and preheat coil. The system is supplied with outside air from the outside air intake plenum.

The control room emergency ventilation filter system is a safety related system which consists of two 100% capacity filter units and redundant supply fans. Each filter unit consists of a charcoal filter and two banks of HEPA filters upstream and downstream of the charcoal filter.

The control room ventilation system is described in additional detail in UFSAR Section 10.13. License renewal boundary diagram reference for the control room ventilation system is LR-M-384.

Intended Functions within the Scope of License Renewal

Control Room Isolation and Filtration - The control room ventilation system provides isolation and filtration for the control room during accident conditions.

Ventilation - The system provides ventilation for the control room during normal, abnormal, accident, and post-accident conditions.

Component Groups Requiring Aging Management Review

Table 2.3.3-8 Component Groups Requiring Aging Management Review - Control Room Ventilation System

Component Group	Component Intended Function	Environment
Casting and Forging • Valve Bodies	• Pressure Boundary	Sheltered, Ventilation Atmosphere
Elastomer • Filter Plenum Access Door Seals • Fan Flex Connections	• Pressure Boundary	Sheltered, Ventilation Atmosphere
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered, Ventilation Atmosphere
Piping Specialties • Flow Elements	• Pressure Boundary	Sheltered, Ventilation Atmosphere
Sheet Metal • Ducting • Damper Enclosures • Plenums • Fan Enclosures	• Pressure Boundary	Sheltered, Ventilation Atmosphere
Sheet Metal • Louvers	• Throttle	Ventilation Atmosphere

Aging management review results for the control room ventilation system are provided in Section 3.3.8.

2.3.3.9 Battery and Emergency Switchgear Ventilation System

System Description

The battery and emergency switchgear ventilation system consists of a common air supply system and separate exhaust systems. Outdoor air is filtered, conditioned by heating coils when required, and discharged by one of the two supply fans to the emergency switchgear and battery rooms of Units 2 and 3. One of the two emergency switchgear room return air fans exhaust air to atmosphere at the radwaste building roof or back to the suction of the supply fan as controlled by an air-operated damper. One of the two battery room exhaust fans discharges exhaust air from the battery rooms to atmosphere at the radwaste building roof. Loss of duct pressure automatically starts standby fans and sounds an alarm in the main control room.

The ventilation system is normally in operation and continues to operate during accident conditions including the loss of offsite power. All system controls are from a local panel. Redundant fans are provided for reliable system operation.

The battery and emergency switchgear ventilation system is described in additional detail in UFSAR Section 10.14. License renewal boundary diagram references for the battery and emergency switchgear ventilation system are LR-M-389 and LR-M-399.

Intended Functions within the Scope of License Renewal

Ventilation - The system provides ventilation to the emergency switchgear and battery rooms during normal, abnormal, and accident conditions.

Heating - The system provides room heating during all normal plant operating conditions and following a design basis event or accident. Heating is the recirculation of heated air with reduced air exchange with the outdoor environment.

Component Groups Requiring Aging Management Review

Table 2.3.3-9 Component Groups Requiring Aging Management Review - Battery and Emergency Switchgear Ventilation System

Component Group	Component Intended Function	Environment
Casting and Forging • Valve Bodies	• Pressure Boundary	Sheltered, Ventilation Atmosphere
Elastomer • Fan Flex Connections	• Pressure Boundary	Sheltered, Ventilation Atmosphere
Piping • Tubing	• Pressure Boundary	Sheltered, Ventilation Atmosphere
Sheet Metal • Bird Screens	• Filter	Outdoor, Ventilation Atmosphere
Sheet Metal • Exhaust Hoods	• Pressure Boundary	Outdoor, Ventilation Atmosphere
Sheet Metal • Ducting • Plenums • Damper Enclosures • Fan Enclosures	• Pressure Boundary	Sheltered, Ventilation Atmosphere
Sheet Metal • Louvers	• Throttle	Ventilation Atmosphere

Aging management review results for the battery and emergency switchgear ventilation system are provided in Section 3.3.9.

2.3.3.10 Diesel Generator Building Ventilation System

System Description

The diesel generator building ventilation system provides heating, cooling and ventilation for personnel comfort, for the diesel generators and associated equipment, and for the ESW booster pumps. The system provides ventilation and cooling to the emergency diesel generator rooms during normal plant operation and following design basis events. It supplies heating as required during normal operating conditions. The system also provides ventilation, cooling, and heating as required to the Cardox and ESW booster pump room during normal plant operating conditions.

Each emergency diesel generator room is provided with ventilation air supply fans and an exhaust relief damper. Combustion air for the diesel engine is taken from the room. The ventilation systems are supplied with power from the diesels during the loss of offsite power.

The diesel generator building ventilation system is discussed in further detail in UFSAR Section 10.14. License renewal boundary diagram reference for the diesel generator building ventilation system is LR-M-392.

Intended Functions within the Scope of License Renewal

Ventilation - The system provides ventilation to maintain an acceptable environment to support proper diesel generator operation during normal plant operating conditions and following design basis events.

Cooling - The system provides cooling to maintain an acceptable environment to support proper operation of the diesel generators and their associated equipment during normal plant operating conditions and following design basis events.

Component Groups Requiring Aging Management Review

Table 2.3.3-10 Component Groups Requiring Aging Management Review - Diesel Generator Building Ventilation System

Component Group	Component Intended Function	Environment
Elastomer • Fan Flex Connections	• Pressure Boundary	Sheltered, Ventilation Atmosphere
Sheet Metal • Ducting • Damper Enclosures • Fan Enclosures	• Pressure Boundary	Sheltered, Ventilation Atmosphere
Sheet Metal • Louvers	• Throttle	Ventilation Atmosphere

Aging management review results for the diesel generator building ventilation system are provided in Section 3.3.10.

2.3.3.11 Pump Structure Ventilation System

System Description

The emergency service water and high pressure service water compartment housing the high pressure service water pumps, emergency service water pumps, fire pumps, and service water screen wash pumps is provided with a ventilation supply and exhaust system in each of the two seismic Class I compartments. The pump structure ventilation system is supplied with standby power during the loss of offsite power. Redundant ventilation equipment is furnished in each compartment for uninterrupted service. Each pump room contains two safety related 100% capacity supply fans, two safety related 100% capacity exhaust fans, and one non-safety related steam unit heater.

Each pump room has a missile protected concrete air mixing box which contains an outdoor air damper and a return air damper. Air is exhausted to a missile protected concrete exhaust air plenum.

The pump structure ventilation system is described in detail in UFSAR Section 10.14. License renewal boundary diagram reference for the pump structure ventilation system is LR-M-392.

Intended Functions within the Scope of License Renewal

Ventilation - The system provides ventilation to maintain an acceptable environment to support proper ESW and HPSW pump operation during normal plant operating conditions and following design basis events.

Cooling - The system provides cooling to maintain an acceptable environment to support proper operation of the ESW and HPSW pumps and their associated equipment during normal plant operating conditions and following design basis events.

Component Groups Requiring Aging Management Review

Table 2.3.3-11 Component Groups Requiring Aging Management Review - Pump Structure Ventilation System

Component Group	Component Intended Function	Environment
Casting and Forging • Valve Bodies	• Pressure Boundary	Sheltered, Ventilation Atmosphere
Elastomer • Flex Hose Connections	• Pressure Boundary	Sheltered, Ventilation Atmosphere
Piping • Tubing	• Pressure Boundary	Sheltered, Ventilation Atmosphere
Sheet Metal • Ducting • Damper Enclosures • Fan Enclosures	• Pressure Boundary	Sheltered, Ventilation Atmosphere
Sheet Metal • Louvers	• Throttle	Ventilation Atmosphere
Sheet Metal • Bird Screens	• Filter	Ventilation Atmosphere, Outdoor

Aging management review results for the pump structure ventilation system are provided in Section 3.3.11.

2.3.3.12 Safety Grade Instrument Gas System

System Description

The safety grade instrument gas (SGIG) system supplies pressurized nitrogen gas from the containment atmospheric dilution tank as a backup to normal instrument air. The safety grade pneumatic supply is isolated from the non-safety grade portion of the air supply by spring-loaded, soft-seat, check valves designed for zero leakage.

Following a LOCA coincident with a loss of instrument air, the SGIG system supplies pressurized nitrogen gas as a backup pneumatic source to the containment atmospheric control purge and vent isolation valves, torus to secondary containment vacuum breakers and the containment atmospheric dilution vent control valves.

A detailed description of the safety grade instrument gas system is provided in UFSAR Sections 5.2 and 10.17. License renewal boundary diagram references for the safety grade instrument gas system are LR-M-367 and LR-M-372.

Intended Functions within the Scope of License Renewal

Backup Nitrogen Supply - The safety grade instrument gas system provides a backup nitrogen supply to safety related pneumatically operated components.

Component Groups Requiring Aging Management Review

Table 2.3.3-12 Component Groups Requiring Aging Management Review - Safety Grade Instrument Gas System

Component Group	Component Intended Function	Environment
Casting and Forging • Valve Bodies	• Pressure Boundary	Sheltered, Dry Gas
Piping • Pipe	• Pressure Boundary	Sheltered, Dry Gas
Piping Specialties • Flexible Hoses	• Pressure Boundary	Sheltered, Dry Gas

Aging management review results for the safety grade instrument gas system are provided in Section 3.3.12.

2.3.3.13 Backup Instrument Nitrogen to ADS System

System Description

The backup instrument nitrogen to ADS system consists of a split ring header with a seismic Category I bottle rack, three nitrogen bottles located in the reactor building, seismic Category I piping and valves, and an external nitrogen connection located outside the reactor building at ground level. The split ring header supplies five ADS valves, three from one section of the header, and two from the other section.

The backup instrument nitrogen to the automatic depressurization system (ADS) supplies a safety related pneumatic supply of nitrogen to the ADS valves in the event that the instrument nitrogen system is unavailable or inoperable. Short-term ADS operation is provided by locally mounted accumulators on each ADS valve which supply sufficient pneumatic pressure for two valve actuations at 70% of drywell design pressure.

The backup instrument nitrogen to ADS system also supports ADS in its emergency core cooling and residual heat removal capacity by providing a safety related pneumatic supply capable of sustaining ADS operation for 100 days post-LOCA.

A long-term, backup, safety grade pneumatic nitrogen supply has been provided to selected safety relief valves. This pneumatic supply is provided to enable remote operation of the above valves for a period of 72 hours following a design basis fire in fire areas that have been postulated to render the ADS valves available for only short-term operation. The source of the pneumatic nitrogen supply is the safety grade instrument gas that is tied into the liquid nitrogen tank that supplies the containment atmospheric dilution system.

A description of the backup instrument nitrogen system is provided in UFSAR Sections 4.4 and 10.17. License renewal boundary diagram references for the backup instrument nitrogen to the ADS are LR-M-333 and LR-M-351.

Intended Functions within the Scope of License Renewal

Backup Nitrogen Supply - Backup instrument nitrogen to the ADS supplies a long-term, back-up, safety grade supply of nitrogen to the five ADS valves during all normal plant operating and accident conditions.

Component Groups Requiring Aging Management Review

Table 2.3.3-13 Component Groups Requiring Aging Management Review - Backup Instrument Nitrogen to ADS

Component Group	Component Intended Function	Environment
Casting and Forging • Valve Bodies	• Pressure Boundary	Sheltered, Dry Gas
Piping • Pipe	• Pressure Boundary	Sheltered, Dry Gas
Piping Specialties • Flexible Hoses • Flow Element	• Pressure Boundary	Sheltered, Dry Gas
Vessel • Accumulators	• Pressure Boundary	Sheltered, Dry Gas

Aging management review results for the backup instrument nitrogen to the ADS are provided in Section 3.3.13.

2.3.3.14 Emergency Cooling Water System

System Description

The emergency cooling water (ECW) system provides a reliable back-up source of cooling water to the emergency service water and high pressure service water systems when the circulating water pump structure is isolated from the normal heat sink, the Conowingo Pond. The source of water for the ECW system is the Emergency Cooling Tower, which includes the reservoir, which is described in Section 2.4.5.

