LICENSE RENEWAL APPLICATION

OYSTER CREEK GENERATING STATION

DOCKET No. 50-219

Facility Operating License No. DPR-16

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1.0 ADMINISTRATIVE INFORMATION

1.1 GENERAL INFORMATION - 10 CFR 54.19

1.1.1 NAME OF APPLICANT

AmerGen Energy Company (AmerGen), LLC, hereby applies for a renewed operating license for Oyster Creek Generating Station (OCGS).

1.1.2 ADDRESS OF APPLICANT

AmerGen Energy Company, LLC
200 Exelon Way
Kennett Square, PA 19348

1.1.3 DESCRIPTIONS OF BUSINESS OR OCCUPATION OF APPLICANT

AmerGen Energy 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. AmerGen Energy Company, LLC is a wholly owned subsidiary of Exelon Generation Company, LLC, a Delaware limited liability company which is wholly owned by Exelon Ventures Company, a Delaware limited liability company, which in turn is wholly owned by Exelon Corporation, a corporation formed under the laws of the Commonwealth of Pennsylvania. AmerGen Energy Company, LLC is the licensed operator of Oyster Creek Generating Station, which is the subject of this application. The current Oyster Creek Generating Station operating license (Facility Operating License No. DPR-16) expires at midnight on April 9, 2009. AmerGen Energy Company, LLC will continue as the licensed operator on the renewed operating license.

1.1.4 DESCRIPTIONS OF ORGANIZATION AND MANAGEMENT OF APPLICANT

<u>AmerGen Energy Company, LLC</u>

AmerGen Energy Company (AmerGen), LLC is organized under the laws of the State of Delaware. AmerGen Energy Company, LLC’s principal place of business is in the Commonwealth of Pennsylvania. Exelon Ventures Company is a Delaware limited liability company and Exelon Corporation is a corporation organized under the laws of the Commonwealth of Pennsylvania with their headquarters and principal places of business in Chicago, Illinois. 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. With one exception all of the directors, management committee members, and principal officers of AmerGen Energy Company, LLC, Exelon

Ventures Company, and Exelon Corporation are U.S. citizens. Neither AmerGen Energy Company, LLC nor its parents, Exelon Ventures Company or Exelon Corporation, is owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government. The principal officers of AmerGen Energy Company, LLC, and their addresses, are presented below:

Principal Officers (AmerGen Energy Company, LLC)

Name	Title	Address
Robert S. Bement	Site Vice President, Clinton	Clinton Power Station Clinton, IL 61727
Jeffrey A. Benjamin	Vice President, Licensing and Regulatory Affairs	4300 Winfield Road Warrenville, IL 60555
Thomas Coutu	Vice President of Midwest Operations	4300 Winfield Road Warrenville, IL 60555
Martin J. Coveney	Vice President	4300 Winfield Road Warrenville, IL 60555
Christopher M. Crane	President, CEO and Chief Nuclear Officer	4300 Winfield Road Warrenville, IL 60555
Edward J. Cullen, Jr.	Secretary	2301 Market Street Philadelphia, PA 19101
Richard P. Lopriore	Senior Vice President of Mid-Atlantic Operations	200 Exelon Way Kennett Square, PA 19348
J. Barry Mitchell	Treasurer	10 South Dearborn Street Chicago, IL 60603
Thomas S. O'Neill	Assistant Secretary	4300 Winfield Road Warrenville, IL 60555
Michael Pacilio	Senior Vice President, Business Operations, Mid-West PWR Operations	4300 Winfield Road Warrenville, IL 60555
Charles G. Pardee	Senior Vice President	4300 Winfield Road Warrenville, IL 60555
George R. Shicora	Assistant Treasurer	2301 Market Street Philadelphia, PA 19101
Diana B. Sorfleet	Vice President, Human Resources	4300 Winfield Road Warrenville, IL 60555
Kevin D. Stepanuk	Assistant Secretary	2301 Market Street Philadelphia, PA 19101
Bud N. Swenson	Site Vice President, Oyster Creek	Oyster Creek Generating Station P.O. Box 388 Forked River, NJ 08731
Charles S. Walls	Assistant Treasurer	10 South Dearborn St. Chicago, IL 60603
Russell G. West	Site Vice President, Three Mile Island	Three Mile Island Rt 441S Middletown, PA 17057

1.1.5 CLASS OF LICENSE, USE OF THE FACILITY, AND PERIOD OF TIME FOR WHICH THE LICENSE IS SOUGHT

AmerGen Energy Company, LLC requests renewal of the Class 104 operating license for Oyster Creek Generating Station, (License No. DPR-16) for a period of 20 years beyond the expiration of the current license, midnight on April 9, 2009.

Because the current licensing basis is carried forward with the possible exception of some aging issues, AmerGen Energy Company, LLC expects the form and content of the license to be generally the same, as they now exist. In this application, AmerGen Energy Company, LLC also requests the renewal of specific licenses under 10 CFR Parts 30, 40, and 70 that are contained in the current operating license.

1.1.6 EARLIEST AND LATEST DATES FOR ALTERATIONS, IF PROPOSED

No physical plant alterations or modifications have been identified as necessary in connection with this 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 applicant 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

AmerGen Energy Company, LLC recovers its share of the costs incurred from operating Oyster Creek Generating Station in its own wholesale rates. The rates charged and services provided by AmerGen Energy Company, LLC are subject to regulation by the Federal Energy Regulatory Commission under the Federal Power Act. AmerGen Energy 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 Oyster Creek that are considered appropriate to give reasonable notice of the application are as follows:

Lacey Beacon
345 East Bay Ave
Manahawkin, New Jersey 08050
Tel. (609) 978-4540

Atlantic City Press
185 North Main St.
Manahawkin, New Jersey 60481
Tel. (609) 978-2011

Asbury Park Press
3601 Highway 66
PO Box 1550
Neptune, New Jersey 07754
Tel. (732) 922-6000

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 (No. B-37) for Oyster Creek 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 license number, DPR-16. 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 license and the terms of the renewed license. Applicant understands that no changes may be necessary for this purpose if the current license number is 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), AmerGen Energy Company, LLC will maintain a summary list in the Oyster Creek Generating Station 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:

Pamela B. Cowan
Director – Licensing and Regulatory Affairs
AmerGen Energy Company, LLC
200 Exelon Way
Kennett Square, PA 19348

with copies to:

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

Donald B. Warfel
License Renewal Project Engineer
Exelon Nuclear
200 Exelon Way
Kennett Square, PA 19348

1.3 PURPOSE

This document provides information required by 10 CFR 54 to support the application for a renewed license for Oyster Creek Generating Station. 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

The Oyster Creek Generating Station (OCGS) is a single unit facility. It is located in Lacey Township, Ocean County, New Jersey, approximately two miles south of the community of Forked River, about two miles inland from the shore of Barnegat Bay and seven miles west-north-west of Barnegat Light. The site, about 800 acres, is approximately nine miles south of Toms River, New Jersey, about fifty miles east of Philadelphia, Pennsylvania, and sixty miles south of Newark, New Jersey.

Initial criticality was achieved on May 3, 1969 and Oyster Creek Generating Station was placed in commercial operation on December 23, 1969 under a Provisional Operating License. On July 2, 1991, the NRC issued a Full Term Operating License (Facility Operating License No. DPR-16) which superseded the Provisional Operating License in its entirety. On August 8, 2000, Oyster Creek Generating Station was acquired by and the license transferred to AmerGen. The License permits steady-state reactor core power levels not in excess of 1930 megawatts (thermal) and is in effect until midnight on April 9, 2009.

The reactor is a single cycle, forced circulation boiling water reactor (BWR-2) with a Mark 1 type Containment. The reactor produces steam for direct use in the steam turbine. The primary containment is of the Mark 1 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.

1.5 APPLICATION STRUCTURE

This license renewal application is structured in accordance with Regulatory Guide 1.188, “Standard Format and Content for Applications to Renew Nuclear Plant Operating Licenses,” and NEI 95-10, "Industry Guideline for Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule”, Revision 5. In addition, Section 3, Aging Management Review Results and Appendix B, Aging Management Programs and activities are structured to address the guidance provided in the Draft NUREG-1800, “Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants”, January 2005. Draft NUREG-1800 references Draft NUREG-1801, “Generic Aging Lessons Learned (GALL) Report”, January 2005.

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:

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 Section 2.2 "Plant Level 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 and structures 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 requiring an aging management review are identified, associated component intended functions are identified, and appropriate reference to the Section 3 Table providing the aging management review results is made.

Selected structural and electrical component groups, such as component supports and electrical cables, were evaluated as commodities. Under the commodity approach, selected structural and electrical component groups were evaluated based upon common environments and materials. Components requiring an aging management review are presented in Sections 2.4 and 2.5. Component intended functions and reference to the applicable Section 3 Table is provided.

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 programs provided in Appendix B.

Aging management review results are presented in tabular form, in a format in accordance with Draft NUREG-1800, "Standard Review Plan for Review of License Renewal Applications", January 2005. For mechanical systems, aging management review results are provided in Sections 3.1 through 3.4 for the reactor vessel, internals, and reactor coolant system, engineered safety features systems, auxiliary systems, and steam and power conversions systems. Aging management review results for containments, structures, and component supports are provided in Section 3.5. Aging management review results for electrical and instrumentation and controls are provided in Section 3.6.

Tables are provided in each of these sections in accordance with Draft NUREG-1800, which provide aging management review results for components, materials, environments, and aging effects which are addressed in the Draft NUREG-1801, and information regarding the degree to which the proposed aging management programs are consistent with those recommended in the Draft NUREG-1801.

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, consistent with 10 CFR 54.21(c)(1)(i)-(iii).

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 Programs

Appendix B describes the programs and 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.

The first and third sections of Appendix B discuss those programs which are contained in Section XI and Section X, respectively, of Draft NUREG-1801. A description of the aging management program is provided and a conclusion based upon the results of an evaluation to each of the ten elements provided in Draft NUREG-1801. In some cases, exceptions and justifications for managing aging are provided for specific Draft NUREG-1801 elements. Additionally, operating experience related to the aging management program is provided.

The second section of Appendix B addresses each of the ten program elements for programs that are credited for managing aging that are not evaluated in Draft NUREG-1801.

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. There were no Technical Specification Changes identified necessary to manage the effects of aging during the period of extended operation.

Appendix E – Environmental Information – Oyster Creek Generating Station

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 for Oyster Creek.

1.6 ACRONYMS

Acronym	**Meaning**
ACAD	Atmospheric containment air dilution system
ADS	Automatic depressurization system
AFU	Air filtration unit
AHU	Air handling unit
AMP	Aging management program
AMR	Aging management review
ARI	Alternate rod injection
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATWS	Anticipated transients without scram
BWR	Boiling water reactor
BWRVIP	Boiling Water Reactor Vessel and Internals Project
CAM	Containment atmospheric monitoring (system)
CAPGRMS	Containment atmosphere particulate and gaseous radioactivity monitor system
CASS	Cast austenitic stainless steel
CCST	Contaminated condensate storage tank
CCSW	Containment cooling service water
CFR	Code of Federal Regulations
CIS	Containment inerting system
CL2	Chlorination system
CLB	Current licensing basis
CNDS	Condensate system
CRD	Control rod drive
CRDS	Control rod drive system
CRDA	Control rod drop accident
CRDM	Control rod drive mechanism
CS	Core spray
CST	Condensate storage tank
CT	Condensate transfer
CUF	Cumulative usage factor
CVB	Containment vacuum breaker
CWS	Circulating water system

Acronym	**Meaning**
DBA	Design basis accident
DBD	Design basis document
DBE	Design basis event
DFED	Drywell floor and equipment drains
DG	Diesel generator
DNI	Drywell nitrogen inerting
DW	Domestic water
DWD	Domestic water distribution
ECCS	Emergency core cooling systems
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
FAC	Flow accelerated corrosion
FDSAR	Facility Description and Safety Analysis Report
FFW	Final feedwater facility
FHAR	Fire Hazards Analysis Report
FS	Feedwater system
FSSD	Fire safe shutdown
FWRV	Feedwater regulating valve
GALL	Generic aging lessons learned
GL	Generic Letter
HCU	Hydraulic control unit
HELB	High energy line break
HEPA	High efficiency particulate air
HPCI	High pressure coolant injection (system)
HRSS	High radiation sampling system
HVAC	Heating, ventilation, and air conditioning
HVC	Hardened vent system
HX	Heat exchanger
I & C	Instrumentation and controls
IASCC	Irradiation assisted stress corrosion cracking
ICS	Isolation condenser system

Acronym	Meaning
IEEE	Institute of Electrical and Electronics Engineers
IGSCC	Intergranular stress corrosion cracking
IN	Information Notice
INPO	Institute of Nuclear Power Operations
IPA	Integrated plant assessment
IRM	Intermediate range monitoring
ISI	Inservice inspection
IST	Inservice testing
LER	Licensee event report
LLRT	Local leak rate test
LOCA	Loss of coolant accident
LPCI	Low pressure coolant injection (system)
LPRM	Local power range monitor
LRA	License renewal application
MCAS	Main generator and auxiliary system
MCC	Motor control center
MFED	Miscellaneous floor and equipment drain
MG	Motor generator
MIC	Microbiologically influenced corrosion
MOV	Motor-operated valve
MSS	Main steam system
MSV	Main stop valve
MSIV	Main steam isolation valve
MTAS	Main turbine and auxiliary systems
MUD	Makeup demineralizer
NBI	Nuclear boiler instrumentation
NCAD	Nitrogen containment atmospheric dilution
NDE	Nondestructive examination
NEI	Nuclear Energy Institute
NFPA	National Fire Protection Association
NMMS	Noble metals monitoring system
NRC	Nuclear Regulatory Commission
NRW	New radwaste
NRWSW	New radwaste service water
OCGS	Oyster Creek Generating Station

Acronym	**Meaning**
OE	Operating experience
ORW	Old radwaste
P&ID	Piping and instrumentation diagram
PASS	Post accident sampling system
PCIS	Primary containment isolation system
PM	Preventive maintenance
P-T curves	Pressure-temperature limit curves
PUA	Plant-unique analyses
RAGEMS	Radioactive gaseous effluent monitoring system
RB	Reactor building
RBCCW	Reactor building closed cooling water
RBVS	Reactor building ventilation system
RCIC	Reactor core isolation cooling (system)
RCPB	Reactor coolant pressure boundary
RCS	Reactor coolant system
RDODS	Roof drains and overboard discharge system
RFED	Reactor building floor and equipment drains
RFP	Reactor feed pump
RG	Regulatory guide
RHCS	Reactor head cooling system
RHR	Residual heat removal (system)
RHRSW	Residual heat removal service water
RMCS	Reactor manual control system
RMS	Radiation monitoring system
RPS	Reactor protection system
RPV	Reactor pressure vessel
RR	Reactor recirculation
RT_{NDT}	nil-ductility transition reference temperature
RVWLIS	Reactor vessel water level instrumentation system
RWM	Rod worth minimizer
RWCU	Reactor water cleanup system
SCS	Shutdown cooling system
SLCS	Standby liquid control system
SBO	Station blackout
SCC	Stress corrosion cracking

Acronym	**Meaning**
SFPCS	Spent fuel pool cooling system
SGTS	Standby gas treatment system
SJAE	Steam jet air ejector
SRM	Source range monitor
SRV	Safety relief valve
SSCs	Systems, structures, and components
SSE	Safe shutdown earthquake
SV	Safety valve
SWS	Service water system
TB	Turbine building
TBCCW	Turbine building closed cooling water
TCV	Turbine control valve
TID	Total integrated dose
TIP	Traveling in-core probe
TLAAs	Time-limited aging analyses
UFSAR	Updated Final Safety Analysis Report
UHS	Ultimate heat sink
USE	Upper-shelf energy
WD	Demineralizer water transfer

1.7 GENERAL REFERENCES

1.7.1 10 CFR 54, “Requirements for Renewal of Operating Licenses for Nuclear Power Plants.”

1.7.2 NEI 95-10, “Industry Guidelines for Implementing the Requirements of 10 CFR Part 54 – The License Renewal Rule,” Revision 5, January 2005.

1.7.3 Regulatory Guide 1.188 “Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses.”

1.7.4 NUREG-1800, Draft “Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants” United States Nuclear Regulatory Commission, January 2005.

1.7.5 NUREG-1801, Draft “Generic Aging Lessons Learned (GALL) Report,” United States Nuclear Regulatory Commission, January 2005.

1.7.6 10 CFR 50.48, “Fire Protection.”

1.7.7 10 CFR 50.49, “Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants.”

1.7.8 10 CFR 50.62, “Requirements for Reduction of Risk From Anticipated Transients Without Scram (ATWS) Events for Light-Water-Cooled Nuclear Power Plants.”

1.7.9 10 CFR 50.63, “Loss of All Alternating Current Power.”

1.7.10 10 CFR 50.65, “Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants.”

1.7.11 10 CFR 50, Appendix B, “Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants.”

1.7.12 10 CFR 51, “Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions.”

1.7.13 NUREG-0800, Section 9.5.1, Appendix C, Supplemental Fire Protection Review Criteria for License Renewal, Revision 4, October 2003

1.7.14 Letter dated December 3, 2002, from NRC to NEI, “Interim Staff Guidance (ISG)-04: Aging Management Of Fire Protection Systems For License Renewal”

1.7.15 NUREG-0933, A Prioritization of Generic Safety Issues, U.S. Nuclear Regulatory Commission, August 2004.

1.7.16 EPRI Technical Report 1003056, Non-Class 1 Mechanical Implementation Guideline and Mechanical Tools, Revision 3.

2.0 SCOPING AND SCREENING METHODOLOGY FOR IDENTIFYING STRUCTURES AND COMPONENTS SUBJECT TO AGING MANAGEMENT REVIEW, AND IMPLEMENTATION RESULTS

This section describes the process for identifying structures and components subject to aging management review in the Oyster Creek Generating Station (OCGS) license renewal integrated plant assessment. For the systems, structures and components (SSCs) within the scope of license renewal, 10 CFR 54.21(a)(1) requires the license renewal applicant to identify and list those structures and components subject to an Aging Management Review (AMR). 10 CFR 54.21(a)(2) further requires that the methods used to implement the requirements of 10 CFR 54.21(a)(1) be described and justified. Section 2 of this application satisfies these requirements.

The process is performed in two steps. “Scoping” refers to the process of identifying the plant systems and structures that are to be included in the scope of license renewal in accordance with 10 CFR 54.4. The intended functions that are the bases for including the systems and structures in the scope of license renewal are also identified during the scoping process. “Screening” is the process of determining which components associated with the in-scope systems and structures are subject to an aging management review in accordance with 10 CFR 54.21(a)(1) requirements. A detailed description of the Oyster Creek scoping and screening process is provided in Section 2.1.

The scoping and screening methodology is consistent with the guidelines presented in NEI-95-10, Industry Guidelines for Implementing the Requirements of 10 CFR Part 54 – The License Renewal Rule, Rev. 5 (reference 1.7.2). The plant level scoping results identify the systems and structures within the scope of license renewal in Section 2.2. The screening results identify structures and components subject to aging management review in the following LRA sections:

- Section 2.3 for mechanical systems
- Section 2.4 for structures
- Section 2.5 for electrical and instrumentation and controls (I&C) systems.

2.1 SCOPING AND SCREENING METHODOLOGY

2.1.1 INTRODUCTION

This introduction provides an overview of the scoping and screening process used at the Oyster Creek Generating Station. Subsequent sections provide details of how the process was implemented.

The methodology began with scoping. The initial step in the scoping process was to define the entire plant in terms of systems and structures. These systems and structures were evaluated against the scoping criteria in 10 CFR 54.4(a)(1), (a)(2), and (a)(3), to determine if they perform or support a safety related intended function, or perform functions that demonstrate compliance with the requirements of one of the five license renewal regulated events. For the systems and structures determined to be in scope, the intended functions that are the bases for including them in scope were also identified. Scoping evaluations are documented on a scoping evaluation form.

If any portion of a system or structure met the scoping criteria of 10 CFR 54.4, the system or structure was included in the scope of license renewal. Mechanical systems and structures were then further evaluated, to determine those mechanical and structural components that perform or support the identified intended functions. The in-scope boundaries of mechanical systems and structures were developed and are described in Sections 2.3 and 2.4. These boundaries are also depicted on the License Renewal Boundary Drawings. The in-scope boundaries of the mechanical systems and structures are highlighted in color. In scope structures and components are shown in green, except non-safety related components that are in scope to preclude physical or spatial interaction, or provide structural support to safety related SSCs, which are shown in red. Additional details on scoping evaluations and boundary drawing development are provided in Section 2.1.5.

All electrical components within in-scope mechanical and electrical systems were included in the scope of license renewal as electrical commodities. Consequently, further system evaluations to determine which electrical components were required to perform or support the system intended functions were not required. Additional details on electrical and I&C system scoping are provided in Section 2.1.5.

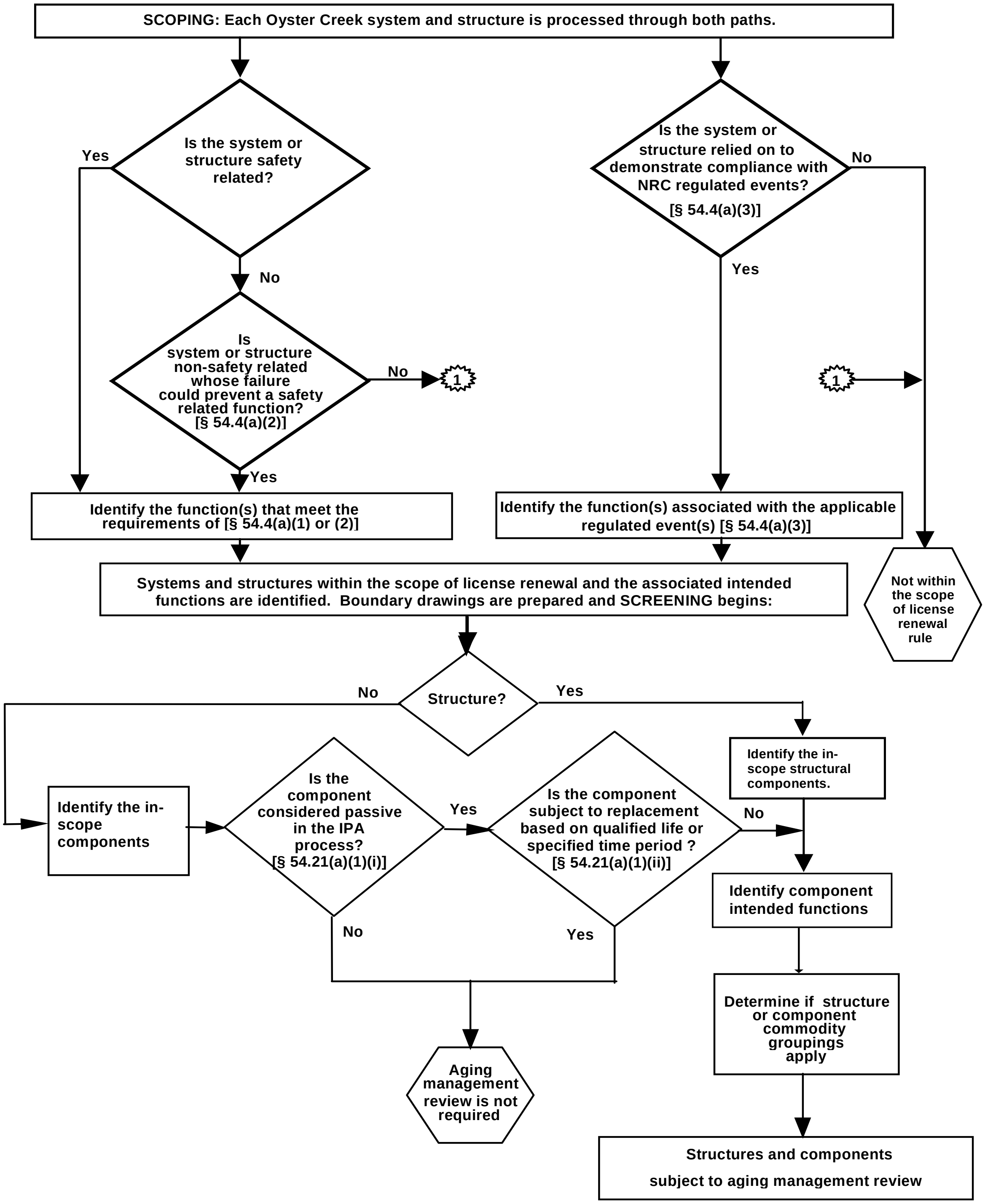
After completion of the scoping and boundary evaluations, the screening process evaluated the in-scope structures and components to identify the long-lived, passive structures and components subject to an aging management review, along with the structure and component passive intended functions. Additional details on the screening process are provided in Section 2.1.6.

Selected components, such as equipment supports and passive electrical components, were more effectively scoped and screened as commodities. As such, they were not evaluated with the individual system or structure, but were evaluated collectively as a commodity group. Commodity groups are identified in

Table 2.2-1. The passive electrical commodities are identified in Section 2.5. Commodity groups utilized are consistent with NUREG-1800 Table 2.1-5 and previous license renewal applications accepted by the NRC.

Figure 2.1-1 provides a flowchart of the general scoping and screening process.

FIGURE 2.1-1
Oyster Creek Scoping and Screening Flowchart



2.1.2 INFORMATION SOURCES USED FOR SCOPING AND SCREENING

A number of different current license basis (CLB) and design basis information sources were utilized in the scoping and screening process. The CLB for Oyster Creek is consistent with the definition provided in 10 CFR 54.3. The significant source documentation is discussed below.

Most of these source documents are readily available in hard copy or electronic format. Document records such as licensing correspondence and NRC Safety Evaluation Reports are available in a word searchable database, such that applicable documents can be identified and located by searching the appropriate topic.

2.1.2.1 Updated Final Safety Analysis Report

The Oyster Creek Updated Final Safety Analysis Report (UFSAR) was initially issued following the completion of the NRC Systematic Evaluation Program (SEP), and has since been updated regularly in accordance with the requirements of 10 CFR 50.71(e). The UFSAR provided significant input for system and structure descriptions and functions.

2.1.2.2 Fire Hazards Analysis Report

The Fire Hazards Analysis Report (FHAR) describes the fire protection configuration for the confinement, detection, and extinguishment of fires, and demonstrates the capability to achieve and maintain safe shutdown conditions in the event of a fire, in support of the Fire Protection Program functions.

2.1.2.3 Environmental Qualification Master List

The scope of the electrical equipment and components that must be environmentally qualified for use in a harsh environment at Oyster Creek is identified in the Environmental Qualification (EQ) Master List. This document is a database listing of equipment and components, and includes fields that identify specific equipment information such as manufacturer, plant location and qualification level. The EQ Master List data has been migrated to the Oyster Creek Component Record List (CRL). The CRL includes an Environmental Qualification data field, and this field is used to identify the EQ components from the EQ Master List. The CRL EQ data field is a design quality field, which means the data is controlled and has been verified accurate.

2.1.2.4 Maintenance Rule Database

The Maintenance Rule Database documents the results of Maintenance Rule scoping for Oyster Creek systems and structures. The Maintenance Rule Database provided an additional source of information to identify system and structure functions.

2.1.2.5 Facility Description and Safety Analysis Report (FDSAR)

This report was submitted to the Atomic Energy Commission in support of the application for an operating license to initially operate the Oyster Creek Generating Station. The FDSAR included the principal design criteria, with description and analysis of how the various plant systems and components were designed to satisfy the principal design criteria.

2.1.2.6 NUREG-0822 and NUREG-0822 Supplement 1

Issued in January 1983, NUREG-0822 is the final NRC Integrated Plant Safety Assessment Report (IPSAR) prepared under the scope of the SEP. The SEP was initiated by the NRC to review the design of older operating nuclear reactor plants to reconfirm and document their safety. Some follow-up requirements for additional analysis were identified in the final IPSAR. Upon completion, these additional items were reviewed and are addressed by NUREG-0822 Supplement 1.

2.1.2.7 NUREG-1382

Issued in January 1991, NUREG-1382 is the NRC Safety Evaluation Report (SER) related to the full-term operating license for Oyster Creek Generating Station. The major portion of the technical input was provided by the IPSAR and SEP topic evaluations, but the SER also addresses other operating license issues not covered under the SEP.

2.1.2.8 Design Basis Documents

System Design Basis Documents (DBD) are available for selected Oyster Creek systems. Design Basis Documents provide detailed descriptions of the associated system design basis, including system functions and design requirements. The system DBD was reviewed, when available, during the system scoping review.

2.1.2.9 Controlled Plant Component Database

Oyster Creek maintains a controlled plant component database that contains component level design and maintenance information. The plant component database is called the Component Record List (CRL). The CRL lists plant components at the level of detail for which discrete maintenance or modification activities typically are performed. At Oyster Creek the CRL provides a comprehensive listing of plant components. Component type and unique component identification numbers identify each component in the database.

2.1.2.10 Other CLB References

NRC Safety Evaluation Reports include NRC staff review of various Oyster Creek submittals, and may include licensee commitments.

Licensing correspondence includes relief requests, Licensee Event Reports, and responses to NRC communications such as NRC bulletins, generic letters or enforcement actions, and may include licensee commitments.

Engineering drawings provide system, structure and component configuration details for Oyster Creek. These drawings were used in conjunction with the plant component database records to support scoping and screening evaluations.

Engineering evaluations and calculations can provide additional information about the requirements or characteristics associated with the evaluated systems, structures or components.

2.1.3 TECHNICAL POSITION PAPERS

Technical position papers were prepared in support of the license renewal project. Engineers experienced in BWR systems, programs and operations prepared the position papers. Position papers contain technical evaluations and bases for decisions or positions associated with various license renewal requirements. Position papers are prepared, reviewed and approved in accordance with controlled project procedures, and are based on the CLB source documents described in Section 2.1.2.

The following sections describe the significant technical position papers associated with the Oyster Creek scoping and screening methodology.

2.1.3.1 License Renewal Systems and Structures List

One of the first steps necessary to begin the license renewal scoping process was to identify a comprehensive list of systems and structures to be evaluated for license renewal scoping. While there exists a variety of document sources that identify and list Oyster Creek systems and structures, no single source provided the comprehensive list in a format appropriate for 10 CFR 54.4 license renewal system and structure scoping. Therefore, a position paper was prepared to establish a comprehensive list of license renewal systems and structures, and to document the basis for the list. Starting with the systems and structures list contained in an approved engineering standard, the list was reviewed against the CRL, the Oyster Creek UFSAR, plant design drawings, the maintenance rule database, and other plant design documents. The position paper grouped license renewal systems and structures into the following categories:

- Reactor Vessel, Internals, and Reactor Coolant System
- Engineered Safety Features
- Auxiliary Systems
- Steam and Power Conversion Systems
- Electrical Components
- Structures and Component Supports

When grouping the Oyster Creek license renewal systems and structures into these categories, the guidance of NUREG-1801 “Generic Aging Lessons Learned (GALL) Report” was utilized. The position paper also identifies the components that are evaluated as commodity groups. The complete list of systems, structures and commodity groups evaluated for license renewal is provided in Section 2.2 of this application.

Certain structures and equipment were excluded at the outset because they do not meet criteria 10 CFR 54.4(a)(1), (a)(2) or (a)(3). These include: driveways and parking lots, temporary equipment, health physics equipment, portable measuring and testing equipment, tools and motor vehicles.

2.1.3.2 Identification of Safety Related Systems and Structures

Safety related systems and structures are included in the scope of license renewal in accordance with 10 CFR 54.4(a)(1) scoping criterion. Oyster Creek systems and structures that have been classified as safety related are identified as “Q” in the controlled quality classification data field in the CRL. Oyster Creek quality classification procedures were reviewed against the license renewal “Safety Related” scoping criterion in 10 CFR 54.4(a)(1), to confirm that Oyster Creek safety related classifications are consistent with license renewal requirements. This review was documented in a technical position paper. The position paper provides a summary list of the systems and structures that are safety related at Oyster Creek. These systems and structures were included in the scope of license renewal under the 10 CFR 54.4(a)(1) scoping criteria.

The Oyster Creek quality classification procedure definition of safety related (Q) is as follows:

> *A structure, system or component shall be classified as Safety Related (Q) if designed to remain functional for all design basis conditions necessary to ensure:*
>
> - *Integrity of reactor coolant pressure boundary,*
> - *Capability to shutdown reactor and maintain it in a safe (hot) shutdown condition, or*
> - *Capability to prevent or mitigate consequences of accidents which could result in potential off-site exposures comparable to guideline exposures of 10 CFR 100*

This definition is nearly identical to 10 CFR 54.4(a)(1). The differences are addressed as follows:

Design Basis Events

The Oyster Creek procedure definition refers to “all design basis conditions” while 10 CFR 54.4(a)(1) is more specific, referring to design basis events as defined in 10 CFR 50.49(b)(1). For Oyster Creek license renewal, an additional technical position paper was prepared to confirm that all applicable design basis events were considered. The position paper documented a review of design basis internal and external events, including abnormal operational transients, anticipated operational occurrences, and natural phenomena as described in the current licensing basis, and provided a summary list of those additional systems and structures relied upon to remain functional to ensure 10 CFR 54.4(a)(1) functions during and following such events. These additional systems and structures were included in the scope of license renewal under 10 CFR 54.4(a)(1).

Exposure Guidelines

The Oyster Creek quality classification procedure “Safety Related” definition refers to 10 CFR 100 for accident exposure guidelines. The license renewal rule references the guidelines in 10 CFR 50.34(a)(1), 10 CFR 50.67(b)(2), or 10 CFR 100.11, as applicable. These different exposure guidelines appear in three different Code sections to address similar accident analyses performed by licensees for different reasons. The guidelines in 10 CFR 50.34(a)(1) are applicable to facilities seeking a construction permit, and are therefore not applicable to Oyster Creek license renewal. The guidelines in 10 CFR 50.67(b)(2) are applicable to facilities seeking to revise the current accident source term used in their design basis radiological analyses. Oyster Creek has submitted revisions to its LOCA accident source term in design basis radiological consequences analyses, but has not yet submitted a license amendment application under 10 CFR 50.67 for other accidents. The Main Condenser and portions of the Main Steam system are credited for radiological plate out and holdup for the Control Rod Drop Accident (CRDA), and are therefore included in the scope of license renewal to perform this intended function. In accordance with NUREG-0800 Standard Review Plan Section 15.4.9, it is not required that the condenser be safety related for this event.

If an additional license amendment request under 10 CFR 50.67 is submitted and approved by the NRC, then it will be reviewed to identify any additional systems, structures and components that would have been subject to an aging management review or evaluation of time-limited aging analysis, in accordance with the requirements of 10 CFR 54.37(b).

Hot Shutdown

The Oyster Creek definition refers to the hot shutdown condition. Systems required to achieve cold shutdown at Oyster Creek are also classified safety related and included in the scope of license renewal.

When supplemented with the broad review of CLB design basis events, the Oyster Creek quality classification procedure definition of “safety related" is consistent with 10 CFR 54.4(a)(1), and results in a comprehensive list of safety related systems and structures that were included in the scope of license renewal. This is consistent with NUREG-1800 Section 2.1.3.1.1.

2.1.3.3 10 CFR 54.4(a)(2) Scoping Criteria

All non-safety related systems, structures, and components whose failure could prevent satisfactory accomplishment of any of the functions identified under

10 CFR 54.4 (a)(1), were included in the scope of license renewal in accordance with 10 CFR 54.4(a)(2) requirements. To assure complete and consistent application of this scoping criterion, a technical position paper was prepared.

This license renewal scoping criteria requires consideration of the following:

1. Non-safety related SSCs required to perform a function that supports a safety related SSC.
2. Non-safety related systems connected to and providing structural support for a safety related SSC.
3. Non-safety related systems with a potential for spatial interaction with safety related SSCs.
4. Certain non-safety related mitigative plant design features that are part of the Oyster Creek CLB

The first item is addressed during the scoping process, by identifying the non-safety related systems and structures required to support the accomplishment of a safety related intended function under 10 CFR 54.4(a)(1), and then confirming that these supporting systems and structures are also included in scope.

The remaining three items concern non-safety related systems with potential physical or spatial interaction with safety related systems, structures and components. Scoping of these systems is the subject of NRC Interim Staff Guidance ISG-09, as discussed in Section 2.1.4.9. To assure complete and consistent application of 10 CFR 54.4(a)(2) requirements and the ISG, a technical position paper was prepared. The position paper documents a review of the CLB references relevant to physical or spatial interactions, including plant design features intended to assure failures will not prevent satisfactory accomplishment of required intended functions.

The position paper describes the Oyster Creek approach to scoping of non-safety related systems with a potential for physical or spatial interaction with safety related SSCs. Oyster Creek chose to implement the preventive option as described in the ISG, although certain mitigative plant features are also included in scope. The paper provides appropriate guidance to assure that license renewal scoping for 10 CFR 54.4(a)(2) met the requirements of the license renewal rule and the ISG. See Section 2.1.5.2 for additional discussion of the application of this scoping criterion.

2.1.3.4 Systems and Structures Credited for Regulated Events

Technical position papers were prepared to address license renewal scoping of SSCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for fire protection, environmental qualification, anticipated transients without scram and station blackout. The Commission’s regulations for pressurized thermal shock are not applicable to the Oyster Creek boiling water reactor design. These position papers are summarized below:

Fire Protection

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) were included in the scope of license renewal in accordance with 10 CFR 54.4(a)(3) requirements.

The scope of systems and structures required for the fire protection program to comply with the requirements of 10CFR50.48 includes:

- Systems and structures required to demonstrate post-fire safe shutdown capabilities
- Systems and structures required for fire detection and suppression
- Systems and structures required to meet commitments made to Appendix A of Branch Technical Position (BTP) APCSB 9.5-1

Recent NRC guidance, including NUREG-0800 Section 9.5.1 Appendix C (reference 1.7.13) and the ISG-7 scoping guidance for fire protection equipment, states that the scope of 10 CFR 50.48 goes beyond the protection of safety related equipment, and also includes fire protection systems, structures and components needed to minimize the effects of a fire and to prevent the release of radioactive material to the environment. Fire protection system and structure scoping for Oyster Creek is performed consistent with this guidance, and is documented in the technical position paper.

The fire protection technical position paper summarizes results of a detailed review of the plant's fire protection program documents that demonstrate compliance with the requirements of 10 CFR 50.48. The position paper provides a list of systems and structures credited in the plant's fire protection program documents. For the listed systems and structures, the position paper also identifies appropriate CLB references. The identified systems and structures were included in the scope of license renewal under the 10 CFR 54.4(a)(3) scoping criteria.

The fire detection and suppression systems at Oyster Creek are plant-wide systems that protect a wide variety of plant equipment. Not all portions of these systems are required to demonstrate compliance with 10 CFR 50.48. Some branches of the fire detection and suppression systems protect plant areas in which a fire would not impact any equipment important to safety, or significantly increase the risk of radioactive releases to the environment. Portions of the fire suppression and detection systems that are not included in the scope of license renewal are identified and documented in the technical position paper. System branches that have not been included in scope can be isolated from the remaining in scope system by closing the associated isolation valve. The isolation valve is included in scope.

Environmental Qualification

Criterion 10 CFR 54.4(a)(3) requires that 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 environmental qualification (10 CFR 50.49) be included in the scope of license renewal.

The Oyster Creek Environmental Qualification (EQ) program includes safety-related electrical equipment, non-safety-related electrical equipment whose failure under postulated environmental conditions could prevent satisfactory accomplishment of safety functions of the safety-related equipment, and certain post-accident monitoring equipment, as defined in 10 CFR 50.49(b)(1), 10 CFR 50.49(b)(2), and 10 CFR 50.49(b)(3) respectively. This equipment was included in the scope of license renewal.

The environmental qualification position paper summarizes the results of a review of Oyster Creek EQ program documents. The EQ position paper provides a list of systems that include EQ components. The EQ position paper also provides a list of structures that are credited to provide the physical boundaries for the postulated harsh environments, and contain environmentally qualified electrical equipment. These systems and structures were included in the scope of license renewal under the 10 CFR 54.4(a)(3) scoping criteria.

Anticipated Transients Without Scram

Criterion 10 CFR 54.4(a)(3) requires that 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 anticipated transients without scram (10 CFR 50.62) be included in the scope of license renewal.

An anticipated transient without scram (ATWS) is a postulated operational transient that generates an automatic scram signal, accompanied by a failure of the reactor protection system to shutdown the reactor. The ATWS rule (10 CFR 50.62) requires improvements in the design and operation of boiling water reactors to reduce the likelihood of failure to shutdown the reactor following anticipated transients, and to mitigate the consequences of an ATWS event. The requirements for a BWR are to install an alternate rod insertion (ARI) system, a reactor coolant recirculation pump trip (RPT) system to be actuated for conditions indicative of an ATWS, and an adequately sized standby liquid control (SLC) system.

The ATWS position paper summarizes the results of a review of the Oyster Creek current licensing basis with respect to ATWS. Oyster Creek has ATWS mitigation instrumentation and logic necessary for ARI and RPT to mitigate the consequences of an ATWS event. Oyster Creek also has an adequately sized standby liquid control system. The ATWS position paper provides a list of the systems required by 10 CFR 50.62 to reduce the risk from ATWS events. The position paper also provides a list of structures that are credited to provide physical support and protection for the credited ATWS systems. These systems and structures were included in the scope of license renewal under the 10 CFR 54.4(a)(3) scoping criteria.

Station Blackout

Criterion 10 CFR 54.4(a)(3) requires that 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 station blackout (10 CFR 50.63) be included in the scope of license renewal.

A station blackout (SBO) event is a complete loss of alternating current (AC) electric power to the essential and nonessential switchgear buses in a nuclear power plant (i.e., loss of the offsite electric power system concurrent with generator trip and unavailability of the onsite emergency AC power sources). SBO does not include the loss of available AC power to buses fed by station batteries through inverters or by alternate AC sources, nor does it assume a concurrent single failure or design basis accident.

Oyster Creek implemented plant modifications and procedures in response to 10 CFR 50.63 to enable the station to withstand and recover from a station blackout of a specified duration. Recovery includes the ability to achieve and maintain hot shutdown of the reactor. Oyster Creek capabilities, commitments and analyses that demonstrate compliance with 10 CFR 50.63 are documented in UFSAR Section 15.9 and in NRC safety evaluation reports and correspondence related to the SBO rule.

The NRC staff guidance ISG-02 on scoping of equipment relied on to meet the requirements of the SBO rule (10 CFR 50.63) for license renewal has been incorporated into the Oyster Creek scoping methodology. In accordance with the ISG requirements, the SSCs required to recover from the SBO event are included in the scope of license renewal. For Oyster Creek, this is the portion of the plant electrical system used to connect the safety related buses to offsite power and recover from an SBO event, in addition to the onsite emergency power system. This includes the disconnect switches on the supply side of the switchyard circuit breakers, connecting the 34.5 kV Oyster Creek substation to OCGS, and continues through the startup transformers to the switchgear breakers of the plant 4160V AC buses.

The SBO position paper summarizes the results of a review of the Oyster Creek current licensing basis with respect to station blackout. The position paper provides lists of systems and structures credited in Oyster Creek SBO evaluations. For the listed systems and structures, the position paper also identifies appropriate CLB references. These systems and structures were included in the scope of license renewal under the 10 CFR 54.4(a)(3) scoping criteria.

2.1.4 INTERIM STAFF GUIDANCE DISCUSSION

The NRC has encouraged applicants for license renewal to address proposed Interim Staff Guidance (ISG) issues in license renewal applications. The following is the complete list of ISG issues as of January 2005.

ISG-1	GALL Report Presenting One Acceptable Way to Manage Aging Effects for License Renewal
ISG-2	Station Blackout Scoping
ISG-3	Concrete Aging Management Program
ISG-4	Fire Protection System Piping Aging Management

ISG-5	Identification and Treatment of Electrical Fuse Holders
ISG-6	Identification and Treatment of Housing for Active Components
ISG-7	Scoping Guidance for Fire Protection Equipment
ISG-8	Updating the Improved License Renewal Guidance Documents – ISG Process
ISG-9	Identification and Treatment of Structures, Systems and Components Which Meet 10 CFR 54.4(a)(2)
ISG-10	Standardized Format for License Renewal Applications
ISG-11	Aging Management of Environmental Fatigue for Carbon/Low-Alloy Steel
ISG-12	Operating Experience with Cracking of Class 1 Small-Bore Piping
ISG-13	Management of Loss of Preload on Reactor Vessel Internals Bolting Using the Loose Parts Monitoring System
ISG-14	Operating Experience with Cracking in Bolting
ISG-15	Revision to GALL Aging Management Program XI.E2
ISG-16	Time-Limited Aging Analyses Supporting Information
ISG-17	Bus Ducts (Iso-phase and Non-segregated) for Electrical Bus Bar
ISG-18	Revision to GALL AMP XI.E3 for Inaccessible Cable (Medium Voltage)
ISG-19	Include Nickel-alloy Nozzles and Penetrations in AMP XI.M11
ISG-20	Include Steam Generator Tube Integrity in AMP XI.M19
ISG-21	Improve GALL Guidance on Reactor Vessel Internals

The following sections provide a summary discussion of each of the ISG issues:

2.1.4.1 GALL Report Presenting One Acceptable Way to Manage Aging Effects for License Renewal (ISG-01)

Oyster Creek applied NUREG-1801 for aging management, or provided justification for any alternative methods.

2.1.4.2 Station Blackout Scoping (ISG-02)

NRC guidance on this issue is as follows: “Both the offsite and onsite power systems are relied upon to meet the requirements of the SBO rule. Elements of both offsite and onsite power are necessary to determine the required coping duration under 10 CFR 50.63(a)(1), and the procedures required by

10 CFR 50.63(c)(1)(ii) must address both offsite power and onsite power restoration. It follows, therefore, that both systems are used to demonstrate compliance with the SBO rule and must be included within the scope of license renewal consistent with the requirements of 10 CFR 54.4(a)(3)." Further clarification was provided which stated that, "the staff has determined that the plant system portion of the Offsite Power System that is used to connect the plant to the offsite power source should be included within the scope of the rule. This path typically includes the switchyard circuit breakers that connect to the Offsite Power System transformers (Startup transformers), the transformers themselves, the intervening overhead or underground circuits between circuit breaker and transformer and transformer and onsite electrical distribution system, and the associated control circuits and structures."

Scoping of Oyster Creek systems and structures relied on to demonstrate compliance with the Commission's regulations for station blackout is documented in a technical position paper as described in Section 2.1.3.4. As stated above, the regulatory guidance of ISG-02 mandates the inclusion of selected offsite power SSCs that may be used for restoration of offsite power following an SBO event, beyond those specifically identified in the regulatory commitments made to satisfy 10 CFR 50.63 criteria. Therefore, the SSCs that provide for restoration of offsite power following an SBO event are also included within the scope of License Renewal, in accordance with this guidance.

2.1.4.3 Concrete Aging Management Program (ISG-03)

Concrete subject to aging management review has been included in an aging management program in accordance with the ISG. This includes concrete for which no aging effects requiring management were identified. See Section 3.5.