The ECW system is designed to remove, via the ESW and HPSW systems, the sensible and decay heat from the reactor primary and auxiliary systems so that the reactor can be shutdown in the event of the unavailability of the normal heat sink.

The ECW system consists of one ECW pump, two ESW booster pumps, three emergency cooling tower fans in an induced draft three-cell cooling tower with integral storage reservoir and associated discharge and distribution piping.

When the normal heat sink is lost, or when flooding occurs, sluice gates in the circulating water pump structure are closed. Water is provided through two gravity fed lines from the emergency cooling tower basin into the circulating water pump structure. The ECW pump in conjunction with the ESW booster pump and HPSW pumps, supply cooling water to heat exchangers required to bring Units 2 and 3 to safe shutdown. Return water from the HPSW flows to the emergency cooling tower. Return water from the ESW system flows through one of the two ESW booster pumps and is pumped into the emergency cooling tower.

The emergency cooling water system is discussed in additional detail in UFSAR Section 10.24. License renewal boundary diagram reference for the emergency cooling water system is LR-M-330.

Intended Functions within the Scope of License Renewal

Component Cooling - The ECW (including the emergency cooling tower) system provides cooling water flow to transfer heat from the ESW and HPSW systems during the mitigation of a flood or loss of the normal heat sink, the Conowingo Pond.

Back-up Cooling - The ECW system is available to provide a reliable back-up source of cooling water to the ESW system during normal plant operation in the unlikely event of failure of the ESW pumps.

Component Groups Requiring Aging Management Review

Table 2.3.3-14 Component Groups Requiring Aging Management Review - Emergency Cooling Water System

Component Group	Component Intended Function	Environment
Casting and Forging • Valve Bodies	• Pressure Boundary	Outdoor
Casting and Forging • Valve Bodies • Pump Casings	• Pressure Boundary	Raw Water, Sheltered
Casting and Forging • Pump Casings (External)	• Pressure Boundary	Raw Water
Piping • Pipe	• Pressure Boundary	Buried, Outdoor
Piping • Pipe • Tubing	• Pressure Boundary	Raw Water, Sheltered
Piping Specialties • Flow Elements	• Pressure Boundary	Raw Water, Sheltered

Aging management review results for the emergency cooling water system are provided in Section 3.3.14.

2.3.3.15 Condensate Storage System

System Description

The condensate storage system is the preferred water supply for the high pressure coolant injection system (HPCI) and the reactor core isolation cooling system (RCIC). The system also provides plant system makeup needs, receives reject flow, and provides condensate for any continuous service needs.

The system consists of two 200,000 gallon capacity (one for each unit), carbon steel condensate storage tanks, two condensate transfer pumps, a condensate transfer system keep full pump, and associated piping and valves necessary to complete required system functions. The condensate storage system is common to both units at PBAPS. Although the condensate storage system is non-safety related, it supplies the HPCI and RCIC systems during fire safe shutdown and station blackout scenarios.

Additional information pertaining to the condensate storage system is found in UFSAR Sections 4.7 and 6.4. License renewal boundary diagram reference for the condensate storage system is LR-M-309.

Intended Functions within the Scope of License Renewal

Water Storage and Supply - The condensate storage system supports HPCI and RCIC Systems during fire safe shutdown and station blackout events by providing a water supply and a means for its storage.

Component Groups Requiring Aging Management Review

Table 2.3.3-15 Component Groups Requiring Aging Management Review - Condensate Storage System

Component Groupings	Component Intended Function	Environment
Casing and Forging • Valve Bodies	• Pressure Boundary	Condensate Storage Water
Casting and Forging • Valve Bodies	• Pressure Boundary	Outdoor, Sheltered
Piping • Pipe • Tubing	• Pressure Boundary	Condensate Storage Water
Piping • Pipe	• Pressure Boundary	Outdoor
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered
Vessel • Condensate Storage Tanks	• Pressure Boundary	Condensate Storage Water
Vessel • Condensate Storage Tanks	• Pressure Boundary	Outdoor
Vessel • Condensate Storage Tanks (Tank Nozzles)	• Pressure Boundary	Outdoor

Aging management review results for the condensate storage system are provided in Section 3.3.15.

2.3.3.16 Emergency Diesel Generator

System Description

Four emergency diesel generators (EDGs) supply independent standby AC power to Units 2 and 3. Each EDG set consists of a diesel engine, a generator, and auxiliary systems (starting air, fuel oil, jacket cooling, air coolant, and lubricating oil). Each EDG is connected to one 4kV Class 1E emergency bus per unit. The 4kV emergency switchgear bus distributes AC power to engineered safeguard and selected non-safeguard systems. Power provided to engineered safeguard loads is divided into four safeguard channels, "A" through "D", for each unit so that the failure of one diesel generator or one 4kV emergency bus will not prevent a safe shutdown of either unit.

Each EDG is automatically started on loss of offsite power, low reactor water level, or high drywell pressure signals. The EDGs are connected to the 4kV emergency buses upon a loss of offsite power after generator voltage and frequency are established.

The EDGs are housed in a seismic Class I, watertight diesel generator enclosure. Each unit is enclosed in its own concrete cell and is isolated from the other units. The building location is separate from the power block.

The emergency diesel generator and standby AC distribution system is discussed in detail in UFSAR Section 8.5. License renewal boundary diagram reference for the EDG system is LR-M-377.

Intended Functions within the Scope of License Renewal

Provide Emergency AC Power - The EDG sets provide Class 1E electrical power to the emergency buses in a Loss of Off-site power (LOOP) condition or a LOCA coincident with LOOP condition.

Support Offsite Power Transfer - The EDG sets are used to support the transfer of power from one offsite safeguard source to another by providing a parallel source of AC power to the emergency buses during the transfer operation.

Component Groups Requiring Aging Management Review

Table 2.3.3-16 Component Groups Requiring Aging Management Review - Emergency Diesel Generator

Component Group	Component Intended Function	Environment
Casting and Forging • Pump Casings • Valve Bodies	• Pressure Boundary	Closed Cooling Water

Table 2.3.3-16 Component Groups Requiring Aging Management Review - Emergency Diesel Generator (Continued)

Component Group	Component Intended Function	Environment
Casting and Forging • Valve Bodies • Pump Casings • Strainer Bodies	• Pressure Boundary	Lubricating and Fuel Oil
Casting and Forging • Strainer Screens	• Filter	Lubricating and Fuel Oil
Casting and Forging • Valve Bodies	• Pressure Boundary	Outdoor
Casting and Forging • Pump Casings • Valve Bodies • Strainer Bodies	• Pressure Boundary	Sheltered
Casting and Forging • Strainer Screens	• Filter	Wetted Gas
Casting and Forging • Valve Bodies • Strainer Bodies	• Pressure Boundary	Wetted Gas
Elastomer • Flexible Hoses	• Pressure Boundary	Closed Cooling Water
Elastomer • Flexible Hoses	• Pressure Boundary	Lubricating and Fuel Oil
Elastomer • Flexible Hoses	• Pressure Boundary	Sheltered
Elastomer • Flexible Hoses	• Pressure Boundary	Wetted Gas
Heat Exchanger • EDG Jacket Coolant Coolers	• Pressure Boundary • Heat Transfer	Closed Cooling Water, Raw Water
Heat Exchanger • EDG Air Coolant Coolers	• Pressure Boundary • Heat Transfer	Closed Cooling Water, Raw Water
Heat Exchanger • EDG Lube Oil Coolers	• Pressure Boundary • Heat Transfer	Lubricating Oil, Raw Water
Heat Exchanger • EDG Jacket Coolant Coolers • EDG Air Coolant Coolers • EDG Lube Oil Coolers	• Pressure Boundary	Sheltered
Piping • Pipe	• Pressure Boundary	Buried
Piping • Pipe • Tubing	• Pressure Boundary	Closed Cooling Water
Piping • Pipe • Tubing • Fittings	• Pressure Boundary	Lubricating and Fuel Oil

Table 2.3.3-16 Component Groups Requiring Aging Management Review - Emergency Diesel Generator (Continued)

Component Group	Component Intended Function	Environment
Piping • Pipe	• Pressure Boundary	Outdoor
Piping • Pipe • Tubing • Fittings	• Pressure Boundary	Sheltered
Piping • Pipe	• Pressure Boundary	Wetted Gas
Piping Specialties • Thermowells	• Pressure Boundary	Closed Cooling Water
Piping Specialties • Thermocouple Cap	• Pressure Boundary	Closed Cooling Water
Piping Specialties • Restricting Orifices • Expansion Joints	• Pressure Boundary	Closed Cooling Water
Piping Specialties • Expansion Joints • Thermowells • Thermowell Caps • Restricting Orifices • Drain Traps	• Pressure Boundary	Sheltered
Piping Specialties • Drain Traps • Expansion Joints	• Pressure Boundary	Wetted Gas
Vessel • Fuel Oil Storage Tank	• Pressure Boundary	Buried, Fuel Oil
Vessel • Expansion Tank	• Pressure Boundary	Closed Cooling Water
Vessel • Fuel Oil Day Tank	• Pressure Boundary	Fuel Oil
Vessel • Lubricating Oil Tank	• Pressure Boundary	Lubricating Oil
Vessel • Lubricating Oil Tank • Expansion Tank • Fuel Oil Day Tank • Air receivers • Silencers	• Pressure Boundary	Sheltered
Vessel • Air Receivers • Silencers	• Pressure Boundary	Wetted Gas

Aging management review results for the emergency diesel generator are provided in Section 3.3.16.

2.3.3.17 Suppression Pool Temperature Monitoring System

System Description

The suppression pool temperature monitoring system (SPOTMOS) provides indication of the individual and average bulk torus water temperature in the control room to ensure torus water is maintained within specified temperature limits. The system also provides indication of torus water temperature to the remote shutdown panel and the high pressure coolant injection alternative control station for remote indication when the control room is not accessible.

The SPOTMOS consists of two independent divisionalized monitoring systems. Each system consists of temperature sensors and a processing unit to display temperature in the control room.

Within each divisionalized system, SPOTMOS is capable of providing individual as well as the average of the temperature sensor indications. For each division, only one of the dual elements for each sensor is permanently connected. The remaining elements are not permanently connected and are provided as installed spares.

The SPOTMOS is normally energized and is supplied from independent divisionalized Class 1E power sources.

The suppression pool temperature monitoring system is discussed in UFSAR Section 7.20.4.7. License renewal boundary diagram reference for the SPOTMOS is LR-M-361.

Intended Functions within the Scope of License Renewal

Torus Water Temperature Monitoring - The suppression pool temperature monitoring system provides indication of the individual and average bulk torus water temperature in the control room to ensure torus water is maintained within specified temperature limits.

Component Groups Requiring Aging Management Review

Table 2.3.3-17 Component Groups Requiring Aging Management Review - Suppression Pool Temperature Monitoring System

Component Group	Component Intended Function	Environment
• Penetration Sleeves (Thermowells)	• Pressure Boundary • Fission Product Barrier	Torus Water, Sheltered

Aging management review results for the suppression pool temperature monitoring system are provided in Section 3.3.17.

2.3.3.18 Cranes and Hoists

System Description

The reactor building cranes, as well as cranes such as the four emergency diesel generator building cranes and hoists in proximity of safety systems, structures, and components are within the scope of this system.

Safety related cranes and hoists in proximity of safety systems, structures, and components (SSCs), are designed and analyzed to perform tasks so as not to prevent the SSCs from performing their safety related function.

The reactor building crane for each unit is designed such that no credible postulated failure of any crane component will result in the dropping of the fuel cask; therefore, the consequences of this accident are precluded.

Additional information pertaining to cranes and hoists is found in UFSAR Sections 10.3, 10.4, 12.2, 14.4, and UFSAR Appendix C.

Intended Functions within the Scope of License Renewal

Prevent Fuel Cask Drop Accident - The reactor building crane is designed to lift and transport spent fuel cask such that no credible postulated failure of any crane component will result in the dropping of the cask.