2.1.4.4 Fire Protection System Piping Aging Management (ISG-04)

In a letter dated December 3, 2002, from the NRC to NEI, "Interim Staff Guidance (ISG)-04: Aging Management Of Fire Protection Systems For License Renewal," (reference 1.7.14) the NRC provided clarification of previous aging management guidance outlined in the program description in NUREG-1801 Chapter XI.M26, Fire Protection, and Chapter XI.M27, Fire Water Systems. The new guidance provides clarifications regarding wall thickness evaluation methods for fire protection system piping, as well as clarification of sprinkler heads testing requirements in accordance with NFPA standards. The ISG also eliminates the previously recommended functional testing of halon and carbon dioxide fire suppression systems. The Oyster Creek aging management programs for fire protection systems is consistent with the ISG-04 guidance. The Oyster Creek aging management programs include guidance as to the performance of volumetric inspections, wall thickness evaluations, and sprinkler head testing.

2.1.4.5 Identification and Treatment of Electrical Fuse Holders (ISG-05)

Consistent with the requirements specified in 10 CFR 54.4(a), fuse holders (including fuse clips and fuse blocks) are considered to be passive electrical components. Fuse holders are scoped, screened, and included in the aging management review in the same manner as terminal blocks and other types of electrical connections. However, fuse holders inside the enclosure of an active component, such as control boards, control panels, switchgear, power supplies, power inverters, battery chargers, circuit boards, and other electrical equipment, are considered to be piece parts of the larger assembly, and are therefore not subject to aging management review.

Fuse holders perform a primary function similar to other types of electrical connections by providing an electrical circuit to deliver rated voltage, current, or signals. These intended functions meet the criteria of 10 CFR 54.4(a). Additionally, these intended functions are performed without moving parts or without a change in configuration or properties as described in 10 CFR 54.21 (a)(1)(i). Fuse holders are therefore passive, long-lived electrical components within the scope of license renewal and subject to an AMR. Therefore, aging management of fuse holders would be required for those cases where fuse holders are not considered subcomponent parts of a larger assembly. Oyster Creek is consistent with this ISG guidance. The aging management review performed for Oyster Creek fuse holders identified no aging effects that require management.

2.1.4.6 Identification and Treatment of Housing for Active Components (ISG-06)

Oyster Creek has treated the housings for active components such as pump casings, valve bodies, damper and fan housings, heating and cooling coils as passive and therefore subject to aging management review, consistent with this ISG guidance.

2.1.4.7 Scoping Guidance for Fire Protection Equipment (ISG-07)

Scoping of Oyster Creek systems and structures relied on to demonstrate compliance with the Commission’s regulations for fire protection is documented in a technical position paper as described in Section 2.1.3.4. Scoping under this criterion goes beyond the systems and structures required for the protection of safety related equipment, and includes systems and structures relied on to minimize the effects of a fire and prevent the release of significant radioactive material if a fire does occur. The Oyster Creek scoping methodology is consistent with this NRC guidance.

2.1.4.8 Updating the Improved License Renewal Guidance Documents – ISG Process (ISG-08)

This issue does not provide any guidance for applicants, and no response is required.

2.1.4.9 Identification and Treatment of Structures, Systems and Components Which Meet 10 CFR 54.4(a)(2) (ISG-09)

The NRC staff issued this ISG to clarify the scoping requirements for 10 CFR 54.4(a)(2). The guidance requires that, when demonstrating that failures of non-safety related systems would not adversely impact on the ability to maintain intended functions, a distinction must be made between non-safety related systems that are connected to safety related systems and those that are not connected to safety related systems. For a non-safety related system that is connected to a safety related system, the non-safety related system should be included within the scope of license renewal up to and including the first seismic anchor past the safety/non-safety interface, and appropriate aging management programs applied.

For non-safety related systems which are not connected to safety related piping or components, or are beyond the first seismic anchor past the safety/non-safety interface, but have a spatial relationship such that their failure could adversely impact on the performance of a safety-related SSC's intended function, the applicant has two options when performing its scoping evaluation; a mitigative option or a preventive option. When mitigative features (e.g., pipe whip restraints, jet impingement shields, spray and drip shields, seismic supports, flood barriers) are provided to protect safety related SSCs from failures of non-safety related SSCs, this demonstration should show that mitigating devices are adequate to protect safety related SSCs from failures of non-safety related SSCs regardless of failure location. If this level of protection can be demonstrated, then only the mitigative features need to be included within the scope of license renewal. However, if an applicant cannot demonstrate that the mitigative features are adequate to protect safety related SSCs from the consequences of failures of non-safety related SSCs, then the applicant should utilize the preventive option, which requires that the entire non-safety related SSC be brought into the scope of license renewal.

The methodology for identification of Oyster Creek SSCs that satisfy the 10 CFR 54.4(a)(2) scoping criterion was based on a review of applicable CLB documents, plant specific and industry operating experience. The preventive option is utilized to demonstrate that safety related SSCs are adequately protected from failure of non-safety related SSCs. A limited number of non-safety related mitigative features, such as missile barriers, flood barriers, and spray shields, are credited in the Oyster Creek CLB for the protection of safety related SSCs. These mitigative features were also included in the scope of license renewal and were evaluated as structural components.

The Oyster Creek scoping methodology for 10 CFR 54.4(a)(2) is consistent with this NRC guidance. See Section 2.1.5.2 for additional discussion of the application of these scoping criteria.

2.1.4.10 Standardized Format for License Renewal Applications (ISG-10)

The NEI standard license renewal format was utilized during the preparation of this application.

2.1.4.11 Aging Management of Environmental Fatigue for Carbon/Low-Alloy Steel (ISG-11)

Aging management of environmental fatigue for carbon/low-alloy steel items is discussed in Section 4.3.

2.1.4.12 Operating Experience with Cracking of Class 1 Small-Bore Piping (ISG-12)

Management of cracking associated with ASME Class 1 small-bore piping has been incorporated into the One-Time Inspection Program described in Section B.1.24. The aging management program is consistent with ISG-12.

2.1.4.13 Management of Loss of Preload on Reactor Vessel Internals Bolting Using the Loose Parts Monitoring System (ISG-13)

The NRC has not developed a position on this issue. Oyster Creek does not have a Loose Parts Monitoring System. Aging management of reactor vessel internals is addressed in Section B.1.9, BWR Vessel Internals.

2.1.4.14 Operating Experience with Cracking in Bolting (ISG-14)

The NRC has not developed a position on this issue. Aging management of bolting is addressed in Section B.1.12, Bolting Integrity.

2.1.4.15 Revision to GALL Aging Management Program XI.E2 (ISG-15)

Oyster Creek has applied this ISG in the development of the LRA. This aging management program is described in Section B.1.35, Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used In Instrument Circuits.

2.1.4.16 Time-Limited Aging Analyses Supporting Information (ISG-16)

Oyster Creek has applied this ISG in the development of the LRA. Time-Limited Aging Analyses are discussed in Section 4.0.

2.1.4.17 Bus Ducts (Iso-phase and Non-segregated) for Electrical Bus Bar (ISG-17)

There are no bus ducts within the scope of license renewal at Oyster Creek.

2.1.4.18 Revision to GALL AMP XI.E3 for Inaccessible Cable (Medium Voltage) (ISG-18)

Oyster Creek has applied this ISG in the development of the LRA. Aging management for inaccessible medium voltage cable is addressed in Section B.1.36, Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements.

2.1.4.19 Include Nickel-alloy Nozzles and Penetrations in AMP XI.M11 (ISG-19)

This aging management program is only applicable to pressurized water reactors, and is therefore not applicable to the Oyster Creek boiling water reactor design.

2.1.4.20 Include Steam Generator Tube Integrity in AMP XI.M19 (ISG-20)

Oyster Creek is a boiling water reactor design and does not utilize steam generators. Therefore, this issue is not applicable to Oyster Creek.

2.1.4.21 Improve GALL Guidance on Reactor Vessel Internals (ISG-21)

The NRC has not developed a position on this issue. Aging management of reactor vessel internals is addressed in Section B.1.9, BWR Vessel Internals.

2.1.5 SCOPING PROCEDURE

The scoping process is the systematic process used to identify the Oyster Creek systems, structures and components within the scope of the license renewal rule. The scoping process was initially performed at the system and structure level, in accordance with the scoping criteria identified in 10 CFR 54.4(a). System and structure functions and intended functions were identified from a review of the source CLB documents. In scope boundaries were established and documented in the scoping evaluations, based on the identified intended functions. The in scope boundaries form the basis for identification of the in scope components, which is the first step in the screening process described in Section 2.1.6. System and structure scoping evaluations are documented and have been retained in a license renewal database. The system and structure scoping results are provided in Section 2.2.

The Oyster Creek scoping process began with the development of a comprehensive list of plant systems and structures, as described in Section 2.1.3.1. The systems and structures were grouped into one of the following categories:

- Reactor Vessel, Internals, and Reactor Coolant System
- Engineered Safety Features
- Auxiliary Systems
- Steam and Power Conversion Systems
- Electrical Components
- Structures and Component Supports

Each Oyster Creek system and structure was then scoped for license renewal using the criteria of 10 CFR 54.4(a). These criteria are briefly identified as follows:

- Title 10 CFR 54.4(a)(1) – Safety-related
- Title 10 CFR 54.4(a)(2) – Non-safety-related affecting safety-related
- Title 10 CFR 54.4(a)(3) – The five regulated events:
    - Fire Protection (10 CFR 50.48)
    - Environmental Qualification, EQ (10 CFR 50.49)
    - Pressurized Thermal Shock (10 CFR 50.61) (PWRs only)
    - Anticipated Transient Without Scram, ATWS (10 CFR 50.62)
    - Station Blackout, SBO (10 CFR 50.63)

The application of each of these criteria is discussed in Section 2.1.5.1, Section 2.1.5.2 and Section 2.1.5.3 below:

2.1.5.1 Safety Related – 10 CFR 54.4(a)(1)

In accordance with 10 CFR 54.4(a)(1), the systems, structures and components within the scope of license renewal include:

> *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 shutdown the reactor and maintain it in a safe shutdown condition; or*
>
> *(iii) The capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposure comparable the guidelines in 10 CFR 50.34(a)(1), 10 CFR 50.67(b)(2), or 10 CFR 100.11, as applicable.*

At Oyster Creek, the safety related systems and structures are identified in the Component Record List (CRL). The safety-related classifications in the Oyster Creek CRL were established using a controlled procedure, with classification criteria nearly identical to the above 10 CFR 54.4(a)(1) criteria. The classification criteria differences were evaluated in a license renewal position paper (see Section 2.1.3.2) and accounted for during the license renewal scoping process.

Safety related classifications for systems and structures were based on system and structure descriptions and analyses in the UFSAR, or on design basis documents such as engineering drawings, evaluations or calculations. Systems and structures that are identified as safety-related in the UFSAR, in design basis documents or in the CRL have been classified as satisfying criteria of 10 CFR 54.4(a)(1) and have been included within the scope of license renewal. The review also confirmed that all plant conditions, including conditions of normal operation, abnormal operational transients, design basis accidents, internal and external events, and natural phenomena for which the plant must be designed, were considered for license renewal scoping under 10 CFR 54.4(a)(1) criteria.

2.1.5.2 Non-Safety Related Affecting Safety Related – 10 CFR 54.4(a)(2)

In accordance with 10 CFR 54.4(a)(2), the systems, structures and components within the scope of license renewal include –

- All non-safety related systems, structures and components whose failure could prevent satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1)(i), (ii) or (iii).

This scoping criteria requires an assessment of non-safety related SSCs with respect to the following application or configuration categories:

- Functional support for safety related SSC 10 CFR 54.4(a)(1) functions
- Connected to and provide structural support for safety related SSCs
- Potential for spatial interactions with safety related SSCs
- Mitigative plant design features that are part of the Oyster Creek CLB

Each of these are categories are discussed below:

Functional Support for Safety Related SSC 10 CFR 54.4(a)(1) Functions

This category addresses non-safety related SSCs that are required to function in support of a safety related SSC intended function. The functional requirement distinguishes this category from the next two categories, where the non-safety related SSCs are required only to maintain adequate integrity to preclude structural failure or spatial interactions. The non-safety related SSCs that were included in scope under this review, to support a safety related SSC in performing its 10 CFR 54.4(a)(1) intended function, are identified on the License Renewal Boundary Drawings in green.

The Oyster Creek UFSAR and other CLB documents were reviewed to identify non-safety related systems or structures credited with supporting satisfactory accomplishment of a safety related function. Non-safety related systems or structures credited in CLB documents to support a safety-related function have been included within the scope of license renewal.

A supporting system review was completed as part of the scoping process. The scoping process was performed on a system and structure basis. The scoping evaluation for each system and structure was documented on a System and Structure Scoping Form. When a system was included in scope under 10 CFR 54.4(a)(1), the scoping evaluation included the identification of any additional systems or structures required to support the safety related system intended functions. It was then confirmed that these identified supporting systems and structures were also included in scope. Identification of supporting systems was not required for structures, as structural intended functions do not rely on supporting systems.

This review did not identify many non-safety related systems or structures that were required to support the accomplishment of safety related functions. Systems and structures required to support safety related functions are generally classified safety related at Oyster Creek, and as such included in the scope of license renewal under 10 CFR 54.4(a)(1). The systems and structures identified by this review were included in the scope of license renewal under 10 CFR 54.4(a)(2).

The next three 10 CFR 54.4(a)(2) scoping categories are the subject of NRC Interim Staff Guidance ISG-9. The NRC staff issued this ISG to clarify the scoping requirements for 10 CFR 54.4(a)(2). The guidance requires that, when demonstrating that failures of non-safety related systems would not adversely impact on the ability to maintain intended functions, a distinction must be made between non-safety related systems that are connected to safety related systems and those that are not connected to safety related systems. For a non-safety related system that is connected to a safety related system, the non-safety related system should be included within the scope of license renewal up to and including the first seismic anchor past the safety/non-safety interface, and appropriate aging management programs applied.

For non-safety related systems which are not connected to safety related piping or components, or are beyond the first seismic anchor past the safety/non-safety interface, but have a spatial relationship such that their failure could adversely impact on the performance of a safety-related SSC's intended function, the applicant has two options when performing its scoping evaluation; a mitigative option or a preventive option. When mitigative features (e.g., pipe whip restraints, jet impingement shields, spray and drip shields, seismic supports, flood barriers) are provided to protect safety related SSCs from failures of non-safety related SSCs, this demonstration should show that mitigating devices are adequate to protect safety related SSCs from failures of non-safety related SSCs regardless of failure location. If this level of protection can be demonstrated, then only the mitigative features need to be included within the scope of license renewal. However, if an applicant cannot demonstrate that the mitigative features are adequate to protect safety related SSCs from the consequences of failures of non-safety related SSCs, then the applicant should utilize the preventive option, which requires that the entire non-safety related SSC be brought into the scope of license renewal.

The methodology for identification of Oyster Creek SSCs that satisfy the 10 CFR 54.4(a)(2) scoping criterion was based on a review of applicable CLB documents, plant specific and industry operating experience. The preventive option is utilized to demonstrate that safety related SSCs are adequately protected from failure of non-safety related SSCs. A limited number of non-safety related mitigative features, such as missile barriers, flood barriers, and spray shields, are credited in the Oyster Creek CLB for the protection of safety related SSCs. These mitigative features were also included in the scope of license renewal and were evaluated as structural components.

Connected to and Provide Structural Support for Safety Related SSCs

For a non-safety related piping system connected to a safety related piping system, the non-safety related system was conservatively assumed to provide structural support to the safety related system, unless otherwise confirmed by a review of the installation details. The entire non-safety related system was included in scope for 10 CFR 54.4(a)(2), up to one of the following:

1. An anchor or three mutually perpendicular restraints (the supports were included in scope) that are equivalent to a seismic anchor in the Oyster Creek CLB
2. An anchored component such as a pump, heat exchanger, or turbine (the component was included in scope)
3. A wall or slab penetration that provide anchorage (the wall or slab was included in scope)
4. A point where the non-safety related line exits a structure and is routed underground
5. A flexible hose or flexible joint that is not capable of load transfer
6. The end of the piping run (e.g., vent and drain lines).

These scoping boundaries are determined from the physical installation details, confirmed in most cases by review of design drawings or visual inspection by plant walkdown.

Failure in the non-safety related piping beyond the above anchor or equivalent anchor locations would not impact structural support for the safety related piping. The associated SSCs included in the scope of license renewal are identified on the License Renewal Boundary Drawings in red. Note that if the connected non-safety related piping system contains water, steam or oil, then the in-scope boundary may extend beyond the locations described above due to potential spatial interaction.

Potential for Spatial Interactions with Safety Related SSCs

Non-safety related systems that are not connected to safety related piping or components, or are beyond the first equivalent seismic anchor past the safety/non-safety interface, and have a spatial relationship such that their failure could adversely impact on the performance of a safety-related SSC intended function, must be evaluated for license renewal scope in accordance with 10 CFR 54.4(a)(2) requirements. As described in ISG-9, there are two options when performing this scoping evaluation: a mitigative option and a preventive option.

The mitigative option involves crediting plant mitigative features (e.g., pipe whip restraints, jet impingement shields, spray and drip shields, seismic supports, flood barriers) to protect safety related SSCs from failures of non-safety related SSCs. This option requires a demonstration that the mitigating features are adequate to protect safety related SSCs from failures of non-safety related SSCs regardless of failure location. If this level of protection can be demonstrated, then only the mitigative features need be included within the scope of the scope of license renewal.

The preventive option involves identifying the non-safety related SSCs that have a spatial relationship such that their failure could adversely impact on the performance of a safety-related SSC intended function, and including the identified non-safety related SSC in the scope of license renewal without consideration of plant mitigative features.

Oyster Creek applied the preventive option for 10 CFR 54.4(a)(2) scoping. Certain plant mitigative features that are part of the Oyster Creek CLB are also included in the scope of license renewal, as described below.

The preventive option as implemented at Oyster Creek is based on a “spaces” approach for scoping of non-safety related systems with potential spatial interaction with safety related SSCs. Potential spatial interaction is assumed in any structure that contains active or passive safety related SSCs. The structures of concern for potential spatial interaction were identified based on a review of the CLB to determine which structures contained active or passive safety related SSCs. Plant walkdowns were performed as required to confirm that all structures containing safety related SSCs had been identified.

For structures that contain safety related SSCs, there may be selected rooms within the structure that do not contain any safety related SSCs. CLB document reviews and plant walkdowns were utilized as appropriate to confirm that these rooms did not contain safety related SSCs, thereby eliminating spatial interaction concerns within these rooms.

Non-safety related systems and components that contain water, oil, or steam, and are located inside structures that contain safety related SSCs, are included in scope for potential spatial interaction under criterion 10 CFR 54.4(a)(2), unless located in an excluded room. All high-energy lines located inside or outside primary containment are included in the scope of license renewal, under 10 CFR 54.4 (a)(1) or (a)(2), depending on their safety classification. Safety related high-energy lines are in scope under 10 CFR 54.4 (a)(1), and non-safety related high-energy lines are in scope under 10 CFR 54.4 (a)(2). System piping and components containing steam below atmospheric pressure, i.e., under vacuum conditions, do not pose a potential spray hazard and are therefore not included in the scope of license renewal for potential spatial interaction with safety related equipment. Supports for all non-safety related SSCs within these structures are included in scope.

Air and gas systems (non-liquid) are not a hazard to other plant equipment, and have therefore been determined not to have spatial interactions with safety-related SSCs. Oyster Creek and industry operating experience has not identified failures due to aging that have adversely impacted the accomplishment of a safety function. SSCs containing air or gas cannot adversely affect safety related SSCs due to leakage or spray, since gas systems contain no fluids that could spray or leak onto safety-related systems causing shorts or other malfunctions. Gas systems do not contain sufficient energy to cause pipe whip or jet impingement. Thus the non-safety related systems containing air or gas (except portions attached to safety related SSCs and required for structural support) are not included in the scope of license renewal for 10 CFR 54.4(a)(2). The supports are included in scope to prevent the non-safety related piping from falling down and potentially impacting safety related SSCs.

The piping systems included in the scope of license renewal under 10 CFR 54.4(a)(2) for potential spatial interaction with safety related SSCs are identified on the License Renewal Boundary Drawings in red.

Mitigative Plant Design Features that are Part of the Oyster Creek CLB

Missile Barriers - SSCs that provide missile barrier protection are generally classified as safety related structures in the CLB and are therefore in the scope of license renewal under 10 CFR 54.4(a)(1) requirements. However, some non-safety related walls in the turbine building are credited for missile protection and are in scope of license renewal under 10 CFR 54.4(a)(2) requirements.

Flood Barriers – Non-safety related flood protection features, such as walls, dikes, curbs, and seals, are included in the scope of license renewal under 10 CFR 54.4(a)(2) requirements. These features are evaluated as a commodity with the structures in which they are located.

Spray Shields - Spray shields are included in the scope of license renewal under 10 CFR 54.4(a)(2) requirements. Spray shields are provided in the CLB to protect safety related components from inadvertent operation or failure of fire protection water systems. Spray shields are included as a commodity with the structures in which they are located.

2.1.5.3 Regulated Events – 10 CFR 54.4(a)(3)

In accordance with 10 CFR 54.4(a)(3), the systems, structures and components within the scope of license renewal include –

> *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 50.61), and station blackout (10 CFR 50.63).*

Oyster Creek is a boiling water reactor, therefore 10 CFR 50.61, the regulation for pressurized thermal shock, is not applicable. For each of the other four applicable regulations, a technical position paper was prepared to provide input into the scoping process. Each of the regulated event position papers (described in Section 2.1.3.4) identify the systems and structures that are relied upon to demonstrate compliance with the applicable regulation, and also point to basis documentation that may be used to determine the scope of components within the system, credited to demonstrate compliance with each of the applicable regulated events. Guidance provided by the technical position papers was incorporated into the system and structure scoping evaluations, to determine the SSCs credited for each of the regulated events. SSCs credited in the regulated events have been classified as satisfying criteria of 10 CFR 54.4(a)(3) and have been included within the scope of license renewal.

2.1.5.4 System and Structure Intended Functions

For the systems and structures in the scope of license renewal, the intended functions that are the bases for including them within the scope of license renewal are identified and documented on the scoping form. The system or structure intended functions are based on the applicable CLB reference documents. For systems, the system level intended function descriptions associated with 10 CFR 54.4(a)(1) were standardized based on nuclear safety criteria for boiling water reactors as documented in industry standard ANSI/ANS-52.1-1983. This provided for consistent function application and appropriate level of detail for system level function descriptions. The component level passive intended functions are those structure and component passive functions that are required to support the system and structure intended functions, and are further described in Section 2.1.6.2, below.

2.1.5.5 Scoping Boundary Determination

Systems and structures that are included in the scope of license renewal are then further evaluated to determine the population of in-scope structures and components. This part of the scoping process is also a transition from the scoping process to the screening process. The process for evaluating mechanical systems is different from the process for structures, primarily because the plant design document formats are different. Mechanical systems are depicted primarily on system flow diagrams that show the system components and their functional relationships, while structures are depicted on physical drawings. Components of electrical systems are screened as commodities. Scoping boundaries for mechanical systems, electrical systems and structures are therefore described separately:

Mechanical Systems

For mechanical systems, the mechanical components that support the system intended functions are included in the scope of license renewal and are depicted on the applicable system flow diagrams. Mechanical system flow diagrams are marked up to create license renewal boundary drawings showing the in scope components. Components that are required to support a safety related function, or a function that demonstrates compliance with one of the license renewal regulated events, are identified on the system flow diagrams by green highlighting. Non-safety related components that are connected to safety related components and are required to provide structural support at the safety/non-safety interface, or components whose failure could prevent satisfactory accomplishment of a safety related function due to spatial interaction with safety related SSCs, are identified by red highlighting. A computer sort and download of associated system components from the CRL confirms the scope of components in the system. Plant walkdowns were performed when required for additional confirmation.

Electrical and I&C Systems

Electrical and I&C systems, and electrical components within mechanical systems, did not require further system evaluations to determine which components were required to perform or support the identified intended functions. Electrical components within in-scope systems were included in the scope of license renewal. From the population of in scope electrical components, those that required an aging management review were evaluated as commodities during the screening process as described in Section 2.1.6.

The Station Blackout System is primarily an electrical system at Oyster Creek, and is included in LRA Sections 2.5.1.19 and 3.6 with other electrical systems and electrical commodities. However, since the Station Blackout System at Oyster Creek also includes the Forked River Combustion Turbines power plant, this system is evaluated similar to a mechanical system and includes a component table in Section 2.5 and Section 3.6, with reference to the aging management program credited for monitoring of the combustion turbines.

A single electrical boundary drawing was prepared to schematically show the portions of the plant electrical distribution system that are included in the scope of license renewal. The electrical boundary drawing shows the main in-plant distribution busses, and also shows the interfaces with the on-site emergency power supplies, the off-site power supplies and the alternate AC Station Blackout power source.

Structures

For structures, the structural components that support the intended functions are included in the scope of license renewal. The structural components are identified from a review of applicable plant design drawings of the structure. Plant walkdowns were performed when required for additional confirmation. A single site plan layout drawing is marked up to create a license renewal boundary drawing showing the in scope structures.

2.1.6 SCREENING PROCEDURE

Once the SSCs within the scope of license renewal have been determined, the next step is to determine which structures and components are subject to an aging management review.

2.1.6.1 Identification of Structures and Components Subject to AMR

The requirement to identify structures and components subject to an aging management review is specified in 10 CFR 54.21(a)(1), which states:

Each application must contain the following information:

> *(a) An integrated plant assessment (IPA). The IPA must –*
>
> *(1) For those systems, structures, and components within the scope of this part, as delineated in §54.4, identify and list those structures and components subject to an aging management review. Structures and components subject to an aging management review shall encompass those structures and components—*
>
> (i) *That perform an intended function, as described in §54.4, without moving parts or without a change in configuration or properties. These structures and components include, but are not limited to, the reactor vessel, the reactor coolant system pressure boundary, steam generators, the pressurizer, piping, pump casings, valve bodies, the core shroud, component supports, pressure retaining boundaries, heat exchangers, ventilation ducts, the containment, the containment liner, electrical and mechanical penetrations, equipment hatches, seismic Category I structures, electrical cables and connections, cable trays, and electrical cabinets, excluding, but not limited to, pumps (except casing), valves (except body), motors, diesel generators, air compressors, snubbers, the control rod drive, ventilation dampers, pressure transmitters, pressure indicators, water level indicators, switchgears, cooling fans, transistors, batteries, breakers, relays, switches, power inverters, circuit boards, battery chargers, and power supplies; and*

(ii) That are not subject to replacement based on a qualified life or specified time period.

Structures and components that perform an intended function without moving parts or without a change in configuration or properties are defined as passive for license renewal. Passive structures and components that are not subject to replacement based on a qualified life or specified time period are defined as long-lived for license renewal. The screening procedure is the process used to identify the passive, long-lived structures and components in the scope of license renewal and subject to aging management review.

NUREG-1800, “Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants” (Reference 1.7.4) and NEI 95-10, Appendix B (Reference 1.7.2), were used as the basis for the identification of passive structures and components. Most passive structures and components are long-lived. In the few cases where a passive component is determined not to be long-lived, such determination is documented in the screening evaluation and, if applicable, on the associated license renewal boundary drawing.

The Oyster Creek structures and components subject to aging management review have been identified in accordance with the requirements of 10 CFR 54.21(a)(1) described above. The process implemented to meet these requirements for mechanical systems, structures and electrical systems and components is described as follows:

Mechanical Systems

The mechanical system screening process began with the results from the scoping process. For in scope mechanical systems, the completed scoping packages include written descriptions and marked up system flow diagrams that clearly identify the in-scope system boundary for license renewal. The marked up system flow diagrams are called boundary drawings for license renewal. These system boundary drawings were carefully reviewed to identify the passive, long-lived components, and the identified components were then entered into the license renewal database. Component listings from the CRL were also reviewed to confirm that all system components were considered. In cases where the system flow diagram did not provide sufficient detail, such as for some large vendor supplied components (e.g., compressors, emergency diesel generators), the associated component drawings or vendor manuals were also reviewed. Plant walkdowns were performed when required for confirmation. Finally, the identified list of passive, long-lived system components was benchmarked against previous license renewal applications containing a similar system.

Mechanical components are screened with the system in which they were scoped. The only exception involves heat exchangers and coolers, which often involve different system fluids on either side of the heat transfer surface. Heat exchangers and coolers are screened as follows:

1. With the exception of heat exchangers and coolers that are in scope only for 10 CFR 54.4 (a)(2) spatial interactions, the materials, environments and aging effects on both sides of the heat transfer surfaces are evaluated with the system that performs the cooling function. This convention was chosen

because the significant aging effects and associated aging management program activities are generally associated with the cooling system side.

2. For heat exchangers and coolers that are in scope for 10 CFR 54.4 (a)(2) only, the portions of the heat exchanger or cooler with the potential for spatial interaction are a function of the design and the process fluid. Therefore, each side of the heat exchanger or cooler is evaluated separately with the system associated with the process environment.

Structures

The structure screening process also began with the results from the scoping process. For in scope structures, the completed scoping packages include written descriptions of the structure. If only selected portions of the structure are in scope, the in-scope portions are described in the scoping evaluation. The associated structure drawings were carefully reviewed to identify the passive, long-lived structures and components, and the identified structures and components were then entered into the license renewal database. Component listings from the CRL were also reviewed to confirm that all structural components were considered. Plant walkdowns were performed when required for confirmation. Finally, the identified list of passive, long-lived structures and components was benchmarked against previous license renewal applications.

Electrical Systems and Components

Screening of electrical system components used a bounding approach as described in NEI 95-10. Electrical commodity groups used plant-wide were identified without regard to system. The commodity groups subject to an aging management review are identified by applying the criteria of 10 CFR 54.21(a)(1). This method provides the most efficient means for determining the electrical commodity groups subject to an aging management review since most of these components are active.

The sequence of steps and special considerations for identification of electrical components that require an aging management review is as follows:

1. All electrical component types in use at Oyster Creek were identified and listed. The listing provided by NEI 95-10 Appendix B is the basis for this list. Electrical component types were organized into commodity groups such as breakers, switches, and cables. Individual components were not identified. The electrical component commodity groups were identified from a review of plant documents, controlled drawings, the plant equipment database (CRL), and interface with the parallel mechanical and civil/structural screening efforts.

2. Following the identification of the electrical component commodity groups, the criterion of 10 CFR 54.21(a)(1)(i) was applied to identify component commodity groups that perform their intended functions without moving parts or without a change in configuration or properties (referred to as “passive” components). These components were identified utilizing the guidance of NEI 95-10 and the EPRI License Renewal Electrical Handbook.

3. The screening criterion found in 10 CFR 54.21(a)(1)(ii) excludes those components or commodity groups that are subject to replacement based on a qualified life or specific time period from the requirements of an aging management review. The 10 CFR 54.21(a)(1)(ii) screening criterion was applied to those components and commodity groups that were not previously eliminated by the application of the 10 CFR 54.21(a)(1)(i) screening criterion. Electrical components included in the plant environmental qualification (EQ) program are replaced on a specified interval based on a qualified life. Components in the EQ program do not meet the “long-lived” criteria of 10 CFR 54.21(a)(1)(ii) and are “short-lived” per the regulatory definition, and are therefore not subject to an aging management review.

4. Electrical commodity groups that perform no license renewal intended functions were not considered further because they do not require aging management review.

5. Components which support or interface with electrical components, for example, cable trays, conduits, instrument racks, panels and enclosures, are assessed as civil/structural components in Section 2.4.

The electrical components that require an aging management review are the separate electrical components that are not a part of a larger active component. For example, the wiring, terminal blocks, and connections located internal to a breaker cubicle were considered to be parts of the breaker. Accordingly, the breaker is screened, but not the individual internal parts.

The passive commodity groups that are not subject to replacement based on a qualified life or specified time period are subject to an aging management review. For Oyster Creek, the electrical commodity groups that require an AMR are identified in Section 2.5.

2.1.6.2 Passive Intended Function Definitions

The intended functions that the components and structures must fulfill are those functions that are the bases for including them within the scope of license renewal. A component function is an intended function if it must perform that function for the system to be able to perform the system intended function(s). For example, pressure boundary failure of a component would cause loss of inventory from the system, and the system would subsequently be unable to perform its intended function(s). Structures and components may have multiple intended functions. Oyster Creek has considered multiple intended functions where applicable, consistent with the staff guidance provided in Table 2.1-3 of NUREG-1800, “Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants” (Reference 1.7.4).

The Containment, Holdup and Plateout intended function applies specifically to the Main Condenser, which does not have a Pressure Boundary intended function. Portions of the Main Steam system are also credited with the Containment, Holdup and Plateout intended function, however this function is bounded by the Pressure Boundary and Leakage Boundary intended functions for the Main Steam components.

Table 2.1-1 provides expanded definitions of structure and component passive intended functions identified in this application.

Table 2.1-1 Passive Intended Function Definitions

Passive Intended Function	Definition
Absorb Neutrons	Provide neutron absorption in spent fuel pool to prevent criticality
Containment, Holdup and Plateout	Provide post accident containment, plateout of iodine and hold-up (for radioactive decay) of iodine and non-condensable gases before release.
Direct Flow	Provide spray shield or curbs for directing flow
Electrical Continuity	Provide electrical connections to specified sections of an electrical circuit to deliver voltage, current, or signals
Enclosure Protection	Provide enclosure, shelter, or protection for in-scope equipment (including shielding)
Filter	Provide filtration
Fire Barrier	Provide rated fire barrier to confine or retard fire from spreading to or from adjacent areas of the plant
Flood Barrier	Provide flood protection barrier (internal and external flood event)
Gaseous Release Path	Provide path for release of filtered and unfiltered gaseous discharge
Heat Transfer	Provide heat transfer
HELB Shielding	Provide HELB shielding
Insulation - Electrical	Insulate and support an electric conductor
Insulation Jacket Integrity	Prevent moisture absorption and provide physical support of thermal insulation

Table 2.1-1 Passive Intended Function Definitions

Passive Intended Function	Definition
Leakage Boundary	Non-safety related component that maintains mechanical and structural integrity to prevent spatial interactions that could cause failure of safety related SSCs. This function includes the required structural support when the non-safety related leakage boundary piping is also attached to safety related piping.
Mechanical Closure	Mechanical closure (e.g., bolting)
Missile Barrier	Provide missile barrier (internal or external missiles)
Pipe Whip Restraint	Provide pipe whip restraint
Pressure Boundary	Provide pressure-retaining boundary so that sufficient flow at adequate pressure is delivered, or provide fission product barrier for containment pressure boundary, or provide containment isolation for fission product retention, or provide the containment, holdup and plateout function (for Main Steam system)
Pressure Relief	Provide a vent path for HELB pressure
Shielding	Provide shielding against radiation
Spray	Convert fluid into spray
Structural Support	Provide structural support for structures and components within the scope for 10 CFR 54.4(a)(1), (a)(2), or (a)(3), or provide structural integrity to preclude non-safety related component interactions that could prevent satisfactory accomplishment of a safety related function.
Thermal Insulation	Control of heat loss to preclude overheating of nearby safety related SSCs, 10 CFR 54.4 (a)(2)
Throttle	Provide flow restriction
Vibration Isolation	Provide flexible support for HVAC fan units.

Table 2.1-1 Passive Intended Function Definitions

Passive Intended Function	Definition
Water retaining boundary	Provide an essentially water leak tight boundary.

2.1.6.3 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 Oyster Creek, certain Appendix R fire scenarios utilize stored equipment to facilitate repairs following the fire. The stored equipment credited for Appendix R repairs include cables and connectors, hoses, tubing, fittings, screws, nuts, washers, exhaust fans, and flexible duct. 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.

2.1.6.4 Consumables

The evaluation process for consumables is consistent with the guidance provided in NUREG-1800 Table 2.1-3. Consumables have been divided into the following four categories for the purpose of license renewal: (a) packing, gaskets, component seals, and O-rings; (b) structural sealants; (c) oil, grease, and component filters; and (d) system filters, fire extinguishers, fire hoses, and air packs.

- Group (a) subcomponents (packing, gaskets, seals, and O-rings): Based on ANSI B31.1 and the ASME B&PV Code Section III, the subcomponents of pressure retaining components as shown above are not pressure-retaining parts. Therefore, these subcomponents are not relied on to form a pressure-retaining function and are not subject to an AMR.
- Group (b) structural sealants: AMRs were required for structural sealants in in-scope structures. A summary of the AMR results is presented in Section 2.4.
- Group (c) subcomponents (oil, grease, and component filters): These components are short lived and are periodically replaced. Various plant procedures are used in the replacement of oil, grease, and filters in components that are in-scope for license renewal.
- Group (d) consumables (system filters, fire extinguishers, fire hoses, and air packs): System Ventilation filters are replaced in accordance with plant procedures based on vendor manufacturers' requirements and system testing. 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 based 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. The periodic inspections are implemented by controlled Oyster Creek procedures. These components are subject to replacement based on NFPA standards implemented by controlled procedures, and are therefore not long-lived and not subject to an aging management review.

2.1.7 GENERIC SAFETY ISSUES

In accordance with the guidance in NEI 95-10 and Appendix A.3 of NUREG-1800, “Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants, review of NRC generic safety issues (GSIs) as part of the license renewal process is required to satisfy 10 CFR 54.29. This guidance suggests that GSIs involving issues related to license renewal aging management reviews or TLAAs should be addressed in the License Renewal Application. Based on Nuclear Energy Institute (NEI) and NRC guidance, NUREG-0933 and previous license renewal applicants, the following GSIs are addressed for Oyster Creek license renewal:

- GSI 168, Environmental Qualification of Electrical Equipment – This GSI has been closed by the NRC, as stated in Letter ACRSR-2028 from John T. Larkins, Executive Director of the Advisory Committee on Reactor Safeguards to William D. Travers, Executive Director for Operations, USNRC. EQ is addressed as a TLAA in Section 4.4.
- GSI 190, Fatigue Evaluation of Metal Components for 60-year Plant Life – This GSI addresses fatigue life of metal components and was closed by the NRC. In the closure letter, however, the NRC concluded that licensees should address the effects of reactor coolant environment on component fatigue life as aging management programs are formulated in support of license renewal. Accordingly, the issue of environmental effects on component fatigue life is addressed in Section 4.3.

NUREG-0933 (reference 1.7.15) was reviewed and there are no new generic issues that involve issues related to license renewal aging management reviews or TLAAs.

2.1.8 CONCLUSION

The scoping and screening methodology described above was used for the Oyster Creek IPA to identify the systems, structures, and components that are within the scope of license renewal and require an aging management review. The methodology is consistent with and satisfies the requirements of 10 CFR 54.4 and 10 CFR 54.21(a)(1).

2.2 PLANT LEVEL SCOPING RESULTS

Table 2.2-1 lists the Oyster Creek systems, structures and commodity groups that were evaluated to determine if they were within the scope of license renewal, using the methodology described in Section 2.1. A reference to the section of the application that contains the scoping and screening results is provided for each in-scope system and structure in the Table.

Table 2.2-1 Plant Level Scoping Results

System, Structure or Commodity Group	**In Scope?**	**Comments**
Reactor Vessel, Internals, and Reactor Coolant System		
Control Rods (2.3.1.1)	Yes	
Fuel Assemblies (2.3.1.2)	Yes	
Isolation Condenser System (2.3.1.3)	Yes	
Nuclear Boiler Instrumentation (2.3.1.4)	Yes	
Reactor Head Cooling System (2.3.1.5)	Yes	
Reactor Internals (2.3.1.6)	Yes	
Reactor Pressure Vessel (2.3.1.7)	Yes	
Reactor Recirculation System (2.3.1.8)	Yes	
Engineered Safety Features Systems		
Automatic Depressurization System (2.3.2.1)	Yes	
Containment Spray System (2.3.2.2)	Yes	
Core Spray System (2.3.2.3)	Yes	

Table 2.2-1 Plant Level Scoping Results

System, Structure or Commodity Group	In Scope?	Comments
Standby Gas Treatment System (SGTS) (2.3.2.4)	Yes	
Auxiliary Systems		
"C" Battery Room Heating & Ventilation (2.3.3.1)	Yes	
4160V Switchgear Room Ventilation (2.3.3.2)	Yes	
480V Switchgear Room Ventilation (2.3.3.3)	Yes	
Augmented Off-Gas Closed Cooling Water System	No	
Augmented Off-Gas System	No	
Battery and MG Set Room Ventilation (2.3.3.4)	Yes	
Breathing Air System	No	
Chemical Laboratory Auxiliary Gases	No	
Chlorination System (2.3.3.5)	Yes	
Circulating Water System (2.3.3.6)	Yes	
Containment Inerting System (2.3.3.7)	Yes	

Table 2.2-1 Plant Level Scoping Results

System, Structure or Commodity Group	In Scope?	Comments
Containment Vacuum Breakers (2.3.3.8)	Yes	
Control Rod Drive System (2.3.3.9)	Yes	
Control Room HVAC (2.3.3.10)	Yes	
Cranes and Hoists (2.3.3.11)	Yes	
Dilution System	No	
Drywell Cooling System	No	
Drywell Floor and Equipment Drains (2.3.3.12)	Yes	
Elevators & Manlifts	No	
Emergency Diesel Generator and Auxiliary System (2.3.3.13)	Yes	
Emergency Service Water System (2.3.3.14)	Yes	
Fire Protection System (2.3.3.15)	Yes	
Fuel Storage and Handling Equipment (2.3.3.16)	Yes	
Hardened Vent System (2.3.3.17)	Yes	

Table 2.2-1 Plant Level Scoping Results

System, Structure or Commodity Group	In Scope?	Comments
Heating & Process Steam System (2.3.3.18)	Yes	
Hydrogen & Oxygen Monitoring System (2.3.3.19)	Yes	
Hydrogen Water Chemistry System	No	
Instrument (Control) Air System (2.3.3.20)	Yes	
Main Fuel Oil Storage & Transfer System (2.3.3.21)	Yes	
Main Office Building HVAC	No	
Meteorological Monitoring System	No	
Miscellaneous Floor and Equipment Drain System (2.3.3.22)	Yes	
Miscellaneous HVAC System	No	
New Radwaste Closed Cooling Water System	No	
New Radwaste Service Water System	No	
Nitrogen Supply System (2.3.3.23)	Yes	
Noble Metals Monitoring System (2.3.3.24)	Yes	

Table 2.2-1 Plant Level Scoping Results

System, Structure or Commodity Group	In Scope?	Comments
Penetration Pressurization System	No	
Plant Communications System	No	
Post-Accident Sampling System (2.3.3.25)	Yes	
Process Sampling System (2.3.3.26)	Yes	
Radiation Monitoring System (2.3.3.27)	Yes	
Radwaste Area Heating and Ventilation System (2.3.3.28)	Yes	
Radwaste System	No	
Reactor Building Closed Cooling Water System (2.3.3.29)	Yes	
Reactor Building Floor and Equipment Drains (2.3.3.30)	Yes	
Reactor Building Ventilation System (2.3.3.31)	Yes	
Reactor Water Cleanup System (2.3.3.32)	Yes	
Roof Drains and Overboard Discharge (2.3.3.33)	Yes	
Sanitary Waste System (2.3.3.34)	Yes	

Table 2.2-1 Plant Level Scoping Results

System, Structure or Commodity Group	In Scope?	Comments
Screen Wash System	No	
Service Air System	No	
Service Water System (2.3.3.35)	Yes	
Shutdown Cooling System (2.3.3.36)	Yes	
Spent Fuel Pool Cooling System (2.3.3.37)	Yes	
Standby Liquid Control System (Liquid Poison System) (2.3.3.38)	Yes	
Torus Water Storage and Transfer System	No	
Traveling In-Core Probe System (2.3.3.39)	Yes	
Turbine Building Closed Cooling Water System (2.3.3.40)	Yes	
Turbine Building Ventilation System	No	
Water Treatment & Distr. System (2.3.3.41)	Yes	
Steam and Power Conversion Systems		
Condensate System (2.3.4.1)	Yes	

Table 2.2-1 Plant Level Scoping Results

System, Structure or Commodity Group	In Scope?	Comments
Condensate Transfer System (2.3.4.2)	Yes	
Feedwater System (2.3.4.3)	Yes	
Main Condenser (2.3.4.4)	Yes	
Main Condenser Air Extraction System	No	
Main Generator and Auxiliary System (2.3.4.5)	Yes	
Main Steam System (2.3.4.6)	Yes	
Main Turbine and Auxiliary System (2.3.4.7)	Yes	
Structures		
Primary Containment (2.4.1)	Yes	
Reactor Building (2.4.2)	Yes	
Ambulance Building	No	The Ambulance Building is a single story prefabricated sheet metal structure founded on reinforced concrete slab on grade. The building is used for storage of an ambulance and considered non-safety related seismic Class II structure. The structure does not perform an intended function delineated in 10 CFR 54.4 (a).

Table 2.2-1 Plant Level Scoping Results

System, Structure or Commodity Group	In Scope?	Comments
Breathing Air Compressor Building	No	The Breathing Air Compressor Building is a single story prefabricated sheet metal structure founded on reinforced concrete mat foundation. The structure houses the Breathing Air System, which provides purified compressed air for use by plant personnel during maintenance for respiratory supply and for pneumatic tools. The building is classified non-safety related seismic Class II structure. The structure does not perform an intended function delineated in 10 CFR 54.4 (a).
Chlorination Facility (2.4.3)	Yes	
Condensate Transfer Building (2.4.4)	Yes	
Dilution Structure (2.4.5)	Yes	
Discharge Structure and Canal	No	The Discharge Structure and Canal is comprised of a discharge concrete transition structure at the outlet of the circulating water discharge tunnels and a canal, which returns discharged water from the plant to Barnegat Bay. The discharge structure and canal is non-safety related, Seismic Class II structure. It is separated from the intake structure and canal and is not considered a part of the Ultimate Heat Sink (UHS). Failure of the Discharge Structure and Canal will not adversely impact the intended function of Intake Structure and Canal. The Discharge Structure and Canal does not perform an intended function delineated in 10 CFR 54.4 (a).
Domestic Water Facility	No	The Domestic Water Facility is a single story steel structure enclosed with metal siding. The facility houses Domestic Water Distribution system components and chemicals required for chemical treatment of deep well water to satisfy potable water standards, and for distribution of the water to the plant. The facility does not perform an intended function delineated in 10 CFR 54.4 (a).

Table 2.2-1 Plant Level Scoping Results

System, Structure or Commodity Group	In Scope?	Comments
Emergency Diesel Generator Building (2.4.6)	Yes	
Exhaust Tunnel (2.4.7)	Yes	
Fire Pond Dam (2.4.8)	Yes	
Fire Pumphouses (2.4.9)	Yes	
Fish Sample Pool	No	The Fish Sample Pool consists of a reinforced concrete pool connected to the Intake Structure and Canal by steel troughs, which collect fish from the intake structure traveling water screen for sampling and testing to meet objectives of the Oyster Creek Environmental Technical Specifications Paragraph 3.1.2.B," Impingement of Organisms". The pool is classified non-safety related, Seismic Class II. Its failure would not adversely impact the safety related Intake Structure and Canal and would not prevent accomplishment of an intended function defined delineated in 10 CFR 54.4 (a)
Heat Exchanger Building	No	The Heat Exchanger Building is a steel structure erected against the south wall of the New Radwaste building. The building is enclosed on the remaining three sides with metal siding and supported on reinforced concrete slab on grade, partially supported from the Pipe Tunnel, which runs directly under the building. The building is classified non-safety related, Seismic Class II. The purpose of the building is to provide structural support, shelter, and protection for the New Radwaste Closed Cooling Water (NRWCCW) system heat exchangers and supporting systems. Scoping of systems inside the building determined that they do not perform an intended function delineated in 10 CFR 54.4 (a) and failure of the building will not adversely impact the intended function of the in scope New Radwaste building.