Heavy Loads - The reactor building cranes support single failure proof criteria for lifting heavy loads over fuel in the reactor pressure vessel or over the spent fuel pool.

Structural Integrity - Cranes and hoists are required to maintain their structural integrity while they travel above or in proximity of safety related SSCs.

Component Groups Requiring Aging Management Review

Table 2.3.3-18 Component Groups Requiring Aging Management Review - Cranes and Hoists

Component Group	Component Intended Function	Environment
Cranes and Hoists • Circulating Water Pump Structure Crane 35 Ton Gantry (Structural Members, Rails, Rail Clips, and Rail Bolts)	• Structural Support to Non-S/R Components	Outdoor
Cranes and Hoists • Reactor Building Overhead Bridge Cranes (Rails, Rail Clips and Rail Bolts)	• Structural Support • Structural Support to Non-S/R Components	Sheltered
Cranes and Hoists • Other Cranes and Hoists (Rails, Monorail Flanges, Rail Clips, and Rail Bolts)	• Structural Support to Non-S/R Components	Sheltered

Aging management review results for cranes and hoists are provided in Section 3.3.18.

2.3.4 Steam and Power Conversion Systems

2.3.4.1 Main Steam System

System Description

The main steam system conducts steam from the reactor vessel through the primary containment to the steam turbine over the full range of reactor power operation. Four steam lines are utilized between the reactor and the main turbine. The use of multiple lines permits turbine stop valve and main steam line isolation valve tests during plant operation with a minimum amount of load reduction. Each main steam line up to and including the main steam line isolation valve external to the primary containment is seismic Class I.

The main steam system provides steam on demand to the high pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) system turbines via the "B" and "C" main steam lines, respectively.

Overpressure protection of the reactor pressure vessel is provided via the main steam safety relief valves (SRVs) and safety valves (SVs). This function ensures the integrity of the reactor coolant pressure boundary and associated piping. The capability to depressurize the reactor vessel via the automatic depressurization system (ADS) designated SRVs during all normal plant operating conditions and following a design basis event allows the operation of the low pressure ECCS systems should they be required.

The five safety relief valves designated to fulfill the ECCS function, in conjunction with the ADS logic, ensure that the low pressure ECCS systems provide adequate core cooling during accident and post accident conditions in the event that the high pressure coolant injection systems are unavailable or unable to maintain level in the vessel.

The main steam system operates in conjunction with the primary containment isolation system to mitigate the consequences of accidents which could result in potential offsite exposure due to a breach of the main steam system. The main steam isolation valves (MSIVs) will close on signals indicative of a LOCA or leak in the main steam system to containment. The main steam line flow restrictors limit maximum steam flow under assumed accident conditions of a steam line rupture to a value which ensures that the steam dryer in the reactor vessel remains in place. This feature ensures that fragments from the dryer will not be blown into the steam lines preventing tight closure of the MSIVs. This function also serves to limit steam line flow during a steam line rupture outside of primary containment until the MSIVs can close, thereby limiting potential radioactive release.

The main steam system also allows for a path for alternate shutdown cooling in the event that the shutdown cooling mode of the RHR system cannot be established. This is accomplished by closure of the main steam isolation valves, raising the reactor vessel level to the main steam lines, and using no more than two ADS SRVs for low pressure liquid discharge to the suppression pool, and one or more RHR loops operating in the suppression pool cooling mode of the system.

Post accident containment, holdup and plateout of MSIV bypass leakage is credited in accident analyses when calculating airborne activities. Plateout of elemental and particulate iodine is credited in steam line piping and the main condenser.

The main steam system is described in detail in UFSAR Sections 4.4, 4.11, 6.4.2, and 14.9. License renewal boundary diagram references for the main steam system are LR-M-303, LR-M-304, LR-M-306, LR-M-308, LR-M-331, and LR-M-351.

Intended Functions within the Scope of License Renewal

Deliver steam to HPCI and RCIC systems - The main steam system provides steam to the HPCI and RCIC systems via the "B" and "C" main steam lines, respectively.

Overpressure Protection of the RPV - This function ensures the integrity of the reactor coolant pressure boundary and associated piping via SRVs and SVs.

RPV Depressurization - This function utilizes the ADS designated SRVs to accommodate operation of the low-pressure ECCS systems should they be required.

Containment Isolation - This function uses the primary containment isolation system to mitigate the consequences of accidents that could result in potential offsite exposure due to a breach of the main steam system.

Limit steam line flow - This function limits potential radioactive release by restricting steam flow during a steam line rupture outside of primary containment. Flow is also limited to ensure integrity of dryers in order to prevent restriction of MSIV closure.

Steam flow measurement – The main steam system provides main steam flow input to PCIS.

Alternate shutdown cooling - This function provides for core cooling in the event that the normal shutdown cooling flow path cannot be established.

Post accident containment, holdup and plateout of MSIV bypass leakage - The main steam system provides for post accident containment, holdup and plateout of MSIV bypass leakage.

Component Groups Requiring Aging Management Review

Table 2.3.4-1 Component Groups Requiring Aging Management Review - Main Steam System

Component Group	Component Intended Function	Environment
Casting and Forging • Valve Bodies	• Pressure Boundary	Dry Gas
Casting and Forging • Valve Bodies	• Pressure Boundary	Sheltered
Casting and Forging • Valve Bodies	• Pressure Boundary	Steam
Casting and Forging • Valve Bodies	• Pressure Boundary	Wetted Gas
Piping • Pipe	• Pressure Boundary	Dry Gas
Piping • Pipe • Tubing	• Pressure Boundary	Sheltered
Piping • Pipe • Tubing	• Pressure Boundary	Steam
Piping • SRV Tailpipe	• Pressure Boundary	Torus Grade Water
Piping • SRV Tailpipe	• Pressure Boundary	Torus Grade Water (Gas Interface)
Piping • Pipe • Pipe (RPV Head Flange Leakoff)	• Pressure Boundary	Wetted Gas
Piping Specialties • Dashpot	• Pressure Boundary	Dry Gas
Piping Specialties • Flexible Hoses	• Pressure Boundary	Dry Gas
Piping Specialties • Flow Elements • Dashpot • Y Strainer • Condensing Chamber • Restricting Orifice • Flexible Hoses	• Pressure Boundary	Sheltered

Table 2.3.4-1 Component Groups Requiring Aging Management Review - Main Steam System (Continued)

Component Group	Component Intended Function	Environment
Piping Specialties • Flow Elements (body) • Y Strainer • Condensing Chambers	• Pressure Boundary	Steam
Piping Specialties • Flow Elements (throat)	• Throttle	Steam
Piping Specialties • Restricting Orifice	• Pressure Boundary • Throttle	Steam
Piping Specialties • Spargers	• Spray	Torus Grade Water
Piping Specialties • Restricting Orifice (RPV Head Flange Leakoff)	• Pressure Boundary • Throttle	Wetted Gas
Vessel • Accumulators	• Pressure Boundary	Dry Gas, Sheltered

Aging management review results for the main steam system are provided in Section 3.4.1.

2.3.4.2 Main Condenser

System Description

The main condenser provides a heat sink for the turbine exhaust steam, turbine bypass steam, and other flows. It also deaerates and stores the condensate for reuse after a period of radioactive decay. Additionally, the main condenser provides for post accident containment, holdup and plateout of main steam isolation valve (MSIV) bypass leakage.

The main condenser is a single pass, single pressure, deaerating type with a reheating deaerating hotwell and divided waterboxes. The condenser consists of three sections, each section located below the low-pressure elements of the turbine, with the tubes oriented transverse to the turbine-generator axis. The steam exhausts directly down into the condenser shells through exhaust openings in the bottom of each low-pressure turbine casing. The condensers also receive steam from the reactor feed pump turbines.

PBAPS accident analyses evaluated MSIV bypass leakage as part of primary containment leakage. This is treated as a ground level release, with credit for holdup and plateout (elemental and particulate iodine only) in steam line piping and the condenser. This leakage is to the condenser, which is assumed to leak at one percent of volume per day.

Additional information pertaining to the main condenser is found in UFSAR Sections 11.3 and 14.9. License renewal boundary diagram reference for the main condenser is LR-M-303.

Intended Functions within the Scope of License Renewal

Post accident containment, holdup and plateout of MSIV bypass leakage - The main condenser provides for post accident containment, holdup and plateout of MSIV bypass leakage.

Component Groups Requiring Aging Management Review

Table 2.3.4-2 Component Groups Requiring Aging Management Review - Main Condenser

Component Group	Component Intended Function	Environment
Main Condenser (Waterbox)	• Containment, Holdup and Plateout	Raw Water
Main Condenser (Shell, Feedwater Heater Shell, Nozzles, Expansion Joint)	• Containment, Holdup and Plateout	Sheltered
Main Condenser (Feedwater Heater Shell) (Drain Cooler Shell)	• Containment, Holdup and Plateout	Steam
Main Condenser (Nozzles)	• Containment, Holdup and Plateout	Steam
Main Condenser (Expansion Joint)	• Containment, Holdup and Plateout	Steam
Main Condenser (Shell)	• Containment, Holdup and Plateout	Steam, Reactor Coolant
Main Condenser (Tubes) (Tubesheet)	• Containment, Holdup and Plateout	Steam, Raw Water

Aging management review results for the main condenser are provided in Section 3.4.2.

2.3.4.3 Feedwater System

System Description

The feedwater system is safety related from the outermost primary containment isolation valve to the reactor pressure vessel (RPV). The portion of the feedwater system from the inlet of the drain cooler up to, but not including, the outermost primary containment isolation valve is non-safety related.

During normal plant operation, the feedwater system receives its supply of water from the outlet of the condensate demineralizers. The system consists of three feedwater heater strings (with cascading drains) connected in parallel, each consisting of five low pressure feedwater heaters and one drain cooler in series. The feedwater heaters receive steam from the main turbine system and preheat feedwater prior to entering the reactor feed pumps, thus increasing the heat cycle efficiency. The outlets of the three heater strings are cross-connected and provide a common suction header for the three reactor feed pumps. The reactor feed pumps are mounted in parallel with each having an individual suction valve, discharge check valve, and discharge valve. The reactor feed pumps discharge to a common discharge header that connects to two feedwater headers. These two feedwater headers contain inboard and outboard containment isolation valves. Inside containment, these two feedwater headers each split into three piping runs for a total of six, which then go to the RPV. The feedwater system provides the injection path for HPCI and RCIC during transient and accident conditions. HPCI and RCIC join the feedwater system outside the primary containment. Flow is then channeled through the feedwater piping to the RPV.

The feedwater system is discussed in further detail in UFSAR Sections 4.11, 7.10, and 11.8. License renewal boundary diagram references for the feedwater system are LR-M-308 and LR-M-351.

Intended functions within the Scope of License Renewal

HPCI and RCIC Injection - The feedwater system provides an injection path into the RPV for both HPCI and RCIC during transient or accident conditions.

Primary Containment Isolation - The feedwater system provides primary containment isolation to prevent primary containment leakage under transient and accident conditions.

Component Groups Requiring Aging Management Review

Table 2.3.4-3 Component Groups Requiring Aging Management Review - Feedwater System

Component Group	Component Intended Function	Environment
Casting and Forging • Valves	• Pressure Boundary	Reactor Coolant, Sheltered
Piping • Pipe • Tubing	• Pressure Boundary	Reactor Coolant, Sheltered
Piping Specialties • Flow Elements • Thermowell	• Pressure Boundary	Reactor Coolant, Sheltered

Aging management review results for the feedwater system are provided in Section 3.4.3.

2.4 SCOPING AND SCREENING RESULTS: STRUCTURES AND COMPONENT SUPPORTS

The structure scoping and screening results consist of lists of components and component groups that require aging management review, arranged by structure. Brief descriptions of structures within the scope of license renewal are provided as background information. Structure intended functions are provided for in-scope structures. For each in-scope structure, components or component groups requiring an aging management review are provided.