Table 2.2-1 Plant Level Scoping Results

System, Structure or Commodity Group	In Scope?	Comments
Heating Boiler House (2.4.10)	Yes	
Independent Spent Fuel Storage Installation	No	The Independent Spent Fuel Storage Installation (ISFSI) consists of reinforced concrete Horizontal Storage Modules (HSM), a storage pad, an approach slab, drainage system, temperature monitoring system, security systems, and perimeter intrusion detection system. ISFSI is provided for the purpose of storing and handling of Dry Shielded Canisters (DSC), NUHOMS 61BT dual purpose (storage and transport) dry fuel storage system. ISFSI is designed to 10 CFR 72.212 Requirements, Licensed under general provisions of 10CFR72.210. Renewal of ISFSI license is not included in this application.
Intake Structure and Canal (2.4.11) (Ultimate Heat Sink)	Yes	
Low Level Radwaste Facility	No	The Low Level Radwaste Storage Facility is a two-story steel structure enclosed with reinforced concrete walls or precast concrete panels. The facility is comprised of five function areas, which include a cell storage area, a dry active waste storage area, a service head area, a dry active waste compaction area and a truck bay. The primary purpose for the facility is to house packaged low level radwaste generated at Oyster Creek in a retrievable mode during such time that access to low level radwaste burial sites in not available. A secondary function of the facility is to provide for temporary storage of reusable radioactive contaminated equipment and materials. It is classified non-safety related, designed to limit off-site radiation exposure below levels of 10CFR50 Appendix I. Scoping of the facility and systems it houses determined that they do not perform an intended function delineated in 10 CFR 54.4 (a).

Table 2.2-1 Plant Level Scoping Results

System, Structure or Commodity Group	In Scope?	Comments
Maintenance Buildings	No	The Maintenance buildings consist of the Maintenance Building and the Old Machine Shop. The Maintenance Building is an added 2-story structure that is constructed of reinforced concrete, masonry block, and structural steel. The Old Machine Shop is a part of the original design and is comprised of a single story steel structure enclosed with metal siding and is supported on a slab on grade. The buildings house equipment and tools used by maintenance personnel to repair, refurbish, test and calibrate mechanical, electrical and I&C components. The Maintenance building also provides office space and facilities for maintenance personnel and electrical and I&C technicians. The buildings are non-safety related, designed to commercial standards.
Material Storage Buildings	No	The Material Storage Buildings consist of the materials warehouse, the storage building, and Level D Storage area. The materials warehouse is a two-story structure constructed of masonry block, structural steel, and enclosed with metal siding. The structure is supported on reinforced concrete footings. The storage building is a single story steel structure enclosed with metal siding and is supported on reinforced concrete slab on grade. The Level D Storage area is a slab on grade open to weather except for a small area, which is covered by a metal canopy. The purpose of the Material Storage buildings is to provide facilities for receiving, inspection, and storage of components, materials, and commodities required for replacement and plant modifications. The buildings do not house plant systems, or systems that interface or support plant systems. They are classified non-safety related designed to commercial grade standards. Scoping of the Material Storage Buildings determined they do not perform an intended function delineated in 10 CFR 54.4(a).
Miscellaneous Yard Structures (2.4.12)	Yes	

Table 2.2-1 Plant Level Scoping Results

System, Structure or Commodity Group	In Scope?	Comments
Monitoring and Change Facility	No	The Monitoring and Change Facility (MAC) is located adjacent to northwest corner of the Reactor Building. The facility consists of a commercial double trailer supported on masonry block footings. The Monitoring and Change Facility is a control point for monitoring personnel and materials that exit radiation areas. The facility houses non-safety related equipment, including personnel contamination monitors, manual friskers, equipment friskers, computer terminals, and electronic personal monitors and readers. The facility also contains laundry bins and scrubs which are worn as required by plant procedures. The facility is classified non-safety related designed to commercial grade standards. Its failure will not impact the adjacent reactor building. Scoping of the Monitoring and Change Facility determined it does not perform an intended function delineated in 10 CFR 54.4(a).
New Radwaste Building (2.4.13)	Yes	
New Sample Pumphouse	No	The New Sample Pumphouse is a single story steel structure, enclosed with metal siding and supported on reinforced concrete slab on grade. The New Sample Pumphouse is classified non-safety related, Seismic Class II. The New Sample Pumphouse provides structural support, shelter, and protection to non-safety related liquid Radwaste system components and its supporting systems. Major components housed in the pumphouse include two high purity waste sample pumps, and two chemical waste distillate sample pumps. The pumps are provided to recirculate, recycle within the plant, or discharge to the environment the content of high purity waste sample or the chemical waste distillate sample tanks. Scoping of the Radwaste system determined that the components do not perform an intended delineated in 10 CFR 54.4 (a). Since the pumphouse houses components that do not perform an intended function and its failure would not prevent accomplishment of an intended function, the New Sample Pumphouse does not perform an intended function defined in 10 CFR 54.4 (a).

Table 2.2-1 Plant Level Scoping Results

System, Structure or Commodity Group	In Scope?	Comments
Off Gas Building	No	The Offgas Building is a two-story steel structure enclosed with metal siding and masonry block walls. The interior intermediate floor and the roof are reinforced concrete slabs. Foundation for the building is reinforced concrete slab on grade, with an integrated pipe chase tunnel for routing of piping underneath the building. Interior walls required for shield are constructed of reinforced concrete or solid concrete blocks. The building is classified non-safety related, Seismic Class II. The building provides structural support, shelter, and protection for non-safety related Augmented Off-Gas (AOG) system components and the Augmented Off-Gas Closed Cooling Water system (AOGCCW) components. The AOG system is designed to reduce radioactive gaseous waste emissions to levels in compliance with 10CFR50, Appendix I. The AOGCCW system provides cooling water to the AOG system components Scoping of AOG system and the AOGCCW system determined that the systems do not perform an intended function delineated in 10 CFR 54.4 (a). The Offgas building is not credited for mitigating the consequences of potential failure of the AOG system in the current licensing bases. As a result the Offgas Building does not perform an intended function defined in 10 CFR 54.4 (a).
Office Building (2.4.14)	Yes	

Table 2.2-1 Plant Level Scoping Results

System, Structure or Commodity Group	In Scope?	Comments
Old Radwaste Building	No	The Old Radwaste building is a single story reinforced concrete structure with a two-story penthouse. The building is linked to the Reactor building, Turbine, and the New Radwaste buildings by underground pipe tunnels. The building is supported on reinforced concrete slab foundation. The building is classified non-safety related, Seismic Class II. The Old Radwaste building was designed to provide structural support, shelter, and protection for non-safety related Radwaste system components required for processing, storage, and handling of liquid radwaste. However, after completion of the New Radwaste building, the Old Radwaste building is no longer used for processing and normal radwaste handling activities, but some of the equipment in the building is used for waste compaction and transfer. Certain areas of the building have been decontaminated and designated for storage of non-waste radioactive materials. Scoping of the Radwaste system determined that portions of the systems inside the Old Radwaste building do not perform an intended function delineated in 10 CFR 54.4 (a). Thus failure of the Seismic Class II building would not prevent accomplishment of an intended defined in 10 CFR 54.4 (a). The building is not credited for mitigating the consequences of a potential failure of the Radwaste system in the current licensing bases. As a result the Old Radwaste building does not perform an intended function defined in 10 CFR 54.4 (a).

Table 2.2-1 Plant Level Scoping Results

System, Structure or Commodity Group	In Scope?	Comments
Other Office Buildings	No	Other Office Buildings include the 3-story Administration building, Rad Pro building, Contractor building, AOB Annex, Drywell Support center, and the Outage Support center. The 3-story Administration building is a steel structure constructed to commercial standards. The architecturally pleasing structure is located south of the reactor building inside the protected area. The Rad Pro building is a single story steel framed structure enclosed with metal siding. The Contractor building, AOB Annex, Drywell Support center, and the Outage Support center consist of single story commercial grade modular steel structures supported on concrete foundation. The purpose of the buildings is to house and provide office facilities for site management, design engineering, system engineering, and other plant support personnel. The 3-story administration building also houses the site document control center and the cafeteria. The buildings are non-safety related and their failure would not prevent accomplishment of an intended function delineated in 10 CFR 54.4 (a).
Oyster Creek Substation (2.4.15)	Yes	

Table 2.2-1 Plant Level Scoping Results

System, Structure or Commodity Group	In Scope?	Comments
Pipe Tunnel	No	The Pipe Tunnel consists of an underground reinforced concrete box structure that connects the New Radwaste building to the Old Radwaste building. The tunnel is continuously supported on soil, and is classified non-safety related, Seismic Class II structure. The Pipe Tunnel provides structural support, shelter, and protection for piping and components of the Radwaste System, Heating & Process Steam system, Water Treatment & Distribution system, and non-safety electrical conduits routed to the New Radwaste building. Scoping of the Radwaste system, Water Treatment & Distr. system, and Heating & Process Steam system, determined that portions of the systems inside the Pipe Tunnel do not perform an intended function delineated in 10 CFR 54.4 (a). The tunnel is not credited for mitigating the consequences of a potential failure of the Radwaste system piping in the current licensing bases. Thus failure of the Seismic Class II Pipe Tunnel would not prevent accomplishment of an intended defined in 10 CFR 54.4 (a). As a result the Pipe Tunnel does not perform an intended function defined in 10 CFR 54.4 (a)

Table 2.2-1 Plant Level Scoping Results

System, Structure or Commodity Group	In Scope?	Comments
Pretreatment Facility	No	The Pretreatment Facility consists of a single story steel structure enclosed with metal siding and two adjacent slabs on grade. The structure is supported from a reinforced concrete perimeter grade beam and a slab on grade. The adjacent slabs, one each side of the structure, are reinforced concrete on grade with a perimeter grade wall and sumps below grade. The facility is classified non-safety related, Seismic Class II. The Pretreatment Facility provides support, shelter, and protection to the non-safety related pretreatment and domestic water system components. Major components within the facility includes the domestic water tank, coagulator & clearwell tank, caustic pump and tank, acid pump and tank, filters, and tanks for hypochlorite and soda ash storage. The two systems are subsystems of, and evaluated with the Water Treatment & Distribution license renewal system. Scoping of the Water Treatment & Distr. System determined that subsystems within the pretreatment facility do not perform an intended function delineated in 10 CFR 54.4 (a). As a result failure of the Seismic Class II pretreatment facility would not prevent an intended defined in 10 CFR 54.4 (a).

Table 2.2-1 Plant Level Scoping Results

System, Structure or Commodity Group	In Scope?	Comments
RAGEMS Buildings	No	RAGEMS (Radioactive Gaseous Effluent Monitoring System) buildings consist of the Ventilation Stack RAGEMS building and the Turbine building RAGEMS building. The buildings consist of small steel structures enclosed with metal siding that are supported on reinforced concrete slabs. The two structures are classified non-safety related Seismic Class II. The buildings provide structural support, shelter, and protection for the non-safety related components of the Ventilation Stack RAGEMS and the Turbine building RAGEMS. Scoping of the Radiation Monitoring system determined that the Ventilation Stack RAGEMS and the Turbine building RAGEMS ensure that plant releases do not exceed the limits specified in 10 CFR Part 20 and 10 CFR 50 Appendix I. The systems do not perform an intended function delineated in 10 CFR 54.4 (a). Since the buildings house components that do not perform an intended function and their failure would not prevent accomplishment of an intended function, the buildings do not perform an intended function defined in 10 CFR 54.4 (a).
Respirator Facility	No	The Respirator Facility is a single story commercial grade modular steel structure supported on concrete foundation. The purpose of the facility is to house equipment and personnel required for cleaning used respirators, their associated hoses, and filters. The facility and the equipment do not perform an intended function delineated in 10 CFR 54.4(a)

Table 2.2-1 Plant Level Scoping Results

System, Structure or Commodity Group	In Scope?	Comments
Security Structures	No	The Security Structures consist of the security building, the north guard house, the personnel processing center, the ballistic resistant enclosures, and guard sheds. The structures are a part of Oyster Creek physical security required by 10CFR73. The purpose of Security structures is to provide shelter and facilities for the plant security force and equipment required to control access into the protected area, surrounded by a perimeter security fence, as required by 10CFR73. The security building also provides a single entry and exit point for radiation areas of the plant. Scoping of the Security structures determined that the structures do not perform an intended function delineated in 10 CFR 54.4 (a)
Site Emergency Building	No	The Site Emergency Building is a two story steel framed structure with reinforced concrete, masonry block, and precast concrete panels on the outside of the building. The interior load bearing walls are either reinforced concrete or reinforced masonry block walls. The interior partition walls are either masonry block walls or metal stud and gypsum wallboard. The non-safety related, Seismic Class II building is partitioned to provide onsite Technical Support Center (TSC), rooms for equipment and communication associated with its operation, Plant Computer System, and office facilities for the emergency response team. Scoping of the building determined that it does not perform an intended function as delineated in 10 CFR 54.4 (a).
Turbine Building (2.4.16)	Yes	
Ventilation Stack (2.4.17)	Yes	
Component Supports Commodity Group (2.4.18)	Yes	
Piping and Component Insulation Commodity Group (2.4.19)	Yes	

Table 2.2-1 Plant Level Scoping Results

System, Structure or Commodity Group	In Scope?	Comments
Electrical Components		
120/208 Volt Non-Essential distribution System (2.5.1.1)	Yes	
120VAC Vital Power System (2.5.1.2)	Yes	
125V Station DC System (2.5.1.3)	Yes	
24/48V Instrument Power DC System (2.5.1.4)	Yes	
4160V AC System (2.5.1.5)	Yes	
480/208/120V Utility (JCP&L) Non-Vital Power (2.5.1.6)	Yes	
480V AC System (2.5.1.7)	Yes	
Alternate Rod Injection System (ARI) (2.5.1.8)	Yes	
Canal Water Temperature Monitoring System	No	
Cathodic Protection System	No	
Electrical Commodities (2.5.2)	Yes	
Electrical Heat Trace System	No	

Table 2.2-1 Plant Level Scoping Results

System, Structure or Commodity Group	**In Scope?**	**Comments**
Grounding and Lightning Protection System (2.5.1.9)	Yes	
Intermediate Range Monitoring System (2.5.1.10)	Yes	
Lighting System (2.5.1.11)	Yes	
Local Power Range Monitoring System/Average Power Range Monitoring System (2.5.1.12)	Yes	
Offsite Power System (2.5.1.13)	Yes	
Plant Annunciator System	No	
Plant Computer System	No	
Post-Accident Monitoring System (2.5.1.14)	Yes	
Radio Communications System (2.5.1.15)	Yes	
Reactor Manual Control System	No	
Reactor Overfill Protection System (ROPS) (2.5.1.16)	Yes	
Reactor Protection System (2.5.1.17)	Yes	
Remote Shutdown System (2.5.1.18)	Yes	

Table 2.2-1 Plant Level Scoping Results

System, Structure or Commodity Group	In Scope?	Comments
Rod Worth Minimizer	No	
Source Range Monitoring System	No	
Station Blackout System (2.5.1.19)	Yes	

2.3 SCOPING AND SCREENING RESULTS: MECHANICAL

2.3.1 REACTOR VESSEL, INTERNALS, AND REACTOR COOLANT SYSTEM

The following systems are addressed in this section:

- Control Rods (Section 2.3.1.1)
- Fuel Assemblies (Section 2.3.1.2)
- Isolation Condenser System (Section 2.3.1.3)
- Nuclear Boiler Instrumentation (Section 2.3.1.4)
- Reactor Head Cooling System (Section 2.3.1.5)
- Reactor Internals (Section 2.3.1.6)
- Reactor Pressure Vessel (Section 2.3.1.7)
- Reactor Recirculation System (Section 2.3.1.8)

2.3.1.1 Control Rods

System Purpose

The Control Rods are replaceable, mechanical components consisting of cruciform-shaped stainless steel assemblies containing neutron-absorbing material, designed to be used for flux shaping and for reactivity control during reactor startup, power level changes, and shutdown. The Oyster Creek reactor contains 137 control rods. The purpose of the control rods is to absorb neutrons in the reactor core, thereby providing the means to adjust core power shape, compensate for reactivity changes caused by fuel and burnable poison depletion, and fully shut down the nuclear reaction. They accomplish this purpose, in conjunction with their positioning system (evaluated with the Control Rod Drive System), by providing continuous regulation of the core excess reactivity and reactivity distribution, and by providing sufficient reactivity compensation to render the reactor adequately subcritical from its most reactive condition.

System Operation

The control rods are comprised of four stainless steel wings assembled in a cruciform configuration. Each wing assembly may consist of stainless steel tubes covered with a sheath, or multiple extruded stainless steel tubes laser welded into a wing assembly depending on blade model. The tubes contain boron carbide neutron absorbing material. Hafnium plates, strips, or rods are also used in high duty locations of the wings in some control rod models. Each control rod has a handle assembly located at the top, and a velocity limiter at the bottom. The velocity limiter is designed to limit control rod free-fall velocity yet have a minimal restricting effect on motion during rod insertion. The velocity limiter is a fabricated conically shaped assembly permanently attached to the bottom of the absorber section of the control rod, and contains the socket assembly for attachment of the control rod to the control rod drive. The velocity limiter acts as a large clearance piston in the control rod guide tube (evaluated with Reactor Internals) to restrict free-fall velocity of the control rod. In this manner, the energy release associated with the positive reactivity insertion during a rod drop accident can not exceed an evaluated maximum, which results in no system damage and presents minimal offsite dose consequences. The restrictive force presented by the velocity limiter during control rod insertion is sufficiently low that a reactor scram will result in a high rate of negative reactivity insertion.

The Control Rod Drive System positions the control rods axially in the core, from fully inserted to fully withdrawn or to any of a number of intermediate positions. Each control rod location is in the center of a group of four fuel assemblies (evaluated with Fuel Assemblies), comprising a “cell”. Each rod is capable of being individually positioned, but the usual practice is to position groups of rods throughout the core to provide reactivity adjustment and flux shaping for optimum power distribution and fuel utilization. Near the end of an operating cycle when core excess reactivity is at a minimum, all rods are withdrawn to maintain rated reactor power (or highest achievable power if lower than rated) until scheduled shutdown for refueling. Control rod absorption of neutrons chemically depletes the absorber material, and control rod lifetime is monitored. Upon reaching prescribed thresholds, control rods are scheduled for replacement during refueling outages.

For more detailed information, see UFSAR sections 4.3.2.4 and 4.6.4.3.

System Boundary

The Control Rod license renewal boundary consists of the entire control rod and velocity limiter assembly.

Not included in the scoping boundary of the Control Rods is the Control Rod Drive System or the Fuel Assemblies, which are separately evaluated as license renewal systems, or the control rod guide tubes, which are evaluated with Reactor Internals.

Reason for Scope Determination

The Control Rods meet 10 CFR 54.4(a)(1) because they are safety related components that are relied upon to remain functional during and following design basis events. They do not meet 10 CFR 54.4(a)(2) because failure of non-safety related portions of the control rods could not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). They do not meet 10 CFR 54.4(a)(3) because they are not required to demonstrate compliance with the Commission's regulations for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49), ATWS (10 CFR 50.62), or station blackout (10 CFR 50.63).

System Intended Functions

1. Introduce negative reactivity to achieve or maintain subcritical reactor condition. 10 CFR 54.4(a)(1)

UFSAR References

4.3.2.4
4.6.4.3

License Renewal Boundary Drawings

None

Table 2.3.1.1 Control Rods
Components Subject to Aging Management Review

Component Type	Intended Functions
None (Control Rods do not require Aging Management Review because they are short-lived components.)	Not Applicable

2.3.1.2 Fuel Assemblies

System Purpose

The Fuel Assemblies are high integrity components containing the fissionable material that sustains the nuclear reaction when the reactor core is made critical. The purpose of the fuel assemblies is to allow efficient heat transfer from the nuclear fuel to the reactor coolant and to maintain structural integrity providing a controllable, coolable bundle geometry and fission product barrier. They accomplish this purpose by satisfying the thermal-mechanical, nuclear, and hydraulic requirements of the nuclear fuel design conditions within the reactor.

The Oyster Creek reactor contains 560 fuel bundle assemblies. During each refueling outage, approximately one-third of the highest depletion bundles are replaced and the positions of the remaining bundles are shuffled as required by the nuclear core design to optimize cycle energy, operating conditions, and fuel economics. Cycle-specific evaluations of the thermal-mechanical design known as supplemental reload licensing submittals are produced to assure that the safety and operational requirements of the fuel product line are met.

System Operation

Each Fuel Assembly is comprised of a fuel bundle and a channel that surrounds it. The fuel rods of each bundle are spaced and supported in a square array by the stainless steel upper and lower tie plates and intermediately placed Zircaloy spacer assemblies. Oyster Creek contains both 8x8 and 9x9 arrayed bundles. The upper tie plate has a handle used for transferring the bundle from one location to another. The lower tie plate has a nosepiece which supports the fuel assembly in the reactor. The lower tie plate may incorporate a debris filter grid. The fuel rods used in the assembly consist of high-density ceramic uranium dioxide fuel pellets stacked within Zircaloy cladding, evacuated and backfilled with helium and sealed with welded Zircaloy end plugs. The core reload design specifies the U-235 pellet enrichments used to reduce local peak-to-average fuel rod power ratios. Selected fuel rods within each reload bundle may also incorporate gadolinium as burnable poison. Three types of fuel rods may be used in a fuel bundle; a standard fuel rod with pin-type ends, tie rods with threaded ends that engage the lower tie plate and extend through the upper tie plate to be fastened with nuts and lock tabs, and part-length rods that by design do not extend the full length of the bundle. Water rods may be located in the center of the bundle array, and are used to provide increased neutron moderation.

The bundle channel is fabricated from Zircaloy and provides the flow path outer periphery for bundle coolant flow, supplies structural stiffness to the bundle and transmits seismic loadings to the core internal structures, provides a heat sink during a LOCA, and supplies a surface for control rod guidance within the reactor core. A channel fastener attaches the channel to the bundle at the upper tie plate. Finger springs may be used at the channel-to-lower tie plate interface to control bypass flow. Channels may be a uniform thickness or a thick-thin design with heavier gauge corners and lighter gauge side surfaces. Channel spacing is provided by means of spacer buttons located on the upper portion of the channel.

For more detailed information, see UFSAR section 4.2.2.

System Boundary

The Fuel Assembly license renewal boundary consists of the entire fuel bundle and channel assembly.

Not included in the scoping boundary of the Fuel Assemblies are the fuel support pieces, top guide, or other core internal structures which are evaluated with Reactor Internals.

Reason for Scope Determination

The Fuel Assemblies meet 10 CFR 54.4(a)(1) because they are safety related components that are relied upon to remain functional during and following design basis events. They do not meet 10 CFR 54.4(a)(2) because failure of non-safety related portions of the fuel assemblies could not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). They do not meet 10 CFR 54.4(a)(3) because they are not required to demonstrate compliance with the Commission's regulations for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49), ATWS (10 CFR 50.62), and station blackout (10 CFR 50.63).

System Intended Functions

1. Maintain reactor core assembly geometry. The Fuel Assemblies assure integrity of the nuclear fuel configuration, maintaining a coolable geometry and providing a cladding barrier to contain the fission products released from the fuel throughout the design life of the fuel rod. 10 CFR 54.4(a)(1)

UFSAR References

4.2.2

License Renewal Boundary Drawings

None

Table 2.3.1.2 Fuel Assemblies
Components Subject to Aging Management Review

Component Type	Intended Functions
None (Fuel Assemblies do not require Aging Management Review because they are short-lived components.)	Not Applicable

2.3.1.3 Isolation Condenser System

System Purpose

The Isolation Condenser System (ICS) is a standby, high pressure system designed for removal of fission product decay heat when the reactor vessel is isolated from the Main Condenser. This condition can occur when the Main Steam Isolation Valves (MSIVs) have closed or the Main Condenser is otherwise unavailable for use as a heat sink.

The purpose of the system is to prevent overheating of the reactor fuel, control the reactor pressure rise, and limit the loss of reactor coolant through the relief valves. The ICS accomplishes this purpose by depressurizing the reactor and removing residual and decay heat. ICS operation is initiated automatically by reactor vessel high pressure or low-low water level, or can be initiated manually.

No single failure in the system can cause both Isolation Condensers to malfunction. The ICS is credited in the mitigation of the effects of a loss of feedwater, and Isolation Condenser System and Reactor Water Cleanup System high energy line breaks. Operation of the ICS is not credited in the 10CFR50 Appendix K evaluation.

System Operation

The ICS is comprised of two independent loops, each with one condenser shell containing two tube bundles. When a loop is in operation, both tube bundles are in service. For ICS initiation, normally both condensers are placed in operation simultaneously, and either loop can be activated or shutdown separately by manual control. Each loop has separate steam and condensate lines and isolation valves, separate shell steam vents, redundant steam line vent isolation valves, and separate instrumentation and controls. The ICS operates by natural circulation without the need for driving power other than the DC electrical system used to open an isolation valve on each condensate return line, initiating ICS operation. Steam flows from the reactor vessel through the condenser tubes, and condensate returns by gravity to the reactor vessel, forming a closed loop. The valves in the steam inlet lines are normally open so that the tube bundles are at reactor pressure. Only the DC motor operated isolation valve on each condensate return line is normally closed, and is the only component that needs to be activated to initiate operation of each loop from standby. The shell side of each heat exchanger contains water filled to a level above the tube bundles. During ICS operation, the water in the shell side boils and vents to atmosphere though vent piping exiting the Reactor Building east wall. During normal plant operations, when the ICS system is in standby, makeup to the shell side is from the Water Treatment and Distribution System. During ICS operation, makeup is provided from the Condensate Transfer System. Alternate makeup sources are also available from the Fire Protection and Core Spray systems, interfacing through the Condensate Transfer System. (Each of these makeup sources is separately evaluated as a license renewal system.)

Each steam supply line (one for each loop) is attached to the reactor vessel at the steam zone. Two normally open isolation valves are in each steam supply line. The single steam supply line for each isolation condenser separates into two lines, one for each of the two tube bundles in each condenser shell. During ICS operation, steam from the reactor vessel condenses in the tube bundles as heat is transferred to the water in the shell side of the condensers. The two condensate return lines from the tube bundles of each condenser join together to form a common condensate return line, one for each loop. Each condensate return line has two isolation valves in series, and a locked open manual maintenance block valve. The condensate return line isolation valve outside the containment is a normally closed dc motor operated valve. The condensate return line isolation valve inside containment is a normally open ac motor operated valve. Only the one normally closed valve in each loop needs to open to place that loop of ICS in operation. Each isolation valve can be manually operated from the control room; manual demand from the control room overrides the automatic signal. The condensate return path from condenser “A” is through the Reactor Recirculation System loop A suction line, and the condensate return path from condenser “B” is through the Shutdown Cooling System supply piping line which attaches to the Reactor Recirculation System loop E suction line. (Each of these systems is evaluated separately as a license renewal system.)

The ICS steam supply path is from the reactor vessel at the steam zone; the steam supply lines are separate from the main steam headers so that ICS steam line condensation does not cause entrainment of liquid in the steam supply to the turbine. High points in the steam supply lines are vented to the main turbine steam header downstream of the MSIVs when the plant is operating and the ICS is in standby. This allows removal of noncondensible gases from the reactor steam that would otherwise collect at these high points. These high point vent lines isolate automatically upon initiation of ICS system operation or upon receipt of a main steam line isolation signal.

Steam from the shell side of the condensers, created from heat transferred during ICS operation, is vented to atmosphere through vent piping exiting the Reactor building east wall. Condenser “A” has two vents from the shell that combine into one larger line before exiting the Reactor Building. Condenser “B” has two vents that are run separately outside the Reactor Building. All three vent lines are provided with bird screens attached to the external piping ends.

Each steam supply line from the reactor vessel and each condensate return line to the recirculation suction piping is equipped with high flow isolation instrumentation, to provide isolation of the ICS in the event of a line break outside the primary containment. The high flow detection is made using differential pressure readings from elbow taps on the system piping. A high flow signal from either the steam supply line or the condensate return line will send an isolation signal to close all four isolation valves on the loop where the signal was generated. Manual isolation is required in the event that tube leakage is discovered. Symptoms of tube leakage could include changing shell side level, increasing shell side temperature, detection of radioisotopes in the shell side water, or increasing area radiation.

For more detailed information, see UFSAR Sections 3.6.2.6 and 6.3.

System Boundary

The tube side boundary of the ICS begins with each loop’s steam supply piping attachment at the reactor vessel, continues through the tube bundles, and as condensate return piping, condenser loop “A” returns directly to an attachment point on Reactor Recirculation System loop A suction piping, while condenser loop “B” returns to an attachment point on the Shutdown Cooling System supply line which in turn attaches to Reactor Recirculation System loop E suction piping. Included in this boundary are the isolation valves on both the steam side and condensate return piping, and the high point vent lines from the steam supply piping to the normally open isolation valve at the Main Steam System north ("A") header. The shell side boundary includes the condenser shell, atmospheric vent lines, makeup piping from the Condensate Transfer System, and the vent, drain, sample, overflow, and hose station lines.

Also included in the license renewal scoping boundary of the ICS are those portions of nonsafety-related piping and equipment that extend beyond the safety-related/nonsafety-related interface up to the location of the first seismic anchor, or to a point no longer in proximity to equipment performing a safety-related function, whichever extends furthest. This includes the nonsafety-related portions of the system located within the Reactor Building and Primary Containment. Included in this boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of this portion of the system. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Not included in the ICS license renewal scoping boundary are the following systems, which are separately evaluated as license renewal systems:
Main Steam System
Reactor Pressure Vessel
Reactor Recirculation System
Shutdown Cooling System
Water Treatment and Distribution Systems
Condensate Transfer System
Core Spray System
Fire Protection System

Reason for Scope Determination

The Isolation Condenser System meets 10 CFR 54.4(a)(1) because it is a safety related system that is relied on to remain functional during and following design basis events. It meets 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and 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), and station blackout (10 CFR 50.63). The Isolation Condenser System is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for ATWS (10 CFR 50.62).

System Intended Functions

1. Remove residual heat from the reactor coolant system. Provides fission product decay heat removal when the reactor vessel is isolated from the Main Condenser, and assists in mitigating loss of feedwater, ICS HELB and RWCU HELB. 10 CFR 54.4(a)(1)
2. Provide reactor coolant pressure boundary. 10 CFR 54.4(a)(1)
3. Provide primary containment boundary. Provides primary containment boundary; provides isolation from a high flow signal in the event of an IC pipe break outside containment. 10 CFR 54.4(a)(1)
4. Resist nonsafety-related SSC failure that could prevent satisfactory accomplishment of a safety related function. 10 CFR 54.4(a)(2)
5. Relied upon to demonstrate compliance with the commission's regulations for Fire Protection (10 CFR 50.48). 10 CFR 54.4(a)(3)
6. Relied upon to demonstrate compliance with the commission's regulations for Environmental

Qualification (10 CFR 50.49). 10 CFR 54.4(a)(3)
7. Relied upon to demonstrate compliance with the commission's regulations for Station Blackout (10 CFR 50.63). 10 CFR 54.4(a)(3)

UFSAR References

3.6.2.6
6.3

License Renewal Boundary Drawings

LR-GE-148F262
LR-BR-2002 sheet 2
LR-BR-2004 sheet 2

Table 2.3.1.3 Isolation Condenser System
Components Subject to Aging Management Review

Component Type	Intended Functions
Bird Screen	Filter
Closure bolting	Mechanical Closure
Gauge Snubber	Pressure Boundary
Heat Exchangers (isolation condensers)	Heat Transfer
	Pressure Boundary
Piping and fittings	Leakage Boundary
	Pressure Boundary
Thermowell	Pressure Boundary
Valve Body	Leakage Boundary
	Pressure Boundary

The aging management review results for these components are provided in
Table 3.1.2.1.1 Isolation Condenser System
-Summary of Aging Management Evaluation

2.3.1.4 Nuclear Boiler Instrumentation

System Purpose

The Nuclear Boiler Instrumentation system is an instrumentation system designed to provide the means to measure parameters of level, pressure, temperature, flow, core differential pressure, and core spray pipe integrity. The purpose of the system is to provide signals to the Reactor Protection System and Emergency Core Cooling System (ECCS) logic, for initiation of protective system functions such as reactor scram, ECCS and Engineered Safety Feature (ESF) system initiation, primary containment isolation, recirculation pump trip, and alternate rod insertion. The FW control function is provided input from this system. Nuclear Boiler Instrumentation also provides the operator with indications of reactor level, pressure, temperature, and flow during normal and transient conditions to support procedural activities performed during normal and post-accident operation. It accomplishes these purposes by utilizing specific instruments to monitor level, pressure (including differential pressure), flow, and temperature.

System Operation

Reactor vessel level is measured by comparing the differential pressure between the variable level of water in the reactor vessel and the pressure from a reference water column of a known height. Both the variable leg and the reference leg experience the same applied steam pressure from the reactor vessel. Steam from the vessel enters the upper instrument tap of the reference leg and condenses in a chamber to keep the reference leg filled with water, with overflow returned to the vessel. Reference legs are compensated for temperature-induced variations in water density as required. The difference in the measured pressures is processed into the vessel water level measurement.

Reactor pressure is measured by pressure instruments utilizing the same piping that is used to measure the pressure in the water level instrument reference legs.

Temperature is measured through thermocouples placed in specific locations on the reactor vessel shell, heads, flange, and skirt to provide indication of the vessel metal temperature.

Reactor core differential pressure is measured by instrumentation that compares pressure below the core plate (in the liquid poison system line) with pressure above the core plate. Core spray piping integrity between the core shroud and reactor vessel wall is monitored by measuring differential pressure between the top of the core support plate and the Core Spray Sparger.

Reactor pressure vessel head flange gasket leak detection is measured by a level switch mounted inside the drywell and a pressure indicator located outside the drywell.

For more detailed information, see UFSAR section 7.6.1.1.

System Boundary

The Nuclear Boiler Instrumentation system boundary begins at the individual reactor vessel nozzles and other attachment points, continues through the instrument piping and tubing, and ends with the instrument(s) to which the sensing lines are routed. The boundary for the wide range level instrument reference leg begins with its condensing chamber, since the boundary of Main Steam head vent piping (evaluated with the Main Steam System) continues up to the condensing chamber. The boundary for the core plate differential pressure instrumentation begins at the sensing lines' attachment points on the liquid poison supply line, which is evaluated with the Standby Liquid Control System (Liquid Poison System). The Nuclear Boiler Instrumentation boundary includes all associated piping, condensing chambers, isolation valves, excess flow check valves, local instrument racks, and mounted instruments for monitoring the specific parameters. The mechanical, electrical, and instrument and control components within the boundary are included. The Nuclear Boiler Instrumentation system boundary also includes the thermocouples monitoring reactor vessel temperature.

Also included in the license renewal scoping boundary of the Nuclear Boiler Instrumentation system are those portions of nonsafety-related piping and equipment that extend beyond the safety-related/nonsafety-related interface up to the location of the first seismic anchor, or to a point no longer in proximity to equipment performing a safety-related function, whichever extends furthest. This includes the nonsafety-related portions of the system located within the Reactor Building. Included in this boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of this portion of the system. For more information, refer to the License Renewal Boundary Drawings for identification of this boundary, shown in red.

Not included in the scoping boundary of the Nuclear Boiler Instrumentation system are the main steam line differential pressure instruments (evaluated with the Main Steam System) which provide a flow signal to the Reactor Protection System. Also not included in the scoping boundary of the Nuclear Boiler Instrumentation system are the Suppression Pool Temperature Monitoring System, Relief Valve/Safety Valve Acoustical Monitoring System, containment pressure monitoring, and torus water level monitoring (all evaluated with the Post-Accident Monitoring System). Also not included in the scoping boundary of the Nuclear Boiler Instrumentation system is reactor coolant pressure boundary leakage monitoring instrumentation which is evaluated with the Drywell Floor and Equipment Drains. Not included in the scoping boundary of the Nuclear Boiler Instrumentation system are the recirculation loop flow and pump seal pressure instruments, which are evaluated with the Reactor Recirculation System. As previously discussed, not included in the scoping boundary of the Nuclear Boiler Instrumentation System is the Main Steam head vent piping up to the wide range level instrument condensing chamber, since this piping is evaluated with the Main Steam System.

Not included in the scoping boundary of the Nuclear Boiler Instrumentation system are the following interfacing systems, which are separately evaluated as license renewal systems:
Reactor Internals
Standby Liquid Control System (Liquid Poison System)
Post-Accident Monitoring System

Reason for Scope Determination

The Nuclear Boiler Instrumentation System meets 10 CFR 54.4(a)(1) because it is a safety related system that is relied on to remain functional during and following design basis events. It meets 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and 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), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

System Intended Functions

1. Provide reactor coolant pressure boundary. Reactor Vessel pressure and differential pressure sensing lines attach to reactor vessel nozzles or other RCPB piping. 10 CFR 54.4(a)(1)
2. Sense process conditions and generate signals for reactor trip or engineered safety features actuation. Provides input signals to RPS, ECCS, and containment isolation for reactor control to prevent safety limits from being exceeded. 10 CFR 54.4(a)(1)
3. Provide primary containment boundary. Sensing lines penetrating primary containment are provided with isolation valves and excess flow check valves. 10 CFR 54.4(a)(1)
4. Provide motive power to safety related components. Power supplies condition electric power input for use by instrumentation components. 10 CFR 54.4(a)(1)
5. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. 10 CFR 54.4(a)(2)
6. Relied upon 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). 10 CFR 54.4(a)(3)
7. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Environmental Qualification (10 CFR 50.49). 10 CFR 54.4(a)(3)
8. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Anticipated Transients Without Scram (10 CFR 50.62). 10 CFR 54.4(a)(3)
9. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Station Blackout (10 CFR 50.63). 10 CFR 54.4(a)(3)

UFSAR References

7.6

License Renewal Boundary Drawings

LR-GE-148F712
LR-GE-237E798

Table 2.3.1.4 Nuclear Boiler Instrumentation
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Condensing chamber	Pressure Boundary
Gauge Snubber	Pressure Boundary
Piping and fittings	Leakage Boundary
	Pressure Boundary
Valve Body	Leakage Boundary
	Pressure Boundary

The aging management review results for these components are provided in
Table 3.1.2.1.2 Nuclear Boiler Instrumentation
-Summary of Aging Management Evaluation

2.3.1.5 Reactor Head Cooling System

System Purpose

The Reactor Head Cooling System (RHCS) is designed to be used in conjunction with reactor vessel flooding and the Shutdown Cooling System for condensing steam formed in the vessel head and for cooling the flanges and the upper portions of the reactor pressure vessel during shutdown operation.

The purpose of the RHCS is to condense steam and condensable gases in the vessel dome to assist in vessel head cooling during shutdown, prevent repressurization as the vessel is flooded to levels above the vessel flange and main steam nozzles to cool the upper portions of the vessel metal, and permit reactor pressure to be reduced to atmospheric while reducing vessel head temperature. A cross connect line between the head cooling line and the head vent line prevents accumulation of hydrogen and other non-condensable gases in the head cooling line above the reactor vessel during normal power operation.

System Operation

The RHCS is comprised of a single spray nozzle located inside the top of the reactor pressure vessel head, which sprays through a cone angle which does not strike the head metal surface. The head spray water is supplied by the standby Control Rod Drive System (CRDS) feed pump. Head spray flow is measured by a flow element, indicated in the Control Room, and controlled by a pneumatically operated flow control valve. The RHCS is connected to the vessel head nozzle by a pipe spool piece which also includes an integral spray nozzle. A check valve is installed as the primary isolation valve inside the drywell. A second isolation valve outside the drywell is an air operated, fail-closed, globe valve which is remotely controlled from the control room. Manually operated stop valves separate the RHCS piping from the Control Rod Drive (CRD) feed pump discharge lines. A leak-off line is used for system drainage and to check for leakage through the isolation valves.

During normal reactor operation, the stop valves connecting the RHCS to the CRDS are both closed, and both air operated valves in the RHCS line are also closed. The isolation check valve in the RHCS line, the closed valves and water in the head spray piping prevent reactor steam from entering the CRDS. The first air operated valve upstream of the isolation check valve is the outboard isolation valve. RHCS piping from the outboard isolation valve to the connections to the CRD feed pump discharge lines is drained during normal operation. During shutdown, when the spare CRD feed pump is needed for RHCS operation, the stop valves and air operated valves are manually repositioned. If the CRD feed pump supplying CRDS fails, the valving is changed manually to give priority to the rod drives, thereby removing the RHCS from service. During reactor head cooling system operation a small amount of water is diverted to the reactor head vent nozzle through a cross connect line. A restriction orifice in the cross connect line limits flow to prevent thermal shock.

For more detailed information, see UFSAR Section 5.4.11.

System Boundary

The RHCS scoping boundary begins at its connection to the CRDS at the downstream side of the two stop valves located between the CRD feed pump discharge lines, and terminates at the spool piece flange. It includes the cross connect line line between the head cooling line and the head vent line of the Main Steam system. All associated piping, components and instrumentation contained within the flow path described above are included in the RHCS scoping boundary.

Also included in the license renewal scoping boundary of the RHCS are those portions of nonsafety-related piping and equipment that extend beyond the safety-related/nonsafety-related interface up to the location of the first seismic anchor, or to a point no longer in proximity to equipment performing a safety-related function, whichever extends furthest. Included in this boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of this portion of the system. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Not included in the RHCS scoping boundary are the following interfacing systems which are separately evaluated as license renewal systems:
Control Rod Drive System
Main Steam System
Reactor Pressure Vessel: RHCS vessel head nozzle
Reactor Internals: Pipe spool piece with integral spray nozzle

RHCS piping, components and instrumentation from the RHCS connections to the CRD pump discharge lines downstream to, but not including, the pipe spool piece with spray nozzle are required to accomplish the system intended functions and are therefore in the scope of license renewal.

Reason for Scope Determination

The RHCS meets 10 CFR 54.4(a)(1) because it is a safety related system that is relied on to remain functional during and following design basis events. The RHCS meets 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of functions identified for 10 CFR 54.4(a)(1). The RHCS meets 10 CFR 54.4(a)(3) because it is relied upon to demonstrate compliance with the Commission's regulations for environmental qualification (10 CFR 50.49).

The RHCS is not relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for ATWS (10 CFR 50.62), fire protection (10 CFR 50.48), or station blackout (10 CFR 50.63).

System Intended Functions

1. Provide reactor coolant pressure boundary. 10 CFR 54.4(a)(1)
2. Provide primary containment boundary. 10 CFR 54.4(a)(1)
3. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Environmental Qualification (10 CFR 50.49). 10 CFR 54.4(a)(3)
4. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. 10 CFR 54.4(a)(2)

UFSAR References

5.4.11

License Renewal Boundary Drawings

LR-GE-237E487
LR-BR-2002 sheet 1

Table 2.3.1.5 Reactor Head Cooling System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Flow Element	Leakage Boundary
Piping and fittings	Leakage Boundary
	Pressure Boundary
Restricting Orifice	Pressure Boundary
	Throttle
Valve Body	Leakage Boundary
	Pressure Boundary

The aging management review results for these components are provided in
Table 3.1.2.1.3 Reactor Head Cooling System
-Summary of Aging Management Evaluation

2.3.1.6 Reactor Internals

System Purpose

The reactor internals provide support for the core and other internal components, maintain the fuel in a coolable geometry during normal and accident conditions, and provide proper distribution of the coolant delivered to the vessel.

System Operation

The shroud is a stainless steel cylinder that surrounds the reactor core and provides a barrier to separate the upward flow of the coolant through the reactor core from the downward recirculation flow. Bolted on top of the shroud is the steam separator assembly, which forms the top of the core discharge plenum. This provides a mixing chamber before the steam-water mixture enters the steam separator. The recirculation outlet and inlet plenum are separated by the shroud support ring (support cone), which joins the bottom of the shroud to the vessel wall. The cone support ring carries all the vertical weight of the shroud, steam separator and dryer assembly, upper core grid (top guide), bottom core support plate, and the peripheral fuel assemblies. The shroud support ring also sustains the differential upward pressure loading on the shroud under operating conditions and the vertical and lateral seismic loads developed during an earthquake.

The control rod guide tubes extend up from the control rod drive housing through holes in the core plate. Each tube is designed as a lateral guide for the control rod and as the vertical support for the fuel support piece, which holds the four fuel assemblies surrounding the control rod. Except for the weight of the peripheral fuel assemblies, the entire weight of the fuel is carried by the guide tubes, and is transmitted to the bottom head through the Control Rod Drive (CRD) housings and stub tubes. For more detail see UFSAR Section 3.9.5.

System Boundary

The boundary for the reactor internals includes all components that are inside the reactor vessel except the fuel assemblies and the control blades, both of which are short-lived components and are evaluated separately. This includes the major components described above plus additional components such as the feedwater spargers, the core spray spargers, the standby liquid control system sparger, the head spray integral nozzle, the inlet recirculation flow diffuser, incore nuclear instrumentation tubes, and reactor internals modification/repair hardware. The incore instrumentation (SRM - Source Range Monitoring, IRM - Intermediate Range Monitoring, LPRM - Local Power Range Monitor, and TIP - Traveling In-core Probe) is evaluated as separate license renewal systems.

The following components of reactor internals perform a safety related function and therefore are within the scope of license renewal: the shroud and shroud repair hardware; shroud support ring, core spray spargers, piping and clamps, core support plate and core support plate wedges, fuel support piece, control rod guide tubes and housings, upper core grid (top guide), and incore instrumentation tubes and housings. The steam dryer is also included in the scope of license renewal. The steam dryer does not perform a safety related function, however, it is included in the license renewal scope, because failure of the steam dryer could potentially prevent satisfactory accomplishment of the safety related functions of the components mentioned above.

The following components of reactor internals are not required to support intended functions and are not included within the scope of license renewal: the feedwater sparger; the steam separator, Standby Liquid Control System (SLCS) sparger, the head spray integral nozzle, the surveillance capsule holders, and core inlet diffuser(flow baffle). A safety assessment for these components has been performed and reported in BWRVIP-06. BWRVIP-27 also provides a safety assessment of the SLCS sparger. These evaluations concluded that these components do not perform a safety related function. These reports also conclude that failure of these components will not result in consequential failure of any safety related equipment. The inlet diffuser is not evaluated in the BWRVIP documents, however, similar reasoning used in BWRVIP-06 when applied to the inlet diffuser results in a similar conclusion. The diffuser does not perform a safety related function nor is it credited any of the regulated events. No failure of the diffuser has been postulated that could cause subsequent failure of safety related equipment.

The control rod drive mechanisms are separately evaluated with the license renewal system Control Rod Drive System (CRDS).

Reason for Scope Determination

The Reactor Internals meet 10 CFR 54.4(a)(1) because the internals are relied to function during and following design basis events. The steam dryer meets 10 CFR 54.4(a)(2) because failure of this non-safety related component could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The Reactor Internals meet 10 CFR 54.4(a)(3) because the core spray piping and sparger are relied on for compliance the Commission’s regulation for Fire Protection (10 CFR 50.48). The Reactor Internals are not relied upon in any safety analysis or plant evaluation to perform a function that demonstrates compliance with the Commission’s regulation for ATWS (10 CFR 50.62) or station blackout (10 CFR 50.63).

System Intended Functions

1. Provide reactor coolant pressure boundary. The CRD housings and incore dry tubes and housings provide a reactor coolant pressure boundary. 10 CFR 54.4(a)(1)
2. Provide emergency core cooling where the equipment provides coolant directly to the core. The Core Spray piping and spargers distribute emergency core cooling flow to the core. 10 CFR 54.4(a)(1)
3. Maintain reactor core assembly geometry. The reactor internal components in conjunction with the reactor vessel are designed to provide physical support for the fuel, steam dryer and other components and to maintain fuel configuration and clearances during normal and accident conditions. Maintaining core geometry ensures adequate core cooling capability and that the control rod drives can be inserted to maintain reactivity control. 10 CFR 54.4(a)(1).
4. Relied upon in safety analyses or plant evaluations to perform to a function that demonstrates compliance with the commissions regulations for Fire Protection (10 CFR 50.48). The Core Spray sparger and piping inside the reactor vessel is credited for core cooling in the protection safe shutdown analysis. 10 CFR 54.4(a)(3)
5. Introduce negative reactivity to achieve or maintain subcritical reactor condition. The control rod mechanisms insert negative reactivity for normal shutdown and for mitigation of operational transients and accidents. The reactor internals are designed to maintain core geometry during normal and accident conditions and support proper insertion of control rods. 10 CFR

54.4(a)(1).

6. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function - nonsafety-related portions of system could interact with safety-related piping and systems. 10 CFR 54.4(a)(2)

UFSAR References

3.9.5
4.5.2

License Renewal Boundary Drawings

See UFSAR Figure 3.9-8

Table 2.3.1.6 Reactor Internals
Components Subject to Aging Management Review

Component Type	Intended Functions
Control Rod Drive Assembly (Housing and Guide Tube)	Pressure Boundary
	Structural Support
Core Plate (Lower Core Grid)	Structural Support
Core Plate (Lower Core Grid) Wedges	Structural Support
Core Shroud	Pressure Boundary
	Structural Support
Core Spray Line Spray Nozzle Elbows	Pressure Boundary
Core Spray Lines, Thermal Sleeves, Spray Rings (Sparger), and Spray Nozzles	Pressure Boundary
	Spray
	Structural Support
Core Spray Ring (Sparger) Repair Hardware	Structural Support
Fuel Support Piece	Direct Flow
	Structural Support
Incore Neutron Monitor Dry Tubes,Guide Tubes, & Housings	Pressure Boundary
Shroud Repairs (tie rods and lug/clevis assemblies)	Structural Support
Shroud Support Structure	Pressure Boundary
	Structural Support
Top Guide (Upper Core Grid)	Structural Support
Vessel Steam Dryer	Structural Support

The aging management review results for these components are provided in

Table 3.1.2.1.4 Reactor Internals
-Summary of Aging Management Evaluation

2.3.1.7 Reactor Pressure Vessel

System Purpose

The reactor pressure vessel (RPV) contains the reactor core, the reactor internals, and reactor core coolant moderator. The RPV forms part of the reactor coolant pressure boundary (RCPB) and serves as a high-integrity barrier against leakage of radioactive materials to the drywell.

System Operation

The reactor pressure vessel is a vertical, cylindrical pressure vessel with hemispherical heads. The cylindrical shell and bottom hemispherical head of the reactor pressure vessel are of welded construction and are fabricated of low alloy steel plate. The removable top head is attached to the cylindrical shell flange with studs and nuts and includes two concentric seal rings in the head flange. The reactor pressure vessel is supported by a steel skirt. The top of the skirt is welded to the bottom of the vessel. The base of the skirt is continuously supported by a ring girder fastened to a concrete foundation, which carries the load through the drywell to the Reactor Building foundation slab.

The major safety function for the reactor pressure vessel is to provide a radioactive material barrier. The RPV also contains and supports the reactor core, reactor internals and coolant moderator. The RPV provides support for the connected RCPB piping.

For additional details see UFSAR Sections 5.1 and 5.3.

System Boundary

The boundary for the reactor pressure vessel includes the vessel shell and flange, top head and flange, bottom head, vessel closure studs and nuts, vessel nozzles (recirculation, main steam, feedwater, control rod drive return line, head spray and others), nozzle safe ends (including thermal sleeves), vessel penetrations (Control Rod Drive stub tubes, standby liquid control, bottom head drain and others), vessel skirt, vessel shell course welds and vessel attachment welds. The vessel flange leak detection is evaluated as part of the Nuclear Boiler Instrumentation System. The remainder of the RCPB (including reactor recirculation, main steam, feedwater, core spray, control drive, head spray) beyond the RPV boundary is evaluated with the respective license renewal system.

Reason for Scope Determination

The reactor pressure vessel meets 10 CFR 54.4(a)(1) because the vessel is relied upon to remain functional during and following design basis events. The reactor pressure vessel does not meet 10 CFR 54.4(a)(2) because there are no non-safety-related components whose failure could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The reactor pressure vessel meets 10 CFR 54.4(a)(3) because the vessel is relied on for compliance with the Commission’s regulation for Fire Protection (10 CFR 50.48). The reactor pressure vessel is not relied upon in any safety analysis or plant evaluation to perform a function that demonstrates compliance with the Commission’s regulation for EQ (10 CFR 50.62), ATWS (10 CFR 50.62) or station blackout (10 CFR 50.63).

System Intended Functions

1. Provide reactor coolant pressure boundary. The reactor pressure vessel maintains the integrity of the reactor coolant pressure boundary (RCPB). The reactor pressure vessel provides structural support for connected RCPB piping. 10 CFR 54.4(a)(1)
2. Maintain reactor core assembly geometry. The reactor pressure vessel in conjunction with the reactor internals provides physical support for the core and other reactor vessel internals and a means to distribute coolant to the fuel assemblies in the core. 10 CFR 54.4(a)(1)
3. Relied upon in safety analyses or plant evaluations to perform to a function that demonstrates compliance with the commission's regulations for Fire Protection (10 CFR 50.48). The reactor pressure vessel is credited in the fire safe shutdown analysis. 10 CFR 54.4(a)(3)

UFSAR References

5.1
5.3

License Renewal Boundary Drawings

See UFSAR Figure 3.9-8

Table 2.3.1.7 Reactor Pressure Vessel
Components Subject to Aging Management Review

Component Type	Intended Functions
Nozzle (Bottom head drain)	Pressure Boundary
Nozzle Safe Ends (Core Spray, Isolation Condenser & CRD Return)	Pressure Boundary
Nozzle Safe Ends (Feedwater & Main Steam)	Pressure Boundary
Nozzle Safe Ends (Recirculation Inlet & outlet)	Pressure Boundary
Nozzle Thermal Sleeves (CRD Return Line)	Direct Flow
Nozzle Thermal Sleeves (Feedwater Nozzle)	Direct Flow
Nozzles (Core Spray)	Pressure Boundary
Nozzles (CRD Return)	Pressure Boundary
Nozzles (Feedwater)	Pressure Boundary
Nozzles (Main Steam & Isolation Condenser)	Pressure Boundary
Nozzles (Recirculation Inlet & Outlet)	Pressure Boundary
Penetrations (CRD Stub Tubes)	Pressure Boundary
	Structural Support
Penetrations (Instrumentation including safe ends)	Pressure Boundary
Penetrations (Standby Liquid Control)	Pressure Boundary
RPV Support Skirt and Attachment Welds	Structural Support
Top Head Closure Studs and Nuts	Mechanical Closure
Top Head Enclosure (Head & Nozzles)	Pressure Boundary
Top Head Enclosure Vessel Flange Leak Detection Penetration	Pressure Boundary
Top Head Flange	Pressure Boundary
Vessel Bottom Head	Pressure Boundary
Vessel Shell (Upper, upper intermediate, lower intermediate, lower, and belt line welds)	Pressure Boundary
Vessel Shell Attachment Welds	Structural Support
Vessel Shell Flange	Pressure Boundary

The aging management review results for these components are provided in

Table 3.1.2.1.5 Reactor Pressure Vessel
-Summary of Aging Management Evaluation

2.3.1.8 Reactor Recirculation System

System Purpose

The Reactor Recirculation System (RR) is a reactivity control system that provides forced circulation of reactor coolant through the core. The Reactor Recirculation System consists of the Reactor Recirculation main loop piping, recirculation pumps and motors, recirculation motor-generator sets, Recirculation System Flow Control, and Recirculation Pump Trip Logic.

The purpose of the Reactor Recirculation System is to provide forced circulation of reactor coolant through the core, providing a means to control reactor power within a limited range without the need for manipulation of the control rods. It accomplishes this purpose by delivering recirculated water flow to the reactor vessel through five separate pumped loops, each with an individually controllable variable speed pump.

System Operation

The Reactor Recirculation System is comprised of five separate recirculation loops, and has been sized to provide a total flow capacity equal to the required flow at rated load. Each loop contains suction and discharge piping, a motor-operated suction isolation valve, motor-driven recirculation pump, motor-operated discharge isolation valve, a bypass line around the discharge isolation valve equipped with a motor-operated bypass valve, and associated instrumentation and drain valves. Each recirculation pump is a centrifugal unit with a mechanical cartridge-type two-stage shaft seal. Each recirculation pump is driven by a variable speed motor powered by a recirculation motor-generator (MG) set, comprised of a constant speed motor, synchronous generator, interconnecting variable speed fluid coupling, and associated instrumentation and controls.

Under normal reactor power conditions, all five recirculation loops are in operation, with all pumps operating at the same speed. Plant operation has been analyzed with up to two recirculation loops out-of service.

The flowpath for recirculated coolant through each of the five loops is as follows: reactor coolant exits the vessel through the loop’s outlet nozzle and into the recirculation pump suction piping. The coolant then passes through the recirculation pump and returns to the vessel via the discharge piping. The coolant enters the vessel through the loop’s lower head inlet nozzle, passes through the diffuser and orifices at the bottom of the core and flows upward through the core where bulk boiling produces steam. The steam-water mixture enters the moisture separators and the steam dryers. The water separated from the steam flows downward across the top of the plenum, where it mixes with the incoming feedwater, and enters the downcomer annulus between the shroud and the vessel wall. The coolant flows downward through the annulus to the outlet nozzles, repeating the path.

The recirculation pump motor oil coolers and recirculation pump seal coolers are provided cooling water from the Reactor Building Closed Cooling Water System. Recirculation pump suction and discharge isolation valve leakoff connections and pump seal leakoff connections are piped to the Drywell Equipment Drain Tank.

If the suction and discharge valves of all five recirculation loops are closed, a level reduction in the core region will not result in a corresponding level reduction in the downcomer where reactor vessel level is measured. For this reason, the suction and discharge valves of at least one recirculation loop are required to be open when vessel level indication is required for ECCS operability.

Recirculation Flow Control is a speed control unit consisting of a pneumatic operator for each fluid coupling scoop tube, an electric tachometer on each generator shaft, a remote manual speed controller for each MG set, a master remote control device for the five pumps, and associated electronic equipment. Operating speeds of the five pumps are normally adjusted in unison by the master speed controller. The individual speed controller is used for taking a pump out of service or returning it to normal operation. The tachometer on each generator shaft provides a feedback signal for comparison of actual versus selected speeds.

Recirculation Pump Trip (RPT) is an instrument-controlled function of the Reactor Recirculation System that decreases the pressure and temperature transient during an ATWS event. The Reactor Protection System (RPS – separately evaluated as a license renewal system) supplies a signal to the RPT system causing a trip of all five recirculation pumps on a vessel low-low level signal. On a vessel high-pressure signal from RPS, RPT trips three recirculation pumps immediately, and trips the remaining two pumps after a time delay if the vessel high-pressure condition still exists. If the high pressure condition is a temporary spike, having two recirculation pumps continue to operate is desirable as it provides better core cooling, more representative level and temperature instrument indications in the core region, and reduced thermal cycling of the reactor vessel and internal components.

For more detailed information, see UFSAR sections 5.4.1 and 7.6.

System Boundary

The boundary of the portion of the Reactor Recirculation System includes the main recirculation flowpath, which begins at the reactor vessel outlet nozzles, continues through the suction piping, suction valves, recirculation pump casings, discharge valves (including bypass valves and piping around the discharge valves), and discharge piping back to the inlet nozzles on the vessel. The temperature elements at each pump suction and discharge are located in thermowells. Included in the boundary are the instrument lines from the pressure taps on the pump suction and discharge lines, and from the flow element instrument pressure taps on each discharge line, out to the isolation valves located outside of containment. Also included are the pump casing drain lines up to and including the isolation valves, and the instrument lines from the recirculation pump seals up to and including the isolation valves outside of containment.

Included in the RR System license renewal scoping boundary for evaluation is the RPT system. The RPT system is an instrument-controlled function of the RR System, and the portion that supports performance of the RR System intended function during an ATWS event is in scope for license renewal. The components of the RPT system are evaluated as electrical commodities.

Also included in the RR System license renewal scoping boundary are the recirculation MG sets, comprised of the constant speed motors, synchronous generators, variable speed fluid couplings, oil coolers, and associated components for control (Recirculation Flow Control). The function of these components is to supply electrical power for operation of the recirculation pump motors inside the containment.

Included in the license renewal scoping boundary of the RR System are those portions of nonsafety-related piping and equipment that extend beyond the safety-related/nonsafety-related interface up to the location of the first seismic anchor, or to a point no longer in proximity to equipment performing a safety-related function, whichever extends furthest. This includes the nonsafety-related portions of the system located within the Reactor Building and Primary Containment. Included in this boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of this portion of the system. For more information, refer to the License Renewal Boundary Drawings for identification of this boundary, shown in red.

Not included in the Reactor Recirculation System boundary is piping beyond the attachment points where the following systems, each separately evaluated for license renewal, interface with Recirculation system piping or components: Shutdown Cooling supply and return piping to the Recirculation Loop E suction and discharge lines, respectively; Isolation Condenser Loop A condensate return attachment to Recirculation Loop A suction piping (Isolation Condenser Loop B piping attaches to the Shutdown Cooling supply line described above); Reactor Water Cleanup supply and return piping to Recirculation Loop B suction and discharge lines, respectively; and Reactor Building Closed Cooling Water lines from their attachment points on the pump seal coolers and pump motor oil coolers. Also not included is the Post-Accident Sampling supply piping beyond the isolation valve on the line attached to the Recirculation Loop A suction piping.

Not included in the Reactor Recirculation System scoping boundary are the following interfacing systems, which are separately evaluated as license renewal systems:
Drywell Floor and Equipment Drain System
Post-Accident Sampling System
Reactor Water Cleanup System
Isolation Condenser System
Shutdown Cooling System
Reactor Protection System
Reactor Building Closed Cooling Water System

Reason for Scope Determination

The Reactor Recirculation System meets 10 CFR 54.4(a)(1) because it is a safety related system that is relied upon to remain functional during and following design basis events. It meets 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for fire protection (10 CFR 50.48) and ATWS (10 CFR 50.62). Pressure boundary integrity of the Reactor Recirculation System is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for station blackout (10 CFR 50.63). The system is not relied upon to perform a function that demonstrates compliance with the Commission’s regulations for environmental qualification (10 CFR 50.49).

The function of the MG set and Recirculation Flow Control portions of the Reactor Recirculation System is to provide regulated electrical power to operate the recirculation pump motors. These portions of the Reactor Recirculation System are not in scope under 10 CFR

54.4(a)(1) because they are nonsafety-related systems that are not relied upon to remain functional during and following design basis events. The MG set portion is in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). MG set and Recirculation Flow Control portions are not in scope under 10 CFR 54.4(a)(3) because they are not relied upon in safety analyses and 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), ATWS (10 CFR 50.62), or station blackout (10 CFR 50.63).

System Intended Functions

1. Provide reactor coolant pressure boundary. 10 CFR 54.4(a)(1)
2. Provides primary containment boundary - piping from pressure taps for determining pump developed pressure and flow exit the containment and have globe isolation valves and excess flow check valves outside containment. 10 CFR 54.4(a)(1)
3. Sense process conditions and generate signals for reactor trip or engineered safety features actuation. The Reactor Recirculation system (RPT) includes the associated pump trip actuation logic. 10 CFR 54.4(a)(1)
4. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. 10 CFR 54.4(a)(2)
5. Relied upon 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). 10 CFR 54.4(a)(3)
6. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Anticipated Transients without Scram (10 CFR 50.62). 10 CFR 54.4(a)(3)
7. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Station Blackout (10 CFR 50.63). Recirculation system operation is not required for SBO, however the pressure boundary integrity of the flowpath must be maintained to support other SBO-required systems. 10 CFR 54.4(a)(3)

UFSAR References

5.4.1
7.6.1
7.6.2

License Renewal Boundary Drawings

LR-GE-237E798
LR-GE-107C5339
LR-BR-M0012
LR-GE-148F262
LR-BR-2006 Sheet 5

Table 2.3.1.8 Reactor Recirculation System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Coolers (oil)	Leakage Boundary
Filter Housing (oil)	Leakage Boundary
Flow Element	Pressure Boundary
Fluid Drive (MG Set Coupling) - Reservoir	Leakage Boundary
Oil Mist Eliminator - Reservoir	Leakage Boundary
Piping and fittings	Leakage Boundary
	Pressure Boundary
Pump Casing	Pressure Boundary
Sight Glasses (oil)	Leakage Boundary
Thermowell	Pressure Boundary
Valve Body	Leakage Boundary
	Pressure Boundary

The aging management review results for these components are provided in
Table 3.1.2.1.6 Reactor Recirculation System
-Summary of Aging Management Evaluation

2.3.2 ENGINEERED SAFETY FEATURES SYSTEMS

The following systems are addressed in this section:

- Automatic Depressurization System (Section 2.3.2.1)
- Containment Spray System (Section 2.3.2.2)
- Core Spray System (Section 2.3.2.3)
- Standby Gas Treatment System (SGTS) (Section 2.3.2.4)

2.3.2.1 Automatic Depressurization System

System Purpose

The Automatic Depressurization System (ADS) is a standby Emergency Core Cooling system (ECCS) that is designed to provide a controlled blowdown of the primary system to rapidly reduce pressure during a small pipe break. Depressurization following a LOCA permits the low pressure Core Spray System to achieve timely rated flow of injection water into the reactor core so that fuel clad melting is prevented. For larger breaks the vessel depressurizes sufficiently to permit Core Spray injection without ADS assistance. The ADS equipment also provides an overpressure protection function for the reactor pressure vessel.

The purpose of the ADS is to depressurize the reactor coolant system, either during a small break LOCA or in the event of an overpressure condition in the reactor pressure vessel. The ADS accomplishes this purpose by opening the electromatic relief valves (EMRVs) to provide a controlled blowdown of the primary coolant system and rapidly reduce reactor vessel pressure during a small pipe break or overpressure condition. Additionally, manual ADS actuation of the EMRVs is credited for pressure control during an isolation condenser high energy line break.

The ADS is one of the systems that comprise the ECCS and as such is designed to function throughout the post accident period. Operation of the system is credited in the 10CFR50 Appendix K and other evaluations. No single failure in the system will prevent the ADS from performing its design basis function.

System Operation

The ADS is comprised of the logic relays, timers, and instrumentation that receive process signal input and provide actuation signals to the five EMRV assemblies (evaluated with the Main Steam System) located on the Main Steam headers upstream of the Main Steam Isolation Valves. Each EMRV assembly consists of a main valve, a pilot valve and a solenoid operator.

The ADS automatic depressurization function, the overpressure function and the manual operation of the EMRVs are all controlled through the ADS logic network. During normal reactor operation (ADS in standby), the EMRVs are closed. ADS initiation for automatic depressurization begins after sensing simultaneous occurrence of high drywell pressure, triple low water level in the reactor pressure vessel, and differential pressure at a core spray booster pump on either core spray loop. There is a time delay before the EMRVs open to allow for operator action to prevent ADS-initiated opening of the EMRVs if appropriate.

In addition, opening of any EMRV will begin immediately upon receipt of either a high pressure condition as sensed by the valve's associated pressure sensor, or a manually initiated signal. The overpressure sensing opening function for each EMRV can be defeated, or individual valves can be manually opened from the control room.

When ADS actuates the EMRVs, a signal is sent to the solenoid-operated EMRV pilot valve, opening the pilot valve and venting steam from under the main valve disc. This creates a differential pressure that opens the main valve. Steam flows down the discharge header (evaluated with the Main Steam System) to the torus and exits below the surface of the water in the suppression pool through Y-quenchers (evaluated with the Main Steam System).

The125 VDC distribution system provides the source of electrical power to the ADS relay logic and the EMRV solenoids. Redundant power supplies with an automatic power transfer feature are provided to assure system operation.

A valve position monitoring system allows the status of the EMRVs to be ascertained from the Control Room. Accelerometers and temperature monitoring instrumentation are used to determine whether EMRVs are relieving steam to the torus.

For more detailed system information see UFSAR Sections 3.6.2.6.1, 5.2.2, 6.3.1.2, and 7.3.1.

System Boundary

The ADS system boundary is electrical, and is comprised of the logic relays, timers, and instrumentation that receive process signal input and provide actuation signals to the five (5) EMRV assemblies. The mechanical system boundary, which includes the EMRV assemblies, vacuum breakers, and inlet and discharge piping and associated components are evaluated with the Main Steam System, and the Y-quenchers located in the torus are evaluated with the Main Steam System.

Not included in the ADS license renewal scoping boundary are the following interfacing systems, which are separately evaluated as license renewal systems:
Core Spray System
Main Steam System

Reason for Scope Determination

The Automatic Depressurization System (ADS) meets the scoping requirements of 10 CFR 54.4(a)(1) because it is a safety-related system which is relied upon to remain functional during and following design basis events. It meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commissions regulations for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49) and station blackout (10 CFR 50.63). The ADS is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for ATWS (10 CFR 50.62).

System Intended Functions

1. Provide emergency core cooling where the equipment provides coolant directly to the core. ADS works in concert with the Core Spray System to provide injection following a LOCA or Isolation Condenser HELB event. 10 CFR 54.4(a)(1)
2. Provide reactor coolant pressure boundary. The ADS overpressure function actuates EMRVs to control primary system pressure. 10 CFR 54.4(a)(1)
3. Sense process conditions and generate signals for reactor trip or engineered safety features actuation. The ADS system includes the associated actuation logic. 10 CFR 54.4(a)(1)
4. Relied upon 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). 10 CFR 54.4(a)(3)
5. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for Environmental Qualification (10 CFR

50.49). 10 CFR 54.4(a)(3)
6. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for Station Blackout (10 CFR 50.63). 10 CFR 54.4(a)(3)

UFSAR References

3.6.2.6.1
5.2
6.3
7.3

License Renewal Boundary Drawings

None

2.3.2.2 Containment Spray System

System Purpose

The Containment Spray System is a standby system designed to be used with the Core Spray System as a means of removing the reactor core decay heat from the containment in the event of a LOCA. The Emergency Service Water (ESW) System provides cooling for the containment spray heat exchangers thereby providing the heat sink for the energy released during a LOCA. Containment Spray System has the alternate capability of cooling the water in the torus pool during normal, shutdown and post-accident conditions.

The purpose of the system is to remove fission product decay heat from containment. It accomplishes this by taking water from the torus pool, which is pumped through the Containment Spray heat exchangers, and discharged through spray nozzles into the containment as well as the option through the full flow test line, which is an alternate mode. Decay heat is removed from the core by the core spray water and transported to the drywell, where the core spray water and containment spray water mix and flow down the vents to the torus pool. The containment spray heat exchangers then remove the heat from the pool and direct it to the Emergency Services Water System.

The Containment Spray System is a manually actuated system.

System Operation

The Containment Spray System is comprised of two redundant loops that deliver water from the torus pool to the spray headers in the drywell and torus. Each loop consists of two pumps in parallel, two heat exchangers in parallel, and two drywell spray headers and a torus spray header. In addition, both loops share a common suction header from the torus pool and a common spray header in the torus. Each loop has two connected ring headers at two elevations inside the drywell. Each Containment Spray System contains a full flow test line. Flow and pressure instrumentation are provided in the control room for each loop. The Containment Spray System piping and components in the pressure boundary are considered an extension of the Primary Containment.

The Containment Spray System is manually initiated from switches in the Control Room. The Containment Spray Pumps can be started manually for Containment Spray Service if the proper containment spray initiation permissives are met. Two independent mode select switches are provided, one for each loop. Each switch has two modes, “Drywell Spray” and “Torus Cooling”.

The main flow path for each loop of the two loop Containment Spray System starts from the torus through three suction strainers. The torus penetration nozzles from the suction strainers are connected to a suction header, which nearly surrounds the torus. The suction lines for each Containment Spray pump connect to this header. The Core Spray pumps also take suction from this header. When the proper containment spray initiation permissives are met, the normally closed motor operated valves can be opened and the containment spray pump can be started to allow the drywell spray mode flow path, which sprays the containment. In addition, the Containment Spray System has the capability in the torus cooling mode of providing cooling of the water in the torus by manual operation of a motor operated valve to direct water from the torus pool through the pumps and heat exchanger and return the water to the torus pool through torus-to-drywell vacuum relief piping [evaluated with Containment Vacuum Breakers System]. Water entering the torus and the drywell gravity drains back to the torus pool to complete the cycle. Thus the water is pumped from the torus pool through the suction strainers to the heat exchangers, sprayed into the containment as well as a potential flow path to the full flow test line and flows by gravity back to the torus pool. The water spray removes latent and sensible heat from the drywell and torus. The heat is rejected back to the Emergency Service Water System to the Ultimate Heat Sink via the Containment Spray heat exchangers.

Each Containment Spray loop with redundant components is supported by separate and redundant ESW Cooling Systems. The ESW System supplies the cooling water to the Containment Spray heat exchangers. The ESW pumps are throttled as necessary to allow for a positive tube-to-shell pressure differential. This differential pressure in the heat exchangers minimizes the radioactive leakage to the environment subsequent to a LOCA in the event of a tube leak.

Each Containment Spray System corner room pump compartment is provided with coolers sized to extract the heat generated by pump operation. Cooling water supplied in these coolers is evaluated with the Reactor Building Closed Cooling Water System. Air flow path for these coolers is evaluated with the Reactor Building Ventilation System.

For more detailed information, see UFSAR Sections 6.2.2 and 6.5.2.

System Boundary

The boundary of the Containment Spray System begins with the suction strainers located inside Primary containment and the pump suction lines to the ring header that is common to the Core Spray System and Containment Spray suction piping. It continues through the containment spray pumps’ suction lines, through the pumps, the shell side of the heat exchangers and to the discharge piping, where each containment spray loop attaches to either the Drywell or the Torus and ends at the drywell headers or the torus spray header. Included in this boundary is the piping & spray headers located inside the torus, the piping and spray headers located inside the Drywell and the full flow test line on each loop from the common header downstream of the heat exchangers to its attachment to the torus-to-drywell vacuum relief piping. All associated piping and components within the flow paths and subsystems described above are included in the Containment Spray system boundary. Additionally, the Containment Spray System boundary also includes the pressure differential monitoring piping and components between the Containment Spray System and the ESW system at the heat exchangers.

Not included in the Containment Spray System license renewal scoping boundary are the following interfacing systems, which are separately evaluated as license renewal systems:
Emergency Service Water System
Containment Vacuum Breakers System

Reason for Scope Determination

The Containment Spray System meets the scoping requirements of 10 CFR 50.54(a)(1) because it is a safety-related system which is relied upon to remain functional during and following design basis events. It does not meet 10 CFR 54.4(a)(2) because failure of nonsafety-related portions of the system could not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 50.54(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commissions regulations for fire protection (10 CFR 50.48) and environmental qualification (10 CFR 50.49). The Containment Spray System is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for ATWS (10 CFR 50.62) or station blackout (10 CFR 50.63).

System Intended Functions

1. Provide emergency heat removal from primary containment and provide containment pressure control. 10 CFR 50.54 (a)(1)
2. Provide primary containment boundary. The Containment Spray System piping and components in the pressure boundary are considered an extension of the primary containment. 10 CFR 50.54(a)(1)
3. Sense process conditions and generate signals for reactor trip or engineered safety features actuation. The Containment Spray system includes the associated actuation logic. 10 CFR 54.4(a)(1)
4. Relied upon 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). 10 CFR 54.4(a)(3)
5. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Environmental Qualification (10 CFR 50.49). 10 CFR 54.4(a)(3)

UFSAR References

6.2.2
1.2.2.2
6.2.1
3.1.34
3.2
6.5.2

License Renewal Boundary Drawings

LR-GE-148F740
LR-BR-2005 Sheet 4
LR-GU-3E-243-21-1000

Table 2.3.2.2 Containment Spray System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Flow Element	Pressure Boundary
Piping and fittings	Leakage Boundary Pressure Boundary
Pump Casing	Pressure Boundary
Spray Nozzle	Pressure Boundary
	Spray
Strainer (ECCS Suction)	Filter
	Pressure Boundary
Thermowell	Pressure Boundary
Valve Body	Pressure Boundary

The aging management review results for these components are provided in
Table 3.2.2.1.1 Containment Spray System
-Summary of Aging Management Evaluation

2.3.2.3 Core Spray System

System Purpose

The Core Spray (CS) System is a low pressure Emergency Core Cooling System (ECCS) designed to provide cooling water for removal of decay heat from the reactor core following a postulated Loss-of-Coolant Accident (LOCA). Large-to-intermediate pipe breaks in the reactor coolant system result in a reactor pressure reduction sufficient to permit the CS System to achieve its rated injection flow prior to fuel cladding melt. To accommodate the remaining intermediate-to-small pipe breaks, the Automatic Depressurization System provides the initial controlled depressurization to reduce reactor pressure, and thus permit timely CS injection. In this manner, the CS System provides core cooling such that fuel clad melting is prevented for the entire spectrum of postulated LOCAs. The CS System provides a supply of cooling water to the reactor core which is independent of the Feedwater System and which can be operated on emergency power.

The purpose of the CS System is to provide for the post-LOCA removal of decay heat from the reactor core so that fuel clad melting is prevented for the entire spectrum of postulated LOCAs. The CS System accomplishes this purpose by delivering a low-pressure spray pattern over the fuel following a LOCA, limiting peak clad temperature. The CS System operation is initiated automatically by either reactor low-low water level or high drywell pressure, or can be initiated manually.

The CS System is a two-loop system. No single failure in the CS System can cause both loops to malfunction. Operation of the CS System loops is credited in the 10 CFR 50 Appendix K evaluation.

System Operation

The CS System is comprised of two independent loops. Each loop consists of two main pumps, two booster pumps, and associated piping, valves, instrumentation, and controls. Main pump suction is through strainers located in the torus (evaluated with the Containment Spray System), and booster pump discharge is through the system isolation valves into spray spargers located inside the reactor shroud (evaluated with Reactor Internals). Each CS System loop contains full flow test, keep-fill, and minimum flow pump protection features. Flow and pressure instrumentation are provided in the control room for each loop. All motor operated valves in the main flowpath of each loop are normally open during system standby, with the exception of the parallel system isolation valves located outside the drywell. The core spray system piping and components in the pressure boundary are considered an extension of the primary containment boundary.

Initiation of both loops of the CS System occurs upon receipt of a high drywell pressure or low-low reactor vessel level signal. These signals also start both Emergency Diesel Generators (EDGs), in order to supply power to the Core Spray pumps in the event of loss of normal electric power supply. The CS System can also be initiated manually. If the suction and discharge valves of all five recirculation loops are closed, a level reduction in the core region will not result in a corresponding level reduction in the downcomer where the low-low reactor vessel level is measured. For this reason, the suction and discharge valves of at least one recirculation loop are required to be open when CS System is required to be operable as an ECCS system. Once the reactor pressure drops below a preset value and the CS System actuation signal is present, the parallel motor operated system isolation valves receive a permissive signal to open. Opening of the parallel motor operated system isolation valves completes the flowpath, and injection water from the two loops enters the vessel through two penetrations. Inside the vessel, each line extends half way around the outside of the core shroud with one loop penetrating the shroud above the other. The core spray spargers inside the shroud (evaluated with Reactor Internals) consist of two 180-degree segments. Thus each sparger forms a complete circle above the core.

The main flowpath for each CS System loop is suction from the torus through one of two main pumps, continuing through one of two booster pumps, through the outboard parallel system isolation valves, through the inboard parallel testable check valves, and into the reactor vessel for discharge onto the core through the associated spray sparger. Each of the parallel valves has 100% flow capacity, so active failure of one valve will not result in insufficient flow. Upon receipt of the initiation signal, one preferred main pump in each CS System loop starts. Should either of these main pumps fail to start, the second main pump in that loop will receive a signal to start. Upon sensing both an actuation signal and a discharge pressure signal of its associated main pump, the preferred booster pump will start. If the preferred booster pump in either loop fails to start, the alternate booster pump in that loop will receive a signal to start.

After CS System flow has been established into the vessel, the torus provides an essentially unlimited supply of cooling water. Water discharged from a pipe break inside the drywell will overflow through the drywell vents into the torus. An alternate supply of cooling water for the CS System is the Condensate Storage Tank through locked closed manual valves located at the suction of each CS System main pump. The Fire Protection System is also capable of delivering water to the reactor vessel using CS System piping. During CS System operation, the heat being absorbed by the water that flows back to the Torus is transferred to the Ultimate Heat Sink by the heat exchangers in the Containment Spray System.

The primary water supply piping for the CS System is attached to suction strainers in the torus (evaluated with the Containment Spray System). The water in the torus is drawn through three strainers into a common header. This header also feeds the Containment Spray System pumps. Each CS System corner room pump compartment is provided with coolers sized to extract the heat generated by pump operation. Cooling water supplied to these coolers is evaluated with the Reactor Building Closed Cooling Water System. Air flow path for these coolers is evaluated with the Reactor Building Ventilation System. Operation of these coolers is not required to support the CS System safety-related function.

For more detailed information, see UFSAR sections 6.3.1 and 6.3.1.3.

System Boundary

The CS System scoping boundary begins with the attachment points of the main pump suction lines to the ring header common to the CS System and Containment Spray System suction piping. It continues through the main CS System pumps' suction lines, through the main pumps and booster pumps to the discharge piping, where each CS System loop attaches to a reactor vessel nozzle. Included in this boundary is a full flow test line on each loop from the common header downstream of the booster pumps to its attachment to the torus-to-drywell vacuum relief piping. Also included is each loop's keep-fill piping which takes suction from the discharge of a CS System main pump in each loop, continues through the fill pump back into the main pump discharge line, and exits the CS System main flowpath piping though the minimum flow return line attached to the full flow test line. The CS System boundary includes the parallel motor operated system isolation valves outside containment, the parallel testable check valves inside containment, and associated piping, components, and instrumentation on each of the main flowpath, test, fill, and minimum flow lines described above. The alternate water supply flow path boundary with the Condensate Storage and Transfer System is at the interface located on the CS System main pump common suction line. The alternate water supply boundary with the Fire Protection System is at the normally closed manual isolation valves where the piping connects to the suction of Loop I booster pumps and the discharge of Loop II booster pumps. The boundaries with the Post- Accident Sampling System (PASS) extend to the first valve of the PASS downstream of each of the sampling connections to the CS System at the suction of the Loop I main pumps suction header and on the discharge of the Loop I booster pumps.

Also included in the license renewal scoping boundary of the Core Spray System are those portions of nonsafety-related piping and equipment that extend beyond the safety-related/nonsafety-related interface up to the location of the first seismic anchor, or to a point no longer in proximity to equipment performing a safety-related function, whichever extends furthest. This includes the nonsafety-related portions of the system located within the Reactor Building and Primary Containment. Included in this boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of this portion of the system. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Not included in the scoping boundary of the CS System are the suction strainers and piping located inside the torus, and the ring (suction) header, which are included in the Containment Spray System scoping boundary. Also not included are the piping and spargers located inside the reactor vessel, which are included in the Reactor Internals scoping boundary. Not included in the CSS license renewal scoping boundary are the following interfacing systems, which are separately evaluated as license renewal systems:
Automatic Depressurization System
Primary Containment System
Condensate Storage and Transfer System
Fire Protection Systems
Reactor Internals
Post Accident Sampling System
Containment Spray System

Reason for Scope Determination

The Core Spray System meets the scoping requirements of 10 CFR 54.4(a)(1) because it is a safety-related system which is relied upon to remain functional during and following design basis events. It meets 10 CFR 54.4(a)(2) because failure of nonsafety-related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commissions regulations for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49) and station blackout (10 CFR 50.63). The Core Spray System is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for ATWS (10 CFR 50.62).

System Intended Functions

1. Provide emergency core cooling where the equipment provides coolant directly to the core. Operates with Automatic Depressurization System (ADS) to accommodate entire spectrum of postulated LOCA breaks. Minimum flow capability provides pump protection to assure capability of ECCS function. 10 CFR 54.4(a)(1)
2. Provide primary containment boundary. 10 CFR 54.4(a)(1)
3. Provide reactor coolant pressure boundary. 10 CFR 54.4(a)(1)
4. Sense process conditions and generate signals for reactor trip or engineered safety features actuation. The Core Spray system includes the associated actuation logic. 10 CFR 54.4(a)(1)
5. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. 10 CFR 54.4(a)(2)
6. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Station Blackout (10 CFR 50.63) 10 CFR 54.4(a)(3)
7. Relied upon 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) 10 CFR 54.4(a)(3)
8. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Environmental Qualification (10 CFR 50.49) 10 CFR 54.4(a)(3)
9. Remove residual heat from the reactor coolant system. Provides a safety-related backup source of condensing (cooling) water to the Isolation Condensers. 10 CFR 54.4(a)(1) and 10 CFR 54.4(a)(3)

UFSAR References

6.3

License Renewal Boundary Drawings

LR-GE-855D781
LR-GU-3E-243-21-1000
LR-BR-2004 sheet 2
LR-BR-M0012
LR-GE-148F712

Table 2.3.2.3 Core Spray System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Cyclone Separator	Pressure Boundary
Flow Element	Pressure Boundary
Gauge Snubber	Pressure Boundary
Piping and fittings	Leakage Boundary
	Pressure Boundary
Pump Casing (Fill Pumps)	Pressure Boundary
Pump Casing (Main and Booster Pumps)	Pressure Boundary
Restricting Orifice	Pressure Boundary
	Throttle
Sight Glasses	Leakage Boundary
Thermowell	Pressure Boundary
Valve Body	Pressure Boundary

The aging management review results for these components are provided in
Table 3.2.2.1.2 Core Spray System
-Summary of Aging Management Evaluation

2.3.2.4 Standby Gas Treatment System (SGTS)

System Purpose

The Standby Gas Treatment System (SGTS) is a plant Engineered Safety Feature (ESF) ventilation system that filters and exhausts the Reactor Building atmosphere and drywell atmosphere to the stack during secondary containment isolation conditions and drywell purging operation.

The purpose of the system is to limit post-accident radioactive releases to the environs by collecting, filtering and transporting fission products to the plant stack for elevated release. It accomplishes this by maintaining a negative pressure of 0.25 inches of water within the Reactor Building with respect to the outside atmosphere to minimize unfiltered leakage of fission products from the Reactor Building and by exhausting filtered release of the primary and secondary containments through the Ventilation Stack. It is also used to purge primary containment prior to outages when increased radioactivity is present and is a backup to the Reactor Building Ventilation System for this function.

During normal operation, the Reactor Building Ventilation System is operating and the SGTS is in standby. During a Design Basis Accident (DBA), the SGTS fans are automatically started and effluents are filtered prior to release through the Ventilation Stack.

System Operation

The Standby Gas Treatment System (SGTS) is comprised of two separate filter trains, each having 100% capacity. Either of the two filter trains is considered as an installed spare, with the remaining one capable of the required flow capacity. Each SGTS train consists of an inlet isolation valve and a low flow orifice valve air intake, a pre-filter, an electric heating coil, a HEPA filter, a charcoal filter and another HEPA filter. Each train is exhausted by a separate exhaust fan with throttled damper through an outlet isolation valve to the Ventilation Stack. A cross-tie is located upstream of the fans and downstream of the filter bank of each train allowing either fan to draw through either filter train. The various elements act to filter and remove radioactive iodines and particulates that may be present in the Reactor Building atmosphere during and after an accident, and in the drywell and suppression chamber atmosphere after primary containment pressure is reduced. The system is also a backup to the Reactor Building Ventilation System's drywell and suppression chamber purge function for outages and is used when radioactivity is high.

The two independent filter trains are normally in standby as the Reactor Building Ventilation System maintains a negative pressure in the Reactor Building and discharges effluents out the Ventilation Stack. During a DBA, upon receipt of high drywell pressure or low-low reactor water level, the normal ventilation supply and exhaust fans are automatically tripped; the reactor building isolation valves (secondary containment isolation) are automatically closed, and the SGTS fans are automatically started to maintain a negative pressure in the secondary containment. The SGTS is also initiated by high level trips of radiation monitors located within the Reactor Building.

The individual SGTS trains can be placed in service manually from the control room, either in parallel with normal ventilation (for test) or with normal ventilation shutdown. Once initiated, either manually or automatically, the SGTS must be manually shutdown when no longer required. Normal ventilation must then be restarted manually.

Upon failure of an operating fan, the second fan will start automatically. The cross-tie valve will open automatically, the inlet and outlet valves of the failed fan will automatically close, and the inlet and outlet valves of the second fan will automatically open. Low flow air bleed will continue to flow through the orifice valve and the filter bank of the failed fan. Cooling air is drawn through the shut down train to remove the decay heat and prevent auto ignition of the charcoal, and the remainder of the flow is drawn through the operating train from the Reactor Building.

Each filter train draws from a common duct connected to the Reactor Building Ventilation System exhaust duct or the drywell and suppression chamber when so aligned (evaluated with Reactor Building Ventilation System). The effluents then are drawn through one of either trains filter banks through the exhaust fan where it is discharged through the Reactor Building Ventilation System exhaust ductwork to the Ventilation Stack.

All of the major components of this system, with the exception of the exhaust fans and outlet valves, are located in the Pipe Tunnel connecting the Turbine Building, Reactor Building, and Old Radwaste Building.

For more detailed information, see UFSAR Section 6.5.1.

System Boundary

The Standby Gas Treatment System (SGTS) boundary begins at the main exhaust header of the Reactor Building Ventilation System where it is drawn into the SGTS filter train intake header. Two parallel low flow orifice valve intake lines connect to the intake header, one for each SGTS filter train. The header is divided by air operated isolation valves to allow use of either filter train. The trains consist of a pre filter, a electric heating coil and a charcoal filter flanked by two HEPA filters. The air is then drawn through a throttled damper to a single exhaust fan in each train and then into an exhaust duct. A cross connect upstream of the fans with a single isolation valve allows either fan to draw from either filter train. The two exhaust ducts combine and the system ends at the connection to the Reactor Building exhaust fan EF-1-6 exhaust duct to the Ventilation Stack. A backdraft damper isolates the upstream Reactor Building Ventilation System from the SGTS effluents to the stack.

Not included in the Standby Gas Treatment System scoping boundary are the Reactor Building Ventilation System (ducts and valves), the Containment Inerting System (valves), the Containment Vacuum Breakers System (piping and valves) and the Ventilation Stack (elevated release) which are evaluated as separate license renewal systems.

Reason for Scope Determination

The Standby Gas Treatment System (SGTS) meets 10 CFR 54.4(a)(1) because portions of the system are safety related and relied on to remain functional during and following design basis events. The Standby Gas Treatment System (SGTS) is not in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system would not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The Standby Gas Treatment System (SGTS) meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the

Commission's regulations for Equipment Qualification (10 CFR 50.49). The Standby Gas Treatment System (SGTS) is not relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for Fire Protection (10 CFR 50.48), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Control and treat radioactive materials released to the secondary containment. (Provides for controlled, elevated release of filtered building atmosphere under accident conditions.) 10 CFR 54.4(a)(1)
2. Provide secondary containment boundary. (Minimize ground level release of airborne radioactive materials by maintaining a negative pressure in the Reactor Building.) 10 CFR 54.4(a)(1)
3. Control combustible gas mixtures in the primary containment atmosphere. (Limit radioactive releases during purging of the drywell and suppression chamber post LOCA, after containment spray has reduced the drywell pressure to approximately 1 psig.) 10 CFR 54.4(a)(1)
4. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Equipment Qualifications (10 CFR 50.49). 10 CFR 54.4(a)(3)

UFSAR References

6.5.1
7.3
9.4.2
11.3.2.5

License Renewal Boundary Drawings

LR-GU-3E-822-21-1000
LR-BR-2011 Sheet 2

Table 2.3.2.4 Standby Gas Treatment System (SGTS)
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Damper Housing	Pressure Boundary
Door Seal	Pressure Boundary
Ductwork	Pressure Boundary
Fan Housing	Pressure Boundary
Filter Housing	Pressure Boundary
Flexible Connection	Pressure Boundary
Flow Element	Pressure Boundary
Heater Housing	Pressure Boundary
Piping and fittings	Pressure Boundary
Restricting Orifice	Pressure Boundary
	Throttle
Thermowell	Pressure Boundary
Valve Body	Pressure Boundary

The aging management review results for these components are provided in
Table 3.2.2.1.3 Standby Gas Treatment System (SGTS)
-Summary of Aging Management Evaluation

2.3.3 AUXILIARY SYSTEMS

The following systems are addressed in this section:

- "C" Battery Room Heating & Ventilation (Section 2.3.3.1)
- 4160V Switchgear Room Ventilation (Section 2.3.3.2)
- 480V Switchgear Room Ventilation (Section 2.3.3.3)
- Battery and MG Set Room Ventilation (Section 2.3.3.4)
- Chlorination System (Section 2.3.3.5)
- Circulating Water System (Section 2.3.3.6)
- Containment Inerting System (Section 2.3.3.7)
- Containment Vacuum Breakers (Section 2.3.3.8)
- Control Rod Drive System (Section 2.3.3.9)
- Control Room HVAC (Section 2.3.3.10)
- Cranes and Hoists (Section 2.3.3.11)
- Drywell Floor and Equipment Drains (Section 2.3.3.12)
- Emergency Diesel Generator and Auxiliary System (Section 2.3.3.13)
- Emergency Service Water System (Section 2.3.3.14)
- Fire Protection System (Section 2.3.3.15)
- Fuel Storage and Handling Equipment (Section 2.3.3.16)
- Hardened Vent System (Section 2.3.3.17)
- Heating & Process Steam System (Section 2.3.3.18)
- Hydrogen & Oxygen Monitoring System (Section 2.3.3.19)
- Instrument (Control) Air System (Section 2.3.3.20)
- Main Fuel Oil Storage & Transfer System (Section 2.3.3.21)
- Miscellaneous Floor and Equipment Drain System (Section 2.3.3.22)
- Nitrogen Supply System (Section 2.3.3.23)
- Noble Metals Monitoring (Section 2.3.3.24)
- Post-Accident Sampling System (Section 2.3.3.25)
- Process Sampling System (Section 2.3.3.26)
- Radiation Monitoring System (Section 2.3.3.27)
- Radwaste Area Heating and Ventilation System (Section 2.3.3.28)
- Reactor Building Closed Cooling Water System (Section 2.3.3.29)
- Reactor Building Floor and Equipment Drains (Section 2.3.3.30)
- Reactor Building Ventilation System (Section 2.3.3.31)
- Reactor Water Cleanup System (Section 2.3.3.32)
- Roof Drains and Overboard Discharge (Section 2.3.3.33)
- Sanitary Waste System (Section 2.3.3.34)
- Service Water System (Section 2.3.3.35)
- Shutdown Cooling System (Section 2.3.3.36)
- Spent Fuel Pool Cooling System (Section 2.3.3.37)
- Standby Liquid Control System (Liquid Poison System) (Section 2.3.3.38)
- Traveling In-Core Probe System (Section 2.3.3.39)
- Turbine Building Closed Cooling Water System (Section 2.3.3.40)
- Water Treatment & Distribution System (Section 2.3.3.41)

2.3.3.1 "C" Battery Room Heating & Ventilation

System Purpose

The "C" Battery Room Ventilation system is a forced air ventilation system designed to maintain the "C" battery room within a specified temperature range and remove hydrogen produced by battery charging. This condition exists when the battery chargers are in operation and hydrogen is being produced by the battery charging function.