In addition to the structures within the scope of license renewal presented in this section, several structural component groups, such as component supports, were evaluated as commodities. Commodity groups were determined based upon similar design or similar materials and similar environments.

For each of the structures within the scope of license renewal, this section provides the following information:

- A general description of the structure,
- The intended functions of the structure within the scope of license renewal,
- A reference to the applicable UFSAR section,
- A reference to the applicable license renewal boundary diagrams,
- A listing of the components or component groups that require aging management review, associated component intended functions and environments.

A discussion of component groups, component intended functions and environments is provided in Section 3.0.

For each structure, the tables are sorted by component group and then by environment.

For each of the structural commodities, this section provides the following information:

- A general description of the commodity,
- A listing of the components or component groups that require aging management review, associated component intended functions and environments.

Section 3.5 provides the results of the aging management reviews for the component groups in each of these structures and commodities.

2.4.1 Containment Structure

Structure Description

The containment structure consists of the primary containment of each unit and internal structural steel. The primary containment of each unit is of the Mark I design that consists of a drywell, a suppression chamber in the shape of a torus, and a connecting vent system between the drywell and the suppression chamber. The containment structure is part of a "multibarrier" system with a primary barrier consisting of the primary containment with its pressure suppression system, and a secondary barrier consisting of the reactor building with a system to limit the ground level release of airborne radioactive material from the secondary containment.

The containment structure contains the released steam in the event of the design basis LOCA to limit the release to the reactor building of fission products associated with this accident.

The containment structure is an enclosure for the reactor vessel, the reactor coolant recirculation system, and other branch connections of the reactor coolant system. It includes a drywell and connected pressure suppression chamber, isolation valves, vacuum breakers, containment cooling systems, and other service equipment. The drywell is a steel pressure vessel in the shape of a light bulb, and the pressure suppression chamber is a torus-shaped steel pressure vessel located below and encircling the drywell. The primary containment is a seismic Class I structure. The drywell is enclosed in reinforced concrete for shielding purposes.

The stiffened pressure suppression chamber is a steel pressure vessel in the shape of a torus. It contains approximately 125,000 cu ft of water and has a gas space volume above the pool. The suppression chamber is supported on braced vertical columns to carry its loading to the reinforced concrete foundation slab of the reactor building.

Internal structural steel is provided at various elevations of the primary containment drywell and the pressure suppression chamber. The internal structural steel provides structural support to safety related and non-safety related systems and equipment inside the primary containment drywell. It also provides personnel access to the equipment for maintenance and testing.

The containment structure is further discussed in UFSAR Sections 5.2, 14.6, and Appendix M.3. License renewal boundary diagram reference for the containment structure is LR-S-001.

Intended Functions within the Scope of License Renewal

Primary Containment - The primary containment provides an essentially leak tight fission product barrier.

Primary Containment Pressure Suppression - The containment structure supports pressure suppression by providing the following:

1. LOCA vent system steam discharge pressure suppression
2. Steam discharge pressure suppression
3. Suppression pool water inventory and supply

Physical Support - The containment structure provides physical support for safety related and non-safety related systems and equipment during normal, and abnormal loading conditions.

Component Groups Requiring Aging Management Review

Table 2.4-1 Component Groups Requiring Aging Management Review - Containment Structure

Component Group	Component Intended Function	Environment
Reinforced Concrete • Reactor Pedestal • Foundation • Floor Slab	• Structural Support • Shelter, Protection and/or Radiation Shielding	Sheltered
Unreinforced Concrete • Sacrificial Shield Wall	• Shelter, Protection and/or Radiation Shielding	Sheltered
Drywell • Shell • Head	• Pressure Boundary • Structural Support • Shelter, Protection and/or Radiation Shielding • Fission Product Barrier	Sheltered
Drywell • CRD Removal Hatch • Equipment Hatch • Personnel Airlock • Access Manhole and Inspection Ports • Penetrations	• Pressure Boundary • Fission Product Barrier	Sheltered
Drywell • Penetration Bellows	• Pressure Boundary • Fission Product Barrier	Sheltered
Drywell • Gaskets, O-Rings and Packing Materials	• Pressure Boundary	Sheltered

Table 2.4-1 Component Groups Requiring Aging Management Review - Containment Structure (Continued)

Component Group	Component Intended Function	Environment
Pressure Suppression Chamber • Shell	• Pressure Boundary • Structural Support • Fission Product Barrier	Sheltered, Torus Water
Pressure Suppression Chamber • Ring Girders	• Structural Support	Sheltered, Torus Water
Pressure Suppression Chamber • Column and Saddle Supports • Seismic Restraints	• Structural Support	Sheltered
Pressure Suppression Chamber • Lubrite Plates	• Structural Support	Sheltered
Pressure Suppression Chamber • Access Hatches	• Pressure Boundary • Fission Product Barrier	Sheltered
Pressure Suppression Chamber • Penetrations	• Pressure Boundary • Fission Product Barrier	Sheltered, Torus Water
Pressure Suppression Chamber • Elastomers (Gaskets)	• Pressure Boundary	Sheltered
Vent System • Vent Lines • Vent Line Bellows	• Pressure Boundary • Fission Product Barrier	Sheltered
Vent System • Header and Downcomers	• Pressure Boundary	Sheltered, Torus Water
Vent System • Downcomer Bracing • Vent System Supports	• Structural Support	Sheltered, Torus Water
Structural Steel • Reactor Vessel Pedestal Steel • Sacrificial Shield Wall Steel • Sacrificial Shield Wall Stabilizer • Radial Beam Seats • Lubrite Plates	• Structural Support	Sheltered
Structural Steel • Jet Impingement Shields	• HELB Shielding	Sheltered
Structural Steel • Pipe Whip Restraints	• Pipe Whip Restraint	Sheltered
Structural Steel • Missile Barriers	• Missile Barrier	Sheltered
Structural Steel • Radiation Shields	• Shelter, Protection and/or Radiation Shielding	Sheltered

Aging management review results for the containment structure are provided in Section 3.5.1.

2.4.2 Reactor Building Structure

Structure Description

The reactor building, for each unit, is a seismic Class I structure completely enclosing the primary containment and auxiliary systems of the nuclear steam supply system, and housing the associated spent fuel storage pool, dryer and separator storage pool, and reactor well. The building is a reinforced concrete structure from its foundation floor to its refueling floor. Above this floor, the building superstructure consists of metal siding and roof decking supported on structural steel framework. The foundation of the building consists of a reinforced concrete mat supported on rock. This mat also supports the primary containment and its internals, including the reactor vessel pedestal. The exterior and some interior walls of the building above the foundation are cast-in-place concrete. Other interior walls are normal weight concrete block walls. Floor slabs of the buildings are of composite construction with cast-in-place concrete over structural steel beams and metal floor deck. The thickness of walls and slabs were governed by structural requirements or shielding requirements.

The steel-framed superstructure is cross-braced to withstand wind and earthquake forces, supports metal siding, metal roof deck, and roofing. The frame also supports a runway for the 125-ton traveling reactor building crane.

The reactor building is further discussed in UFSAR Section 12.2 and Appendix C. License renewal boundary diagram reference for the reactor building is LR-S-001.

Intended functions within the Scope of License Renewal

Physical Support - The reactor building provides physical support for safety related and non-safety related systems and equipment during normal, severe environmental, extreme environmental and abnormal loading conditions.

Protection - The reactor building provides protection for safety related and non-safety related systems and equipment from external, internal, and environmental hazards.

Containment - The reactor building provides a secondary containment boundary to contain any release of radioactive material outside the primary containment.

Fire Protection - The reactor building provides rated fire barriers or retards a fire from spreading to adjacent areas of the plant.

Storage - The spent fuel pool portion of the reactor building provides storage for spent fuel, new fuel, and spent fuel storage cask.

Water Volume - The spent fuel pool holds the volume of water necessary for shielding, cooling, and reactivity control during normal plant operation.

Reactivity Management - The spent fuel storage racks maintain spent fuel in subcritical configuration having a k(eff) less than or equal to 0.95.

Component Groups Requiring Aging Management Review

Table 2.4-2 Component Groups Requiring Aging Management Review - Reactor Building Structure

Component Group	Component Intended Function	Environment
Reinforced Concrete • Walls • Slabs • Columns • Beams • Foundation	• Structural Support • Fire Barrier • Shelter, Protection and/or Radiation Shielding • Flood Barrier • Fission Product Barrier • Missile Barrier • HELB Shielding • Structural Support to Non-S/R Components • Contain Fluids	Buried, Outdoor, Sheltered
Reinforced Concrete Block Walls	• Structural Support • Fire Barrier • Shelter, Protection and/or Radiation Shielding • Flood Barrier • HELB Shielding • Structural Support to Non-S/R Components	Sheltered
Fuel Pool Liner	• Pressure Boundary	Sheltered, Fuel Pool Water
Fuel Pool Gates	• Pressure Boundary	Sheltered, Fuel Pool Water
Fuel Storage Racks	• Structural Support	Fuel Pool Water
Boraflex Absorbers	• Absorb Neutrons	Fuel Pool Water
Component Supports	• Structural Support	Fuel Pool Water
Structural Steel • Structural Steel • Reinforced Concrete Embedments	• Structural Support • Structural Support to Non-S/R Components	Sheltered

Table 2.4-2 Component Groups Requiring Aging Management Review - Reactor Building Structure (Continued)

Component Group	Component Intended Function	Environment
Structural Steel • Pipe Whip Restraints	• Pipe Whip Restraint	Sheltered
Structural Steel • Missile Barrier	• Missile Barrier	Sheltered
Structural Steel • Metal Siding	• Fission Product Barrier	Outdoor
Structural Steel • Roof Deck	• Fission Product Barrier	Sheltered
Structural Steel • Blowout Panels	• Fission Product Barrier • Over-Pressure Protection	Sheltered, Outdoor

Aging management review results for the reactor building structure are provided in Section 3.5.2.

2.4.3 Radwaste Building and Reactor Auxiliary Bay

Structure Description

The radwaste building and reactor auxiliary bay are connected to the control room and are located between the two reactor buildings. This complex is designed as a seismic Class I structure. Though located between the reactor buildings, the radwaste building is structurally separated from them. The radwaste building houses various components of the radwaste system, the standby gas treatment system, and associated equipment. It also houses the recirculation system motor generator sets for the two units of the power plant, along with the heating and ventilating equipment for the radwaste building and the main control room. The adjoining reactor auxiliary bay houses HPCI and RCIC turbine pumps, and RHR equipment.

The building is founded on rock with a reinforced concrete mat. All walls except the west wall are concrete up to the roof. The west wall consists of concrete and metal siding for its full height.

The HPCI and RCIC equipment is protected by concrete walls and floor slabs for protection from floods, missiles, and tornados.

The heating and ventilating equipment located at elevation 165 ft. is considered essential for a safe shutdown of the plant, and thus is protected from tornado missiles.

The radwaste building and reactor auxiliary bay are discussed in additional detail in UFSAR Section 12.2 and Appendix C. License renewal boundary diagram reference for the radwaste building and reactor auxiliary bay is LR-S-001.

Intended functions within the Scope of License Renewal

Physical Support - The radwaste building and reactor auxiliary bay provide physical support for safety related and non-safety related systems and equipment during normal, severe environmental, extreme environmental, and abnormal loading conditions.

Protection - The radwaste building and reactor auxiliary bay provide protection for safety related and non-safety related systems and equipment from external, internal, and environmental hazards.

Fire Protection - The radwaste building and reactor auxiliary bay provide rated fire barriers or retard a fire from spreading to adjacent areas of the plant.