The purpose of the "C" Battery Room Ventilation system is to maintain temperatures of the batteries within battery design limits and prevent the buildup of hydrogen within the confines of the "C" Battery Room. The "C" Battery Room Ventilation system accomplishes this purpose by supplying the required air flow through the room necessary to keep the batteries within design temperature limits and remove the hydrogen produced by charging the batteries.

The "C" Battery Room Ventilation system is a non-safety system that is designed to support the 125V DC Station "C" Battery operation.

System Operation

The "C" Battery Room Ventilation system is comprised of air inlet and exhaust louvers, inlet and exhaust ducting, inlet air filter, fan inlet and exhaust duct flexible connections, motor operated isolation dampers, fire dampers, two exhaust fans and fan exhaust gravity dampers. One exhaust fan is normally operating and the other fan is in standby. Also included in the system is a unit heater located in the room for heating during the winter months.

During the summer, outside air is drawn through a louver and filter. The air moves down the ducting passing through a filter and dampers to the ‘C’ Battery Room. The air sweeps through the room and across the equipment removing heat and hydrogen. The air then moves into the room exhaust duct and down the ducting through the dampers, fan and out the louvers. During the winter months, a minimum amount of outside air is drawn in and mixed with air from the 4160V Switchgear Room which flows through the ducting and dampers in the south wall and is exhausted to the outside atmosphere through the exhaust ducting and fans.

For more detailed information, see UFSAR Section 9.4.3.2.

System Boundary

The boundary of the "C" Battery Room ventilation system begins at the intake louvers, encompasses the intake duct, through the inlet filter, up to the entrance into the "C" Battery Room, then out of the room through the room outlet duct, through dampers into the fans and out the outlet louvers. The "C" Battery Room ventilation system also includes an opening in the "C" Battery Room wall to allow air flow from the switchgear room general area. The opening includes a fire damper and an isolation damper. Interior building ducting, inlet, and outlet louvers, fire dampers, motor operated and gravity operated dampers, fans, flexible connections and inline mounted instruments are all within the boundary of the "C" Battery Room ventilation system.

Reason for Scope Determination

The C Battery Room Heating and Ventilation System is not in scope under 10 CFR 54.4(a)(1) because it is not a safety related system relied on to remain functional during and following design basis events. It does meet 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The C Battery Room Heating and Ventilation System is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for Fire Protection (10 CFR 50.48), ATWS (10 CFR 50.62), Environmental Qualification (10 CFR 50.49), or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The system provides ventilation and maintains area temperatures within equipment design limits. 10 CFR 54.4(a)(2)

UFSAR References

8.3.2.1
9.4.3.2

License Renewal Boundary Drawings

LR-BR-2009 sheet 1

Table 2.3.3.1 "C" Battery Room Heating & Ventilation
Components Subject to Aging Management Review

Component Type	Intended Functions
Bird Screen	Filter
Closure bolting	Mechanical Closure
Damper housing	Pressure Boundary
Door Seal	Pressure Boundary
Ductwork	Pressure Boundary
Fan Housing	Pressure Boundary
Filter Housing	Pressure Boundary
Flexible Connection	Pressure Boundary
Flow Element	Pressure Boundary
Louvers	Pressure Boundary
Piping and fittings	Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.1 "C" Battery Room Heating & Ventilation
-Summary of Aging Management Evaluation

2.3.3.2 4160V Switchgear Room Ventilation

System Purpose

The 4160V Switchgear Room Ventilation System is a continuous operating forced air flow system designed to remove the heat produced by the operation of the switchgear, and also to remove smoke in the event of a fire.

The purpose of the 4160V Switchgear Room Ventilation System is to maintain the temperatures in the 1C and 1D switchgear vaults within the design limits of the switchgear, and to remove smoke from the switchgear vaults in the event of a fire. The 4160V Switchgear Room Ventilation System accomplishes this purpose by supplying the required air flow through the vaults necessary to keep the room temperatures within the design limits of the switchgear and to meet the smoke removal requirements of 10 CFR 50.48.

System Operation

The switchgear areas serviced by this ventilation system are located in the Turbine Building within the 1C and 1D switchgear vaults. The ventilation system for each vault is identical and is comprised of a ventilation air intake hood located on the low roof section of the vault and a direct drive power roof ventilator located on the high roof section of the vault.

Each vault roof ventilation penetration is provided with a three hour rated fire damper. The ventilator fan is two speed and equipped with a backdraft damper that automatically closes on loss of fan motive power. The controls and power source for the ventilators are located in a local ventilation control panel that is located directly outside the 4160V 1C switchgear vault. The starters for the ventilators are located within the ventilation control panel. Operation of either roof ventilator is initiated by depressing the high speed or low speed push button on the local control panel. Each ventilator is also provided with a differential pressure switch that is located at the inlet to the ventilator. The purpose of the differential pressure switch is to annunciate a loss of ventilation for the 4160V 1C and 1D vaults. The annunciator is located in the main control room.

The roof ventilators for each 4160V switchgear vault draws ventilation air from the general area containing the non-safety related 4160V switchgear trains 1A and 1B. Air is drawn into the respective vaults via the air intake hood, sweeps across the switchgear and is exhausted back to the train 1A, 1B switchgear area by the associated roof ventilator. The 4160V Switchgear 1C, 1D vaults are located in the Turbine Building and will be addressed with the Turbine Building structure for license renewal scoping. The vaults are not included within the boundary of the 4160V Switchgear Room Ventilation system.

For more detailed information, see UFSAR Section 9.4.3.2.

System Boundary

The 4160V Switchgear Room Ventilation System boundary begins at the air intake hood, encompasses the hood fire damper, moves on to include the roof ventilator fire damper, roof ventilator and backdraft damper. The boundary includes the entire penetration assembly of both the intake hood and the roof ventilator. Not included in the boundary is the 4160V 1C, 1D switchgear vault, which is included in the Turbine Building structure.

Reason for Scope Determination

The 4160V Switchgear Room Ventilation System is not in scope under 10 CFR 54.4(a)(1) because it is not a safety related system that is relied on to remain functional during and following design basis events. It is not in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The 4160V Switchgear Room Ventilation System meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for fire protection (10 CFR 50.48) and SBO (10 CFR 50.63). The 4160V Switchgear Room Ventilation System is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for ATWS (10 CFR 50.62) or environmental qualification (10 CFR 50.49).

System Intended Functions

1. Relied upon 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). The system is credited for smoke removal during a fire. 10 CFR 54.4(a)(3)
2. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Station Blackout (10 CFR 50.63). The system is credited for heat removal. 10 CFR 54.4(a)(3)

UFSAR References

9.4.3.2

License Renewal Boundary Drawings

LR-BR-2009 sheet 1

Table 2.3.3.2 4160V Switchgear Room Ventilation
Components Subject to Aging Management Review

Component Type	Intended Functions
Bird Screen	Filter
Closure bolting	Mechanical Closure
Damper housing	Pressure Boundary
Fan Housing	Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.2 4160V Switchgear Room Ventilation
-Summary of Aging Management Evaluation

2.3.3.3 480V Switchgear Room Ventilation

System Purpose

The 480V Switchgear Ventilation system is a continuously operating forced air flow system designed to remove the heat produced by the operation of the 480V switchgear, and to also remove any smoke produced by a fire. The purpose of the system is to provide adequate ventilation to maintain the equipment environment within design temperature limits. The system accomplishes this purpose by utilizing supply and exhaust fans, a recirculation flow path, and associated ducting, dampers and controls.

The system consists of two independent ventilation trains. Train "A" provides ventilation for 480V switchgear room A, and train "B" is for 480v switchgear room B. Train "A" also includes an alternate exhaust fan and associated intake and exhaust dampers.

System Operation

The 480V Switchgear Ventilation system supplies ventilation for each of the two 480 V Switchgear Rooms and uses purge and air recirculation to maintain the Switchgear Room temperature at or below 104°F, with maximum room temperature of 120°F for switchgear operabability. The ventilation system for the "A" Switchgear Room is comprised of two fans (one supply and one exhaust) connected to the "A" Emergency Diesel Generator (EDG). The ventilation system for the "B" Switchgear Room utilizes two fans (one supply and one exhaust) connected to the "B" EDG. In addition, one permanently installed backup ventilation system consisting of one exhaust fan and intake damper is provided in the "A" Switchgear Room. This backup system is connected to the "B" EDG and operates concurrently with the "B" Switchgear Room ventilation system. Filters are provided at the supply air intake.

Each switchgear supply fan draws outside air through a ventilation intake louver, pneumatic damper, and filter, and directs the air to the switchgear room. Air is exhausted from the switchgear room to atmosphere through an exhaust fan and pneumatic damper. A recirculation duct and pneumatic dampers and controls are provided for temperature control. Switchgear room A includes an alternate exhaust fan to provide air flow through alternate intake and exhaust dampers when normal ventilation is lost. No heating or cooling is provided by this system.

Supply and exhaust dampers fail open, recirculation dampers fail closed on loss of the pneumatic control air supply. Ventilation with outside air will therefore remain available upon loss of air.

For more detailed information, see UFSAR Section 9.4.5.2.6.

System Boundary

The 480V Switchgear Ventilation supply system begins at outside air louvers and continues through the supply filters to the supply fans through isolation dampers and discharges to the "A" and "B" Switchgear Rooms. The 480V Switchgear Ventilation exhaust system begins at the exhaust registers in each Switchgear room and continues through isolation dampers and exhaust fans prior to discharge to the outdoor atmosphere. Both the "A" and the "B" Switchgear Ventilation system trains include a recirculation duct between the supply fan suction and the exhaust fan discharge, to allow for operation in a recirculation mode for temperature control.

The "A" Switchgear Room ventilation also includes an alternate path through the alternate air intake damper and alternate exhaust fan. The alternate exhaust fan also discharges to the outdoor atmosphere.

Reason for Scope Determination

The 480V Switchgear Room Ventilation System is in scope under 10 CFR 54.4(a)(1) because it is relied on to remain functional during and following design basis events. It does not meet 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system would not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for fire protection (10 CFR 50.48) and Station Blackout (10 CFR 50.63). This system is not relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for Environmental Qualification (10 CFR 50.49) or ATWS (10 CFR 50.62).

System Intended Functions

1. Maintain emergency temperature limits within areas containing safety related components. The 480V Switchgear Room Ventilation System maintains area temperatures within equipment design limits. 10 CFR 54.4(a)(1)
2. Relied upon 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). 10 CFR 54.4(a)(3)
3. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Station Blackout (10 CFR 50.63). 10 CFR 54.4(a)(3)

UFSAR References

9.4.5.2.6

License Renewal Boundary Drawings

LR-BR-2010 sheet 3

Table 2.3.3.3 480V Switchgear Room Ventilation
Components Subject to Aging Management Review

Component Type	Intended Functions
Bird Screen	Filter
Closure bolting	Mechanical Closure
Damper housing	Pressure Boundary
Door Seal	Pressure Boundary
Ductwork	Pressure Boundary
Fan Housing	Pressure Boundary
Filter Housing	Pressure Boundary
Flexible Connection	Pressure Boundary
Louvers	Pressure Boundary
Piping and fittings	Pressure Boundary
Sensor Element	Pressure Boundary
Valve Body	Pressure Boundary

The aging management review results for these components are provided in Table 3.3.2.1.3 480V Switchgear Room Ventilation -Summary of Aging Management Evaluation

2.3.3.4 Battery and MG Set Room Ventilation

System Purpose

The Battery and MG Set Room Ventilation system is a continuously operating forced air flow system designed to remove the heat produced by operating equipment. The system is also designed to remove gasses produced by the A and B station batteries, and to remove any smoke produced by a fire. The purpose of the system is to provide adequate ventilation to maintain the equipment environment within design temperature limits, and to remove any hydrogen released from the batteries. The system is supplemented with an air conditioning unit to provide additional MG Set cooling when required. The system accomplishes this purpose by utilizing supply and exhaust fans, a recirculation flow path, an air conditioning unit and associated ducting, dampers and controls.

System Operation

The system is comprised of an outside air inlet louver, supply filter, one supply fan, one exhaust fan, a bypass duct, dampers and associated controls. The supply system flow splits to supply both the Battery Room and the MG Room, and the exhaust system draws air from both rooms.

As a supplement to the ventilation of the MG Sets, an air conditioner has been provided. Cooled air is directed to the area close to the cooling inlets for each motor. This system is actuated when motor temperature either approaches or exceeds a set motor temperature.

The Battery and MG Set Room Ventilation system supplies ventilation to the A/B Battery Room and the MG Room, using one supply fan and one exhaust fan. The system uses purge and air recirculation to maintain the room temperatures within design limits. Inlet vane control dampers on both fans are normally throttled. If either fan fails, the dampers open wide so that the operating fan can either supply or exhaust the air in the area. The system is manually initiated and is normally in operation.

Battery and MG Set Room Ventilation system supply fan draws outside air through a ventilation intake louver, pneumatic damper, and filter, and directs the air to the Battery Room and the MG Room. Air is exhausted from these rooms to atmosphere through an exhaust fan and pneumatic damper. A recirculation duct and pneumatic dampers and controls are provided for temperature control.

For more detailed information, see UFSAR Section 9.4.5.2.5.

System Boundary

The Battery and MG Set Room Ventilation supply begins at outside air louvers and continues through the inlet dampers and supply filter, through the supply fan, through the supply duct that splits to supply air to the Battery Room and the MG Room. The Battery and MG Set Room Ventilation exhaust begins at the exhaust registers in each room, and continues through the exhaust ducts from each room to a common duct, through the exhaust fan and isolation dampers, and discharges to the outdoor atmosphere. The Battery and MG Set Room Ventilation system includes a recirculation duct between the supply fan suction and the exhaust fan discharge, to allow for operation in a recirculation mode for temperature control.

The supplemental air conditioner does not replace the ventilation system and is not required to support the intended cooling function of the Battery and MG Set Room Ventilation system. This portion of the system is not included within the scope of license renewal.

Reason for Scope Determination

The Battery and MG Set Room Ventilation System is in scope under 10 CFR 54.4(a)(1) because it is relied on to remain functional during and following design basis events. It does not meet 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system would not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48) and station blackout (10 CFR 50.63). This system is not relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for environmental qualification (10 CFR 50.49) or ATWS (10 CFR 50.62).

System Intended Functions

1. Maintain emergency temperature limits within areas containing safety related components. This system maintains the room environment within design limits for equipment operation. 10 CFR 54.4(a)(1)
2. Relied upon 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). 10 CFR 54.4(a)(3)
3. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Station Blackout (10 CFR 50.63). 10 CFR 54.4(a)(3)

UFSAR References

9.4.5.2.5

License Renewal Boundary Drawings

LR-BR-2010 sheet 5

Table 2.3.3.4 Battery and MG Set Room Ventilation
Components Subject to Aging Management Review

Component Type	Intended Functions
Bird Screen	Filter
Closure bolting	Mechanical Closure
Damper housing	Pressure Boundary
Door Seal	Pressure Boundary
Ductwork	Pressure Boundary
Fan Housing	Pressure Boundary
Filter Housing	Pressure Boundary
Flexible Connection	Pressure Boundary
Flow Element (Pitot Tube)	Pressure Boundary
Louvers	Pressure Boundary
Piping and fittings	Pressure Boundary
Sensor Element (Temperature)	Pressure Boundary
Valve Body	Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.4 Battery and MG Set Room Ventilation
-Summary of Aging Management Evaluation

2.3.3.5 Chlorination System

System Purpose

The intended function of the Chlorination System (CL2) for license renewal is to maintain leakage boundary integrity to preclude system interactions as described in ISG-09, Guidance on the Identification of Structures, Systems, and Components that meet 10CFR54.4(a)(2), dated March 15, 2002. For this reason, this system's pressure retaining components located in proximity to other components performing safety-related functions have been included in the scope of license renewal. This system is not required to operate to support license renewal intended functions, and is in scope for potential spatial interaction.

The CL2 system operates year-round and is designed to inject sodium hypochlorite to various points in the circulating water, service water and emergency service water systems.

The purpose of the system is to eliminate or reduce biofouling while maintaining residual chlorine concentration at the discharge canal within Federal and State regulations.

The system accomplishes the purpose by treatment of systems using bay water as a heat sink in order to minimize micro and macro biofouling of heat exchangers. Biofouling, if left unchecked, will affect performance. It accomplishes this by the chlorine bonding with amines in the marine environment to form toxic chloramine compounds. It will also displace bromine and iodine, both essential marine salts. Marine life, dependent upon a stable balance of chemistry, dies.

System Operation

The Chlorination System (CL2) is comprised of two hypochlorite storage tanks, two eductors and the required piping, valves, instrumentation and controls.

The sodium hypochlorite is stored in two 6500-gallon plastic storage tanks. The system is located within the chlorination building and adjacent pad with the exception of the piping routed below grade and in the Turbine Building. Eductor's are installed in the system that deliver sodium hypochlorite to the main circulating water, service water, and emergency service water headers.

The New Radwaste Service Water (NRWSW) System uses an independent gaseous chlorine system to minimize biofouling (refer to FSAR Section 9.2.1.2). The chlorination equipment utilized for the NRWSW System is included in the NRWSW system and is not included within the boundary of the Chlorination System.

For more detailed information, see UFSAR Section 10.4.5.2.

System Boundary

The license renewal scoping boundary of the Chlorination System (CL2) encompasses that portion of the system that is located in proximity to equipment performing a safety-related function. This includes the portions of the system located within the Turbine Building, and the portions of the system located at the interface between the Service Water and Emergency Service Water systems at the intake structure. Included in this boundary are pressure-retaining components relied upon to preserve the leakage boundary intended function of this system. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Components that are not required to support the system leakage boundary intended function are not included in the scoping boundary of the CL2.

Not included in the CL2 scoping boundary are the following interfacing systems, which are separately evaluated as license renewal systems:
Service Water System
Emergency Service Water System
Circulating Water System

Reason for Scope Determination

The Chlorination System (CL2) is not in scope under 10 CFR 54.4(a)(1) because no portions of the system are safety related or relied on to remain functional during and following design basis events. The CL2 is in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The system is not in scope under 10 CFR 54.4(a)(3) because it is not relied upon 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), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The CL2 has potential for spatial interaction with safety related equipment within Turbine Building. 10 CFR 54.4(a)(2)

UFSAR References

10.4.5.2

License Renewal Boundary Drawing

LR-FP-SE-5419
LR-BR-2005 sheet 6
LR-BR-2005 sheet 4

Table 2.3.3.5 Chlorination System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Piping and fittings	Leakage Boundary
Valve Body	Leakage Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.5 Chlorination System
-Summary of Aging Management Evaluation

2.3.3.6 Circulating Water System

System Purpose

The intended function of the Circulating Water System (CWS) for license renewal is to maintain leakage boundary integrity to preclude system interactions as described in ISG-09, "Guidance on the Identification of Structures, Systems, and Components that meet 10CFR54.4(a)(2)", dated March 15, 2002. For this reason, this system's pressure retaining components located in proximity to other components performing safety-related functions have been included in the scope of license renewal. This system is not required to operate to support license renewal intended functions, and is in scope for potential spatial interaction.

The Circulating Water System (CWS) is a low pressure, high volume open cycle cooling water system that is designed to provide cooling water to the Main Condenser and is the main source of cooling water for the Turbine Building Closed Cooling Water (TBCCW) heat exchangers. If TBCCW heat exchanger cooling water is not available from the CWS, the Service Water system provides the cooling water to the TBCCW heat exchangers.

The purpose of the CWS is to remove waste heat released by the power cycle in the Main Condenser and the heat load from the Turbine Building Closed Cooling Water heat exchangers. The CWS accomplishes this purpose by supplying a continuous flow of Barnegat Bay water to the Main Condensers and TBCCW heat exchangers for cooling.

System Operation

The Circulating Water system is comprised of four vertical turbine circulating water pumps, the intake and discharge tunnels, the deicing recirculation line and associated sluice gates, valves and expansion joints, the connections to the Main Condenser and the connections to the Turbine Building Closed Cooling Water heat exchangers. The circulating pump bearings are cooled by water provided to the pumps by a local Fire Protection Water system header.

The CWS pumps are located at the intake structure in separate chambers. The pumps draw sea water from the intake canal and discharge the water into large diameter pipe lines that deliver the cooling water to the intake tunnel. Each pump discharge line is provided with an isolation valve and local pressure instrumentation. From the intake tunnel the water flows into large individual pipes that supply the cooling water to each condenser shell. Each of these cooling water supply lines is provided with an isolation valve and a Chlorination System connection. Heat is absorbed by the cooling water, increasing the water discharge temperature. The heated water is discharged through large lines to the discharge tunnel. Each discharge line is equipped with an isolation valve. The discharge tunnel delivers the water to the discharge canal and the water flows from the canal into Barnegat Bay.

Deicing recirculation is provided during cold weather operation. The deicing recirculation flow is taken from the discharge tunnel and returned to the intake pump structure. A recirculation tunnel provides the heated water which is introduced into the intake structure via sluice gates installed in the tunnel upstream of the trash racks and traveling screens. If sufficient recirculation flow is not available, an alternate portable system is temporarily installed to pump water from the discharge tunnel to the intake structure.

A small percentage of the cooling water supplied to the intake tunnel is diverted to the TBCCW heat exchangers as cooling water. The heated TBCCW heat exchanger water is returned to the discharge tunnel downstream of the condenser discharge connections.

For more detailed information, see UFSAR Section 10.4.5.

System Boundary

The license renewal scoping boundary of the Circulating Water System encompasses that portion of the system that is located in proximity to equipment performing a safety-related function. This includes the portions of the system located within the Turbine Building. Included in this boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of this system. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Components that are not required to support the system's leakage boundary intended function are not included in the scoping boundary of the Circulating Water System.

Not included in the CWS boundary is the Main Condenser tubes which are performing an LR function associated with the Main Condenser system to allow for holdup and plate out of elemental and particulate Iodine. The discharge canal is also not included within the CWS system boundary. The discharge canal is addressed as a structure, identified as Discharge Structure and Canal for license renewal scoping. Not included in the Circulating Water System boundary are the TBCCW heat exchangers and their associated water box vacuum priming system, which is evaluated in the Service Water System scoping evaluation.

The Traveling Screens and Trash Rakes are upstream of the flow path of the Circulating Water System. The Trash Rakes are addressed as part of the Intake Structure for license renewal. The Traveling Screens are part of the Screen Wash system and are therefore addressed with the Screen Wash system for license renewal.

Reason for Scope Determination

The Circulating Water system is not in scope under 10 CFR 54.4(a)(1) because no portions of the system are safety related or relied on to remain functional during and following design basis events. The Circulating Water System is in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The system is not in scope under 10 CFR 54.4(a)(3) because it is not relied upon 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) and environmental qualification (10 CFR 50.49), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. 10 CFR 54.4(a)(2)

UFSAR References

10.4.5

License Renewal Boundary Drawings

LR-BR-2005 sheet 6

Table 2.3.3.6 Circulating Water System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Expansion Joint	Leakage Boundary
Flow Glass	Leakage Boundary
Flow Indicator	Leakage Boundary
Level Glass	Leakage Boundary
Piping and fittings	Leakage Boundary
Strainer Body	Leakage Boundary
Thermowell	Leakage Boundary
Valve Body	Leakage Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.6 Circulating Water System
-Summary of Aging Management Evaluation

2.3.3.7 Containment Inerting System

System Purpose

The Containment Inerting System (CIS) is a pressurized gas system designed to maintain an inert atmosphere within the Primary Containment to preclude energy releases from a possible hydrogen-oxygen reaction following a postulated Loss-of-Coolant-Accident.

The purpose of the CIS is to provide Primary Containment purging and makeup in order to control the oxygen concentration inside the Primary Containment. To ready the Primary Containment for power operation, the CIS accomplishes the purpose of purging by introducing nitrogen to displace the oxygen from the free volume in the Primary Containment. During power operation, the CIS accomplishes the purpose of makeup by introducing nitrogen to maintain a low oxygen concentration in the Primary Containment. During power operation, when nitrogen makeup is not in service, the nitrogen atmosphere is isolated within the Primary Containment and recirculated by the Drywell Cooling System. Following a Design Basis Accident (DBA) Loss-of-Coolant-Accident (LOCA), the CIS accomplishes the purpose of purging by introducing nitrogen into the Primary Containment to control post LOCA hydrogen and oxygen concentrations to below combustible levels. CIS operation in both the purge and makeup modes is initiated manually.

All remotely operated containment isolation valves in the CIS are automatically closed by the Reactor Protection System upon indications of high drywell pressure or low-low reactor water level.

System Operation

The CIS is comprised of a nitrogen purge header, a nitrogen makeup header, drywell and torus nitrogen purge inlet manual pressure control valves, drywell and torus nitrogen makeup inlet valves, drywell nitrogen relief vent valves, and system flow, pressure, and temperature instrumentation.

The CIS receives vaporized nitrogen through two headers from the Nitrogen Supply System, the Purge Header and the Nitrogen Makeup Header. The Purge Header supplies large volumes of nitrogen to the containment during Primary Containment purging. The Purge Header branches off of the Nitrogen Supply System between the Feedwater Heater layup nitrogen supply line and the pressure reducing station. The Purge Header includes a branch connection for the Hardened Vent System and a portable nitrogen supply connection prior to splitting into separate purge lines for the drywell and the torus. Purge flow to the drywell passes through two drywell nitrogen purge inlet pressure control valves arranged in series and enters the drywell through the Reactor Building Ventilation System drywell purge line. Purge flow to the torus passes through two torus nitrogen purge inlet pressure control valves arranged in series and enters the torus through the reactor building to torus vacuum breaker line. The drywell and torus nitrogen purge inlet pressure control valves are provided with a containment isolation bypass function to allow the operation of these valves for Primary Containment purging post DBA LOCA.

The Makeup Header supplies nitrogen to the Primary Containment for periodic makeup. The Makeup Header is supplied from the Nitrogen Supply System downstream of the electric heater. The Makeup Header includes a branch connection for the nitrogen supply to the

Traversing Incore Probe System, a second branch connection for the nitrogen supply to the drywell nitrogen compressors, and a third branch connection to the Shutdown Cooling Heat Exchanger Room nitrogen addition hose connection prior to splitting into separate makeup lines for the drywell and torus. Makeup flow to the drywell passes through two drywell nitrogen makeup valves arranged in parallel and two drywell nitrogen makeup purge inlet valves arranged in series and enters the drywell through the Reactor Building Ventilation System drywell purge line. Makeup flow to the torus passes through two torus nitrogen makeup valves arranged in parallel and two torus nitrogen makeup inlet valves arranged in series and enters the torus through the reactor building to torus vacuum breaker line.

The CIS also includes the drywell nitrogen relief vent valves and their associated piping connections to the Reactor Building Ventilation System. During Drywell purging operation, when the exhaust is routed through the SGTS, the drywell nitrogen relief vent valves are used to limit the exhaust flow and pressure to the SGTS filters. These valves are also used for venting of the drywell to accommodate pressure increases during normal drywell heatup during startup. This venting is provided through the Reactor Building Ventilation System directly to the stack or through the SGTS prior to release to the stack. The drywell nitrogen relief vent valves are remotely controlled and normally closed except during purge operation.

For more detailed information, see UFSAR Section 6.2.5.

System Boundary

The CIS consists of a Purge Header and a Makeup Header. The Purge Header starts between the Nitrogen Supply System Feedwater Heater layup nitrogen supply line and the pressure reducing station and continues until it splits to provide a purge flowpath to the Drywell and Torus. Each purge flowpath includes two nitrogen purge inlet pressure control valves in series. The drywell purge line terminates at the Reactor Building Ventilation System drywell purge line. The torus purge line terminates at the torus to reactor building vacuum breaker line. Included in the boundary of the CIS Purge Header is the branch connection to the Hardened Vent System up to the normally closed locked Hardened Vent System isolation valve.

The Makeup Header starts downstream of the Nitrogen Supply System electric heater and continues until it splits to provide a makeup flowpath to the Drywell and Torus. Each makeup flowpath includes two nitrogen makeup valves in parallel and then two nitrogen makeup inlet valves in series. The drywell makeup line ties into the CIS drywell purge line downstream of the drywell purge inlet pressure control valves which then terminates at the Reactor Building Ventilation System drywell purge line. The torus makeup line ties into the CIS torus purge line downstream of the torus purge inlet pressure control valves which then terminates at the torus to reactor building vacuum breaker line. Included in the boundary of the CIS Makeup Header is a branch connection to the Shutdown Cooling Heat Exchanger Room nitrogen addition hose connection.

The CIS boundary includes the drywell nitrogen relief vent valves and their associated piping up to the connections to the Reactor Building Ventilation System drywell vent line.

All associated piping, components, and instrumentation contained within the flowpath described above are included in the CIS boundary.

Not included in the CIS license renewal scoping boundary is the Nitrogen Supply System which includes the portable nitrogen supply connection located off of the CIS nitrogen purge header, and, the nitrogen supply to the TIP indexers and the drywell nitrogen compressors located off of the CIS nitrogen makeup header. The Nitrogen Supply System is separately evaluated as its own license renewal system. Also not included in the CIS license renewal scoping boundary are the Hardened Vent System from the normally closed locked Hardened Vent System isolation valve to the Ventilation Stack, the Reactor Building Ventilation System, the Standby Gas Treatment System, the Containment Vacuum Breaker System, and the Instrument (Control) Air System which are separately evaluated as their own license renewal systems.

The CIS supports the primary containment boundary intended function. The CIS nitrogen purge, makeup, and nitrogen relief lines are equipped with air operated containment isolation valves. The limit switches associated with the air operated containment isolation valves are environmentally qualified and support the Environmental Qualification intended function.

The CIS supports the primary containment combustible gas control intended function. This portion of the system includes the Purge Header, the drywell nitrogen purge inlet pressure control valves, and the torus nitrogen purge inlet pressure control valves.

The CIS supports the Fire Protection intended function. This portion of the system is the same as that identified for the combustible gas control intended function described above but also includes the Makeup Header, drywell nitrogen makeup valves, drywell nitrogen makeup purge inlet valves, torus nitrogen makeup valves, and torus nitrogen makeup inlet valves.

Reason for Scope Determination

The Containment Inerting System meets 10 CFR 54.4(a)(1) because portions of the system are safety related and relied on to remain functional during and following design basis events. The Containment Inerting System is not in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system would not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The Containment Inerting System meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for Fire Protection (10 CFR 50.48) and Environmental Qualification (10 CFR 50.49). The Containment Inerting System is not relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for ATWS (10 CFR 50.62), or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Provide primary containment boundary. The CIS includes Primary Containment isolation valves that close to prevent the release of radioactive contamination through system lines. 10 CFR 54.4(a)(1)
2. Control combustible gas mixtures in the primary containment atmosphere. The CIS is used for post accident combustible gas control of the containment atmosphere. 10 CFR 54.4(a)(1)
3. Relied upon 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). The CIS is credited with establishing the inert drywell environment in which a design basis fire cannot occur. The CIS is not required to function during a fire or survive a fire. 10 CFR 54.4(a)(3)
4. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Environmental Qualification (10 CFR 50.49).

The limit switches associated with the primary containment isolation valves within the CIS are Environmentally Qualified. 10 CFR 54.4(a)(3)

UFSAR References

1.9.21
3.1.37
6.2.5

License Renewal Boundary Drawings

LR-SN-13432.19-1
LR-BR-2011 sheet 2
LR-GU-3E-243-21-1000

Table 2.3.3.7 Containment Inerting System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Drain Trap	Pressure Boundary
Flow Element	Pressure Boundary
Piping and fittings	Pressure Boundary
Thermowell	Pressure Boundary
Valve Body	Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.7 Containment Inerting System
-Summary of Aging Management Evaluation

2.3.3.8 Containment Vacuum Breakers

System Purpose

The Containment Vacuum Breaker (CVB) System is two systems designed to prevent torus water from backing up into the drywell during various reactor leakage and suppression condensation modes, and limits negative pressure differentials on the drywell in conjunction with the reactor building to torus vacuum relief system. The reactor building to torus vacuum relief system limits the torus negative pressure relative to reactor building pressure. These systems limit drywell negative pressures relative to the reactor building pressure and permits gas flow only inward from the reactor building to the containment vessel. These systems are the torus to drywell vacuum relief system and the reactor building to torus vacuum relief system.

The purpose of the torus to drywell vacuum relief system is to prevent the drywell pressure from dropping significantly below the pressure in the torus airspace. The reactor building to torus vacuum relief system is intended to prevent the torus air space pressure from dropping significantly below the ambient atmospheric pressure in the reactor building.

The reactor building to torus vacuum breakers accomplish their purpose by opening automatically at a predetermined differential pressure. The torus to drywell vacuum breakers accomplish their purpose by venting non-condensable gas (carryover to the torus during an accident) back to the drywell from the torus.

System Operation

The primary containment is provided with a vacuum breaker system to equalize the pressure between the drywell and the torus, and between the torus and the reactor building. The vacuum breaker system assures that the external design pressure limits of the two chambers are not exceeded. The design bases accident is the complete instantaneous circumferential break of one of the recirculation lines while the reactor is at rated power. The air-steam mixture is vented to the torus. Within the first few seconds, all the air is swept into the torus water space. Because of the high velocity steam within the vents, the air cannot diffuse back into the drywell and it is all effectively forced into the torus water space. After blowdown is complete, only steam is present in the drywell. As the steam condenses on the various surfaces and the drywell spray is activated, the drywell pressure drops. This allows the torus to drywell vacuum breakers to open admitting the gas from the torus air space into the drywell, thus equalizing the pressures.

The torus to drywell vacuum breaker system is comprised of seven vacuum breaker assemblies, each connected between the torus and a drywell vent line, and each of which contains a pair of swing check valves (14 valves total). These valves permit flow from the torus air space into the drywell to torus vent line air space, when pressure differential between the torus and drywell is sufficient to open the check valve. The check valve prevents air from flowing in the opposite direction.

The reactor building to torus vacuum relief system is comprised of a single line that splits into two parallel paths. Each path is equipped with a check valve that permits air flow from the reactor building into the torus, when pressure differential between the reactor building and torus air pressure is sufficient to open the valve. The check valve prevents air from flowing in the opposite direction. Each path is also equipped with an air-operated butterfly valve which provides positive isolation of containment. A differential pressure switch between reactor building and torus opens the air-operated valve automatically.

For more detailed information, see UFSAR Section 6.2.

System Boundary

The boundary of the CVB System starts at the seven torus penetrations for the torus to drywell vacuum relief system then proceeds through check valves and continues to the seven drywell vent line penetrations.

The reactor building to torus vacuum breaker system starts at a vent opening in the reactor building and continues through the containment isolation valves (two parallel check valves followed by two parallel butterfly valves) and return to a penetration on the torus.

All associated piping, components, and instrumentation contained within the flowpath described above are included in the CVB boundary.

Not included in the scoping boundary of the CVB System is the instrument (control) air that is included in the Instrument (Control) Air System scoping boundary. The support portion of the air piping extends from the actuator of the reactor building to torus valves to the associated isolation check valve including the piping to the air accumulator for each butterfly valve. Not included in the CVB System scoping boundary are the following interfacing systems, which are separately evaluated as license renewal systems:
Primary Containment (includes drywell, suppression chamber, vent pipes, penetrations)
Instrument (Control) Air System
Containment Spray System
Core Spray
Reactor Building Ventilation System
Containment Inerting System

Reason for Scope Determination

The Containment Vacuum Breaker System meets 10 CFR 54.4(a)(1) because portions of the system are safety related and relied on to remain functional during and following design basis events.
The Containment Vacuum Breaker System is not in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system would not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1).
The Containment Vacuum Breaker System meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for Fire Protection (10 CFR 50.48) and Environmental Qualification (10 CFR 50.49). The Containment Vacuum Breaker System is not relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for ATWS (10 CFR 50.62), or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Provide primary containment boundary. The CVB includes primary containment isolation valves (V-26-15 through V-26-18) that close to prevent the release of radioactive contamination through system lines. 10 CFR 54.4(a)(1)
2. Control combustible gas mixtures in the primary containment atmosphere. The CVB is used for post accident combustible gas control of the containment atmosphere. 10 CFR 54.4(a)(1)
3. Sense process conditions and generate signals for reactor trip or engineered safety features actuation. The Drywell pressure instrumentation is contained in the Containment Vacuum Breakers system. 10 CFR 54.4(a)(1)
4. Relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the regulations for Fire Protection (10 CFR 50.48). 10 CFR 54.4(a)(3)
5. Relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the regulations for Environmental Qualification (10 CFR 50.49). 10 CFR 54.4(a)(3)
6. Provide emergency heat removal from primary containment and provide containment pressure control. Provides path to torus for Containment Spray System heat removal. 10 CFR 54.4(a)(1)

UFSAR References

6.2

License Renewal Boundary Drawings

LR-GU-3E-243-21-1000
LR-BR-2004 Sheet 1

Table 2.3.3.8 Containment Vacuum Breakers
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Expansion Joint	Pressure Boundary
Piping and fittings	Pressure Boundary
Valve Body	Pressure Boundary
Valve Body (Vacuum Breakers)	Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.8 Containment Vacuum Breakers
-Summary of Aging Management Evaluation

2.3.3.9 Control Rod Drive System

System Purpose

The Control Rod Drive System (CRDS) is a high pressure, low flow system designed to rapidly insert all control rods into the core in response to a manual or automatic signal from the Reactor Protection System (RPS) or to incrementally position control rods in response to signals from the Reactor Manual Control System (RMCS). In addition, the CRDS is designed to supply high pressure, low flow water to the Reactor Head Cooling System. It also serves as an additional source of makeup water to the reactor vessel for level control. The CRDS is not credited in the 10CFR50 Appendix K analysis.

The primary purpose of the CRDS is to rapidly insert negative reactivity to shut down the reactor under accident or transient conditions and to manage reactivity in the reactor core by inserting or withdrawing control rods at a limited rate, one rod at a time for power level control and flux shaping during normal reactor operation. The CRDS accomplishes this by providing water at the required operating pressures to the control rod drives for cooling and for all types of control rod motion in response to inputs from the RMCS & RPS.

The secondary purpose of the CRDS is to supply the Reactor Head Cooling System (RHCS). It accomplishes this by providing water at the required pressure to the reactor vessel head spray nozzle used to cool the upper head region during plant cooldown.

System Operation

The CRDS is comprised of control rod drive mechanisms (CRDMs) and the control rod drive hydraulic system.

Each of the CRDMs is a double acting, mechanically latched, hydraulic cylinder using reactor grade water as the operating fluid. Each CRDM is capable of inserting or withdrawing the attached control rod at a slow, controlled rate as well as providing rapid insertion in an emergency. A locking mechanism allows a drive to be positioned during stroking and will hold the control rod in a fixed position. Each CRDM is an integral unit mounted vertically inside a drive housing, welded to a stub tube, which is welded into a reactor bottom head penetration (evaluated with the Reactor Vessel). The lower end of each drive housing terminates in a flange containing ports for attaching the hydraulic lines from the hydraulic control units (HCUs), and a machined face which mates with a corresponding flange at the lower end of the CRDM drive housing.

The control rod drive hydraulic system is comprised of feed pumps, filters, control valves, piping and associated instrumentation and controllers. In normal operation, one of the two Control Rod Drive (CRD) feed pumps pressurizes condensate water which is then passed through parallel drive water filters. The discharge from the filters supplies the HCUs via the charging header, the drive water header, and the cooling water header, each at a different pressure. The charging header supplies pressurized water to maintain the accumulators charged and ready for service in the event of a scram. Stored energy available from the nitrogen charged accumulators and from reactor pressure provide hydraulic power for rapid simultaneous insertion, or scram, of all control rods. The drive water header provides the CRDMs with motive force for moving the control rods to manage reactivity in the reactor core. The cooling water header provides a constant flow of water to the CRDMs to maximize the life of its internal seals. Minimum flow protection to the feed pumps is provided by a line from the discharge of each pump to the Condensate Storage Tank. A cross connect line between the feed pumps allows the pump not supplying the CRDS to supply the RHCS. A pump test bypass line discharging to the CRD return header to the vessel allows maintenance testing of the feed pumps, and can also supply makeup.

The control rod drive hydraulic system is arranged so that the equipment supporting each CRDM is packaged into modular HCUs, one HCU module to each drive. The HCUs receive signals from the RMCS or RPS and direct water to and from the CRDMs to move the control rods accordingly. Water exhausted from the CRDMs is returned through the HCUs to the exhaust water header and discharged into the CRD return header. Each CRDM has its own separate control and scram devices. Solenoid operated valves on each HCU direct air pressure from the instrument air system scram valve pilot air headers to the inlet and outlet scram valves on each HCU to maintain them in a closed position during normal operation, or to vent them to atmosphere on a scram signal or loss of power.

The HCUs are arranged into a north and south bank, each of which discharges to its own scram discharge volume (SDV). Each SDV consists of a scram discharge volume and an instrument volume with level instrumentation. The SDV receives the reactor water exhausted from all the CRDs during a scram. During normal plant operation and following a scram, the SDVs are drained to the reactor building equipment drain tank.

Excess CRDS flow not required for charging, cooling or drive is discharged directly to the reactor vessel via the CRD return header. This flow path is also utilized to add inventory to the vessel during certain Appendix R, station blackout and abnormal operational transient events.

For additional information, see UFSAR Section 3.9.4.

System Boundary

The CRD system suction side boundary starts at the suction isolation valve which connects to the condensate transfer system. The boundary continues through the CRD feed pumps, the drive water filters, to the HCUs (including the inlet and outlet scram valves) and CRDMs via the charging, drive water and cooling headers and back via the exhaust header, to the CRD nozzle safe end at the reactor vessel. The boundary includes piping downstream of the CRD feed pumps which connects to the Reactor Head Cooling System, and includes the suction piping, discharge piping, minimum flow line to the Condensate Storage Tank (CST) connection, test bypass and stabilizing header lines, HCUs, CRDMs and CRD insert & withdraw lines up to the CRD housing flange. All associated piping, components and instrumentation contained within the flow paths described above are included in the control rod drive system boundary. Also included within the system boundary are the scram discharge volume and instrument volume, their associated piping, instruments, valves, vents and drains.

Also included in the license renewal scoping boundary of the CRD System are those portions of nonsafety-related piping and equipment that extend beyond the safety-related/nonsafety-related interface up to the location of the first seismic anchor, or to a point no longer in proximity to equipment performing a safety-related function, whichever extends furthest. This includes the nonsafety-related portions of the system located within the Reactor Building. Included in this boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of this portion of the system. For more information, refer to the license renewal boundary drawing for identification of this boundary, shown in red.

Not included in the CRDS boundary are the CRD drive housings, stub tubes and CRD nozzle safe end which are included in the Reactor Pressure Vessel system.

Not included in the CRDS license renewal scoping boundary are the following interfacing systems, which are evaluated as separate license renewal systems:
Control Rods
Alternate Rod Injection (ARI) System
Instrument (Control)Air System
Reactor Head Cooling System
Reactor Building Floor and Equipment Drains
Condensate Transfer System
Reactor Manual Control System
Reactor Pressure Vessel
480V AC System
Reactor Protection System

Reason for Scope Determination

The Control Rod Drive System meets 10 CFR 54.4(a)(1) because it is a safety related system that is relied on to remain functional during and following design basis events. It meets 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and 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), and station blackout (10 CFR 50.63). The CRDS is not relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for ATWS (10 CFR 50.62).

System Intended Functions

1. Introduce negative reactivity to achieve or maintain subcritical reactor condition. 10 CFR 54.4(a)(1)
2. Provide reactor coolant pressure boundary. 10 CFR 54.4(a)(1)
3. Relied upon 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). 10 CFR 54.4(a)(3)
4. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Environmental Qualification (10 CFR 50.49). 10 CFR 54.4(a)(3)
5. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Station Blackout. (10 CFR 50.63). 10 CFR 54.4(a)(3)
6. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. 10 CFR 54.4(a)(2)

UFSAR References

3.9.4
4.5
4.6
15.8

License Renewal Boundary Drawings

LR-GE-237E487
LR-GE-197E871
LR-BR-2004 Sheet 2
LR-GE-148F712

Table 2.3.3.9 Control Rod Drive System
Components Subject to Aging Management Review

Component Type	Intended Functions
Accumulator	Pressure Boundary
Closure bolting	Mechanical Closure
Filter	Filter
Filter Housing	Pressure Boundary
Flow Element	Pressure Boundary
Gauge Snubber	Pressure Boundary
Gear Box	Pressure Boundary
Piping and fittings	Leakage Boundary
	Pressure Boundary
Pump Casing	Pressure Boundary
Restricting Orifice	Pressure Boundary
	Throttle
Rupture Disks	Pressure Boundary
Strainer	Filter
Strainer Body	Pressure Boundary
Valve Body	Leakage Boundary
	Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.9 Control Rod Drive System
-Summary of Aging Management Evaluation

2.3.3.10 Control Room HVAC

System Purpose

The Control Room HVAC System serves the Control Room Envelope which consists of the Control Room and Lower Cable Spreading Room. The Computer Room HVAC System is evaluated with the separate Miscellaneous HVAC license renewal system.

The Control Room HVAC system is a ventilation system with emergency operating modes. The system is designed to maintain a habitable environment in the Control Room and to provide ventilation for equipment in the Lower Cable Spreading Room.

The purpose of the Control Room HVAC System is to maintain a comfortable temperature and provide ventilation for personnel and equipment during normal operation. It also incorporates three incident modes of operation to provide a habitable environment for control room operators and equipment cooling after radiological releases associated with design basis accidents, during or after toxic chemical releases and for fires inside the control room. The Control Room HVAC System accomplishes its purpose by providing conditioned air with or without recirculation. The normally operating ventilation system is manually initiated into different incident modes by operator action from a panel in the control room.

Long term cooling is ensured by supplemental ventilation equipment augmenting a Control Room HVAC train when air conditioning is not available.

Plant ventilation systems including the Control Room HVAC are used to control the radioactivity levels in the Control Room areas so as to ensure overall compliance with 10CFR50, Appendix A, GDC 19 "Control Room".

System Operation

The system is comprised of two independent ventilation trains sharing common ductwork. Train A consists of one supply fan and includes steam coils heated by the Heating & Process Steam System, a refrigeration unit with a Turbine Building Closed Cooling Water (TBCCW) cooled condenser and air operated dampers. Train B consists of one supply fan with an electric heating coil for heating and a refrigeration unit with air-cooled condenser. Dampers are motor operated. Temporary ventilation equipment consisting of portable fans, flexible duct and power extension cords are stored adjacent to the Control Room. Additionally, a fan provides exhaust from a kitchenette and toilet rooms. Supply is from the normally operating control room HVAC trains.

Each train draws outside air that is then filtered, conditioned and supplied through a common duct to the Control Room Envelope (Control and Cable Spreading Rooms). A common exhaust duct delivers air back to the HVAC units where it can be discharged to the atmosphere or recirculated. The system has the ability to recirculate air from 0 to 100 percent of rated flow.

Only one system train is operated at any time. Train B is the lead unit to provide the temperature control and air distribution for the control room. Train A serves as a lag or backup to the train B and provides the source of cooling for the control room in the event train B is lost. During normal operation, outside air is mixed with return air, heated or cooled as required, to maintain temperature and ventilation in the control room. When the turbine generator unit is in service, the system operates in the cooling mode. During winter, and if the turbine generator is not in service the system is utilized in the heating mode to maintain inside temperature conditions.