Component Groups Requiring Aging Management Review

Table 2.4-3 Component Groups Requiring Aging Management Review - Radwaste Building and Reactor Auxiliary Bay

Component Group	Component Intended Function	Environment
Reinforced Concrete • Walls • Slabs • Columns • Beams • Foundation	• Structural Support • Fire Barrier • Shelter, Protection and/or Radiation Shielding • Flood Barrier • HELB Shielding • Missile Barrier • Structural Support to Non-S/R Components	Buried, Outdoor, Sheltered
Reinforced Concrete Block Walls	• Structural Support • Fire Barrier • Shelter, Protection and/or Radiation Shielding • Structural Support to Non-S/R Components	Sheltered
Structural Steel • Structural Steel • Reinforced Concrete Embedments	• Structural Support • Structural Support to Non-S/R Components	Sheltered
Structural Steel • Jet Impingement Shields	• HELB Shielding	Sheltered
Structural Steel • Missile Barrier	• Missile Barrier	Sheltered

Aging management review results for the radwaste building and reactor auxiliary bay are provided in Section 3.5.3.

2.4.4 Turbine Building and Main Control Room Complex

Structure Description

The turbine building is nominally 600 ft. by 150 ft. in plan and houses both turbine-generators, one for each unit, and other auxiliary plant equipment.

This building is founded on rock at various elevations below elevation 116 ft. The external and some internal walls are concrete up to the operating floor. The structure above this level is metal siding and deck above a 20-ft. band of precast concrete wall panels all supported by structural steel frames. Frames also support two 110-ton overhead bridge cranes in tandem.

Each turbine-generator is mounted on a concrete pedestal nominally 225 ft. by 42 ft. and 50 ft. high. The pedestals are supported on a concrete mat and founded on rock. The turbine building is designed with the seismic design criteria for Zone 1 established by the Uniform Building Code. The turbine building is located east of the two reactor buildings and is separated from them by a gap to accommodate movements of the structures during an earthquake.

The main control room, the cable spreading room, computer room, battery rooms, and emergency switchgear rooms, are located in the center portion of the turbine building.

The failure of the turbine building will not impair the safety function of any seismic Class I structure or equipment inside it or adjacent to it.

The turbine building and main control room complex is discussed in UFSAR Section 12.2 and Appendix C. License renewal boundary diagram reference for the turbine building is LR-S-001.

Intended functions within the Scope of License Renewal

Physical Support - The turbine building provides physical support for safety related and non-safety related systems and equipment during normal, severe environmental, extreme environmental and abnormal loading conditions.

Protection - The turbine building provides protection for safety related and non-safety related systems and equipment from external, internal, and environmental hazards.

Leak-tightness - The control room provides airtight containment for the habitability areas housed within.

Fire Protection - The turbine building provides rated fire barriers or retards a fire from spreading to adjacent areas of the plant.

Support and Protection - The turbine building provides support and protection for the condensers that are credited for accident analysis in UFSAR Chapter 14.

Component Groups Requiring Aging Management Review

Table 2.4-4 Component Groups Requiring Aging Management Review - Turbine Building and Main Control Room Complex

Component Group	Component Intended Function	Environment
Reinforced Concrete • Walls • Slabs • Columns • Beams • Foundation	• Structural Support • Fire Barrier • Shelter, Protection and/or Radiation Shielding • Flood Barrier • Missile Barrier • HELB Shielding • Structural Support to Non-S/R Components	Buried, Outdoor, Sheltered
Reinforced Concrete Block Walls	• Structural Support • Fire Barrier • Shelter, Protection and/or Radiation Shielding • Structural Support to Non-S/R Components	Sheltered
Structural Steel • Structural Steel • Reinforced Concrete Embedments	• Structural Support • Structural Support to Non-S/R Components	Sheltered
Structural Steel • Missile Barrier	• Missile Barrier	Sheltered

Aging management review results for the turbine building and main control room complex are provided in Section 3.5.4.

2.4.5 Emergency Cooling Tower and Reservoir

Structure Description

The emergency cooling tower and reservoir and associated mechanical and electrical equipment are classified as seismic Class I. The Class I elements of the emergency cooling tower and reservoir structure are founded on rock.

The reservoir of the emergency cooling tower and reservoir has a one-week water storage capacity, and is a reinforced concrete tank structure approximately 25 ft. deep with a pre-cast, prestressed concrete roof. The tank structure is founded on rock.

The cooling tower is a mechanical induced draft type, consisting of three cells. The reservoir and tower facility is a reinforced concrete structure. The cooling tower fill consists of vitreous clay tiles of the multi-cell block design.

UFSAR Sections 10.24 and 12.2 describe the emergency cooling tower and reservoir in detail. License renewal boundary diagram reference for the emergency cooling tower structure is LR-S-001.

Intended Functions within the Scope of License Renewal

Physical Support - The emergency cooling tower and reservoir provides physical support for safety related and non-safety related systems and equipment during normal, severe environmental, extreme environmental, and abnormal loading conditions.

Protection - The emergency cooling tower and reservoir provides protection for safety related and non-safety related systems and equipment from external, internal, and environmental hazards.

Fire Protection - The emergency cooling tower and reservoir provides rated fire barriers or retards a fire from spreading to adjacent areas of the plant.

Emergency Heat Sink - The emergency cooling tower and reservoir provides sufficient capacity for removing the sensible and decay heat from the reactor's primary systems so that both reactors can be shut down in the event of unavailability of the normal heat sink.

Sustained Operation - The emergency cooling tower and reservoir provides sufficient storage water capacity to permit emergency cooling tower operation until a makeup water supply can be established.

Component Groups Requiring Aging Management Review

Table 2.4-5 Component Groups Requiring Aging Management Review - Emergency Cooling Tower and Reservoir

Component Group	Component Intended Function	Environment
Reinforced Concrete • Walls	• Structural Support	Raw Water, Outdoor
Reinforced Concrete • Slabs • Columns • Beams • Foundation	• Structural Support • Fire Barrier • Shelter, Protection and/or Radiation Shielding • Flood Barrier • Missile Barrier • Structural Support to Non-S/R Components	Buried, Outdoor, Sheltered
Prestressed Concrete • Roof Slab	• Structural Support • Shelter, Protection and/or Radiation Shielding	Outdoor
Reinforced Concrete Block Walls	• Structural Support • Shelter, Protection and/or Radiation Shielding • Structural Support to Non-S/R Components	Sheltered
Structural Steel • Structural Steel • Reinforced Concrete Embedments	• Structural Support • Structural Support to Non-S/R Components	Sheltered

Aging management review results for the emergency cooling tower and reservoir are provided in Section 3.5.5.

2.4.6 Station Blackout Structure and Foundations

Structure Description

The station blackout structure houses the switchgear necessary to connect the alternate AC source to PBAPS. The structure is a pre-fabricated steel enclosure with double doors at either end of the structure to facilitate equipment transfer in and out of the structure as required. The structure is designed to protect the equipment from damage due to external weather exposure and is mounted on three reinforced concrete piers. License renewal boundary diagram reference for the station blackout structure is LR-S-001.

Intended functions within the Scope of License Renewal

Protection - The station blackout structure protects equipment required for SBO.

Physical Support - The station blackout structure provides support for equipment required for SBO.

Component Groups Requiring Aging Management Review

Table 2.4-6 Component Groups Requiring Aging Management Review - Station Blackout Structure and Foundations

Component Group	Component Intended Function	Environment
Reinforced Concrete • Foundation	• Structural Support to Non-S/R Components	Buried, Outdoor
Structural Steel • Metal Siding	• Shelter, Protection and/or Radiation Shielding	Outdoor
Structural Steel • Structural Steel • Reinforced Concrete Embedments	• Structural Support to Non-S/R Components	Sheltered

Aging management review results for the station blackout structure and foundation are provided in Section 3.5.6.

2.4.7 Yard Structures

Structure Description

Yard structures consist of various conduit duct banks, manholes, high pressure service water system valve pit, service water pipe tunnel and condensate storage tank foundations.

Conduit duct banks are located throughout the plant to provide passageways and protection for electrical cables and conduits. Manholes provide access to electrical components to meet accessibility requirements. These concrete structures provide a method for routing cables and protection from various environmental conditions. Manholes are protected from intrusion of combustible liquid by raised curbing.

The high pressure service water valve pit is a concrete structure located in the yard area south of the discharge outlet structure. Two high pressure service water valves as well as one emergency service water valve are located within the valve pit.

The Unit 2 condensate storage tank is located south of the Unit 2 reactor building. Its base is supported on a 14 inches thick perimeter ring reinforced concrete wall and sub-base consisting of crushed stone and sand. The Unit 3 condensate storage tank is located north of the Unit 3 reactor building. Its base is supported on the crushed stone and sand sub-base.

The high pressure service water, service water, and emergency service water pipes run from the circulating water pump structure to the turbine building in the service water pipe tunnel.

The yard structures are described in the Fire Protection Program, Section 6.3. License renewal boundary diagram reference for the yard structures is LR-S-001.

Intended functions within the Scope of License Renewal

Physical support - The yard structures provide physical support for safety and non-safety related systems and equipment during normal, severe environmental, extreme environmental, and abnormal loading conditions.

Protection - The yard structures provide protection for safety related and non-safety related systems and equipment from external, internal, and environmental hazards.

Fire Barrier - The yard structures provide rated fire barriers or retard a fire from spreading to adjacent areas of the plant.

Component Groups Requiring Aging Management Review

Table 2.4-7 Component Groups Requiring Aging Management Review - Yard Structures

Component Group	Component Intended Function	Environment
Reinforced Concrete • Walls • Slabs • Foundation	• Structural Support • Fire Barrier • Shelter, Protection and/or Radiation Shielding • Missile Barrier • Structural Support to Non-S/R Components	Buried, Outdoor
Condensate Storage Tanks Foundation	• Structural Support	Buried
Structural Steel • Reinforced Concrete Embedments (Service Water Pipe Tunnel)	• Structural Support • Structural Support to Non-S/R Components	Sheltered

Aging management review results for the yard structures are provided in Section 3.5.7.

2.4.8 Stack

Structure Description

A single stack is used to discharge gaseous waste from both units. The stack is located approximately 670 ft. west of the reactor buildings, where the grade elevation is approximately 265 ft.

The stack is a tapered, reinforced concrete structure 500 ft. high. The foundation is an octagonal concrete mat approximately 7 ft. thick. The dilution fans and eductor are housed in the lower 30 feet of the structure.

The stack is designed to seismic Class I criteria and for normal wind load; it is not designed to withstand tornado wind forces. The stack is located a sufficient distance from the reactor buildings that they would not incur any damage in the event of a complete stack failure.

The stack is further discussed in UFSAR Sections 12.2 and Appendix C. License renewal boundary diagram reference for the stack is LR-S-001.

Intended functions within the Scope of License Renewal

Elevated Release - The stack provides for the discharge of gaseous waste to meet the requirements of 10 CFR 100.

Component Groups Requiring Aging Management Review

Table 2.4-8 Component Groups Requiring Aging Management Review - Stack

Component Group	Component Intended Function	Environment
Reinforced Concrete	• Structural Support	Buried, Outdoor, Sheltered

Aging management review results for the stack are provided in Section 3.5.8.

2.4.9 Nitrogen Storage Building

Structure Description

The nitrogen storage building is a seismic Class I reinforced concrete structure nominally 26.6 ft. by 43.2 ft. founded on rock and structural lean concrete backfill supported on rock. The western portion of the building is supported and connected to the residual heat removal pump room cover slab. The east wall is butted directly up to the Unit 2 condensate storage water dike wall. The north wall is structurally separated from the reactor building to eliminate interaction between both structures.

License renewal boundary diagram reference for the nitrogen storage building is LR-S-001.

Intended functions within the Scope of License Renewal

Physical Support - The nitrogen storage building provides physical support for safety related and non-safety related systems and equipment during normal, severe environmental, extreme environmental and abnormal loading conditions.

Protection - The nitrogen storage building provides protection for safety related and non-safety related systems and equipment from external, internal, and environmental hazards.

Component Groups Requiring Aging Management Review

Table 2.4-9 Component Groups Requiring Aging Management Review - Nitrogen Storage Building

Component Group	Component Intended Function	Environment
Reinforced Concrete • Walls • Slab • Foundation	• Structural Support • Fire Barrier • Shelter, Protection and/or Radiation Shielding • Missile Barrier • Structural Support to Non-S/R Components	Buried, Outdoor, Sheltered
Structural Steel • Reinforced Concrete Embedments	• Structural Support • Structural Support to Non-S/R Components	Sheltered

Aging management review results for the nitrogen storage building are provided in Section 3.5.9.

2.4.10 Diesel Generator Building

Structure Description

The diesel generator building is a seismic Class I structure. The diesel generator building is a separate structure located south of the Unit 2 turbine building. The building is founded on steel H piles and concrete shear walls which are supported on rock. The superstructure of the building consists of reinforced concrete walls and roof. Large openings in the diesel generator building are either protected by missile-proof doors, or have baffle walls located in front of them. The emergency diesel fuel supply is stored in underground steel tanks east of the building.

The diesel generator building is further discussed in UFSAR Sections 12.2 and Appendix C. License renewal boundary diagram reference for the diesel generator building is LR-S-001.

Intended functions within the Scope of License Renewal

Physical Support - The diesel generator building provides physical support for safety related and non-safety related systems and equipment during normal, severe environmental, extreme environmental, and abnormal loading conditions.

Protection - The diesel generator building provides protection for safety related and non-safety related systems and equipment from external, internal, and environmental hazards.

Fire Protection - The diesel generator building provides rated fire barriers or retards a fire from spreading to adjacent areas of the plant.

Component Groups Requiring Aging Management Review

Table 2.4-10 Component Groups Requiring Aging Management Review - Diesel Generator Building

Component Group	Component Intended Function	Environment
Reinforced Concrete • Walls • Slabs • Columns • Beams • Foundation	• Structural Support • Fire Barrier • Shelter, Protection and/or Radiation Shielding • Flood Barrier • Missile Barrier • Structural Support to Non-S/R Components	Buried, Outdoor, Sheltered
Structural Steel • Structural Steel • Reinforced Concrete Embedments	• Structural Support • Structural Support to Non-S/R Components	Sheltered
Steel Foundation Piles	• Structural Support	Buried

Aging management review results for the diesel generator building are provided in Section 3.5.10.

2.4.11 Circulating Water Pump Structure

Structure Description

The Circulating Water Pump Structure complex, nominally 280 ft. by 80 ft. of reinforced concrete founded on rock, consists of several sections. The central portion is a reinforced concrete, seismic Class I, tornado-resistant structure. The central portion has three pump bays; one for Unit 2, one for Unit 3, and a third, smaller bay containing the two emergency service water pumps in individual cells. These pump bays are interconnected by openings equipped with sluice gates.

The superstructure over these pumps is constructed with reinforced concrete walls and floor and has a concrete roof supported on structural steel beams. Removable panels in the roof provide access to the pumps. A structural steel and plate wall divides the pump area into two rooms for additional protection. The rooms are flood protected to Elevation 135 ft. by means of watertight doors and sealed floor penetrations.

To the east of this superstructure is a similar reinforced concrete, seismic Class I, tornado-resistant structure housing the service water traveling screens. Four screens, two per unit, screen the water before it goes into the pump bays. Each screen has a sluice-gated opening on each side.

The seismic Class I portion of the circulating water pump structure is designed such that no credible event, including internal flooding due to failure of a seismic Class II structure or component would prevent the equipment housed therein from functioning as necessary to assure safe shutdown of both Units 2 and 3.

The circulating water pump structure is described in further detail in UFSAR Section 12.2. License renewal boundary diagram reference for the circulating water pump structure is LR-S-001.

Intended Functions within the Scope of License Renewal

Physical Support - The circulating water pump structure provides physical support for safety related and non-safety related systems and equipment during normal, severe environmental, extreme environmental, and abnormal loading conditions.

Protection - The circulating water pump structure provides protection for safety related and non-safety related systems and equipment from external, internal, and environmental hazards.

Fire Protection - The circulating water pump structure provides rated fire barriers or retards a fire from spreading to adjacent areas of the plant.

Component Groups Requiring Aging Management Review

Table 2.4-11 Component Groups Requiring Aging Management Review - Circulating Water Pump Structure

Component Group	Component Intended Function	Environment
Reinforced Concrete • Walls • Slabs • Columns • Beams • Foundation	• Structural Support • Fire Barrier • Shelter, Protection and/or Radiation Shielding • Flood Barrier • Missile Barrier • Structural Support to Non-S/R Components	Raw Water, Buried, Outdoor, Sheltered
Reinforced Concrete Block Walls	• Structural Support • Fire Barrier • Shelter, Protection and/or Radiation Shielding • Structural Support to Non-S/R Components	Sheltered
Structural Steel • Sluice Gates and Embedments	• Pressure Boundary	Raw Water, Sheltered
Structural Steel • Structural Steel • Reinforced Concrete Embedments	• Structural Support • Structural Support to Non-S/R Components • Flood Barrier	Sheltered

Aging management review results for the circulating water pump structure are provided in Section 3.5.11.

2.4.12 Recombiner Building

Structure Description

The recombiner building is a rectangular shaped structure nominally 66.5 ft. by 80.4 ft. consisting of several cubicle areas constructed of reinforced concrete founded on rock. The recombiner building is a seismic Class I structure and houses the hydrogen recombiner system catalytic recombiner, condensers, preheaters, analyzers, and other system equipment. This structure is located north of the Unit 3 reactor building and west of the Unit 3 turbine building.

The structure has two exterior doors at elevation 135 ft. on the north wall. The recombiner building is a shared structure and houses equipment for both Unit 2 and Unit 3.

The recombiner building is discussed in UFSAR Section 12.1 and Appendix C. License renewal boundary diagram reference for the recombiner building is LR-S-001.

Intended functions within the Scope of License Renewal

Physical Support - The recombiner building supports structures and components whose failure could adversely impact safety related structures.

Component Groups Requiring Aging Management Review

Table 2.4-12 Component Groups Requiring Aging Management Review - Recombiner Building

Component Group	Component Intended Function	Environment
Reinforced Concrete • Walls • Slabs • Columns • Beams • Foundation	• Structural Support to Non-S/R Components	Buried, Outdoor, Sheltered
Structural Steel • Structural Steel	• Structural Support to Non-S/R Components	Sheltered

Aging management review results for the recombiner building are provided in Section 3.5.12.

2.4.13 Component Supports

Description

The component support commodity group includes the following component groupings:

- Support members;
- Anchors; and
- Grout

The support members component group includes supports for piping and components, HVAC ducts, conduits, cable trays, instrumentation tubing trays, electrical junction and terminal boxes, electrical and I&C devices, instrument tubing, and supports for major equipment, including pumps, transformers, HVAC fans and filters. This component group also includes components such as spring hangers, including the springs, rod hangers, braces, guides, clamps, base plates, metal to metal sliding joints, lubrite plates, snubber supports, stops, mounting brackets, support bolting, instrument racks and bottle racks.

The anchors component group is the part of the component support assembly used to attach electrical panels, electrical cabinets, racks, switchgears, enclosures for electrical and instrumentation equipment, pipe hangers, pumps, transformers, HVAC fans, and HVAC filters to other components or structures. Welds are used for steel attachments while undercut anchors, expansion anchors, cast-in-place anchors, and grouted-in anchors are used for concrete attachments.

The grout component group includes grouted support pads and grouted base plates. Grout is used in the construction of equipment pads, and for filling, leveling, and setting equipment bases to their respective foundations.

Component Groups Requiring Aging Management Review

Table 2.4-13 Component Groups Requiring Aging Management Review - Component Supports

Component Group	Component Intended Function	Environment
Anchors (Emergency Cooling Water)	Structural Support	Outdoor
Anchors	Structural Support	Sheltered
Grout	Structural Support	Sheltered
Lubrite Plates	Structural Support	Sheltered
Support Members	Structural Support	Sheltered
Support Members	Structural Support	Raw Water, Torus Water
Support Members (Emergency Cooling Water)	Structural Support	Outdoor

Aging management review results for component supports are provided in Section 3.5.13.

2.4.14 Hazard Barriers and Elastomers

Description

Hazard barrier components include fire and other hazard barrier penetration seals, fire wraps, and fire and other hazard barrier doors. Elastomer components include expansion joint seals (seismic joint seal material, control joint seal material, and seismic separation joint seal material), moisture barrier inside drywell at the juncture of the drywell shell wall with the concrete floor, reactor building blowout panel seals, and reactor building metal siding gap seals. Hazard barriers and elastomers are treated as a commodity because of similarities in design, material, aging effect, and or environment.

Component Groups Requiring Aging Management Review

Table 2.4-14 Component Groups Requiring Aging Management Review - Hazard Barriers and Elastomers

Component Group	Component Intended Function	Environment
Hazard Barrier: • Fire Barrier Penetration Seals	• Fire Barrier	Sheltered, Outdoor
Hazard Barrier: • Other Penetration Seals	• Flood Barrier • HELB Shielding • Fission Product Barrier	Sheltered, Outdoor
Hazard Barrier: • Fire Barrier Doors	• Fire Barrier	Sheltered, Outdoor
Hazard Barrier: • Other Hazard Barrier Doors	• Shelter, Protection and/or Radiation Shielding • Flood Barrier • Fission Product Barrier • Missile Barrier • HELB Shielding • Over-Pressure Protection	Sheltered, Outdoor
Hazard Barrier: • Gaskets for Watertight Doors	• Shelter, Protection and/or Radiation Shielding • Flood Barrier • Fission Product Barrier	Sheltered, Outdoor
Hazard Barrier: • Fire Wraps	• Fire Barrier	Sheltered
Elastomer: • Expansion Joint Seals	• Flood Barrier	Sheltered, Outdoor

Table 2.4-14 Component Groups Requiring Aging Management Review - Hazard Barriers (Continued)

Component Group	Component Intended Function	Environment
Elastomer: • Reactor Building Blowout Panel Seals	• Fission Product Barrier	Sheltered
Elastomer: • Reactor Building Metal Siding Gap Seals	• Fission Product Barrier	Sheltered
Elastomer: • Moisture Barrier Inside Drywell	• Flood Barrier	Sheltered

Aging management review results for hazard barriers are provided in Section 3.5.14.

2.4.15 Miscellaneous Steel

Description

The miscellaneous steel group includes platforms, grating, stairs, ladders, steel curbs, handrails, kick plates, decking, instrument tubing trays and manhole covers. These structural steel components are generally installed throughout PBAPS structures. Some structural steel components are exposed to the outdoor environment. These steel components are treated as a commodity group because of similarities in design, material and/or environment.

Component Groups Requiring Aging Management Review

Table 2.4-15 Component Groups Requiring Aging Management Review - Miscellaneous Steel

Component Group	Component Intended Function	Environment
Miscellaneous Steel • Platforms • Grating • Stairs • Ladders • Curbs (Steel) • Handrails • Kick Plates • Instrument Tubing Trays	• Structural Support • Structural Support to Non-S/R Components • Contain Fluid	Sheltered
Miscellaneous Steel • Manhole Covers (1)	• Shelter, Protection and/or Radiation Shielding • Contain Fluid	Outdoor

(1) Manhole covers are credited for preventing intrusion of flammable fluids into manholes containing fire safe shutdown equipment and cables.

Aging management review results for miscellaneous steel are provided in Section 3.5.15.

2.4.16 Electrical and Instrumentation Enclosures and Raceways

Description

The electrical and instrumentation enclosures and raceways group includes cable trays, cable tray covers, drip shields, rigid and flexible electrical conduits and fittings, wireway gutters, panels, electrical panels, cabinets and boxes installed in the reactor buildings and other PBAPS buildings. These electrical components are treated as a commodity group because of similarities in design, material and environment.