The normally operating system is initiated into incident modes manually. In addition to normal operation, three incident modes of partial recirculation, full recirculation and purge are available. In the event of a design basis accident, manual selection of the partial recirculation mode maintains the Control Room Envelope at a positive pressure with minimal infiltration. During toxic gas releases, the full recirculation mode provides minimal intrusion of toxic gases by using no outside air. In the event of smoke in the Control Room Envelope, purge mode selection supplies all outdoor air to avoid recirculation and clear smoke and fumes. Train B is a fully electric powered unit. Train A air conditioning condenser is normally cooled with TBCCW and heated by the Heating and Process Steam System. Dampers of Train A fail closed upon loss of air. The air dampers can still be manually operated, as required. A single train of refrigeration or a fan in either train with additional cooling provided by temporary equipment will maintain control room temperature.

For more detailed information see UFSAR Section(s) 6.4.1 and 9.4.1.

System Boundary

The Control Room HVAC System boundary begins at the inlet louver of each train and passes through an inlet damper, an air filter, cooling and heating coils, a supply fan and an isolation damper. Air is then ducted and joined by the redundant train and supplied to the Control Room Envelope which includes the Control Room Panel Area, the shift supervisors office, the Lower Cable Spreading Room and the kitchen and toilet area of the control room. Included within the boundary are the fire dampers at the penetrations into the Control Room Envelope. A common return duct which begins at the Lower Cable Spreading Room draws exhaust air from the Control Room Area through an isolation damper and ends at the exhaust air louver and recirculation air plenum of each air handling unit.

A separate fan exhausts air from the control room kitchen and toilet rooms. The boundary begins at the exhaust register of each room and continues through the exhaust duct, exhaust fan and backdraft damper prior to ending at the discharge to the atmosphere. In addition, there is control room temporary ventilation equipment consisting of portable fans, flexible duct and power extension cords.

All associated ductwork, components and instrumentation contained within the flow paths and systems described above are included in the Control Room HVAC System boundary. Not included in the scoping boundary of the Control Room HVAC System is the HVAC Train A heating coil and piping which is evaluated with the Heating and Process Steam System for license renewal scoping. Also not included is the Train A condensing coil which is evaluated with the Turbine Building Closed Cooling Water System for license renewal scoping.

The refrigeration equipment of Train A is not credited to support the cooling intended function which is supplemented by temporary ventilation. The kitchen and toilet room exhaust fan and inlet louver are not required to support intended functions as the fans backdraft damper maintains Control Room Envelope. These portions of the Control Room HVAC System are not included within the scope for license renewal.

The ventilation equipment of both HVAC trains along with the refrigeration unit of Train B and temporary ventilation perform the intended functions and are included in the scope of license renewal.

Reason for Scope Determination

The Control Room HVAC System is in scope under 10 CFR 54.4(a)(1) because it is relied on to remain functional during and following design basis events. It does not meet 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system would not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for fire protection (10 CFR 50.48) and SBO (10 CFR 50.63). The Control Room HVAC System is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for environmental qualification (10 CFR 50.49) or ATWS (10 CFR 50.62).

System Intended Functions

1. Provide centralized area for control and monitoring of nuclear safety related equipment. The Control Room HVAC system provides habitability of the control room. 10 CFR 54.4(a)(1)
2. Maintain emergency temperature limits within areas containing safety related components. Single train of refrigeration or a Train A or B fan with additional cooling provided by temporary equipment will maintain Control Room temperature. 10 CFR 54.4(a)(1)
3. Relied upon 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). Purges smoke from control room. 10 CFR 54.4(a)(3)
4. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Station Blackout (10 CFR 50.63). The Control Room HVAC system provides habitability of the control room. 10 CFR 54.4(a)(3)

UFSAR References

9.4.1
6.4.1
12.3.3

License Renewal Boundary Drawings

LR-BR-2010 sheet 4

Table 2.3.3.10 Control Room HVAC
Components Subject to Aging Management Review

Component Type	Intended Functions
Bird Screen	Filter
Closure bolting	Mechanical Closure
Damper housing	Pressure Boundary
Door Seal	Pressure Boundary
Ductwork	Pressure Boundary
Fan Housing	Pressure Boundary
Filter Housing	Pressure Boundary
Flexible Connection	Pressure Boundary
Heat Exchangers (Condensing Coil)	Heat Transfer
	Pressure Boundary
Heat Exchangers (Evaporator Coil)	Heat Transfer
	Pressure Boundary
Heater Housing	Pressure Boundary
Louvers	Pressure Boundary
Piping and fittings	Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.10 Control Room HVAC
-Summary of Aging Management Evaluation

2.3.3.11 Cranes and Hoists

System Purpose

The Cranes and Hoists system is comprised of load handling overhead bridge cranes, monorails, jib cranes, and hoists provided throughout the facility to support operation and maintenance activities. The system includes cranes and hoists required to comply with the requirements of NUREG-0612, Control of Heavy Loads, and hoists for handling light load. Major cranes include the reactor building crane, and the turbine building crane.

The reactor building crane services the operating floor and is used to lift all heavy loads required to travel over the spent fuel pool. The crane is also used to handle new fuel and transport the spent fuel cask. The crane has been upgraded to a single failure proof criteria in accordance with NUREG-0612 and NUREG-0554. The turbine building crane is used to handle heavy loads in the Turbine Building, primarily to support turbine repairs or maintenance. Cranes and hoists are classified non-safety related, designed to Seismic Class II criteria.

The purpose of Cranes and Hoist is to safely move material and equipment as required to support operations and maintenance activities.

Included in the evaluation boundary of Cranes and Hoists system are load handling systems in various areas of the facility. Cranes and hoists in scope of NUREG-0612 are in scope of license renewal. Other cranes and hoists that are not in scope of NUREG-0612 but travel in the vicinity of safety related systems, structures, and components (SSCs) are also in scope of license renewal; if it is determined that their failure will impact a safety related function. As a result the reactor building (RB) crane, the turbine building crane, turbine building heater bay crane, recirculation pumps monorail, spent fuel pool jib cranes, containment vacuum breakers jib cranes/hoists, equipment handling monorail (RB El. 95'), and the torus bay monorail are in scope of license renewal. The boundary for Cranes and Hoists is limited to load bearing structural components such as, the bridge, the trolley, rails and rail fasteners, monorail beams, and jib crane structural members.

Cranes and Hoists that are determined not to be in scope of license renewal include New Radwaste Building overhead crane, Maintenance Building overhead crane, Low Level Radwaste Storage Facility cranes, machine shop overhead crane, storage building crane, Reactor Building railroad airlock hoist, control rod drive rebuild area jib cranes and hoist, drywell airlock monorails, Chlorination Facility hoist, and Ventilation Stack hoist. Failure of these cranes and hoists will not impact a safety related function.

Not included in the evaluation boundary of Cranes and Hoists is the reactor refueling platform, overhead crane structural support steel and crane runway girders. The refueling platform is separately evaluated with Fuel Storage and Handling license renewal system. The structural support steel and runway girders are included with the license renewal structure serviced by the crane.

For more detailed information, refer to UFSAR Section 9.1.4.2.3

System Operation

Not Required

System Boundary

Not Required

Reason for Scope Determination

Cranes and Hoists meet the scoping requirements of 10 CFR 54.4(a)(1) because the reactor building crane a safety-related structure which is relied upon to remain functional during and following design basis events.

Cranes and Hoists meet 10 CFR 54.4(a)(2) because failure of the non-safety related structure could prevent satisfactory accomplishment of functions(s) identified for 10 CFR 54.4(a)(1).

Cranes and Hoists are also not relied upon 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), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Provide physical support for safety related systems, structures, and components (SSCs). The reactor building crane is used to transport the spent fuel cask over irradiated fuel. 10 CFR 54.4(a)(1)
2. Provide a safe means for handling safety related components and loads above or near safety related components. 10 CFR 54.4(a)(2)

UFSAR References

9.1.4.2.3

License Renewal Boundary Drawings

Not Required

Table 2.3.3.11 Cranes and Hoists
Components Subject to Aging Management Review

Component Type	Intended Functions
Crane (Bridge; Trolley)	Structural Support
Crane (Bridge; Trolley; Girders)	Structural Support
Jib Cranes (Columns; Beams; Anchorage)	Structural Support
Monorails, and Hoists (Beams; Plates)	Structural Support
Rail System (Rail, Plates, Clips)	Structural Support
Structural Bolts	Structural Support

The aging management review results for these components are provided in
Table 3.3.2.1.11 Cranes and Hoists
-Summary of Aging Management Evaluation

2.3.3.12 Drywell Floor and Equipment Drains

System Purpose

Drywell Floor and Equipment Drains (DFED) are comprised of both gravity and pumped fluid lines designed for the collection of drainage from floor drains and equipment drains located in the drywell structure, and subsequent transfer of the drainage to the Radwaste System. They also include that portion of the reactor coolant pressure boundary leak detection function comprised of the instrumentation monitoring the drywell floor drain sump fill time and pump flow rates from the Drywell Floor Drain Sump and Drywell Equipment Drain Tank.

The purpose of the DFED is to provide for collection of floor drains and equipment drains located inside the drywell structure, and to transfer the collected drainage to the Radwaste System for processing. The DFED accomplish this purpose by collecting floor drainage and condensed steam from the drywell air coolers in the Drywell Floor Drain Sump, and equipment drainage in the Drywell Equipment Drain Tank, and using submersible pumps from the sump and duplex pumps from the drain tank to transfer the collected drainage to Radwaste System collection tanks for processing.

System Operation

The DFED are comprised of drain lines that begin at various floor drains and equipment drain funnels located throughout the drywell. Floor drain lines and condensate drains from the Drywell air coolers are routed to the Drywell Floor Drain Sump. The sump fill time is monitored by the unidentified drywell leak rate recorder, which alarms if sump fill rate exceeds a predetermined value. Two submersible pumps transfer the sump contents to either the Floor Drain Collector Tank or the Chemical Waste Floor Drain Collector Tank, both of which are part of the Radwaste System. Floor drain sump pumpout is monitored by a timer which measures time between successive pump operations and alarms on abnormal operation. The flowrate of pumped discharge from the sump is monitored as part of the leak detection function. The equipment drain lines are routed to the Drywell Equipment Drain Tank. Duplex pumps route the drainage through the Drywell Equipment Drain Tank Heat Exchanger as necessary and transfer the leakage to either of the high purity waste collection tanks in the Radwaste System. The flowrate of pumped discharge from the equipment drain tank is monitored as part of the leakage monitoring system. The portions of the pumped discharge lines from both the Drywell Floor Drain Sump and from the Drywell Equipment Drain Tank that penetrate the drywell are primary containment boundaries and include dual containment isolation valves. The Reactor Protection System closes these valves on high drywell pressure or low-low reactor level. The submersible and duplex pumps from the floor drain sump and the equipment drain tank are level switch controlled and actuate automatically. The pumps are interlocked to shut down on closure of the isolation valves.

Both identified and unidentified leakage is collected by the DFED system. The Drywell Floor Drain Sump receives both liquid drainage from the floor drains and steam leakage which is condensed by the drywell air coolers, consequently it is the primary sump used to measure both steam and liquid reactor coolant leaks. Until confirmation of leakage sources is made, all leakage into the Drywell Floor Drain Sump is considered unidentified leakage. Increase in flow to the Drywell Equipment Drain Tank is due to increased seal and gland leakages only, which by definition is identified leakage. Reactor Recirculation Pump seal failure is detected in this manner. The only sources of leakage inside the drywell are from either the primary system, or the Reactor Building Closed Cooling Water System.

For more detailed information, see UFSAR sections 5.2.5, 9.3.3, and 11.2.2.

System Boundary

The boundary of the DFED begins with the individual floor drains, drywell air coolers condensate drains, and equipment drains located in the drywell, and continues through gravity lines to the drywell floor drain sump and drywell equipment drain tank. At both the floor drain sump and the equipment drain tank, pumps discharge the drainage through pressure piping, with the system boundary ending at the attachment points on the various Radwaste System collection tanks. Included in this boundary are the containment isolation valves, and other various valves and fittings required for maintaining the system leakage boundary, along with the instrumentation described above as comprising part of the reactor coolant pressure boundary leak detection function.

Also included in the license renewal scoping boundary of the DFED are those portions of nonsafety-related piping and equipment that extend beyond the safety-related/nonsafety-related interface up to the location of the first seismic anchor, or to a point no longer in proximity to equipment performing a safety-related function, whichever extends furthest. This includes the nonsafety-related portions of the system located within the Reactor Building, Primary Containment, and Exhaust Tunnel. Included in this boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of this portion of the system. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Not included in the scope of license renewal are portions of the DFED that are encased in concrete, as leakage in this environment does not have the potential for spatial interaction. Not included are the Drywell Equipment Drain Tank level switches and Drywell Floor Drain Sump level switches, as these are not considered leakage boundary components.

Not included in the DFED boundary are the following systems, which are separately evaluated as license renewal systems:
Radwaste System
Reactor Protection System
Reactor Building Closed Cooling Water System
Drywell Cooling System

Reason for Scope Determination

The Drywell Floor and Equipment Drains meet 10 CFR 54.4(a)(1) because portions of the system are safety related and are relied on to remain functional during and following design basis events. They meet 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). They also meet 10 CFR 54.4(a)(3) because they are relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for environmental qualification (10 CFR 50.49). The Drywell Floor and Equipment Drains are not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for fire protection (10 CFR 50.48), ATWS (10 CFR 50.62), or station blackout (10 CFR 50.63).

System Intended Functions

1. Provide primary containment boundary. 10 CFR 54.4(a)(1)
2. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The Drywell Floor and Equipment Drains system has potential for spatial interaction with safety-related equipment within the drywell, reactor building, and exhaust tunnel. 10 CFR 54.4(a)(2)
3. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Environmental Qualification (10 CFR 50.49) The limit switches associated with the DFED containment isolation valves are environmentally qualified. 10 CFR 54.4(a)(3)

UFSAR References

5.2.5
9.3.3
11.2

License Renewal Boundary Drawings

LR-JC-147434 sheet 2
LR-JC-147434 sheet 3
LR-GE-237E798 sheet 1
LR-BR-2002 Sheet 1
LR-GE-107C5339
LR-GE-148F444
LR-GE-237E756

Table 2.3.3.12 Drywell Floor and Equipment Drains
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Flow Element	Leakage Boundary
Flow Glass	Leakage Boundary
Heat Exchanger (DWEDT)	Leakage Boundary
	Structural Support
Piping and fittings	Leakage Boundary
	Pressure Boundary
Pump Casing (DWEDT pumps)	Leakage Boundary
Tanks (DWEDT)	Leakage Boundary
Valve Body	Leakage Boundary
	Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.12 Drywell Floor and Equipment Drains
-Summary of Aging Management Evaluation

2.3.3.13 Emergency Diesel Generator and Auxiliary System

System Purpose

The Emergency Diesel Generator (EDG) and Auxiliary System is a pair of stand alone, diesel engine driven electrical power plants, designed to provide a source of onsite power to the plant AC electrical systems in the event of a design basis accident or loss of offsite power.

The purpose of the EDG and Auxiliary System is to independently provide sufficient power to energize all equipment required for safely shutting down the reactor. It accomplishes this using two diesel generator units located in separate rooms of a stand alone, reinforced concrete structure. Each diesel engine powers a generator at a voltage compatible to the plant electrical distribution systems with sufficient output capacity to meet plant shutdown loads. Each diesel generator is equipped with its own starting system, cooling system, lubrication system, combustion air and equipment cooling system, a fuel oil storage and transfer system and all the auxiliaries that allow it to perform its function.

System Operation

The Emergency Diesel Generator (EDG) and Auxiliary System is comprised of two diesel driven generators and associated auxiliary equipment. Each unit with its auxiliaries is located in separate rooms within the Diesel Generator Building. A tank vault contains the common fuel oil tank. Included in the diesel assembly are directly attached piping, valves, starters, fans, filters, turbochargers, radiators, speed governor, instrumentation and other equipment. The diesels are automatically started by a reactor low-low level, a high drywell pressure signal, by an undervoltage condition in the 4160V AC System or by a low diesel generator lube oil temperature. The diesels can be remote manually started from the Control Room or at the local EDG switchgear panels.

The EDG starting system for each diesel consists of electric starting motors powered by 56-cell batteries. Battery chargers keep the battery cells charged. The battery compartments are fan ventilated.

The EDG cooling water system for each diesel consists of engine driven cylinder bank pumps that supply cooling to the engine. Heated water from the discharge manifold flows through two forced air cooled radiators through a lube oil cooler and back again to the pumps. During shutdown, an immersion heater maintains coolant temperature. Water circulates by siphon action through the lube oil cooler, which then functions as a lube oil warmer. The system includes a temperature control manifold, water tank, piping and instrumentation.

The EDG lubrication system for each diesel provides automatic lubrication and warming of the diesel and its subcomponents. It consists of three shaft driven and three auxiliary motor driven pumps, piping, valves, filters, strainers and instrumentation. When the engine is operating, three lube oil pumps circulate oil for lubrication and cooling of engine components and the turbocharger. The lubrication system operates continuously to maintain the diesels in a standby condition. Lube oil warmed by the cooling system is circulated through the engine and turbocharger. The engine speed governor contains a separate oil piping circuit for the governor hydraulics.

The EDG combustion air intake cooling system for each diesel supplies filtered air for engine combustion and also for generator, engine and electrical component cooling. Combustion exhaust powers the turbocharger and passes through a silencer before discharge through an engine exhaust stack. The ventilation exhaust of each generator housing circulates over the engine prior to discharge from the diesel compartment. They consist of fans, filters and plenums.

The EDG fuel oil storage and transfer system consists of a common diesel generator fuel oil tank and two fuel transfer pumps, a fuel pump and a single day tank per diesel. It also includes filters, piping, valves and instrumentation. Automatic transfer from the diesel generator fuel oil tank by the transfer pumps maintains day tank level. An engine mounted fuel pump then draws fuel from the day tank and delivers it to the engine. Makeup to the diesel generator fuel oil tank is from the plant fuel oil storage tank (evaluated with the Main Fuel Oil Storage and Transfer System). An alternate connection allows fuel oil to be supplied directly from the plant fuel oil storage tank to each day tank. A tanker truck connection located outside the EDG building also utilizes the alternate fuel oil path to the day tanks. A fuel oil waste tank located outside the structure receives waste oil and water from the EDG fuel oil tank vault sump pump.

For additional detail, see UFSAR sections 8.3 and 9.5.4 through 9.5.9.

System Boundary

The EDG and Auxiliary system boundary includes directly attached piping, valves, manifolds, starters, turbochargers, internal coolers, instrumentation, and other equipment. Included in the EDG license renewal scoping boundary for evaluation is the EDG starting system. The EDG starting system consists of batteries, starter motors, cable, battery chargers and the relays to start the diesels. These items are considered electrical commodities. The EDG cooling water system boundary begins at the EDG cooling water discharge manifold and continues through forced air-cooled radiators, oil coolers and individual engine bank water pumps where it is returned to the EDGs. Included is the water tank, temperature control valve, immersion heater and drain valves for each EDG. The EDG lubrication system boundary for each EDG begins with the engine sump, continues through strainers, pumps, filters, and valves for the main lube, piston cooling, oil cooler and turbocharger pumping circuits. Also included is the oil pumping circuit for the engine speed governor hydraulics. The EDG combustion air intake and exhaust system boundary begins with the air intake hood, continues through the inertial dust bin air filter and enters the engine compartment. Combustion air is drawn through an oil bath air filter and into the turbocharger compressor. Combustion gases pass through the turbocharger and are discharged through a silencer and out the engine exhaust stack through the roof. Also included are two shaft driven fans for equipment and radiator cooling and the battery compartment ventilation fans. The EDG fuel oil storage and transfer system begins at the diesel generator fuel oil tank. A tank discharge line then splits and continues through each diesel's dual fuel transfer pumps and to the day tank of each diesel. A supply line from each day tank then ends at its connection to the engine mounted fuel pump. Included is the connections from the plant fuel oil storage tank to the diesel generator fuel oil tank discharge lines and fill line. All associated piping, components and instrumentation contained within the flow paths and systems described above are included in the emergency diesel generator system boundary. Not included in the scoping boundary of the Emergency Diesel Generator and Auxiliary System is the piping of the plant fuel oil storage tank which is evaluated with the Main Fuel Oil Storage and Transfer System for license renewal scoping.

Also included in the license renewal scoping boundary of the Emergency Diesel Generator and

Auxiliary System are those portions of nonsafety-related piping and equipment that extend beyond the safety-related/nonsafety-related interface up to the location of the first seismic anchor, or to a point no longer in proximity to equipment performing a safety-related function, whichever extends furthest. This includes the nonsafety-related portions of the system located within the Emergency Diesel Generator Building. Included in this boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of this portion of the system. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Reason for Scope Determination

The Emergency Diesel Generator and Auxiliary System is in scope under 10 CFR 54.4(a)(1) because it is relied on to remain functional during and following design basis events. It meets 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for fire protection (10 CFR 50.48) and SBO (10 CFR 50.63). The Emergency Diesel Generator and Auxiliary System is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for environmental qualification (10 CFR 50.49) or ATWS (10 CFR 50.62).

System Intended Functions

1. Provide motive power to safety related components. Each diesel generator can independently provide sufficient power to energize all equipment required for safely shutting down the reactor. 10 CFR 54.4(a)(1)
2. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The EDG System has the potential for spatial interaction with safety related equipment within the Emergency Diesel Generator Building. 10 CFR 54.4(a)(2)
3. Relied upon 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). The diesels provide an alternate power supply to offsite power. 10 CFR 54.4(a)(3)
4. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Station Blackout (10 CFR 50.63). Credited as the source of onsite power during SBO recovery. 10 CFR 54.4(a)(3)

UFSAR References

8.3.1.1.5
9.5.4
9.5.5
9.5.6
9.5.7
9.5.8
9.5.9

License Renewal Boundary Drawings

LR-BR-3000
LR-GU-3E-861-21-1000
LR-GU-3E-861-21-1001
LR-GU-3E-861-21-1002
LR-GU-3E-862-21-1000

Table 2.3.3.13 Emergency Diesel Generator and Auxiliary System Components Subject to Aging Management Review

Component Type	Intended Functions
Bird Screen	Filter
Closure bolting	Mechanical Closure
Ductwork	Pressure Boundary
Exhaust Stack	Pressure Boundary
Fan Housing (Dust Bin Blower Fan)	Pressure Boundary
Fan Housing (Radiator Fan)	Pressure Boundary
Filter (Inertial Air Bin)	Filter
Filter (Oil Bath)	Filter
Filter Housing (Air Cooling)	Pressure Boundary
Filter Housing (Fuel Oil)	Pressure Boundary
Filter Housing (Lube Oil)	Pressure Boundary
Flame Arrestor (Fuel Oil Tank)	Filter
	Fire Barrier
Flexible Hose	Pressure Boundary
Heat Exchanger (Lube Oil Cooler)	Heat Transfer
	Pressure Boundary
Heat Exchangers (Radiator)	Heat Transfer
	Pressure Boundary
Louvers	Direct Flow
Muffler	Pressure Boundary
Piping and fittings	Leakage Boundary
	Pressure Boundary
Pump Casing (Fuel Oil)	Pressure Boundary
Pump Casing (Lube Oil)	Pressure Boundary
Restricting Orifice	Pressure Boundary
	Throttle
Sensor Element (Lube Oil)	Pressure Boundary
Sensor Element (Temperature Control Manifold)	Pressure Boundary
Sight Glasses	Pressure Boundary
Strainer	Filter
Strainer Body	Pressure Boundary
Tanks (Fuel Day Tank)	Pressure Boundary
Tanks (Fuel Oil Tank)	Pressure Boundary
Tanks (Immersion Heater)	Pressure Boundary
Tanks (Water Tank)	Pressure Boundary
Temperature Control Manifold (Water Cooling)	Pressure Boundary
Thermowell	Pressure Boundary
Valve Body	Leakage Boundary
	Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.13 Emergency Diesel Generator and Auxiliary System
-Summary of Aging Management Evaluation

2.3.3.14 Emergency Service Water System

System Purpose

The Emergency Service Water (ESW) is a standby system designed to supply cooling water from the Ultimate Heat Sink (UHS) to the tube side of the containment spray heat exchangers. The ESW system, along with the Containment Spray System, comprise the Containment Heat Removal Systems.

The purpose of this system is to aid the Containment Spray System in removing fission product decay heat from the primary containment following a design basis LOCA. This system is also used during normal operation to cool the torus when necessary. It accomplishes this by supplying cooling water, from the UHS (Intake Canal), to the Containment Spray heat exchangers and transferring the heat energy to the environment via the discharge canal.

System Operation

ESW is comprised of two independent loops, each with two pumps that supply cooling water to one containment spray loop, which contains two heat exchangers. The four ESW pumps and piping supply cooling water from the Intake Canal (UHS) to the containment heat exchangers, its only load, and discharges the heated water to the Discharge Canal. The ESW pumps are controlled manually from switches located in the Control Room. All of the valves in the ESW system are either manually operated or check valves. There are no MOVs in the system. The ESW pumps can be manually operated at any time except when diesel-generator load sequencing is in progress. A backup interlock is provided to prevent pump start if diesel-generator load sequencing is in progress.

During normal plant operations, when ESW is in standby, the Service Water System (SWS) supplies a constant flow of water through the containment spray heat exchangers to maintain them full of chlorinated water. Sodium hypochlorite is injected into the ESW system via the SWS Keep Fill Line. Additionally, ESW can be cross-connected with the SWS, which allows ESW to provide an alternate cooling path during plant shutdown and during SWS maintenance.

A single restrictive orifice downstream of ESW Overboard Discharge isolation valves is designed to prevent containment heat exchangers tube leakage of radioactive contamination from containment to the environment by maintaining adequate backpressure to keep ESW (tube side) pressure higher that the Containment Spray (shell side) pressure.

For more detailed information, see UFSAR Section 6.2.2.

System Boundary

The system boundary of ESW starts with each pump and continues through to the connection between the ESW and the Overboard Discharge lines. Included in this boundary is the tube side of the Containment Spray Heat Exchangers, all safety related vent/drain lines and valves, safety related instrumentation and the Service Water System supply line up to and including the SWS to containment spray heat exchanger valves.

Also included in the license renewal scoping boundary of the ESW System are those portions of nonsafety-related piping and equipment that extend beyond the safety-related/nonsafety-related interface up to the location of the first seismic anchor, or to a point no longer in proximity to equipment performing a safety-related function, whichever extends furthest. This includes the nonsafety-related portions of the system located within the Reactor Building. Included in this boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of this portion of the system. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Not included in the ESW license renewal scoping boundary is the shell side of the Containment Spray Heat Exchangers, which will be scoped separately as part of the Containment Spray System.

Not included in the ESW license renewal scoping boundary is the SWS piping upstream of the SWS to the containment spray heat exchanger valves, including the Chlorination System interface, which will be scoped separately as part of the Service Water System.

Not included in the ESW license renewal scoping boundary is the 30" Overboard Discharge line and the Roof Drains line off of ESW Loop I, downstream of restrictive orifice RO-21A, which will be scoped separately as part of the Roof Drain & Overboard Discharge System.

Reason for Scope Determination

The Emergency Service Water system meets 10 CFR 54.4(a)(1) because it is a safety related system that is relied on to remain functional during and following design basis events. It meets 10 CFR 54.4(a)(2) because failure of nonsafety-related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48) and environmental qualification (10 CFR 50.49).
The Emergency Service Water System is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for ATWS (10 CFR 50.62), or station blackout (10 CFR 50.63).

System Intended Functions

1. Provide heat removal from safety related heat exchangers. Provides a water supply to remove heat from the Containment Spray System and reject it to the Ultimate Heat Sink via the Discharge Canal. 10 CFR 54.4(a)(1).
2. Provide secondary containment boundary. Ensures ESW is at a higher pressure than the Containment Spray System to prevent leakage form the Containment to the Ultimate Heat Sink. 10 CFR 54.4(a)(1)
3. Provide emergency heat removal from primary containment and provide containment pressure control. Provides a water supply to remove the heat from the Containment Spray System and reject it to the Ultimate Heat Sink via the Discharge Canal. 10 CFR 54.4(a)(1).
4. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. 10 CFR 54.4(a)(2)
5. Relied upon 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). 10 CFR 54.4(a)(3)
6. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Environmental Qualification (10 CFR 50.49). 10 CFR 54.4(a)(3)

UFSAR References

6.2.2
7.3.1
9.2.1

License Renewal Boundary Drawings

LR-BR-2005 sheet 2
LR-BR-2005 sheet 4

Table 2.3.3.14 Emergency Service Water System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Expansion Joint	Pressure Boundary
Flow Element	Pressure Boundary
Heat Exchangers (Containment Spray)	Heat Transfer
	Pressure Boundary
Piping and fittings	Leakage Boundary
	Pressure Boundary
Pump Casing (ESW Pumps)	Pressure Boundary
Pump Casing (HTXR Drain Pumps)	Leakage Boundary
Restricting Orifice	Pressure Boundary
	Throttle
Sight Glasses	Pressure Boundary
Thermowell	Pressure Boundary
Valve Body	Leakage Boundary
	Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.14 Emergency Service Water System
-Summary of Aging Management Evaluation

2.3.3.15 Fire Protection System

System Purpose

The Fire Protection System is a normally operating mechanical system, designed to provide for the rapid detection and suppression of a fire at the plant. Some portions of the Fire Protection System are not required to perform intended functions and are not in scope.

The Fire Protection System consists of the fire protection water system, carbon dioxide gas systems, Halon systems, portable foam equipment, portable fire extinguishers, and fire detection and signaling systems. These systems work in conjunction with physical plant design features to provide overall fire protection for Oyster Creek. The physical plant design features consist of fire barrier walls and slabs, fire barrier penetration seals, fire doors, fire rated enclosures (including steel fire wrap), and dikes credited for containing oil spills.

The purpose of the Fire Protection System is to promptly detect, contain, and extinguish fires if they occur, maintain the capability to safely shutdown the plant if fires occur, and prevent the release of a significant amount of radiation in the event of a fire. The Fire Protection System accomplishes this by providing fire protection in the form of detection, alarms, fire barriers, and suppression for selected areas of the plant.

System Operation

The fire protection water system is supplied by two diesel driven fire pumps, each taking suction from a pond formed by a small dam on the Oyster Creek. The two fire pumps are housed in a common fresh water pumphouse adjacent to the pond. Each fire pump diesel engine has its own fuel supply located adjacent to the pumphouse. Two electric motor driven pond pumps normally provide pressure to the fire protection system, with the diesel fire pumps maintained in standby operation.

Fire water system pressure is normally maintained by the two electric pond pumps. The diesel driven fire pumps are arranged to start automatically if the pressure drops due to a large water demand. The pumps can be manually started from the Control Room or at the pump house.

To satisfy redundancy requirements, a Fire Protection Water Tank with an electric motor driven fire pump is also provided as a backup supply. This backup fire pump is located in the redundant fire protection pumphouse. The redundant motor driven electric fire pump and its associated tank constitute an emergency supply when the primary water supply is not available. The redundant fire pump can only be started manually, either at the redundant fire protection pumphouse or from the Control Room. This water source is normally isolated from the yard loop.

The supply lines from both the normal and redundant fire water sources connect with an underground loop which encircles the plant and provides fire protection water to yard fire hydrants, fixed pipe water suppression systems and fire hose stations. Sectionalizing valves of the post indicator type are provided on the loop to allow isolation of the various sections for maintenance. The piping system is arranged to prevent loss of both primary and backup fire suppression capability from a single failure.

Suppression systems include automatic wet pipe sprinkler and deluge systems, manually actuated preaction sprinkler systems, and an automatic preaction sprinkler system. Hose stations have been provided within plant buildings, and are located so that all areas containing or exposing safety related systems can be reached with a fire hose not over 100 feet in length.

In addition to supplying water for fire protection, the fire protection water system normally provides seal water to the dilution pumps, the circulating water pumps and the new radwaste service water pumps. The system also provides a source of backup water to the Core Spray System, to the Condensate Storage Tank and to the Isolation Condensers, and backup cooling to the main plant air compressors.

A total flooding carbon dioxide system protects the safety related 4160 volt switchgear area and is manually actuated. The turbine generator exciter and turbine bearings are protected by high-pressure carbon dioxide systems, and are automatically actuated by thermal heat detectors.

The Halon systems protect the 480 Volt Switchgear Rooms A and B, the Electric Tray Room, the A/B Battery Room, and critical panels in the Control Room. Automatic actuation is provided in each area.

The carbon dioxide and halon systems are normally aligned to their respective gas supplies, and are actuated either automatically and/or manually upon detection of a fire.

Portable aqueous film forming foam equipment is provided in the vicinity of the Diesel Generator Building, located in hose houses.

Dry chemical, carbon dioxide and pressurized water fire extinguishers have been distributed throughout the plant in accordance with NFPA guidelines. In addition, a manual dry chemical system utilizing wheeled portable extinguishers has been provided for the turbine operating floor. Portable fire extinguishers are provided in the drywell when the drywell is open for maintenance. Extinguishers are also provided in other areas of the Reactor Building, and at the Circulating Water intake area. Portable extinguishers are provided for the Control Room.

Fire detection and signaling systems provide a means of detecting the presence of a fire, and initiate an alarm in the Main Control Room or Security Guard House, or automatically initiate the appropriate fire protection system. Fire detection and signaling systems utilize three types of detection systems: products of combustion (ionization and photo electric), thermal (fixed rate of rise and rate compensated/fixed temperature) and flow switches. For areas that are vital, the alarms are fed to a local alarm panel and then to the Fire Alarm Master Panel in the Control Room. Non-vital systems alarm in the Security Guard House. Flow switches or pressure switches are used as the means of detection in wet pipe sprinkler systems. For wet pipe sprinkler systems with flow alarm valves, a pressure switch is the means of detecting a fire. The wet pipe sprinkler systems have fusible heads. The fire detection and signaling system include fire detectors for selected safety related areas. Smoke detectors are provided in the ventilation systems of the Control Room and the A/B Battery Room. Actuation of automatic suppression systems transmits an alarm on the signaling system to the Control Room. A unique fire alarm signal is provided in the Control Room.

For more detailed information, see UFSAR Section 9.5.1.

System Boundary

The boundary of the fire protection water system begins with the two diesel driven fire pumps and two electric motor driven pond pumps located at the fresh water pumphouse. The discharge from the four pumps ties into a common header that continues to a connection with the main fire protection water loop, which terminates at the suppression systems, hydrants, hose stations or connections with other systems. A connection off the common header supplies seal water to the circulating water pumps, dilution pumps and radwaste service water pumps. The main loop continues around the perimeter of the power block, and includes numerous branch lines that supply various sprinkler systems, hose stations and fire hydrants. The main fire protection water loop also includes a branch connection to each of the two Core Spray System trains, a branch connection to the Condensate Transfer System, a branch connection to the Isolation Condenser makeup, and a branch connection for backup cooling to the Instrument Air compressors. Sectionalizing post indicator type valves are provided on the main loop to allow isolation of the various sections for maintenance.

The main loop also includes a connection from the redundant fire protection water supply. The redundant supply begins at the fire protection water storage tank, and continues through the redundant motor driven fire pump through a normally closed valve to the connection with the main fire protection water loop.

The diesel driven fire pumps diesel engines have independent fuel supplies that begins at each of the two Fire Diesel Fuel Oil tanks, and continues through the fuel supply piping to each diesel engine.

The boundary for the total flooding carbon dioxide suppression system protecting the C and D 4160V switchgear area begins at the carbon dioxide storage tank, and continues through the normally closed master control valve to the spray nozzles in the C and D 4160V switchgear area. The boundary for the turbine exciter and turbine bearing carbon dioxide suppression systems begin at the carbon dioxide storage cylinders, and continues through the normally closed discharge control valves to the spray nozzles at the turbine exciter and turbine bearing.

The boundary for the Halon suppression systems that protect the 480 Volt Switchgear Rooms A and B, the A/B Battery Room and Electric Tray Room, and critical panels in the Control Room begin at the Halon storage cylinders, and continues through the normally closed discharge control valves to the spray nozzles in the previously mentioned rooms.

Portable aqueous film forming foam equipment and portable fire extinguishers are included in the boundary of this licensed renewal system scoping evaluation, however a flowpath description is not applicable for this self-contained portable equipment.

All associated piping, components and instrumentation contained within the flowpath described above are included in the system evaluation boundary. Also included in the system evaluation boundary are the physical plant design features that consist of fire barrier walls and slabs, fire barrier penetration seals, fire doors, and fire rated enclosures located in the Reactor Building, Office Building, Turbine Building, and the Emergency Diesel Generator Building. In addition, dikes around the Unit Substation transformers are included in the evaluation boundary of the fire protection system.

The fire detection and signaling systems and associated circuitry are evaluated as an electrical commodity.

The fire protection water system seal water supply to the circulating water, dilution and radwaste service water pumps is not required to support an intended function for the Fire Protection System and is not included within the scope of license renewal. Suppression systems that protect equipment that is not important to safety and where a fire would not significantly increase the risk of radioactive releases to the environment are also not required to support an intended function for the Fire Protection System and are not included within the scope of license renewal.

The Fire Protection System scope boundary includes portions of the system associated with the safety-related/nonsafety-related interfaces up to the location of the first seismic anchor. The boundary also includes water-filled fire protection piping and equipment in proximity to equipment performing a safety-related function, located within the Reactor Building, Turbine Building, and Office Building. Included in this boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of this portion of the system. For more information, refer to the License Renewal Boundary Drawing. This boundary is typically shown in red for other license renewal systems, but is included within the green boundary for the Fire Protection System because it coincides with piping and equipment that perform functions associated with the fire protection (10CFR50.48) regulated event.

Not included in the Fire Protection System license renewal scoping boundary are the following systems, which are separately evaluated as license renewal systems:
Core Spray System
Condensate Transfer System
Isolation Condenser System
Instrument Air System
Circulating Water System

Reason for Scope Determination

The Fire Protection System is not in scope under 10 CFR 54.4(a)(1) because it is not relied on to remain functional during and following design basis events. It meets 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for fire protection (10 CFR 50.48). The Fire Protection System is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for environmental qualification (10CFR50.49), SBO (10 CFR 50.63) or ATWS (10 CFR 50.62).

System Intended Functions

1. Relied upon 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). The Fire Protection System works in conjunction with fire barriers and other plant design features, and established safe shutdown systems and procedures to demonstrate compliance with fire protection regulations. 10 CFR 54.4(a)(3)
2. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The Fire Protection System has leakage boundary and structural

support intended functions, due to the connections to safety related piping, and the potential for spatial interaction with safety related equipment located in the vicinity of water-filled fire protection system piping. 10 CFR 54.4(a)(2)

UFSAR References

9.5.1

License Renewal Boundary Drawings

LR-JC-19479 sheet 1
LR-JC-19479 sheet 2
LR-JC-19479 sheet 3
LR-JC-19629 sheet 1
LR-JC-19629 sheet 2
LR-BR-2004 Sheet 2
LR-GE-885D781

Table 2.3.3.15 Fire Protection System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Dikes	Fire Barrier (Contain oil spill)
Expansion Joint	Pressure Boundary
Fire Barrier Penetration Seals	Fire Barrier
Fire Barrier Walls and Slabs	Fire Barrier
Fire Doors	Fire Barrier
Fire hydrant	Pressure Boundary
Fire Rated Enclosures	Fire Barrier
Flexible Hose	Pressure Boundary
Flow Element (Annubar)	Pressure Boundary
Gas Bottles (CO2, Halon Storage Cylinders)	Pressure Boundary
Gauge Snubber	Pressure Boundary
Gear Box	Pressure Boundary
Heat Exchangers	Heat Transfer
	Pressure Boundary
Hose Manifold	Pressure Boundary
Odorizer	Pressure Boundary
Piping and fittings	Pressure Boundary
Pump Casing (Redundant Fire Pump)	Pressure Boundary
Pump Casing (Vertical Turbine)	Pressure Boundary
Restricting Orifice	Pressure Boundary
	Throttle
Spray Nozzle (CO2, Halon)	Spray
Sprinkler Heads	Pressure Boundary
	Spray
Strainer	Filter
Strainer Body	Pressure Boundary
Tank Heater	Pressure Boundary
Tanks (CO2)	Pressure Boundary
Tanks (Fuel Oil)	Pressure Boundary
Tanks (Retarding Chamber)	Pressure Boundary
Tanks (Water Storage)	Pressure Boundary
Thermowell	Pressure Boundary
Valve Body	Pressure Boundary
Water Motor Alarm	Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.15 Fire Protection System
-Summary of Aging Management Evaluation

2.3.3.16 Fuel Storage and Handling Equipment

System Purpose

The Fuel Storage and Handling Equipment system is comprised of the spent fuel storage pool and racks, the new fuel storage vault and racks, Cask Drop Protection system, and fuel handling equipment.

The spent fuel storage pool is enclosed and an integral part of the Reactor Building Structure. It is a reinforced concrete structure, completely lined with seam welded stainless steel liner plate that serves as a watertight barrier. The pool contains fourteen (14) high-density stainless steel poison racks for storage of spent fuel, ten (10) are equipped with Boraflex poison and four (4) are equipped with Boral poison. The pool is filled with 38 feet of demineralized water (25 feet above the fuel), providing adequate shielding for normal building occupancy by operating personnel. Water temperature is maintained within acceptable limits by the Spent Fuel Pool Cooling System (evaluated with the Spent Fuel Pool Cooling System). The spent fuel storage pool communicates with the reactor well through the refueling canal. Removable concrete plugs and gates are inserted in the canal opening to provide a watertight boundary; except during refueling when the reactor well is also flooded for underwater transfer of nuclear fuel. The spent fuel storage pool and the racks are classified safety related Seismic Class I structures.

The new fuel storage vault is located within the reactor building adjacent to the spent fuel storage pool. The reinforced concrete vault contains aluminum racks for dry storage of new fuel bundles. The new fuel storage vault and the racks are classified Seismic Class I structures.

The Cask Drop Protection system is a cylindrical stainless steel guide structure assembly that is permanently installed in the northeast corner of the spent fuel storage pool. The guide structure assembly consists of an upper guide cylinder and a lower dashpot cylinder. The upper guide cylinder is approximately 23 feet high, with an inside diameter of 130 inches at the top, tapering to a diameter of 118 inches at the flanged connection with the dashpot cylinder. A gated opening in the guide cylinder is provided to permit transfer of spent fuel into a cask within the cylindrical guide. The lower dashpot cylinder is approximately 16 feet high, with an inside diameter that tapers from 118 inches at the flange connection with the upper guide cylinder to 110½ inches at the bottom. The Cask Drop Protection system rests on the bottom of the spent fuel pool and is laterally braced from the pool walls. The structure is classified Seismic Class I.

Fuel handling equipment consists of the reactor building overhead bridge crane, jib cranes, the refueling platform, fuel preparation machines, and special purpose tools for handling new fuel, spent fuel, and reactor vessel internals and components.

The reactor building overhead bridge crane and the jib cranes are separately evaluated with Cranes and Hoists license renewal structure and are not described herein.

The refueling platform is a motor driven bridge and trolley which traverses the space between the reactor well and the spent fuel storage pool. The bridge travels on rails extending on both sides of the fuel storage pool and the reactor well. The trolley runs on rails located on top of the bridge. The fuel grapple is mounted on the trolley. Two auxiliary hoists are provided on the platform. The hoists are used with an assortment of refueling and component handling tools. Together with the fuel grapple, they perform all necessary tasks in the irradiated fuel and the core components.

Two fuel preparation machines are mounted on the wall of the spent fuel storage pool farthest from the reactor well. The machines consist of an aluminum frame, 40 feet long, and a carriage for the fuel bundle, which runs the full length of the frame. Power for the carriage is supplied by an air hoist mounted under the operator platform at the top of the spent fuel pool.

Special purpose tools include control rod grapple tool, control rod latch tool, fuel support installation tool, instrument handling tool, channel bolt wrench, fuel bundle sampler, and other tools specifically designed for handling nuclear fuel and for servicing reactor vessel internals during an outage.

The purpose of the Fuel Storage and Handling Equipment system is to support, transfer, and provide for storage of nuclear fuel in a manner that precludes inadvertent criticality. The spent fuel storage racks are designed to maintain fuel assemblies in a subcritical configuration having a k(eff) less than or equal to 0.95. The special purpose tools facilitate handling and transfer of nuclear fuel, and assembly and disassembly of reactor vessel internals.

The purpose of the Cask Drop Protection system in the original design was to attenuate the effects of a cask drop accident. However this function is no longer required since the reactor building crane is upgraded to a single failure proof design and a cask drop accident is no longer credible.

Included in the evaluation boundary of Fuel Storage and Handling Equipment system are new and spent fuel storage racks, the Cask Drop Protection system, the refueling platform, fuel preparation machines, and the special purpose tools. New and spent fuel storage racks are in scope of license renewal since they perform a safety related function. The Cask Drop Protection system, the refueling platform, and the fuel preparation machines are also in scope of license renewal because they are required to maintain structural integrity during a design basis seismic event (Seismic II/I) to preclude interaction with nuclear fuel. Special purpose tools are used to support refueling activities and to facilitate transfer of nuclear fuel. They do not perform an intended function and are not included in the scope of license renewal.

Not included in the evaluation boundary of the Fuel Storage and Handling Equipment system are the new fuel vault, the spent fuel storage pool, its liner plate, gates and plugs, the reactor building overhead bridge crane, jib cranes, and supports for components and tools. The new fuel vault, the spent fuel storage pool, its liner plate, and gates and plugs are separately evaluated with the Reactor Building license renewal structure. The reactor building overhead bridge crane and jib cranes are separately evaluated with Cranes and Hoists license renewal structure. Supports for components are separately evaluated with the license renewal Component Supports Commodity Group.

For more detailed information, refer to UFSAR Section 9.1

System Operation

Not required

System Boundary

Not Required

Reason for Scope Determination

The Fuel Storage and Handling Equipment system meets the scoping requirements of 10 CFR 54.4(a)(1) because it is a safety-related structure which is relied upon to remain functional during and following design basis events. It meets 10 CFR 54.4(a)(2) because failure of nonsafety related portions of the structure could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1).
The Fuel Storage and Handling Equipment system does not meet 10 CFR 54.4(a)(3) because it is not relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48), ATWS (10 CFR 50.62), Environmental Qualification (10 CFR 50.49), and Station Blackout (10 CFR 50.63).

System Intended Functions

1. Prevents criticality of fuel assemblies stored in the spent fuel pool. The spent fuel storage racks maintain fuel in subcritical configuration having a k(eff) less or equal to 0.95. 10 CFR5 4.4(a)(1)
2. Provides physical support, shelter, and protection for safety related systems, structures, and components (SSCs). The spent fuel and the new fuel storage racks provide physical support for nuclear fuel. 10 CFR 54.4(a)(1)
3. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The refueling platform, the fuel preparation machines, and the Cask Drop Protection system are required to maintain structural integrity during design basis seismic events to preclude interaction with nuclear fuel (Seismic II/I). 10 CFR 54.4 (a)(2)

UFSAR References

9.1

License Renewal Boundary Drawings

None

Table 2.3.3.16 Fuel Storage and Handling Equipment
Components Subject to Aging Management Review

Component Type	Intended Functions
Cask Drop Protection Cylindrical Structure	Structural Support
Fuel Grapple/Mast	Structural Support
Fuel Preparation Machine	Structural Support
New Fuel Storage Racks	Structural Support
Refueling platform	Structural Support
Spent Fuel Storage Racks	Absorb Neutrons
	Structural Support
Structural Bolts	Structural Support

The aging management review results for these components are provided in
Table 3.3.2.1.16 Fuel Storage and Handling Equipment
-Summary of Aging Management Evaluation

2.3.3.17 Hardened Vent System

System Purpose

The Hardened Vent System (HVS) is a hard piped vent system designed for venting the Primary Containment during severe accident sequences.

The purpose of the HVS is to vent the primary containment via the torus (primary path) or drywell (secondary path) during severe accident sequences that involve loss of decay heat removal capability (the torus is the preferred vent path because of the scrubbing effect of the torus water). The HVS accomplishes this by providing a vent path to the ventilation stack from either the torus or drywell through the Containment Inerting System (CIS) nitrogen purge header and its associated drywell and torus nitrogen purge inlet pressure control valves.

The HVS is only used for conditions beyond the Design Basis Accident.

System Operation

The HVS is comprised of a hard pipe installed between the CIS nitrogen purge header and the plant ventilation stack. Functionally, the HVS relies on the valves and piping associated with the CIS nitrogen purge header. Torus venting via the HVS is through the CIS torus nitrogen purge inlet pressure control valves, through the CIS nitrogen purge header, through the manual HVS to stack isolation valve, through the hardened vent pipe, and out the ventilation stack. Drywell venting via the HVS is through the CIS drywell nitrogen purge inlet pressure control valves, through the CIS nitrogen purge header, through the manual HVS to stack isolation valve, through the hardened vent pipe, and out the ventilation stack. The Hardened Vent System (HVS) is designed for the mitigation of Severe Accident Sequences that are beyond the Design Basis Accident (DBA).

For more detailed information, see UFSAR Section 6.2.7.

System Boundary

The HVS begins at the normally locked closed manual HVS to stack isolation valve located off of the CIS nitrogen purge header and terminates inside the ventilation stack. The HVS pipe is provided with an enclosure boot at the penetration to the stack.

Not included in the HVS license renewal scoping boundary are the following systems/structures, which are separately evaluated as license renewal systems/structures:
Containment Inerting System (CIS)
Ventilation Stack

The Hardened Vent System (HVS) is designed for the mitigation of Severe Accident Sequences that are beyond the Design Basis Accident (DBA). Beyond Design Basis Severe Accident events are not in-scope for License Renewal. However, the HVS pipe and enclosure boot are an extension of the ventilation stack boundary and are required to maintain their pressure boundary integrity to prevent the backflow of gas effluents and unmonitored releases to the environment.

Reason for Scope Determination

The Hardened Vent System is not in scope under 10 CFR 54.4(a)(1) because no portions of the system are safety related or relied on to remain functional during or following design basis events. The Hardened Vent System is in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The Hardened Vent System is not in scope under 10 CFR 54.4(a)(3) because it is not relied upon 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), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The HVS pipe and enclosure boot are an extension of the ventilation stack boundary and are required to maintain their pressure boundary integrity to prevent the backflow of gas effluents and unmonitored releases to the environment. 10 CFR 54.4(a)(2)

UFSAR References

6.2.7

License Renewal Boundary Drawings

LR-SN-13432.19-1

Table 2.3.3.17 Hardened Vent System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Enclosure Boot	Pressure Boundary
Piping and fittings	Pressure Boundary
Valve Body	Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.17 Hardened Vent System
-Summary of Aging Management Evaluation

2.3.3.18 Heating & Process Steam System

System Purpose

The intended function of the Heating and Process Steam System for license renewal is to maintain leakage boundary integrity to preclude system interactions as described in ISG-09, “Guidance on the Identification of Structures, Systems, and Components that meet 10CFR54.4(a)(2)”, dated March 15, 2002. For this reason, this system’s pressure retaining components located in proximity to other components performing safety-related functions have been included in the scope of license renewal. This system is not required to operate to support license renewal intended functions, and is in scope for potential spatial interaction.

The Heating and Process Steam System is a mechanical system designed to supply steam for processing liquid radwaste, for plant area heating, and for deaerator operation.

The purpose of the Heating and Process Steam System is to provide steam in sufficient capacity for operation of the radwaste concentrator for evaporative processing of liquid radioactive waste, for plant area heating, and to provide oxygen-free boiler feedwater. It accomplishes its purpose through use of two fuel oil fired boilers and their supporting systems including steam distribution and condensate systems, and chemical addition. Operation of the Heating and Process Steam System is not required to perform or support any safety related function and consequently the system is not safety related.

System Operation

The Heating and Process Steam System is comprised of two fuel oil fired boilers utilizing a vapor cycle. The boilers, either of which may be in operation depending on the steam requirement, are each supplied by two fuel oil pumps which take suction from the fuel oil storage tank (evaluated with the Main Fuel Oil Storage & Transfer System) and transfer fuel to the boiler burner. The boilers produce steam that discharges into a common distribution header, which discharges steam through various loops to the radwaste concentrator components, plant area heating equipment, and deaerators as required. Makeup water is from demineralized water transfer (evaluated with the Water Treatment and Distribution System).

For more detailed information, see UFSAR section 10.4.8.

System Boundary

The license renewal scoping boundary of the Heating and Process Steam System encompasses that portion of the system that is located in proximity to equipment performing a safety-related function. This includes the portions of the system located within the Reactor Building, Turbine Building, Office Building, and old Heating Boiler House. Included in this boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of this system. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Components that are not required to support the system’s leakage boundary intended function are not included in the license renewal scoping boundary of the Heating and Process Steam System.

Not included in the Heating and Process Steam System scoping boundary are the following interfacing systems, which are separately evaluated as license renewal systems:
Water Treatment and Distribution System
Main Fuel Oil Storage & Transfer System
Radwaste Systems

Reason for Scope Determination

The Heating and Process Steam System does not meet 10 CFR 54.4(a)(1) because it is not a safety related system that is relied upon to remain functional during and following design basis events. It does meet 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It does not meet the requirements of 10 CFR 54.4(a)(3) since it is not required to demonstrate compliance with the Commission's regulations for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49), ATWS (10 CFR 50.62), or station blackout (10 CFR 50.63).

System Intended Functions

1. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The Heating and Process steam System contains non-safety related water and steam-filled lines which have potential spatial interaction (spray or leakage) with safety related SSCs. 10 CFR 54.4(a)(2)

UFSAR References

10.4.8

License Renewal Boundary Drawings

LR-BR-2015 sheet 2
LR-BR-2015 sheet 3
LR-BR-2015 sheet 4
LR-BR-2015 sheet 6

Table 2.3.3.18 Heating & Process Steam System Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Coolers (Sample)	Leakage Boundary
Flexible Connection	Leakage Boundary
Flow Element	Leakage Boundary
Heat Exchangers	Leakage Boundary
Piping and fittings	Leakage Boundary
Pump Casing - Chemical Addition Pump CH-P-11	Leakage Boundary
Pump Casing - Condensate Return Pumps P-13-1A/B, Chemical Feed Addition Pumps CH-P-6A/B, Boiler No. 1 Feed Pumps CH-P-4A/B, Boiler No. 2 Feed Pumps CH-P-3A/B, Deaerator Feed Pumps CH-P-5A/B, Chemical Recirc Pump CH-P-10	Leakage Boundary
Restricting Orifice	Leakage Boundary
Sight Glasses	Leakage Boundary
Soot Blowers	Leakage Boundary
Steam Trap	Leakage Boundary
Strainer Body	Leakage Boundary
Tanks - Chemical Feed Addition Tanks CH-T-3A/B	Leakage Boundary
Tanks - Deaerator CH-T-2, Condensate Return Unit T-13-1, Heating Boiler Condensate Storage Tank T-13-2, Heating Boiler Flash Tank T-13-3	Leakage Boundary
Valve Body	Leakage Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.18 Heating & Process Steam System
-Summary of Aging Management Evaluation

2.3.3.19 Hydrogen & Oxygen Monitoring System

System Purpose

The Hydrogen & Oxygen Monitoring License Renewal System consists of the Drywell Hydrogen/Oxygen Monitoring Subsystem and the Drywell and Torus Oxygen Monitoring Subsystem. The Hydrogen & Oxygen Monitoring System is in scope for license renewal. However, portions of the Hydrogen & Oxygen Monitoring System are not required to perform intended functions and are not in scope. The Hydrogen & Oxygen Monitoring System has several interfaces with other systems that are not in the license renewal boundary of the Hydrogen & Oxygen Monitoring System.

The Hydrogen & Oxygen Monitoring System is a gas sampling system designed to monitor the hydrogen and oxygen concentration in the drywell during accident conditions. A portion of the Hydrogen & Oxygen Monitoring System is designed to monitor the oxygen concentration in the drywell and torus during normal power operations.

The purpose of the Hydrogen & Oxygen Monitoring System is to monitor the Primary Containment atmosphere to ensure that oxygen and hydrogen levels do not approach flammability limits. The Hydrogen & Oxygen Monitoring System accomplishes this purpose post accident and during normal power operations. During post accident operation, the Drywell Hydrogen/Oxygen Monitoring Subsystem portion of the Hydrogen & Oxygen Monitoring System processes a drywell atmosphere sample through one of two redundant hydrogen and oxygen measuring loops. During normal power operation, the Drywell Hydrogen/Oxygen Monitoring Subsystem is in the standby mode except for calibration or maintenance and the Drywell and Torus Oxygen Monitoring Subsystem portion of the Hydrogen & Oxygen Monitoring System is in service to monitor the oxygen concentration of the atmosphere in the drywell and torus areas.

System Operation

The Drywell Hydrogen/Oxygen Monitoring Subsystem is comprised of two redundant drywell hydrogen and oxygen measuring loops each consisting of a hydrogen and oxygen analyzer, sample pump, indicators, recorder, system trouble alarm, calibration and reagent gas bottles and valves, and a control switch with indicating lights for the manual containment isolation valves. The indicators, recorders, alarms and control switches are located in the Main Control Room. The Drywell Hydrogen/Oxygen Monitoring Subsystem is initiated manually. A containment atmosphere sample is drawn from the drywell dome airspace through electrically heat traced sample lines. Flow continues through two series manual solenoid operated containment isolation valves prior to passing through the hydrogen and oxygen analyzers. From the analyzers, sample flow passes through the sample pump and two series manual solenoid operated containment isolation valves after which it is returned to the drywell through an open-ended sample return line.

The Drywell and Torus Oxygen Monitoring Subsystem is comprised of an oxygen analyzer for the Drywell area and an oxygen analyzer for the Torus area. Both the Drywell and the Torus oxygen analyzing systems include an oxygen analyzer, sample pump, indicators, a recorder, a system trouble alarm, calibration and reagent gas bottles and valves, and switches to allow for local operation of the oxygen analyzing systems from within the Reactor Building. Remote instrumentation and controls for each of the oxygen analyzing systems are also located in the

Main Control Room. The Drywell and Torus Oxygen Monitoring Subsystem is initiated manually. For the drywell, a containment atmosphere sample is drawn from the drywell ring header through two series automatic solenoid operated containment isolation valves and a drywell oxygen analyzer bypass valve (to the Post Accident Sampling System). Flow continues through a water separator, filters, sample pump, and drywell oxygen analyzer prior to discharge to the Reactor Building Floor and Equipment Drain System. For the torus, a torus atmosphere sample is drawn from the torus airspace through two series automatic solenoid operated containment isolation valves and a torus oxygen analyzer bypass valve (to the Post Accident Sampling System). Flow continues through a water separator, filters, sample pump, and torus oxygen analyzer prior to discharge to the Reactor Building Floor and Equipment Drain System. Upon primary containment isolation (reactor low low level, hi drywell pressure), the drywell and torus sample pumps will trip and the drywell and torus containment isolation valves will close. The containment isolation valves on the drywell and torus sample lines are provided with bypass logic in order to re-establish a sample flowpath to the Post Accident Sampling System (PASS) which shares the drywell and torus sample supply flowpath with the Drywell and Torus Oxygen Monitoring Subsystem.

For more detailed information, see UFSAR Sections 6.2.5 and 7.6.1

System Boundary

The boundary of the Drywell Hydrogen/Oxygen Monitoring Subsystem begins at the Drywell dome sample inlet, continues through the hydrogen and oxygen analyzers, and ends at an open ended connection in the sample return line inside the drywell. Included in the boundary are the hydrogen and oxygen calibration and reagent gas bottles and their piping connections to the hydrogen and oxygen analyzers. All associated piping, components, and instrumentation contained within the boundary described are included within the system evaluation boundary. This boundary is similar for both redundant measuring loops. Also included in the boundary of the Drywell Hydrogen/Oxygen Monitoring Subsystem is the Post Accident Sampling System sample inlet branch connection located off of the sample inlet line from the Drywell dome airspace to the "A" panel of the Drywell Hydrogen/Oxygen Monitoring System.

The boundary of the Drywell and Torus Oxygen Monitoring Subsystem includes separate boundaries for the drywell and for the torus oxygen monitoring loops. The drywell oxygen monitoring loop begins at the drywell ring header and continues through the drywell oxygen analyzer bypass valve (to the Post Accident Sampling System), through the drywell oxygen analyzer, and ends at the sample discharge to the Reactor Building Floor and Equipment Drain System. The torus oxygen monitoring loop begins at the torus airspace sample inlet connection and continues through the torus oxygen analyzer bypass valve (to the Post Accident Sampling System), through the torus oxygen analyzer, and ends at the sample discharge to the Reactor Building Floor and Equipment Drain System. All associated piping, components, and instrumentation contained within the boundaries described are included within the system evaluation boundary.

Included in the license renewal boundary of the Hydrogen & Oxygen Monitoring System are those portions of nonsafety-related piping and equipment that extend beyond the safety-related/nonsafety-related interface up to the location of the first seismic anchor, or to a point no longer in proximity to equipment performing a safety-related function, whichever extends furthest. This includes the nonsafety-related portions of the system located within the Reactor Building. Also included in the boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of this portion of the system. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Not included in the Hydrogen & Oxygen Monitoring System license renewal scoping boundary are the following systems, which are separately evaluated as license renewal systems:
Primary Containment
Reactor Building Floor and Equipment Drain System
Post Accident Sampling System
Radiation Monitoring System

Not included in the boundary of the Drywell and Torus Oxygen Monitoring Subsystem are the drywell and torus oxygen analyzer bypass valves and their branch sample lines to the Post Accident Sampling System which are evaluated with the Post Accident Sampling System for license renewal scoping. Also not included in the boundary of the Drywell and Torus Oxygen Monitoring Subsystem are the containment isolation valves and branch line connections to and from the Containment Atmosphere Particulate and Gaseous Radioactivity Monitoring System which are evaluated with the Radiation Monitoring System for license renewal scoping.

The oxygen analysis portion of the Drywell and Torus Oxygen Monitoring Subsystem, exclusive of both of the containment isolation boundaries, does not support the intended functions of the Hydrogen & Oxygen Monitoring System and is not included within the scope of license renewal. Loss of the electric heat trace on the Drywell Hydrogen/Oxygen Monitoring Subsystem sample lines does not change the operator response to the design basis accident. Therefore, the sample line electric heat trace is not required to support the intended functions of the Hydrogen & Oxygen Monitoring System and is not included within the scope of license renewal.

Reason for Scope Determination

The Hydrogen & Oxygen Monitoring System meets 10 CFR 54.4(a)(1) because portions of the system are safety related and relied on to remain functional during and following design basis events. The Hydrogen & Oxygen Monitoring System meets 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The Hydrogen & Oxygen Monitoring System meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for Environmental Qualification (10 CFR 50.49). The Hydrogen & Oxygen Monitoring System is not relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for Fire Protection (10 CFR 50.48), ATWS (10 CFR 50.62), or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Provide primary containment boundary. The Hydrogen & Oxygen Monitoring System sample lines that penetrate the primary containment have containment isolation valves. 10 CFR 54.4(a)(1)
2. Control combustible gas mixtures in the primary containment atmosphere. The Hydrogen & Oxygen Monitoring System analyzes the primary containment atmosphere post LOCA for hydrogen and oxygen concentration. 10 CFR 54.4(a)(1)
3. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a

safety related function. The Hydrogen & Oxygen Monitoring System contains non-safety related water filled lines in the Reactor Building which have potential spatial interaction (spray or leakage) with safety related SSCs, and, it contains non-safety related piping that provides structural support for safety related piping. 10 CFR 54.4(a)(2)

4. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Environmental Qualification (10 CFR 50.49). The Drywell Hydrogen/Oxygen Monitoring Subsystem containment isolation valves and analyzers are Environmentally Qualified. 10 CFR 54.4(a)(3)

UFSAR References

7.6.1.4.3
6.2.5.2.2
Table 6.2-12

License Renewal Boundary Drawings

LR-GU-3E-666-21-1000
LR-BR-M0012
LR-GU-3E-243-21-1000
LR-OC-010520

Table 2.3.3.19 Hydrogen & Oxygen Monitoring System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Drain Trap (O2 Analyzers)	Leakage Boundary
Filter Housing (O2 Analyzers)	Leakage Boundary
Flexible Hose	Pressure Boundary
Flow Element	Pressure Boundary
Heat Exchangers (Air Cooled)	Pressure Boundary
Moisture Separator (H2O2 Analyzers)	Pressure Boundary
Piping and fittings	Leakage Boundary
	Pressure Boundary
	Structural Support
Pump Casing	Pressure Boundary
Restricting Orifice	Pressure Boundary
	Throttle
Sensor Element	Pressure Boundary
Tanks (Volume Chamber)	Pressure Boundary
Valve Body	Leakage Boundary
	Pressure Boundary
Water Separator (O2 Analyzers)	Leakage Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.19 Hydrogen & Oxygen Monitoring System
-Summary of Aging Management Evaluation

2.3.3.20 Instrument (Control) Air System

System Purpose

The Instrument Air System is in scope for License Renewal. However, major portions of the system are not required to perform intended functions and are not in scope.

The purpose of the system is to provide clean and dried compressed air to pneumatically operated instruments and valves. To accomplish this purpose, the Instrument Air System receives compressed air from the Service Air System, and processes the compressed air through air dryers for distribution to components in support of plant operation.

The Instrument Air system also penetrates the drywell and is isolated by the closing of the instrument air containment isolation valve. This instrument air supply to the drywell is charged with nitrogen during power operation to reduce combustible gas in the drywell and torus with compressed air as a backup. This function is evaluated in the Nitrogen Supply License Renewal System.

System Operation

The Instrument Air System is comprised primarily of piping, valves, accumulators, regulators, tubing, air dryers and filters. The Instrument Air starts at the supply connection from the Service Air System and terminates at the connections to the supplied pneumatic components. Compressed air from the Service Air System is supplied thru a single instrument air line to the Instrument Air system dryers and filters prior to distribution as processed air.

During normal plant operation the Service Air compressors operate continuously to supply the source of the plants required instrument and control air and keep the accumulators charged. Where required, pneumatically operated devices are designed to fail safe upon loss of air or are provided with accumulators to provide a stored volume of compressed air when the compressors or other non safety related sections of the instrument air system are unavailable. Accumulators are isolated by check valves to ensure backup air for components credited to function during or following design basis events.

Compressed air from the Service Air Systems air receivers charge the instrument air supply line and is sent to the Instrument Air System dryers and filters prior to distribution as processed air. The dryers and filters are located in the Turbine Building. The two instrument air dryers will cycle, one on and one off, depending on moisture loading of the desiccant, and provide air that exceeds the quality standards for instrument air. A single dryer discharge line then charges the main instrument air ring header in the turbine building. Manual shutoff valves are provided both along the ring header and at the connections of smaller headers and taps from which instrument air is supplied to the plant. Two headers off the ring header supply the Reactor Building instrument air. One supplies the outboard Main Steam Isolation Valves (MSIVs) in the Trunnion Room. The other supplies the Reactor Building loads and provides a connection to the Drywell with its connection to the Nitrogen Supply System. It also supplies two additional air receivers located in the New Radwaste and Offgas Buildings before distribution to equipment located in those buildings. The receivers reduce the effects of load demands for instrument air at other plant locations. The Boiler House, Old Radwaste Building, Chlorine Building, Intake Structure, Condensate Transfer Pump House and the Standby Gas Treatment System are also provided instrument air. The headers provide instrument (control) air to individual plant components. Where instruments or air operated valve loads require reduced pressure, pressure reducing valves are utilized.

The Instrument Air System requires only compressed air from the Service Air System and electric power for dryers and solenoid operated valves. Air from the Service Air compressors and the instrument air dryers is not required for safe shutdown of the plant. Instrument air is required for normal plant operation and is used to hold the control rod scram valves closed. Upon loss of air the scram valves will open and shut down the reactor. Reliability for the Instrument Air System is enhanced by three full capacity service air compressors and isolation of the service air system header upon low air pressure. Plant air operated valves and pneumatic control devices are also designed to fail safe upon loss of air or are supplied with accumulators to permit continued operation.

For more detailed information, see UFSAR section 9.3.1.

System Boundary

The Instrument Air System boundary begins at the supply connection from the Service Air System. The system boundary contains the instrument air dryers and filters that discharge into the Turbine Building air ring header that distributes air to the individual plant components through piping headers and branches. The system boundary includes piping downstream of the instrument air dryers, main instrument air header, instrument air receivers, connections of smaller headers, manual shutoff valves, pressure reducing valves, check valves, accumulators and all associated piping components and instrumentation. The system boundary ends at the individual connection to the supplied pneumatic instruments and air operated valves.

Not included in the scoping boundary are the pneumatic instrumentation and air operated valves supplied by instrument air in the Main Steam, Standby Gas Treatment, Containment Vacuum Breaker, Nitrogen, Reactor Building Ventilation and Condensate Transfer host systems which are separately evaluated in the their License Renewal systems.

Not included in the scoping boundary are the service air compressors which are evaluated with the Service Air System for license renewal scoping.

The Instrument Air System receiver tanks, dryers, filters and headers, isolation valves and branch piping up to check valves of accumulators supplied pneumatic devices are not required to support intended functions and are not included within the scope of license renewal components.

The Instrument Air System supports the intended functions of pneumatic components requiring air for operation by the discharge of compressed air from accumulators. Thus, those portions of the Instrument Air System that are in scope of license renewal start at the isolation check valves upstream of the individual air accumulator that supplies the in line solenoid valves and ends at the host pneumatic components. Additionally the drywell penetration spool and associated isolation valves are in scope for their containment isolation function. As previously described, the host components are separately evaluated in their associated License Renewal Systems.

Also included in the portion of the IA system in scope for license renewal are those portions of nonsafety-related piping and equipment that extend beyond the safety-related/nonsafety-related interface up to and including the first seismic anchor. For more information, refer to the

License Renewal Boundary Drawing for identification of this boundary, shown in red.

Reason for Scope Determination

The Instrument Air System meets 10 CFR 54.4(a)(1) because it is a safety related system that is relied on to remain functional during and following design basis events. The Instrument Air System meets 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and 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) and SBO (10 CFR 50.63). The Instrument Air System is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for ATWS (10 CFR 50.62).

System Intended Functions

1. Provide motive power to safety related components. Accumulators are connected to air operated valves. 10 CFR 54.4(a)(1)
2. Provides primary containment boundary. Isolation valves on instrument air line to drywell. 10 CFR 54.4(a)(1)
3. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. 10 CFR 54.4(a)(2)
4. Relied upon 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). Provides pneumatic motive force to air operated valves and control devices. 10 CFR 54.4(a)(3)
5. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Environmental Qualification (10 CFR 50.49). EQ in line solenoid valves control air flow to valve operators and control devices. 10 CFR 54.4(a)(3)
6. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Station Blackout (10 CFR 50.63). Provides pneumatic motive force to air operated valves and control devices. 10 CFR 54.4(a)(3)

UFSAR References

9.3.1

License Renewal Boundary Drawings

LR-BR-2013 sheet 5
LR-BR-2013 sheet 6
LR-BR-2013 sheet 7
LR-GE-148F723
LR-BR-2002 sheet 1
LR-BR-2002 sheet 2
LR-BR-2011 sheet 2
LR-GU-3E-822-21-1000
LR-GU-3E-243-21-1000
LR-SN-13432.19-1
LR-BR-2004 sheet 2

Table 2.3.3.20 Instrument (Control) Air System
Components Subject to Aging Management Review

Component Type	Intended Functions
Accumulator	Pressure Boundary
Closure bolting	Mechanical Closure
Filter Housing	Pressure Boundary
	Structural Support
Flexible Hose	Pressure Boundary
Flow Element	Structural Support
Piping and fittings	Pressure Boundary
	Structural Support
Valve Body	Pressure Boundary
	Structural Support

The aging management review results for these components are provided in
Table 3.3.2.1.20 Instrument (Control) Air System
-Summary of Aging Management Evaluation

2.3.3.21 Main Fuel Oil Storage & Transfer System

System Purpose

The intended function of the Main Fuel Oil Storage & Transfer System for license renewal is to maintain leakage boundary integrity to preclude system interactions as described in ISG-09, "Guidance on the Identification of Structures, Systems, and Components that meet 10CFR54.4(a)(2)", dated March 15, 2002. For this reason, this system's pressure retaining components located in proximity to other components performing safety-related functions have been included in the scope of license renewal. This system is not required to operate to support license renewal intended functions, and is in scope for potential spatial interaction only.

The Main Fuel Oil Storage & Transfer System is a mechanical system designed to store and transfer fuel oil to the Heating and Process Steam System and to the Emergency Diesel Generator Fuel Storage Tank under normal plant operating conditions.

System Operation

The Main Fuel Oil Storage and Transfer System receives fuel oil from tank trucks and stores it in a tank located in the yard. Fuel oil is conveyed to the #1 and #2 heating boilers by a transfer pump and is pressurized by boiler fuel pumps and fed to the boilers for combustion. The system supplies bottled propane to both heating boilers for ignition, and supplies atomizing air to the #2 heating boiler.

The system can be aligned to provide fuel oil to the Emergency Diesel Generator fuel oil tank, but is not credited for Diesel Generator operation.

For more detailed information, see UFSAR Section 9.5.4.

System Boundary

The license renewal scoping boundary of the Main Fuel Oil Storage & Transfer System encompasses that portion of the system which is located in proximity to equipment performing a safety-related function. This includes those portions of the system which are located within the Heating Boiler House. Included in this boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of the Main Fuel Oil Storage and Transfer System. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Not included in the scoping boundary of the Main Fuel Oil Storage and Transfer System are those portions located in the yard or buried, because those portions are not located within an area in proximity to components performing a safety related function. Components that are not required to support the systems leakage boundary intended function are not included in the scoping boundary.

Reason for Scope Determination

The Main Fuel Oil Storage & Transfer System is not in scope under 10 CFR 54.4(a)(1) because no portions of the system are safety related or relied on to remain functional during or following a design basis event. It is in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54(a)(1). The Main Fuel Oil Storage & Transfer System does not meet 10 CFR 54.4(a)(3) since it is not relied upon in the safety analyses and 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), ATWS (10 CFR 50.62), or station blackout (10 CFR 50.63).

System Intended Functions

1. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. 10 CFR 54.4(a)(2)

UFSAR References

9.5.4
10.4.8

License Renewal Boundary Drawings

LR-BR-2015 sheet 3
LR-BR-2015 sheet 5

Table 2.3.3.21 Main Fuel Oil Storage & Transfer System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Flexible Hose	Leakage Boundary
Flow Meter	Leakage Boundary
Piping and fittings	Leakage Boundary
Pump Casing	Leakage Boundary
Sight Glasses	Leakage Boundary
Strainer Body	Leakage Boundary
Valve Body	Leakage Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.21 Main Fuel Oil Storage & Transfer System
-Summary of Aging Management Evaluation

2.3.3.22 Miscellaneous Floor and Equipment Drain System

System Purpose

The Miscellaneous Floor and Equipment Drain (MFED) system consists of both gravity and pumped fluid lines designed to provide collection of plant liquid effluents from floor drains and equipment drains located in various building structures, and subsequent transfer of the drainage for appropriate processing by the Radwaste System, overboard discharge, or disposal. The MFED system consists of Turbine Building Floor and Equipment Drains, Offgas Building Floor and Equipment Drains, Radwaste Floor and Equipment Drains, Laundry and Laboratory Drains, Miscellaneous Building Sumps, Condensate Transfer Building Sump, and Miscellaneous Oil Drains systems.

The purpose of the MFED system is to provide for collection of floor drains and equipment drains located in various locations throughout the site, and transfer of the collected drainage to the Radwaste System for processing, overboard discharge, or disposal. The MFED system accomplishes this purpose though use of gravity drain lines, sumps, tanks, pumps, and monitoring instruments used to collect and classify waste drainage. The MFED system is designed to accommodate the volumes of fluids resulting from maintenance activities, system flushing, rinsing operations, and other plant work, and is sized to minimize any potential for plant flooding. No part of the MFED system is required for the safe shutdown of the reactor or to mitigate the consequence of any postulated accident. Floor drains in the cable spreading rooms in the Turbine Building are credited in existing analyses with accommodating water flow resulting from actuation of the fire suppression systems in those rooms.

System Operation

The Turbine Building Floor and Equipment Drains are comprised of various floor drains and equipment drains, sumps, high and low conductivity drain tanks, pumps for each sump and tank, and associated piping and instrumentation. The offgas building floor and equipment drains, sump, pump, and piping are also evaluated with this portion of the system. Drains are directed into the various sumps and tanks, and then pumped to the Radwaste System chemical waste floor drain collection tanks, high purity waste system, or overboard discharge depending on the nature and source of the drainage.

The Radwaste Floor and Equipment Drains are comprised of floor and equipment drains, sumps, tanks, pumps and associated piping and instrumentation located in both the Old Radwaste and New Radwaste buildings. Drains associated with the processing of radwaste are directed into the various sumps and tanks in these buildings (e.g., discharge from Reactor Building Floor Drain Sump 1-7 may be directed to the Chemical Waste Floor Drain Collection Tanks), and then routed for continued processing as appropriate.

The Laundry and Laboratory Drains are routed to tanks located in the northwest corner of the reactor building basement. The Laundry Drain Tank receives floor and equipment drains from the Cold Chemistry and Instrument Laboratories and the cask washdown (decontamination) area. It is equipped with one pump which discharges to either the Chemical Waste Floor Drain Collection Tanks or the Waste Neutralizer Tanks (evaluated with the Radwaste System). The Laboratory Drain Tank receives floor and equipment drains from the Hot Chemistry Laboratory, which may include chemical reagents used in process sampling as well as plant grade water. It is equipped with one pump which can discharge to the Chemical Waste Floor

Drain Collection Tanks or Waste Neutralizer Tank A as appropriate.

The Miscellaneous Building Sumps system collects floor and equipment drainage from the Low Level Radwaste Facility. This system consists primarily of gravity drains, a sump, pump, and associated piping and controls. The sump contents can be discharged to a portable tank or to a portable demineralizer system as appropriate.

The Condensate Transfer Building Sump is located in the Condensate Transfer Building outside the turbine building west wall. It receives floor and equipment drains from the chlorination building and condensate transfer sump area. It is equipped with a pump which discharges to the turbine building under-condenser area via the Condensate Storage Tank/Demineralized Water Storage Tank overflow line. Drains in this area of the turbine building ultimately empty into the Turbine Building 1-3 sump.

The Miscellaneous Oil Drains system consists of valved and capped drain points on the five Recirculation System Motor-Generator set oil cooler shell side oil drains and one location on the Service Air Compressor 1-3 crankcase oil drain. Local provisions are made to collect the drained oil for sampling and maintenance activities at these locations when appropriate.

For more detailed information, see UFSAR section 9.3.3, and 11.2.2.

System Boundary

The license renewal scoping boundary of the Miscellaneous Floor and Equipment Drain (MFED) system begins with the individual floor drains of the Turbine Building Floor and Equipment Drains system that are located in the Old and New Cable Spreading Rooms and continue through gravity lines to the 1-1 Turbine Building Sump. Also included are floor drain lines in the New Cable Spreading Room that gravity drain to the existing roof drain downcomer in the Office Building. These lines are relied on to prevent flooding of the Cable Spreading Rooms during actuation of their respective portions of the Fire Protection System.

Also included in the license renewal scoping boundary of the MFED system are liquid-filled portions of the system that are located in proximity to equipment performing a safety-related function. This includes the liquid-filled portions of the system located within the Reactor Building, Turbine Building, and Heating Boiler House. Included in this boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of this system. For more information, refer to the License Renewal Boundary Drawings for identification of this boundary, shown in red.

Not included in the scope of license renewal are the Radwaste Floor and Equipment Drains, and Miscellaneous Building Sumps, as these systems are not located within an area in proximity of components performing a safety-related function. Components that are not required to support the system’s leakage boundary intended function and have no other intended function are not included in the scope of license renewal. Also not included are floor and equipment drain portions of the MFED that are encased in concrete (except for floor drains from the Old and New Cable Spreading Rooms, as described above), as leakage in this environment does not have the potential for spatial interaction.

Not included in the MFED boundary are the following interfacing systems, which are separately evaluated as license renewal systems:
Radwaste System

Reactor Building Floor and Equipment Drains
Drywell Floor and Equipment Drains
Fire Protection System
Roof Drains and Overboard Discharge

Reason for Scope Determination

The Miscellaneous Floor and Equipment Drain (MFED) system does not meet 10 CFR 54.4(a)(1) because it is not a safety related system that is relied upon to remain functional during and following design basis events. It does meet 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48). The MFED system is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for environmental qualification (10 CFR 50.49), ATWS (10 CFR 50.62), or station blackout (10 CFR 50.63).

System Intended Functions

1. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The MFED system has the potential for spatial interaction with safety-related equipment located within the Reactor Building, Turbine Building, and Heating Boiler House. 10 CFR 54.4(a)(2)
2. Relied upon 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). Portions of the MFED are relied upon to remove credible water flow due to actuation of the Fire Protection System in the Turbine Building. 10 CFR 54.4(a)(3)

UFSAR References

9.3.3
11.2.2

License Renewal Boundary Drawings

LR-JC-147434 sheet 2
LR-JC-147434 sheet 3
LR-GE-148F437 sheet 2
LR-GE-148F437 sheet 12
LR-BR-2006 sheet 5
LR-BR-2007 Sheet 1
LR-BR-2007 Sheet 3
LR-BR-2015 Sheet 6

Table 2.3.3.22 Miscellaneous Floor and Equipment Drain System Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Flexible Hose	Leakage Boundary
Piping and fittings	Leakage Boundary
	Pressure Boundary
Pump Casing (Lab Drain Tank Pump P-22-003)	Leakage Boundary
Pump Casing (Laundry Drain Tank Pump P-22-002)	Leakage Boundary
Pump Casings (Regeneration Waste Transfer Pumps P-22-28A,B and P-22-29A,B)	Leakage Boundary
Strainer Body	Leakage Boundary
Tanks (Lab Drain Tank T-22-003)	Leakage Boundary
Tanks (Laundry Drain Tank T-22-002)	Leakage Boundary
Tanks (Oil Separator DS-Y-105 and Oil Receiver DS-T-1)	Leakage Boundary
Tanks (Regeneration System Waste Tank 1-1 Low and High Conductivity Compartments)	Leakage Boundary
Valve Body	Leakage Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.22 Miscellaneous Floor and Equipment Drain System
-Summary of Aging Management Evaluation

2.3.3.23 Nitrogen Supply System

System Purpose

The Nitrogen Supply System is in scope for License Renewal. However, portions of the system are not required to perform intended functions and are not in scope. The Nitrogen Supply System has several interfaces with other systems that are not in the license renewal boundary of the Nitrogen Supply System.

The Nitrogen Supply System is a pressurized gas system designed to provide nitrogen to the Containment Inerting System (CIS), drywell nitrogen sub-system, Traveling In-Core Probe (TIP) System indexing mechanisms, feedwater heaters, Reactor Water Cleanup (RWCU) System recirculation pump surge tank, and Control Rod Drive (CRD) System accumulator nitrogen charging system.

The purpose of the Nitrogen Supply System is to supply vaporized nitrogen at a specified pressure and temperature to the CIS, drywell nitrogen sub-system, TIP System indexing mechanisms, and feedwater heaters. The Nitrogen Supply System accomplishes this by processing stored liquid nitrogen through a vaporizer, heaters, and pressure regulating valves and providing it to the CIS, drywell nitrogen sub-system, TIP System indexing mechanisms, and feedwater heaters on demand.

The Nitrogen Supply System also provides nitrogen to the RWCU System recirculation pump surge tank and the CRD System accumulator nitrogen charging system. This portion of the Nitrogen Supply System consists of local bottled nitrogen supplies, pressure regulators, and piping.

The Nitrogen Supply System is manually initiated to support its users. The nitrogen supply to the TIP System indexing mechanisms penetrates the primary containment and is provided with containment isolation devices.

System Operation

The Nitrogen Supply System is comprised of a liquid nitrogen storage tank, pressure building coils, vaporizer, electric heaters, thermostatic control valves, pressure regulating devices, piping, valves, and system instrumentation and controls. The Nitrogen Supply System is initiated manually.

The Nitrogen Supply System has two major users which are the CIS nitrogen purge header and the CIS nitrogen makeup header. For the CIS nitrogen purge header, flow is from the liquid nitrogen storage tank, through a vaporizer, trim heaters, thermostatic control valve, and pressure regulating valves. The CIS nitrogen purge header branches off of the nitrogen supply line downstream of the pressure regulating valves. The CIS nitrogen purge header includes a connection outside of the reactor building to allow the hookup of a portable supply of nitrogen to the CIS nitrogen purge header in the event the permanent liquid nitrogen tank is unavailable. The feedwater heater nitrogen layup supply also branches off of the nitrogen supply line downstream of the pressure regulating valves. The feedwater heater nitrogen layup supply is normally isolated from the Nitrogen Supply System by a removable spool piece.

For the CIS nitrogen makeup header, flow is from the liquid nitrogen storage tank, through a vaporizer, pressure regulating valve, electric heater, and then to the CIS nitrogen makeup header. Both the TIP System indexing mechanism purge supply and the nitrogen supply to the drywell nitrogen sub-system branch off of the CIS nitrogen makeup header. TIP indexing purge flow, which provides a drying and inerting function for the TIP tubes, passes through a nitrogen regulating valve, an automatic containment isolation valve, and a check valve prior to entering the primary containment. Flow continues to the TIP indexing mechanisms. The nitrogen supply to the drywell nitrogen sub-system flows to the drywell nitrogen compressors, continues to the drywell nitrogen storage tank, ties into the Instrument (Control) Air pneumatic supply line to the drywell upstream of the Instrument (Control) Air System primary containment isolation valves, then flows into the drywell through the Instrument (Control) Air System primary containment isolation valves to the pneumatically operated devices in the drywell.

The Nitrogen Supply System also provides nitrogen to the RWCU System recirculation pump surge tank for pressure surge suppression. This portion of the Nitrogen Supply System consists of local bottled nitrogen supplies, pressure regulators, and piping. The nitrogen Supply System also provides nitrogen to the CRD System accumulator nitrogen charging system. This portion of the Nitrogen Supply System consists of local bottled nitrogen supplies, pressure regulators, and piping and is normally disconnected from the CRD accumulators.

For more detailed information, see UFSAR Section 6.2.5.

System Boundary

The Nitrogen Supply System boundary begins at the liquid nitrogen tank and continues through the pressure building coils and vaporizer. From the vaporizer, the Nitrogen Supply System branches off to support the CIS nitrogen purge header and the CIS nitrogen makeup header. The Nitrogen Supply System evaluation boundary supporting the CIS nitrogen purge header includes trim heaters, thermostatic control valves, pressure regulating valves, and piping prior to ending at the CIS nitrogen purge header. Also included in the Nitrogen Supply System evaluation boundary is the portable nitrogen supply connection located off of the CIS nitrogen purge header. The Nitrogen Supply System evaluation boundary supporting the CIS nitrogen makeup header includes nitrogen regulating and bypass valves, an electric line heater, and piping prior to ending at the CIS nitrogen makeup header. Also included in the Nitrogen Supply System evaluation boundary are the nitrogen branch lines for TIP System purge and the drywell nitrogen compressors located off of the CIS nitrogen makeup header. The portion of the evaluation boundary supporting the TIP System nitrogen purge starts at the CIS nitrogen makeup header and continues through the purge line flow indicator and regulating valve, and includes the automatic containment isolation valve, containment isolation check valve, and nitrogen piping up to the tip indexers. The Nitrogen Supply System evaluation boundary also includes the TIP System purge instrumentation reference leg from the Tip indexers up to and including the manual containment isolation valve. The portion of the Nitrogen Supply System evaluation boundary supporting the drywell nitrogen compressors starts at the CIS nitrogen makeup header and continues up to, and includes, the drywell nitrogen compressors, nitrogen storage tank, and nitrogen piping up to the connection to the Instrument (Control) Air System. All associated piping, components, and instrumentation contained within the boundary described above are included in the boundary.

Not included in the Nitrogen Supply System license renewal scoping boundary are the following systems, which are separately evaluated as license renewal systems:
Containment Inerting System

Traveling In-Core Probe System
Reactor Water Cleanup System
Control Rod Drive System
Instrument (Control) Air System

The Nitrogen Supply System piping and components associated with feedwater heater layup are normally isolated from the Nitrogen Supply System by a removable spool piece and are not required to support intended functions. This portion of the Nitrogen Supply System is not included in the scope of license renewal. The drywell nitrogen storage tank and components associated with providing a pneumatic nitrogen supply to drywell pneumatically actuated valves during normal power operation are not required to support intended functions and are not included in the scope of license renewal. The nitrogen piping inside the primary containment up to the TIP indexers is not required to support intended functions and is not included within the scope of license renewal. The local nitrogen supplies to the RWCU System recirculation pump surge tank and CRD System accumulator nitrogen charging system are not required to support intended functions and are not included in the scope of license renewal.

The Nitrogen Supply System supports the primary containment boundary intended function. This portion of the system includes the nitrogen supply to the TIP System indexers starting from the automatic containment isolation valve and continuing to the containment penetration. Also included is the TIP purge instrumentation reference leg piping from the containment penetration up to and including the manual isolation valve.

The Nitrogen Supply System supports the primary containment combustible gas control intended function. This portion of the Nitrogen Supply System starts at the liquid nitrogen tank and continues through the pressure building coils, vaporizer, trim heaters, thermostatic control valve, pressure regulating valves, and CIS nitrogen purge header. This boundary includes the portable nitrogen supply connection located off of the CIS nitrogen purge header. Also included in this boundary is the nitrogen supply line between the vaporizer and the makeup line header regulating and bypass valves. This boundary excludes the normally isolated nitrogen layup supply to the feedwater heaters.

The Nitrogen Supply System supports the Fire Protection intended function. This portion of the system is the same as that identified for the combustible gas control intended function described above but also includes the nitrogen supply line downstream of the makeup line header regulating and bypass valves up to the makeup line electric heater, and, it includes the nitrogen branch lines for TIP System purge and drywell nitrogen compressors off of the CIS nitrogen makeup header. The TIP System purge nitrogen supply line starts at the CIS nitrogen makeup header and continues through the purge line flow indicator and regulating valve up to the automatic containment isolation valve and containment penetration. The drywell nitrogen compressor supply starts at the CIS nitrogen makeup header and continues up to, and includes, the drywell nitrogen compressors. The TIP System purge and drywell nitrogen compressor supply lines do not functionally support the intended function for Fire Protection but are included as they define the Nitrogen Supply System pressure boundary necessary to support this intended function.

Reason for Scope Determination

The Nitrogen Supply System meets 10 CFR 54.4(a)(1) because portions of the system are relied on to remain functional during and following design basis events. The Nitrogen Supply

System is not in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system would not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The Nitrogen Supply System meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48). The Nitrogen Supply System is not relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for Environmental Qualification (10 CFR 50.49), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Provide primary containment boundary. The Nitrogen Supply System includes containment isolation devices that function to prevent the release of radioactive contamination through system lines. - 10 CFR 54.4(a)(1)
2. Control combustible gas mixtures in the primary containment atmosphere. The Nitrogen Supply System supports the Containment Inerting System in accomplishing the function of post LOCA combustible gas control of the primary containment atmosphere. - 10 CFR 54.4(a)(1)
3. Relied upon 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). The Nitrogen Supply System is credited with establishing the inert drywell environment in which a design basis fire cannot occur. The Nitrogen Supply System is not required to function during a fire or survive a fire. The Nitrogen Supply System supports the Containment Inerting System in accomplishing this function. - 10 CFR 54.4(a)(3)

UFSAR References

1.9.21
3.1.37
6.2.5
Table 6.2-12

License Renewal Boundary Drawings

LR-SN-13432.19-1
LR-BR-2013 sheet 6

Table 2.3.3.23 Nitrogen Supply System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Drip Leg	Pressure Boundary
Heat Exchangers (Electric Heater)	Pressure Boundary
Heat Exchangers (Trim Heater)	Heat Transfer
	Pressure Boundary
Heat Exchangers (Vaporizer)	Heat Transfer
	Pressure Boundary
Piping and fittings	Pressure Boundary
Pressure Building Coils	Pressure Boundary
Restricting Orifice	Pressure Boundary
	Throttle
Rupture Disks	Pressure Boundary
Sight Glasses (Flow Indication)	Pressure Boundary
Strainer	Filter
Strainer Body	Pressure Boundary
Tanks	Pressure Boundary
Thermowell	Pressure Boundary
Valve Body	Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.23 Nitrogen Supply System
-Summary of Aging Management Evaluation

2.3.3.24 Noble Metals Monitoring System

System Purpose

The intended function of the Noble Metals Monitoring System (NMMS) for license renewal is to maintain leakage boundary integrity to preclude system interactions as described in ISG-09, "Guidance on the Identification of Structures, Systems, and Components that meet 10CFR54.4(a)(2)", dated March 15, 2002. For this reason, this system's pressure retaining components located in proximity to other components performing safety-related functions have been included in the scope of license renewal. This system is not required to operate to support license renewal intended functions, and is in scope for potential spatial interaction.

The NMMS is a reactor coolant monitoring system designed for determining the effectiveness of the Noble Metal Chemical Addition (NMCA) injection process performed during the 1R19 Refueling Outage. The NMMS is operated when the plant is at power and the Reactor Water Cleanup (RWCU) System is in operation.

The purpose of the NMMS is to track and trend the integrity of the noble metals film applied to the reactor internals and recirculation piping to ensure its ability to support Hydrogen Water Chemistry (HWC) in the mitigation of Intergranular Stress Corrosion Cracking (IGSCC). The NMMS accomplishes this by monitoring the electrochemical corrosion potential (ECP) of the reactor coolant, simulating and trending noble metals deposition, and monitoring and recording NMMS parameters. Manual valves local to the NMMS are used to place the system in service.

System Operation

The NMMS is comprised of an ECP monitor, a durability monitor, and a data acquisition system. The NMMS draws a small flow of reactor coolant from upstream of the RWCU Regenerative Heat Exchanger through normally open manual valves. The reactor coolant flows through an ECP monitor where the corrosivity of the reactor coolant is monitored with respect to the noble metals treated surfaces, a durability monitor where noble metals deposition and wear rate are simulated and trended, and a data acquisition system which monitors and records the durability monitor flowrate, temperature and ECP readings. Flow is returned to the RWCU System downstream of the Non-Regenerative Heat Exchangers through normally open manual valves.

The NMMS is provided with manual isolation valves to allow it to be isolated from the RWCU process line for sample removal and maintenance without affecting RWCU operation.