Component Groups Requiring Aging Management Review

Table 2.4-16 Component Groups Requiring Aging Management Review - Electrical and Instrumentation Enclosures and Raceways

Component Group	Component Intended Function	Environment
Electrical and Instrumentation Enclosures and Raceways • Cable Tray and Covers • Electrical Conduits and Fittings • Wireway Gutters • Panels • Cabinets • Boxes	• Structural Support • Shelter, Protection and/or Radiation Shielding	Sheltered
Raceways • Electrical Conduits and Fittings • Boxes	• Structural Support • Shelter, Protection and/or Radiation Shielding	Outdoor
• Drip shields	• Shelter, Protection and/or Radiation Shielding	Sheltered

Aging management review results for electrical and instrumentation enclosures and raceways are provided in Section 3.5.16.

2.4.17 Insulation

Description

The insulation commodity group includes all insulating materials within the scope of license renewal that are used in plant areas where temperature control is considered critical for system and component operation or where high room temperatures could impact environmental qualification. Plant areas that require temperature control include inside the drywell, inside the HPCI and RCIC pumprooms and the outboard MSIV rooms, and on heat traced outdoor piping and components for freeze protection.

The jacketing on outdoor insulation applications serves a leak-tight function by preventing moisture absorption of the insulation material that not only decreases the effectiveness of the insulation but also creates a corrosive environment in contact with the external piping or component surfaces.

Piping and equipment insulation materials used inside the drywell include stainless steel and aluminum mirror insulation and fiberglass blanket insulation with either stainless steel or aluminum jacketing. HPCI and RCIC pumproom and the outboard MSIV room piping insulation materials include calcium silicate or fiberglass blankets covered by an aluminum jacket. Equipment insulation consists of either calcium silicate blocks or removable ceramic fiber blankets. Anti-sweat insulation is fiberglass with an integral vapor barrier.

Outdoor piping insulation materials installed over electric heat tracing may consist of calcium silicate or fiberglass with an integral vapor barrier with either water-tight aluminum or reinforced mastic-plastic compound jacketing.

Component Groups Requiring Aging Management Review

Table 2.4-17 Component Groups Requiring Aging Management Review - Insulation

Component Group	Component Intended Function	Environment
Insulation	• Insulating Characteristics	Sheltered
Insulation (Jacketing)	• Insulation Jacket Integrity	Sheltered
Insulation	• Insulating Characteristics	Outdoor
Insulation (Jacketing)	• Insulation Jacket Integrity	Outdoor

Aging management review results for insulation is provided in Section 3.5.17.

2.5 SCOPING AND SCREENING RESULTS: ELECTRICAL AND INSTRUMENTATION AND CONTROLS

This section presents the results of the scoping and screening processes for electrical and instrument and control (I&C) components, and the station blackout system.

The components comprising the station blackout system were reviewed and the passive, long-lived components subject to an aging management review were identified.

For all other electrical and I&C components, the passive, long-lived electrical components subject to aging management review are identified as commodities. The guidance provided in NEI 95-10, Appendix B was used to define electrical commodities subject to aging management review. The guidance provided in NEI 95-10, Appendix B identifies the passive, long-lived electrical components potentially subject to an aging management review as:

Electrical portions of electrical and I&C penetration assemblies
High-voltage insulators
Insulated cables and connections (connectors, splices, terminal blocks)
Phase bus (e.g., isolated-phase bus, non-segregated-phase bus, bus duct)
Switchyard bus
Transmission conductors
Uninsulated ground conductors

After applying the scoping and screening criteria discussed in Sections 2.1.2 and 2.1.3, the electrical commodities requiring aging management reviews applicable to PBAPS were determined to be the following:

Insulated cables and connections (connectors, splices, terminal blocks)
Electrical portions of electrical and I&C penetration assemblies

Electrical portions of electrical and I&C penetration assemblies are a TLAA and addressed in Section 4.4

Electrical and I&C component groups were evaluated using the plant "spaces" approach, whereby aging effects are identified, and bounding environmental parameters are used to evaluate the identified aging effect(s) with respect to component intended function. This is further discussed in Section 3.6.

For each of the electrical and instrumentation and controls (I&C) commodities, this section provides the following information:

- A general description of the commodity,
- A listing of the components or component groups that require aging management review, associated component intended functions and environments.

For the station blackout system, this section provides the following information:

- A general description of the system,
- The intended functions of the system within the scope of license renewal,
- A reference to the applicable UFSAR section,
- A reference to the applicable license renewal boundary diagrams,
- A listing of the components or component groups that require aging management review, associated component intended functions and environments.

A discussion of component groups, component intended functions and environments is provided in Section 3.0.

For each commodity or system, the tables are sorted by component group and then by environment.

Section 3.6 provides the results of the aging management reviews for the component groups in each of these structures and commodities.

2.5.1 Cables

Description

There are approximately 39,000 installed cables at PBAPS, Units 2 & 3. Electrical cables were treated as a commodity group during the aging management review process. This group included all documented cables within the scope of license renewal that are used for power, control and instrumentation applications. The intended function of electrical cables is to provide electrical connections to specified sections of an electrical circuit to deliver voltage, current or signals. Although EQ cables are reviewed as TLAAs, all documented cables, whether EQ or non-EQ, were assumed in scope and required an aging management review.

Cable insulation material groups were assessed on the basis of common materials and their respective material aging characteristics for both safety-related and non-safety related cables.

A plant database was used as the primary tool to identify cable insulation groups and for screening electrical cables for the cables aging management review. The database contains a cable code. The cable code is defined by a specification that identifies a unique cable size, application (power, control, and instrumentation) and insulation. Cable insulation groups and the associated application were the determining factors in performing the assessment against bounding plant parameters.

Electrical cables were reviewed as a commodity group for all systems. The electrical cable aging management review for radiation and temperature utilized a plant "spaces" approach, whereby aging effects were identified, and bounding environmental parameters were used to evaluate the identified aging effect(s) with respect to component intended function. The spaces approach is additionally discussed in Section 3.6.

The stressors potentially affecting "Loss of Material Properties" for cables at PBAPS are moisture, temperature, and radiation.

Moisture is of concern because of a phenomenon called "water-treeing". To be identified as being susceptible to aging effects caused by moisture (water-treeing), a non-EQ cable must be exposed to long-term standing water, energized more than 25% of the time, be of medium voltage (4KV-13KV for PBAPS), and be constructed of insulation material containing a void or impurity (inclusion, flaw).

Since the industry and manufacturers recognized this issue in the late 70's, improved formulations (resistant to water-treeing) have been made available and used since 1980. PBAPS recognized this issue, and took a pro-active position. A cable replacement program was initiated in 1995 to replace "suspected" cables subjected to the water-treeing criteria described above. No cable failures have occurred at PBAPS since the cable replacement program was initiated.

Therefore, moisture is not an aging effect requiring management at PBAPS.

The remaining stressors affecting "loss of material properties" of cable insulation at PBAPS are temperature and radiation. Applying the "spaces" approach for the identification of the temperature and radiation stressors was a primary focus for the aging management review of cables. Maintaining adequate dielectric properties of the cable insulation is essential for ensuring that the electrical cables perform their intended function.

A review of cable insulation aging effects from radiation was performed by comparing the least radiation resilient cable insulation (PVC) with the highest radiation area where cables that support components within the scope of license renewal may be present in the plant. The value used for the highest radiation area was obtained by multiplying the existing radiation design value by 1.5 to obtain a 60-year value, and then adding the accident dose. All other cable insulation types were bounded by this analysis. No cables requiring aging management review as a result of radiation effects were identified.

A review of cable insulation aging effects from temperature required a more detailed elimination process. Cable populations were grouped according to their common cable insulation material type, and voltage application (power, control, and instrumentation). For each cable insulation material type, a 60-year limiting service temperature was established. Comparison of this value was made against the, bounding cable service temperature to determine if it was below the 60-year limiting service temperature. Ohmic heating was considered for power cables, and for control cables that are routed with power cables, where applicable to determine the bounding service temperature.

Figure 2.5-1 provides a summary flowchart overview of the temperature review process and conclusions based upon the cable groupings in the PBAPS cables database. A summary of each cable group review follows:

- Computer Cable Groups:
  Computer cable groups are not in the scope of license renewal and were eliminated from temperature review.

- Fiber Optic & Bare Ground Cable Groups:
  Fiber optic cable insulation material is unaffected by thermal aging. Bare ground cables have no insulation and were determined not to be within the scope of license renewal.

- Instrumentation Cable Groups:
  Instrumentation cable groups with cross linked polyethylene (XLPE), polyethylene, cross linked polyolefin (XLPO), hypalon, teflon-based, and polypropylene insulation were determined to have 60-year limiting service temperatures greater than the bounding ambient temperature of PBAPS. Two bounding ambient temperatures were determined; one bounding ambient temperature for containment and another bounding ambient temperature for all other plant areas with exception of containment.

- XLPE Power & Control Cable Groups:
  XLPE insulated cable groups can operate continuously at its bounding service temperature for greater than 60 years. The 60-year limiting service temperature is greater than bounding ambient temperature and its associated ohmic heating temperature rise.

- EPR Power and Control Cable Groups:
  EPR cables groups supplying loads not in the scope of license renewal were eliminated from review. The remaining EPR cable groups were determined to be routed in areas outside containment and have 60-year limiting service temperature greater than the bounding ambient temperature and its associated ohmic heating temperature rise.

- PE Power and Control Cable Groups:
  The routing of PE power and control cable groups was determined and local ambient temperature field measurements were conducted in bounding cases. The 60-year limiting service temperature for PE insulation groups were greater than the bounding ambient temperature and its associated ohmic heating temperature rise.

- PVC Cable Groups:
  PVC cables groups and individual cables from the remaining PVC cable groups supplying loads not in the scope of license renewal were eliminated from review. The remaining PVC cables were reviewed to identify cables with 60-year limiting service temperatures greater than the bounding service

temperature. Thirty cables relied upon for Fire Safe Shutdown (FSSD) were determined to require aging management.

- Miscellaneous Cable Groups:
  Miscellaneous cables groups not in the scope of license renewal loads were eliminated from review. Miscellaneous cable groups were also reviewed to delete cables with 60-year limiting service temperature greater than the bounding ambient temperature. Individual cables within the remaining group were reviewed to identify cables within the scope of the environmental qualification aging management activity or cables supplying loads not within the scope of license renewal. None of the miscellaneous cables were identified as requiring aging management.

Component Groups Requiring Aging Management Review

Table 2.5-1 Component Groups Requiring Aging Management Review - Cables

Component Group	Component Intended Function	Environment
Electrical Cables	• Electrical Continuity	Sheltered

Aging management review results for cables are provided in Section 3.6.1.

Figure 2.5-1
Cable Group Temperature Review Process Overview

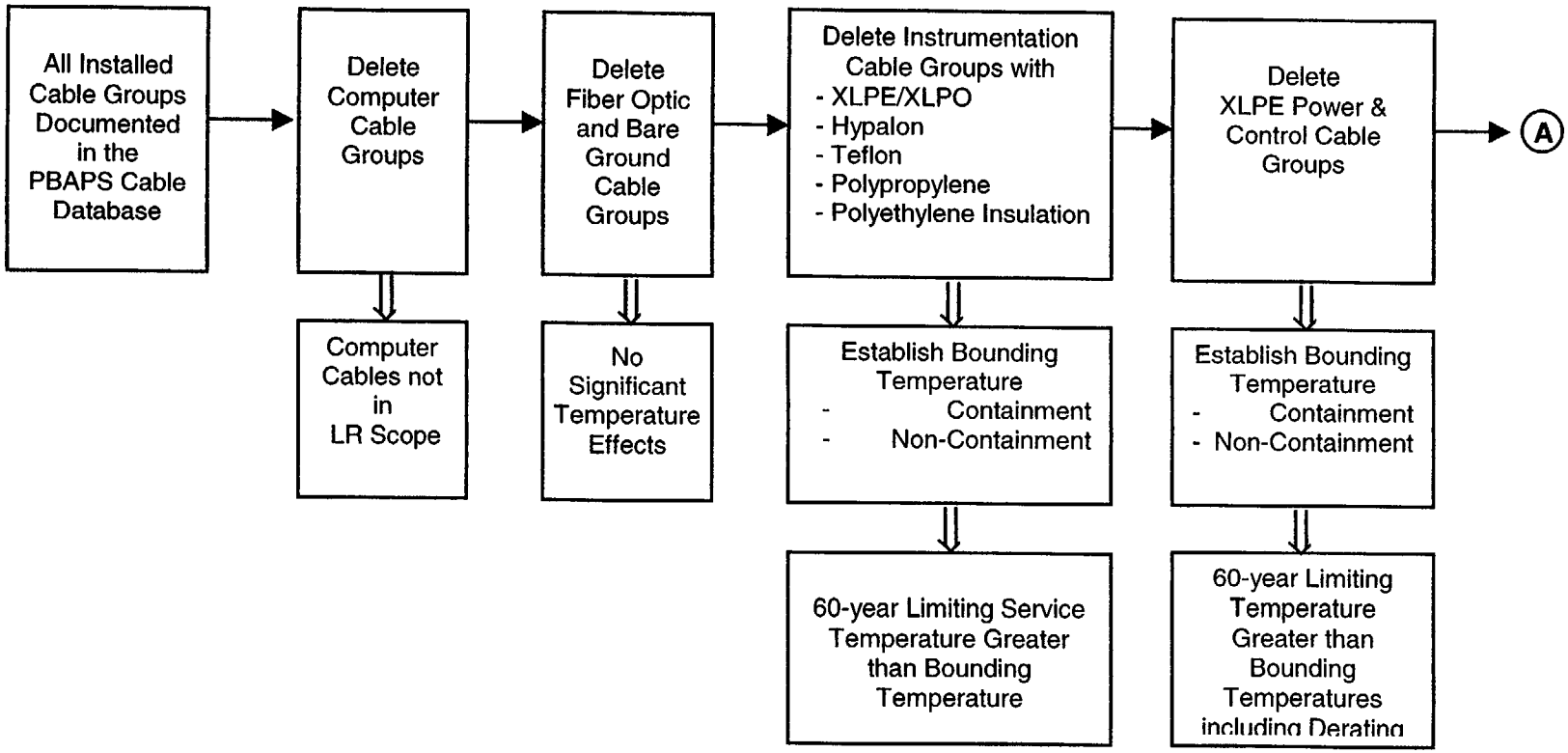
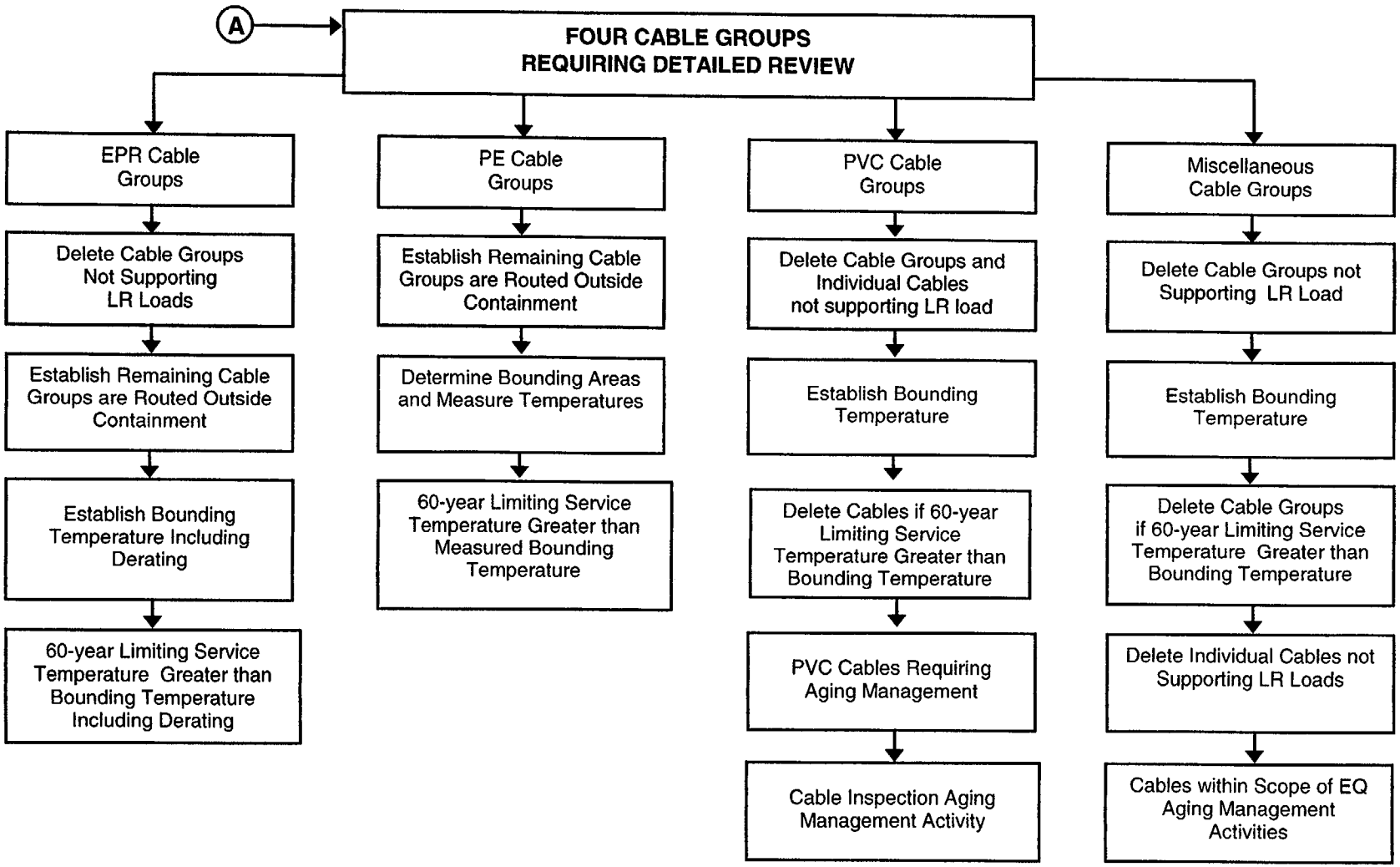


Figure 2.5-1 (Continued)
Cable Group Temperature Review Process Overview



2.5.2 Connectors, Splices, and Terminal Blocks

Description

The commodity group electrical connectors, splices and terminal blocks (terminations) includes electrical connectors, splices and terminal blocks used for power, control and instrumentation applications.

PBAPS connectors, splices and terminal blocks that are part of the environmental qualification program were reviewed as Time-Limited Aging Analyses and the results are provided in Section 4.4.

The intended function of electrical connectors, splices, and terminal blocks is to provide electrical connections to specified sections of an electrical circuit to deliver voltage, current or signals.

The electrical connector materials subject to aging are metal and insulation. The metals used for electrical connectors are copper, tinned copper, and aluminum. The connector insulation materials used are various elastomers and thermoplastics, and are bounded by the Cables aging management review discussed in Section 2.5.1.

The splice material subject to aging is insulation. The insulation materials used are various elastomers, and are bounded by the Cables aging management review discussed in Section 2.5.1.

The electrical terminal block materials subject to aging are metal and insulation. The metals used for terminal blocks are copper, tinned copper, brass, bronze and aluminum. The insulation materials used are phenolic compounds and nylon.

Components Requiring Aging Management Review

Table 2.5-2 Component Groups Requiring Aging Management Review - Connectors, Splices, and Terminal Blocks

Component Group	Component Intended Function	Environment
Electrical Connectors - Insulation	• Electrical Continuity	Sheltered
Electrical Connectors - metallic connector	• Electrical Continuity	Sheltered
Electrical Splices - Insulation	• Electrical Continuity	Sheltered
Electrical Terminations - Insulation	• Electrical Continuity	Sheltered
Electrical Terminations - Metallic	• Electrical Continuity	Sheltered

Aging management review results for connectors, splices, and terminal blocks are provided in Section 3.6.2.

2.5.3 Station Blackout System

Description

The Station Blackout System is defined as the Alternate AC (AAC) source required per NUMARC 87-00, "Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors." The Station Blackout System for PBAPS is in compliance with 10CFR50.63, qualifies as an AAC power source per NUMARC 87-00, and is comprised of the following components:

- Conowingo Hydroelectric Plant (Dam)
- Susquehanna Substation
- Wooden Takeoff Pole
- Manholes at Conowingo and Peach Bottom
- Submarine Cable (Transmission Line)
- Station Blackout Substation at PBAPS

Conowingo Hydroelectric Plant (Dam)

The Conowingo Hydroelectric Plant (Dam) is located on the Susquehanna River approximately ten miles above the mouth of the river on the Chesapeake Bay, five miles below the Pennsylvania border, and approximately ten miles south of PBAPS. The Dam is the source of power to support the PBAPS SBO commitment. The Federal Energy Regulatory Commission (FERC) licenses the dam and associated power block. The Dam is constructed primarily of concrete and steel. The associated power block is comprised of reinforced concrete and structural steel.

Susquehanna Substation

The Susquehanna Substation is located adjacent to and receives power from the Conowingo Hydroelectric Plant. The substation delivers 34.5 KV power to PBAPS to support the SBO scenario. The substation is of industry standard power distribution design consisting of aluminum bus bar, insulators, circuit breakers, transformers, and associated foundations.

Wooden Pole

The takeoff tower for the transmission line from the Susquehanna Substation is a wooden pole. The pole is constructed of yellow pine, and chemically treated prior to installation. The installed pole has been analyzed to be able to withstand the severe weather conditions associated with the SBO event.

Manholes

Manholes exist at both the Conowingo and PBAPS locations to house the transition between the standard power cables from the substations at each location and the submarine cable. The manholes are constructed of reinforced concrete. Aging effects for concrete structures have concluded that no aging management activities are required, except for change of material properties, due to leaching of calcium hydroxide, in the emergency cooling tower and reservoir walls.

Submarine Cable (Transmission Line)

A 35KV Submarine cable exits the manhole at Conowingo and runs under the bed of the Susquehanna River from just north of the dam to a manhole just south of the SBO Substation. The submarine cable is comprised of copper phase conductors, ground conductors, EPR shielding and insulation, metallic shielding, and polyethylene (Okolene) jackets. The assembly of the submarine cable has three (3) individually shielded and jacketed conductors cabled together with two (2) ground conductors, and one (1) fiber optic cable, with polypropylene fillers as necessary. A polypropylene bedding covers the entire cable. Over the bedding, a layer of steel armor is applied. Each wire is jacketed with black polyethylene. A nylon serving is then applied, and an asphaltic solution is applied both under and over the armor and nylon serving.

PBAPS SBO Substation

The PBAPS SBO Substation is comprised of 34.5KV and 13.8 KV metalclad outdoor walk-in switchgear, a 15/20 MVA oil filled transformer, and associated breakers and control. The SBO Substation is designed as a "stand alone" facility with control power coming from within the switchgear. The switchgear is contained within a standard prefabricated metal enclosure. The enclosure and switchgear foundation are discussed in Section 2.4.6.

The station blackout system is further discussed in UFSAR Sections 8.1, 8.3, 8.4, and 8.5. License renewal boundary diagram reference for the station blackout system is LR-E-001.

Intended Functions within the Scope of License Renewal

AC Power Source - Provide AC power within one hour to essential switchgear busses upon loss of all off-site power coincident with the failure of all on-site power (EDGs).

Components Requiring Aging Management Review

Table 2.5-3 Component Groups Requiring Aging Management Review - Station Blackout System

Component Group	Component Intended Function	Environment
Wooden Pole	• Structural Support to Non-S/R Components	Outdoor, Buried
Conowingo Hydroelectric Plant	• Shelter, Protection and/or Radiation Shielding • Structural Support to Non-S/R Components	Raw Water, Outdoor
Substation Foundations	• Structural Support to Non-S/R Components	Outdoor
Substation Busbar	• Structural Support to Non-S/R Components • Electrical Continuity	Outdoor
Substation Insulators	• Insulate	Outdoor
Submarine Cable	• Electrical Continuity	Raw Water

Aging management review results for the station blackout system are provided in Section 3.6.3.