For more detailed information, see UFSAR Section 5.2.

System Boundary

The license renewal scoping boundary of the NMMS encompasses that portion of the system that is located in proximity to equipment performing a safety-related function. This includes the whole NMMS as this system is located entirely within the Reactor Building. Included in this boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of this system. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Not included in the NMMS scoping boundary is the RWCU System which is separately evaluated as a license renewal system.

Reason for Scope Determination

The Noble Metals Monitoring System does not meet 10 CFR 54.4(a)(1) because it is a non-safety related system and is not relied upon to remain functional during or following a design basis event. It meets 10 CFR 54.4(a)(2) because failure of this non-safety related system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54(a)(1). It does not meet 10 CFR 54.4(a)(3) since it is not relied upon in the safety analyses and 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), ATWS (10 CFR 50.62), or station blackout (10 CFR 50.63).

System Intended Functions

1. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The NMMS is located entirely within the Reactor Building and is considered a High Energy Line (HEL). - 10 CFR 54.4(a)(2)

UFSAR References

5.2.3.4

License Renewal Boundary Drawings

LR-GE-148F444

Table 2.3.3.24 Noble Metals Monitoring System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Flow Element	Leakage Boundary
Piping and fittings	Leakage Boundary
Sensor Element	Leakage Boundary
Valve Body	Leakage Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.24 Noble Metals Monitoring System
-Summary of Aging Management Evaluation

2.3.3.25 Post-Accident Sampling System

System Purpose

The Post-Accident Sampling System (PASS) is designed to obtain liquid and gaseous samples from the primary containment, gaseous samples from the secondary containment, and liquid samples from the reactor vessel for radiological and chemical analysis to determine an estimate of post-accident core damage and coolant corrosivity.

The purpose of the PASS system is to permit collection and processing of liquid and gaseous samples. The PASS system accomplishes its purpose by providing piping to collect these samples during normal and post-accident conditions, and a system to analyze the samples during post-accident conditions. The PASS was originally installed as required by the NRC and as described in NUREG 0737. While no longer required by the Technical Specifications, the PASS system continues to be maintained and operation of the system is described in approved plant procedures.

System Operation

The Post-Accident Sampling System is comprised of piping, tubing, valves, and sample coolers designed to convey the liquid and gaseous samples to the sample station, which consists of the liquid and gas sampling units, instrumentation, controls, fume hood, and displays to accomplish the designed sampling functions.

Reactor coolant samples can be drawn from reactor recirculation Loop A, the Liquid Poison System piping, and the Shutdown Cooling System piping. A torus water sample can be drawn from the Core Spray System piping. The samples pass through sample coolers (cooled by Reactor Building Closed Cooling Water) located in the Reactor Building TIP Room, and continue to the sample station in the PASS room. All liquid samples are returned to the primary containment through the core spray pumps suction line during accident conditions.

Gaseous atmosphere samples can be obtained from the drywell and wetwell through the Hydrogen & Oxygen Monitoring System. A secondary containment atmosphere sample can also be drawn into the PASS station. Primary containment gas samples are returned to the drywell, and secondary containment gas samples are returned to the reactor building atmosphere.

For more detailed information, see UFSAR section 11.5.2.12.

System Boundary

The PASS liquid sample scoping boundary begins with interfaces with Reactor Recirculation System Loop A pump suction piping, the Liquid Poison System supply piping to the reactor vessel, the Shutdown Cooling System return line, and Core Spray System A Loop discharge piping. The sample line from reactor recirculation proceeds through PASS containment isolation valves, and each of these sample lines continues to the sample coolers located in the Reactor Building TIP room and passes through the reactor building wall into the sample station located in the PASS room. The liquid samples are returned to the primary containment through a line from the sample station to the core spray pumps suction line during accident conditions. Included in this boundary are the associated valves, coolers, and instrumentation associated with the PASS piping and analysis system.

The PASS gaseous sample scoping boundary from primary containment begins with interfaces with the Drywell Hydrogen Monitoring System, the Drywell Oxygen Analyzer System, and the Torus Oxygen Analyzer System (all evaluated with the Hydrogen & Oxygen Monitoring System) and continues to the sample station. The primary containment gaseous samples return to the drywell through the discharge line of the containment particulate monitor. Included in this boundary are the valves and components associated with the PASS piping and analysis system. The secondary containment atmosphere sample lines which attach to the sample station through the reactor building wall and return to the TIP room are not included in the scope of license renewal as these gas-filled lines are not liquid- or steam-filled, with no potential for spatial interaction with components performing a safety-related function, and do not themselves support other intended functions.

Included in the license renewal scoping boundary of the PASS are those portions of nonsafety-related piping and equipment that extend beyond the safety-related/nonsafety-related interface up to the location of the first seismic anchor, or to a point no longer in proximity to equipment performing a safety-related function, whichever extends furthest. This includes the nonsafety-related portions of the system located within the Reactor Building. Included in this boundary are liquid-filled pressure retaining components relied upon to preserve the leakage boundary intended function of this portion of the system. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Not included in the scope of license renewal is the sample station located in the PASS room of the office building, as this station is physically shielded and does not have the potential for spatial interaction with components performing a safety-related function.

Not included in the scoping boundary of the PASS system are the containment isolation valves that are evaluated with the Hydrogen & Oxygen Monitoring System. Also not included in the scoping boundary of the PASS system are the following interfacing systems, which are separately evaluated as license renewal systems:
Reactor Recirculation System
Standby Liquid Control System (Liquid Poison System)
Shutdown Cooling System
Core Spray System
Hydrogen & Oxygen Monitoring System

Reason for Scope Determination

The Post-Accident Sampling System meets 10 CFR 54.4(a)(1) because it contains safety related components that are relied upon to remain functional during and following design basis events. It also meets 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets the requirements of 10 CFR 54.4(a)(3) since it is required to demonstrate compliance with the Commission’s regulations for environmental qualification (10 CFR 50.49). It is not required to demonstrate compliance with the Commission’s regulations for fire protection (10 CFR 50.48), ATWS (10 CFR 50.62), or station blackout (10 CFR 50.63).

System Intended Functions

1. Provide primary containment boundary. Containment isolation valves and containment

sample valves provide ability to close sample lines coming from primary containment. 10 CFR 54.4(a)(1)

2. Provide reactor coolant pressure boundary. Automatic and administratively controlled valves on sample lines from the RCPB maintain the boundary. 10 CFR 54.4(a)(1)
3. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. 10 CFR 54.4(a)(2)
4. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Environmental Qualification (10 CFR 50.49). Sample isolation valve from Liquid Poison system is environmentally qualified. 10 CFR 54.4(a)(3)

UFSAR References

1.9
11.5.2.12

License Renewal Boundary Drawings

LR-BR-M0012
LR-GE-148F723

Table 2.3.3.25 Post-Accident Sampling System

Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Piping and fittings	Leakage Boundary
	Pressure Boundary
	Structural Support
Valve Body	Leakage Boundary
	Pressure Boundary

The aging management review results for these components are provided in Table 3.3.2.1.25 Post-Accident Sampling System -Summary of Aging Management Evaluation

2.3.3.26 Process Sampling System

System Purpose

The intended function of the Process Sampling System for license renewal is to maintain leakage boundary integrity to preclude system interactions as described in ISG-09, "Guidance on the Identification of Structures, Systems, and Components that meet 10 CFR 54.4(a)(2)", dated March 15, 2002. For this reason, portions of this system's pressure retaining components located in proximity to other components performing safety-related functions have been included in the scope of license renewal. This system is not required to operate to support license renewal intended functions, and portions of this system are in scope for potential spatial interaction.

The Process Sampling System is designed to permit a representative sample to be taken in a form which can be used in the laboratory and which safeguards against change in the constituents to be examined, minimizes the contamination and radiation at the sample point and reduces decay and sample line plateout as much as possible.

The purpose of the Process Sampling System is to monitor the operation of equipment, and to supply information for making operating decisions where these are influenced by water chemistry. It accomplishes this by collecting steam, gaseous and liquid samples throughout the facility.

The Process Sampling System is comprised of the following subsystems: Reactor Sampling subsystem, Radwaste Sampling subsystem, Composite Sample subsystem, Hydrogen Detection/Sampling subsystem and the Off-Gas Sample subsystem. Sample stream flow rates are selected to maintain turbulent flow for more accurate sampling. All liquid sample lines are provided with means of regulating sample flow and are as short and direct as possible. Piping and sample lines are routed as to avoid crud traps, dead legs and low points. The sample line takeoffs are connected at the side of the process pipe rather than the bottom. Nozzles for liquid sampling are inserted into the process stream to about one fourth of the process pipe diameter for all pipes two inches and larger in diameter. This is to avoid sampling the relatively low velocity fluid near the wall of the pipe. Pipes smaller than two inches are sampled by reducing tees or flush welded tubing.

System Operation

Reactor Sampling Subsystem
The Reactor Sampling subsystem consists of the Reactor Water Sample Station (RWSS) and the Final Feedwater Facility (FFW).

The RWSS provides sample and analysis capabilities for reactor water and the Reactor Water Cleanup System (RWCU). All sample points terminate at the RWSS. The RWSS consists of a wet and a dry section to accommodate both grab sampling and in-line analysis instrumentation respectively. It is equipped with a splash guard sash and an exhaust fume hood. RWCU filter influent sample is taken from the filter inlet pipe to monitor reactor water quality. Filter effluent sample is taken at the filter outlet pipe for filter efficiency. Demineralized effluent sample is taken at the pump discharge pipe for demineralizer efficiency. A reactor water sample sink with a laboratory type hood and a demineralized water supply is provided for a continuous flowing reactor water cleanup filter inlet sample.

The FFW system consists of sampling of the turbine building primary systems. These systems include feedwater, condensate water and condensate demineralizer effluent. All sample points terminate at either the FFW sample sink or the condensate sample sink. The FFW provides sample and analysis capabilities for the final feedwater. Whenever necessary, sample coolers and valves for manual pressure reduction are provided. The FFW consists of in-line sample and analysis equipment. Grab sampling is done at both the feedwater and condensate sample sinks. Samples of the Feedwater System are taken at the sample sink located at the north wall of the feedwater pump room. Filter samples of feedwater, inline conductivity and dissolved oxygen are taken at the FFW sample console located to the right side of the feedwater pump room sample sink. Condensate is sampled at two points. One sample point is on the common header pipe just downstream of the tie-in from "C" condensate pump. The sample line extends from this sample point to the sample sink located on the north end of the feed pump room. Additionally there is a sample point at the inlet to the condensate demineralizers. The sample line extends to the sample sink on the south side of the Turbine Building Condensate Demineralizer Control Room. Condensate demineralizer effluent samples are taken from the demineralizer effluent header. Individual demineralizer bed effluent samples are taken from effluent conductivity instruments. The condensate sample sink is located at the south end of the Turbine Building Condensate Demineralizer Control Room.

This subsystem is not required to operate to support license renewal intended functions, but is included in the scope of license renewal as this liquid filled subsystem is located within an area in proximity of components performing a safety related function. Portions of this system are located in the Reactor and Turbine Buildings.

Radwaste Sampling Subsystem

The Radwaste Sampling subsystem monitors activity at various points of the Radwaste System which is a liquid and solid radioactive waste management system.

This subsystem is not required to operate to support license renewal intended functions, and is not included in the scope of license renewal as this liquid filled subsystem is not located within an area in proximity of components performing a safety related function. Portions of this system are located in the New Radwaste and Old Radwaste Buildings.

Composite Sample Subsystem

Composite samples of condenser cooling water are taken locally at the plant's intake and outfall. The outfall sampler is located at such a point that good mixing is ensured for the outflow. An influent sample is taken at the inlet to the closed cooling water heat exchanger in order to determine background. An effluent sample is taken as the discharge structure in order to monitor plant activity release.

This subsystem is not required to operate to support license renewal intended functions, and is not included in the scope of license renewal as this liquid filled subsystem is not located within an area in proximity of components performing a safety related function.

Hydrogen Detection/Sampling Subsystem

The Hydrogen Detection/Sampling subsystem monitors the Augmented Off Gas Recombiner

Subsystem. Hydrogen analyzers are located before and after the recombiners to monitor recombiner performance and to ensure that the hydrogen concentration is maintained below the flammable limit of 4% by volume.

This subsystem is not required to operate to support license renewal intended functions. Portions of this system are located in the Turbine Building, however they are not included in the scope of license renewal as this subsystem is gas filled and is not liquid or steam filled.

Off-Gas Sample Subsystem
The Off-Gas subsystem takes a sample after the air ejectors to measure activity release and H2O2 and air leakage, a sample at the stack to measure particulate and iodine release, and a sample at the inlet and outlet of the offgas filter to determine filter efficiency.

This subsystem is not required to operate to support license renewal intended functions. Portions of this system are located in the Turbine Building, however they are not included in the scope of license renewal as this subsystem is gas filled and is not liquid or steam filled.

For more detailed information, see UFSAR Section 9.3.2.

System Boundary

The license renewal scoping boundary of the Process Sampling System encompasses the liquid filled portions of the system that are located in proximity to equipment performing a safety-related function. This includes the liquid filled portions of the Reactor Sampling subsystem located within the Reactor Building and Turbine Building. Included in this boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of this system. For more information, refer to the License Renewal Boundary Drawings for identification of this boundary, shown in red.

Components and subsystems that are not required to support the system's leakage boundary intended function are not included in the scope of license renewal. This includes the Radwaste Sampling subsystem, Composite Sample subsystem, Hydrogen Detection/Sampling subsystem and Off-Gas Sample subsystem.

Not included in the Process Sampling System scoping boundary are the following interfacing systems, which are separately evaluated as license renewal systems:
Feedwater System
Condensate System
Turbine Building Closed Cooling Water System
Reactor Building Closed Cooling Water System
Reactor Water Cleanup System
Offgas Building Ventilation System
Radwaste Systems
Circulating Water System
Demineralized Water System

Reason for Scope Determination

The Process Sampling system is not in scope under 10 CFR 54.4(a)(1) because no portions of the system are safety related or relied on to remain functional during and following design basis events. The Process Sampling system is in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The system is not in scope under 10 CFR 54.4(a)(3) because it is not relied upon 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) and environmental qualification (10 CFR 50.49), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The Process Sampling System has the potential for spatial interaction with safety related equipment located in the vicinity to water filled process sampling piping. 10 CFR 54.4(a)(2)

UFSAR References

9.3.2
Table 9.3-3

License Renewal Boundary Drawings

LR-GU-3E-551-21-1001
LR-GU-3E-551-21-1000
LR-GE-148F444
LR-BR-2003
LR-BR-2002 sheet 2
LR-BR-2004 sheet 1
LR-BR-M0012

Table 2.3.3.26 Process Sampling System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Coolers	Leakage Boundary
Evaporator	Leakage Boundary
Flexible Hose	Leakage Boundary
Flow Element	Leakage Boundary
Piping and fittings	Leakage Boundary
Pump Casing	Leakage Boundary
Sensor Element	Leakage Boundary
Sight Glasses	Leakage Boundary
Tanks (Reservoir)	Leakage Boundary
Thermowell	Leakage Boundary
Valve Body	Leakage Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.26 Process Sampling System
-Summary of Aging Management Evaluation

2.3.3.27 Radiation Monitoring System

System Purpose

The Radiation Monitoring System is in scope for License Renewal. However, major portions of the system are not required to perform intended functions and are not in scope.

The Radiation Monitoring System is a system that utilizes radiation detectors to assess overall plant radiological conditions at the facility.

The purpose of the Radiation Monitoring System is to detect the release of radioactivity, monitor radiation levels in key locations throughout the plant, and monitor radioactivity concentration levels of major process system discharge streams.

The system accomplishes the purpose by utilizing radiation detectors and associated circuitry to monitor and indicate radiation levels.

The Radiation Monitoring system consists of Process and Effluent Radiological Monitoring, Area Radiation and Airborne Radioactivity Monitoring and Containment Atmosphere Particulate and Gaseous Radioactivity Monitoring (CAPGRMS).

The Process and Effluent Radiological Monitoring System consists of Main Steam Line Monitoring, Process Liquid Monitoring, Air Ejector Offgas Monitoring, Stack Radioactive Gaseous Effluent Monitoring (RAGEMS), Turbine Building RAGEMS, Domestic Sewer Effluent Monitor, and Augmented Offgas Building Ventilation Monitor. Process Liquid Monitoring is comprised of the reactor building closed cooling water monitor, the service water radiation monitor and the turbine building sump radiation monitor.

Most process and effluent monitors utilize radiation detectors located in proximity to the process piping being monitored, but some utilize sample piping to deliver a sample to a monitoring station. The service water radiation monitor is an offline radiation monitor on an enclosed skid located outside the Reactor Building. The sample piping to and from the service water radiation monitor is not included in this scoping evaluation, and is evaluated separately for license renewal with the Service Water System. Similarly, the Air Ejector Offgas Monitor sample piping is not included in this scoping evaluation, and is evaluated separately for license renewal with the Main Condenser Air Extraction System. The Augmented Offgas Building Ventilation Monitor sample piping is not included in this scoping evaluation, and is evaluated separately for license renewal with the Radwaste Area Heating and Ventilation System.

The Stack and Turbine Building RAGEMS include sample piping that deliver the gas samples to monitoring stations. These monitors ensure that plant releases do not exceed the limits specified in 10 CFR 20 and 10 CFR 50 Appendix I. These monitors do not support a license renewal intended function, and are not included in the scope of license renewal. The RAGEMS sample piping is not required to support a safety related pressure boundary, does not support a license renewal intended function, and so is also not included in the scope of license renewal.

The Area Radiation and Airborne Radioactivity Monitoring system consists of In Plant and Refueling Area Monitors, Augmented Offgas Building Area Monitors, New Radioactive Waste

Building Area Monitors and Reactor Building Ventilation Monitors.

The Containment Atmosphere Particulate and Gaseous Radioactivity Monitor System provides a diverse means of reactor coolant system leak detection by detecting the release of radioactivity from a leak and subsequent flashing to steam. The system is designed to detect both particulate and noble gas radiation. The CAPGRMS system draws a sample of the containment atmosphere from the Hydrogen and Oxygen Monitoring System. The sample is returned to the torus. The return line to the torus includes solenoid operated containment isolation valves

System Operation

The CAPGRMS system monitors the primary containment by drawing a containment atmosphere sample from the Hydrogen and Oxygen Monitoring System, which also draws a sample from the containment. The sample is drawn through the CAPGRMS monitoring station by an air sample pump. The sample is returned to the torus through two solenoid operated containment isolation valves.

The CAPGRMS continuously samples containment atmosphere for a fixed period and measures the activity levels for both particulates and noble gases. The measured count rates are compared to expected values stored in the CAPGRMS microprocessor. The CAPGRMS activates a Control Room annunciator when either the particulate or noble gas channel activity increases at a rate that exceeds the expected increase from a previous sample period, or exceeds a pre-established setpoint for either channel. The CAPGRMS is equipped with Control Room annunciation of system malfunction.

The Process and Effluent Radiological Monitoring System includes radiation monitors to provide indication, alarm, and in some cases, automatic control functions. Monitors that initiate isolation valve closure or plant shutdown are designed so that a single component failure does not prevent the required automatic action. All monitors are capable of self-supervision, i.e., give an alarm when downscale or de-energized. For monitoring configurations using offline sampling, alarms are also provided to give warning if the sampling flow is low. All monitors are capable of convenient, operational verification by means of test signals or radioactive check sources.

The Process and Effluent Radiological Monitoring System is designed to detect radioactive gaseous and liquid leakage, provide warning and automatic control as appropriate when radioactivity in a process stream reaches a preset limit, provide information on fuel and radioactive processing equipment performance, provide a record of radioactivity present in various plant systems, and provide a record of radioactivity released to the environment to assure compliance with regulatory limits. These monitors continuously measure, indicate, and record the radioactivity concentration levels of major process system discharge streams. The monitors are set to alarm when concentrations vary significantly from normal levels.

The Main Steam Line Monitoring subsystem is provided for continuous monitoring of each main steam line to permit the prompt indication of gross release of fission products from the fuel to the reactor coolant. Main steam line high radiation is an indication of excessive fuel failure. The Process Liquid Monitor subsystem is provided to monitor the radioactivity concentration levels of the major liquid process discharge streams, and to provide an alarm when concentration levels vary significantly from normal levels. The Domestic Sewer Monitor is provided to measure radiation level in the domestic sewer prior to discharge from the plant.

This monitor will initiate an alarm, and will also trip the sewer lift pump.

The Area Radiation and Airborne Radioactivity Monitoring system is designed to monitor the level of radiation in areas where personnel access may be required, assist in maintaining occupational radiation exposures as low as reasonably achievable, alarm when radiation levels exceed preset limits, and provide a continuous record of radiation levels in key locations throughout the plant.

The In Plant and Refueling Area monitors include thirty-two points of area monitoring, sufficient to insure that no plant areas where personnel are likely to work for prolonged periods of time are left unmonitored. The radiation monitors consist of gamma sensitive Geiger Mueller detectors or ion chamber detectors. All but three monitors are linked to a readout, power supply, and recorder located in the Main Control Room. Two refueling bridge monitors and one monitor located in the Chemistry Lab Post-Accident Sampling System (PASS) Room are for local alarm and indication only. Only two of the area monitors have automatic functions. Following a high alarm at the Spent Fuel Storage Pool low range monitor or the Reactor Building Equipment Hatch monitor, a two-minute timer is started. If the alarm has not cleared in two minutes, the Reactor Building normal ventilation is secured and the Standby Gas Treatment System is initiated.

The Augmented Offgas Building Area Monitors consist of four channels, each comprised of a detector, an alarm and meter module, and a readout module. The New Radioactive Waste Building Area Monitors consist of twenty channels, each comprised of a detector, an alarm and meter module, and a readout module. Both subsystems employ identical components. Each detector assembly consists of a dual air filled ion chamber and a preamplifier in a cylindrical wall mounted container. Each readout module receives and conditions the amplified output from the associated detector assembly for distribution to alert and high trip units, and to a logarithmic ratemeter. The alarm and meter modules provide local indication and annunciation.

Readout modules for the Augmented Offgas Building Area Monitoring channels are located in the Augmented Offgas Control Room. Output from the alert and high trip circuits also supply alert and high radiation indicator mounted at the stairwell entrance to the Augmented Offgas Building to warn personnel on entering of high radiation levels. Readout modules for the New Radwaste Building are located on the Radwaste Control Panel.

Reactor Building Ventilation Monitors provide continuous monitoring so that appropriate action can be taken if the radiation level is excessive. Two gross gamma detectors are located in the Reactor Building exhaust plenum upstream of the building ventilation system exhaust valve. The detectors are GM tubes identical to those used for area radiation monitoring. When either of the two detectors indicates a radioactivity level above the high alarm setpoint, a high radiation alarm is given in the Control Room. The Reactor Building Ventilation System isolation valves close automatically, and the exhaust is diverted to the Standby Gas Treatment System prior to release to the plant ventilation stack.

For more detailed information about the Radiation Monitoring System, see UFSAR Section 11.5, 12.3.4 and 5.2.5.1.3.

System Boundary

The majority of the Radiation Monitoring System consists of radiation detectors and associated circuitry, and a boundary description for a mechanical system is not applicable since these components are evaluated as an electrical commodity. Some portions of the system utilize sample piping to direct samples to monitoring stations. Most of the sample piping is either included within the associated process system license renewal evaluation boundary as described above, or is not included in the scope of license renewal. The only sample piping in the Radiation Monitoring System that is included in the scope of license renewal is associated with the CAPGRMS system.

The boundary of the CAPGRMS system begins at the attachment point to the Hydrogen and Oxygen Monitoring System. It continues through the CAPGRMS monitoring station through an air sample pump and then returns to the torus through two solenoid operated containment isolation valves and sample return piping to the connection with the torus shell. The CAPGRMS boundary includes all associated piping, components and instrumentation in the sample flowpath described above.

The portion of the CAPGRMS sample flowpath from the attachment point to the Hydrogen and Oxygen Monitoring System through the CAPGRMS monitoring station and sample return piping and components to the outer containment isolation valves are not required to perform a safety related intended function. Portions of this piping are included in the scope of license renewal for physical interaction as described below.

The CAPGRMS supports the primary containment isolation intended function. This portion of the CAPGRMS starts at the outer containment isolation valve and continues to the connection with the torus shell, and includes all associated piping and valves.

Included in the license renewal scoping boundary of the Radiation Monitoring System are those portions of nonsafety-related piping and equipment that extend beyond the safety-related/nonsafety-related interface up to the location of the first seismic anchor. The interface is located where the CAPGRMS sample return piping connects to the outer containment isolation valve. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Not included in the Radiation Monitoring system license renewal scoping evaluation boundary are the following systems, which are separately evaluated as license renewal systems:

Reactor Building Ventilation System
Standby Gas Treatment System
Hydrogen and Oxygen Monitoring System

Reason for Scope Determination

The Radiation Monitoring System is in scope under 10 CFR 54.4(a)(1) because portions of the system are safety related and relied on to remain functional during and following design basis events. The Radiation Monitoring System is in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The system is not in scope under 10 CFR 54.4(a)(3) because it is not relied upon 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), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Sense process conditions and generate signals for reactor trip or engineered safety features actuation. Reactor Building Ventilation System trip and isolation, and Standby Gas Treatment System initiation, on high radiation in reactor building ventilation exhaust, refuel platform or spent fuel pool area. 10 CFR 54.4 (a)(1)
2. Provide primary containment boundary. Sample return piping to torus and associated containment isolation valves provide a primary containment boundary. 10 CFR 54.4 (a)(1)
3. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. Non-safety related Radiation Monitoring System piping is attached and provides physical support to the safety related containment boundary piping. 10 CFR 54.4(a)(2)

UFSAR References

5.2.5.1.3
11.5
12.3.4

License Renewal Boundary Drawings

LR-GU-3E-666-21-1000

Table 2.3.3.27 Radiation Monitoring System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Piping and fittings	Pressure Boundary
	Structural Support
Valve Body	Pressure Boundary
	Structural Support

The aging management review results for these components are provided in
Table 3.3.2.1.27 Radiation Monitoring System
-Summary of Aging Management Evaluation

2.3.3.28 Radwaste Area Heating and Ventilation System

System Purpose

The Radwaste Area Heating and Ventilation System is in scope for License Renewal. However, major portions of the system are not required to perform intended functions and are not in scope.

The Radwaste Area Heating and Ventilation System is a normally operating mechanical ventilation system to the radwaste areas of the plant which include the Old Radwaste (ORW) Building, the New Radwaste (NRW) Building, the NRW Heat Exchanger Building, the Offgas Building, and the Hot Machine Shop in the New Maintenance Building.

The purpose of the Radwaste Area Heating and Ventilation System is to provide ventilation, heating and cooling to control area temperatures, to control air movement from low contamination areas to high contamination areas and to provide means for filtering and monitoring the exhaust air before discharging to atmosphere. It accomplishes this by means of five independent HVAC systems, incorporating the necessary fans, filters and ducting to accommodate the individual requirements of the processes contained within each of the five buildings.

The radiological design objectives of the Radwaste Area Heating and Ventilation System is to limit the average in-plant airborne radioactivity levels below the guideline limits in 10 CFR 20 and to reduce offsite releases of radioactivity to as low as reasonably achievable levels (10 CFR 50 App I). The system is not required to provide ventilation to support license renewal intended functions, but is in scope to support the pressure boundary integrity of the Ventilation Stack in meeting 10 CFR 100 limits. The ventilation exhaust ducts from the New and Old Radwaste Buildings connect to the Ventilation Stack and support the stack function of providing an elevated release path because they maintain their pressure boundary integrity to prevent the backflow of gas effluents and unmonitored release to the environment.

System Operation

The Radwaste Area Heating and Ventilation System comprises independent ventilation equipment in the following five buildings:

New Radwaste Building

The ventilation system for the NRW Building includes a supply system and an exhaust system. The supply system is comprised of one axial fan, associated ductwork, controls, heating coils and filters. The supply fan is sized to handle 100 percent fresh air with no recirculation and is filtered by fully automatic roll-up type filters and intermediate filters.

The exhaust system is comprised of two axial fans in the building, two axial fans on the roof, an isolation damper, a filter train and associated ductwork. The exhaust fans are each redundant and are sized to handle 100 percent of the exhaust air with no recirculation.

The exhaust filter train is sized to handle 100 percent exhaust air and consists of a roughing filter and a HEPA filter located directly upstream of the exhaust fans. After the air is filtered and discharged from the building, the exhaust booster fans transfer the air to the stack, where it is monitored for radioactivity and exhausted. A bypass ductwork arrangement is designed into the exhaust unit (filter train) to allow constant exhaust air flow during maintenance or replacement of filters.

An automatically operated isolation damper, located downstream of the booster exhaust fans on the roof, completely isolates the exhaust system from the outside environment during shutdown conditions, thus preventing backflow to the NRW Building from the Ventilation Stack.

The NRW Building Control Room, which is normally occupied, is air-conditioned using a minimum fresh air design. This room is sealed from adjacent areas and maintained at a positive pressure with respect to the adjacent building areas, which are under a slightly negative pressure. This design will allow only air leakage from the local Control Room to the adjacent areas at all times.

The NRW Building Control Room air conditioning system consists of a floor mounted package unit, located in the change room, and its associated ductwork extended to the single zone Control Room. The package unit is provided with an economizer cycle and low pressure steam coils for winter heating.

NRW Heat Exchanger Building

The Heat Exchanger Building is adjacent to the NRW Building. Temperatures and ventilation levels for this building are maintained by once-through outside air ventilation comprised of a wall exhaust fan and interconnected wall thermostat. A low-pressure steam unit heater provides heating.

Old Radwaste Building

The ORW Building ventilating system is comprised of two exhaust fans, two filter banks and discharges to the stack. The supply fans and air washer have been removed from service and abandoned in place. In normal operation one exhaust fan will be on. The alternate fan will be off and its respective inlet damper will be closed. An interlock is provided for the exhaust fans so that if the operating fan stops the other will start automatically. The Ventilation Stack pressure boundary is thus maintained whether the Old Radwaste Building exhaust fans are running or shut down with closed dampers. The exhaust fans have inlet vanes which are locked in an open position to hold the static pressure in the building at a negative 0.25 inches WG or greater. Heating is supplied by means of electric heating units throughout the building.

All exhaust air is filtered before release. Absolute filters remove small particles (0.3 microns or larger), and roughing filters upstream of the absolute filters remove large particles. The filters are arranged in two parallel banks, each with an air operated, manually controlled valve in the outlet.

Offgas Building

The Offgas Building Heating and Ventilation System is a push-pull heating and ventilation system providing once-through air flow with no recirculation. It is comprised of a supply air system and an exhaust air system, which discharges through a louver in the north wall of the building. The supply air system consists of one full capacity centrifugal fan in a cabinet together with an electric heating coil and prefilter. The prefilter is the renewable roll type and is automatically advanced to maintain a uniform pressure drop. The heating unit is a staged electric heater.

Sheet metal ducts are arranged to take outside air and deliver it to the various spaces within the building in proportion to the ventilation air in accordance with space requirements. An additional electric booster heating coil is provided in each of the three branches of the supply air system. This allows different temperatures to be selected for each zone.

The exhaust air system includes one full capacity air mover assembly, consisting of a cabinet containing a centrifugal fan together with a prefilter and final filter (HEPA). The prefilter is of the renewable roll type and is automatically advanced to maintain uniform pressure drop. The final filter is a replaceable high efficiency (99.97 percent) unit.

New Maintenance Building

The ventilation equipment for the New Maintenance Building is comprised primarily of 13 exhaust fans and associated ductwork providing ventilation of the individual rooms, unit & wall heaters and self contained a/c units. Four of the exhaust fans with filtered exhaust serve the Hot Machine Shop room of the New Maintenance Building. The remaining rooms of the New Maintenance Building are clean and discharges are not filtered.

The room exhaust for the Hot Machine Shop consist of two parallel trains with an intake isolation damper and pre and HEPA filters directly upstream of each exhaust fan. The fans then exhaust to the atmosphere. Two additional exhaust fans are provided, one being a fume exhauster. They both discharge to ductwork connected to the intake of one of the room exhaust thus being filtered prior to discharge.

For more detailed information, see UFSAR Section(s) 9.4.4 & 12.3.3.

System Boundary

The boundary of the Radwaste Area Heating and Ventilation System includes the supply and exhaust ventilation systems of the New Radwaste Building (NRW), the NRW Heat Exchanger Building, the Old Radwaste Building, the Offgas Building and the New Maintenance Building.

Not included in the license renewal scoping boundary are the following connected systems, which are separately evaluated as license renewal systems.
Instrument Air System
Heating & Process Steam System

The ventilation and pressure boundary integrity of the NRW Heat Exchanger Building, the Offgas Building and the New Maintenance Building are not required to support intended functions. This portion of the Radwaste Area Heating and Ventilation System is not included within the scope of license renewal.

The New and Old Radwaste Buildings exhaust ventilation ducts support the Ventilation Stack boundary intended function. The only portion of the Radwaste Area Heating and Ventilation System in scope of license renewal consists of the NRW Building exhaust duct from the isolation damper to the connection with the Reactor Building ventilation exhaust duct and the

Old Radwaste Building exhaust duct from the exhaust fan inlet isolation dampers to the connection with the Ventilation Stack. Not included in the scoping boundary of the Radwaste Area Heating and Ventilation System is the Reactor Building exhaust duct and the Ventilation Stack which are evaluated with the Reactor Building Ventilation System and Ventilation Stack Structure respectively for license renewal scoping.

Reason for Scope Determination

The Radwaste Area Heating and Ventilation System is not in scope under 10 CFR 54.4(a)(1) because no portions of the system are safety related or relied on to remain functional during and following design basis events. The Radwaste Area Heating and Ventilation System is in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The system is not in scope under 10 CFR 54.4(a)(3) because it is not relied upon 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) and environmental qualification (10 CFR 50.49), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. 10 CFR 54.4(a)(2) (The New and Old Radwaste Buildings outdoor exhaust ducts connect to and support the Ventilation Stack boundary and are required to maintain their pressure boundary integrity to prevent the backflow of gas effluents and unmonitored releases to the environment.)

UFSAR References

9.4.4
12.3.3

License Renewal Boundary Drawings

LR-BR-2012
LR-BR-2009 sheet 2

Table 2.3.3.28 Radwaste Area Heating and Ventilation System Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Damper housing	Pressure Boundary
Door Seal	Pressure Boundary
Ductwork	Pressure Boundary
Fan Housing	Pressure Boundary
Flexible Connection	Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.28 Radwaste Area Heating and Ventilation System
-Summary of Aging Management Evaluation

2.3.3.29 Reactor Building Closed Cooling Water System

System Purpose

The Reactor Building Closed Cooling Water (RBCCW) System is a closed-loop system designed to provide inhibited demineralized cooling water to Reactor Building and Primary Containment equipment that is subject to radioactive contamination. Included in the RBCCW System is a corrosion inhibiting chemical treatment system designed for intermittent injection of a chemical solution into the demineralized water contained within the system.

The purpose of the RBCCW System is to remove heat from the following loads during various modes of reactor operation: Spent Fuel Pool Cooling System (Fuel Pool Cooling Heat Exchangers and Augmented Fuel Pool Cooling Heat Exchanger), Shutdown Cooling System (Shutdown Cooling Heat Exchangers and Shutdown Cooling Pumps), Reactor Water Cleanup System (Cleanup Non-Regenerative Heat Exchangers, Cleanup Recirc. Pump Coolers, Cleanup Auxiliary Pump Coolers, and Cleanup Pre-Coat Pump Cooler), Reactor Building Ventilation System (Tunnel Coolers, Core Spray Pump Room Coolers, Containment Spray Pump Room Coolers), Reactor Building Floor and Equipment Drain System (Reactor Building Equipment Drain Tank Cooler), Drywell Cooling System (Drywell Cooling Units), Reactor Recirculation System (Recirc. Pump Seal and Motor Coolers), Post Accident Sampling System (Post Accident Sample Coolers), Process Sampling System (Reactor Water Sample Station Coolers, Thermal Control Unit Condenser, miscellaneous sample coolers), and Drywell Floor and Equipment Drain System (Drywell Equipment Drain Tank Heat Exchanger). The RBCCW System accomplishes this by transferring heat from these loads to the Service Water System through the RBCCW heat exchangers. Flow and temperature control is achieved through manual/remote manual manipulation of RBCCW System valves.

System Operation

The RBCCW System is comprised of pumps, heat exchangers, chemical addition equipment, a surge tank, and necessary controls and support equipment. Two half capacity RBCCW pumps discharge to a common header which branches into the two half capacity RBCCW heat exchangers. Cooling water from the RBCCW heat exchangers flows to a common header and is distributed in parallel to the components cooled by the RBCCW System. Cooling water from the equipment being cooled flows into a common return header and is routed to the pump's suction. A bypass line is provided from the RBCCW pump discharge header to the heat exchanger discharge header to compensate for fluctuations in service water temperature.

A surge tank is provided at the high point of the system and is sized to hold the expected maximum expansion of the RBCCW System. Makeup to the surge tank from the Demineralized Water Transfer System can be added manually or by an automatic level control valve. Makeup flowrate is monitored and recorded to provide an indication of RBCCW System leakage.

The chemical treatment system is comprised of a mixing tank and a chemical feed pump. Water is drawn from the discharge header of the RBCCW pumps and the solution is injected upstream of the pumps in the common pump suction header.

The RBCCW System penetrates the Primary Containment at two points to provide cooling to the Reactor Recirculation Pump seal and motor coolers, Drywell Equipment Drain Tank Heat

Exchanger, and the Drywell Cooling System fan unit cooling coils. RBCCW flow enters the Primary Containment through one motor operated and one check valve in series and exits the Primary Containment through two motor operated valves in series. The motor operated containment isolation valves automatically close when coincident reactor vessel low low level and drywell high pressure signals are present (LOCA signal) or when a reactor vessel triple low level signal is present. Deliberate operator action is required to reopen these isolation valves.

A safety injection signal (reactor vessel low low level or drywell high pressure) trips the RBCCW pumps. Then, during operation from the Emergency Diesel Generators, both RBCCW pumps start automatically after a time delay, unless a LOCA signal is present. Both RBCCW heat exchangers remain in service. One, two, or three shutdown cooling heat exchangers may be started up manually, depending on the total heat load on the system. RBCCW room cooling for Core Spray and Containment Spray equipment is not required for long term operation of these systems post LOCA.

The RBCCW System acts as a buffer between radioactively contaminated systems, which it cools, and the Service Water System, which is the heat sink for the RBCCW System. Process Liquid Monitoring (evaluated with the Radiation Monitoring System) is provided for the RBCCW System to continuously measure, indicate, and record the radioactivity concentration levels at the discharge header of the RBCCW heat exchangers.

For additional information, see UFSAR Section 9.2.2.

System Boundary

The RBCCW System boundary begins at the RBCCW System pumps and continues through the shell side of the RBCCW heat exchangers and through all the cooled loads (Fuel Pool Cooling Heat Exchangers, Augmented Fuel Pool Cooling Heat Exchanger, Shutdown Cooling Heat Exchangers, Shutdown Cooling Pumps, Cleanup Non-Regenerative Heat Exchangers, Cleanup Recirc. Pump Coolers, Cleanup Auxiliary Pump Coolers, Cleanup Pre-Coat Pump Cooler, Tunnel Coolers, Core Spray Pump Room Coolers, Containment Spray Pump Room Coolers, Reactor Building Equipment Drain Tank Cooler, Drywell Cooling Units, Reactor Recirculation Pump Seal and Motor Coolers, Post Accident Sample Coolers, Process Sampling Coolers and Condensers, and Drywell Equipment Drain Tank Heat Exchanger). The boundary continues from the cooled loads back to the suction of the RBCCW System pumps. Included in the boundary are the RBCCW System Primary Containment isolation valves, the RBCCW surge tank, and the RBCCW System chemical treatment equipment. All associated piping, components, and instrumentation contained within the flowpath described above are also included in the RBCCW System boundary.

Included in the license renewal boundary of the RBCCW System are those portions of nonsafety-related piping and equipment that extend beyond the safety-related/nonsafety-related interface up to the location of the first seismic anchor, or to a point no longer in proximity to equipment performing a safety-related function, whichever extends furthest. This includes the nonsafety-related portions of the system located within the Reactor Building and Primary Containment. Also included in the boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of this portion of the system. Not included in the scope of license renewal for leakage boundary are the Reactor Recirc. Pump Seal Cooler, Reactor Recirc. Pump Motor Cooler, Reactor Building Equipment Drain Tank Cooler, Reactor Water Sample Station Coolers, and Thermal Control Unit Condenser. These coolers are internal to components or enclosed panels and do not create the potential for spatial interaction (leakage or spray) with safety related equipment. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Not included in the RBCCW System license renewal scoping boundary are the following systems, which are separately evaluated as license renewal system:

Spent Fuel Pool Cooling System
Shutdown Cooling System
Reactor Water Cleanup System
Reactor Building Ventilation System
Reactor Building Floor and Equipment Drain System
Drywell Cooling System
Reactor Recirculation System
Post Accident Sampling System
Process Sampling System
Drywell Floor and Equipment Drain System
Water Treatment & Distribution System
Radiation Monitoring System

The RBCCW System supports the Primary Containment Boundary intended function. This portion of the system includes the RBCCW supply and return inboard and outboard containment isolation valves and interconnecting piping. The motor operated containment isolation valves are environmentally qualified and support the Environmental Qualification intended function.

The RBCCW System supports the Spent Fuel Pool Cooling System in ensuring adequate cooling in the spent fuel pool to maintain stored fuel within acceptable temperature limits. This portion of the system includes that which must remain operational and pressurized to provide cooling water to the Fuel Pool Cooling and Augmented Fuel Pool Cooling Heat Exchangers. It includes the RBCCW pumps, heat exchangers, and piping and valves associated with establishing this flowpath. It also includes the RBCCW System surge tank and associated piping and components since these must operate in order to compensate for thermal expansion and monitor for system leakage. It does not include the RBCCW System chemical treatment equipment since this equipment operates intermittently and is not necessary for RBCCW System support of this intended function.

The RBCCW System supports the Fire Protection intended function. This portion of the system includes that which must remain operational and pressurized to provide cooling water to the Shutdown Cooling System heat exchangers and pumps. It includes the RBCCW pumps, heat exchangers, and piping and valves associated with establishing this flowpath. It also includes the RBCCW System surge tank and associated piping and components since these must operate in order to compensate for thermal expansion and monitor for system leakage. It does not include the RBCCW System chemical treatment equipment since this equipment operates intermittently and is not necessary for RBCCW System support of this intended function.

Reason for Scope Determination

The Reactor Building Closed Cooling Water System meets 10 CFR 54.4(a)(1) because portions of the system are safety related and relied on to remain functional during and following design basis events. The Reactor Building Closed Cooling Water System is in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The Reactor Building Closed Cooling Water System meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for Fire Protection (10 CFR 50.48) and Environmental Qualification (10 CFR 50.49). The Reactor Building Closed Cooling Water System is not relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Provide primary containment boundary. The RBCCW System includes Primary Containment isolation valves that close to prevent the release of radioactive contamination through system lines. - 10 CFR 54.4(a)(1)
2. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The RBCCW System provides cooling to the Fuel Pool Cooling and Augmented Fuel Pool Cooling Heat Exchangers to ensure that stored fuel is maintained within acceptable temperature limits. The RBCCW System contains non-safety related water filled lines throughout the Primary Containment and the Reactor Building which have spatial interactions (spray or leakage) with safety related SSCs. - 10 CFR 54.4(a)(2)
3. Relied upon 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). The RBCCW System is credited for supporting the Shutdown Cooling System (SDC). - 10 CFR 54.4(a)(3)
4. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Environmental Qualification (10 CFR 50.49). The Primary Containment isolation valves within the RBCCW System are Environmentally Qualified. - 10 CFR 54.4(a)(3)

UFSAR References

3.1
9.2
7.3
Table 6.2-12

License Renewal Boundary Drawings

LR-BR-2006 sheet 1
LR-BR-2006 sheet 2
LR-BR-2006 sheet 3
LR-BR-2006 sheet 5
LR-BR-2006 sheet 7
LR-GU-3E-551-21-1001
LR-GE-148F444

LR-BR-M0012
LR-GE-107C5339
LR-JC-147434 sheet 2

Table 2.3.3.29 Reactor Building Closed Cooling Water System Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Coolers (Cleanup Auxiliary Pump)	Leakage Boundary
Coolers (Cleanup Pre-coat Pump)	Leakage Boundary
Coolers (Cleanup Recirc. Pumps Lube Oil)	Leakage Boundary
Coolers (Containment Spray Pump Room)	Leakage Boundary
Coolers (Core Spray Pump Room)	Leakage Boundary
Coolers (Drywell Cooling Units)	Leakage Boundary
Coolers (Post Accident Sample)	Leakage Boundary
Coolers (Sample)	Leakage Boundary
Coolers (Shutdown Cooling Pumps)	Heat Transfer
	Pressure Boundary
Coolers (Tunnel)	Leakage Boundary
Filter Housing	Leakage Boundary
Flow Element	Pressure Boundary
Gauge Snubber	Leakage Boundary
	Pressure Boundary
Heat Exchangers (Augmented Fuel Pool Cooling)	Heat Transfer
	Pressure Boundary
	Structural Support
Heat Exchangers (Cleanup Non-Regenerative)	Leakage Boundary
Heat Exchangers (Drywell Equipment Drain Tank)	Leakage Boundary
	Structural Support
Heat Exchangers (Fuel Pool Cooling)	Heat Transfer
	Pressure Boundary
Heat Exchangers (Shutdown Cooling)	Heat Transfer
	Pressure Boundary
Level Glass	Leakage Boundary
Piping and fittings	Leakage Boundary
	Pressure Boundary
Pump Casing (Chemical Feed Pump)	Leakage Boundary
Pump Casing (RBCCW Pumps)	Pressure Boundary
Rupture Disks	Leakage Boundary
Strainer Body	Leakage Boundary
Tanks (Chemical Mixing Tank)	Leakage Boundary
Tanks (RBCCW Surge Tank)	Pressure Boundary

Thermowell	Leakage Boundary
	Pressure Boundary
Valve Body	Leakage Boundary
	Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.29 Reactor Building Closed Cooling Water System
-Summary of Aging Management Evaluation

2.3.3.30 Reactor Building Floor and Equipment Drains

System Purpose

Reactor Building Floor and Equipment Drains (RFED) are comprised of both gravity and pumped fluid lines designed to provide collection of drainage from floor drains and equipment drains located in the Reactor Building structure outside of the primary containment, and subsequent transfer of the drainage to the Radwaste System.

The purpose of the RFED is to provide for collection of floor drains and equipment drains located in the Reactor Building outside of the primary containment, and to transfer the collected drainage to the Radwaste System for processing. The RFED accomplish this purpose by directing floor drains first to the Torus room and then to one of two sumps in the Reactor Building basement, and directing equipment drains through a ring header to the Reactor Building Equipment Drain Tank. The Reactor Building Floor Drain Sump – A (1-6 floor drain sump) in the Reactor Building basement drains by gravity to the Reactor Building Floor Drain Sump – B (1-7 floor drain sump), which uses duplex, 100 percent capacity pumps to transfer the collected drainage to Radwaste System collection tanks for processing. A single pump transfers drainage from the Reactor Building Equipment Drain Tank to the Radwaste System collection tanks.

System Operation

The RFED are comprised of drain lines that begin at various floor drains and equipment drain funnels located throughout the Reactor Building. The floor drain lines are directed into the Torus room, and then into either the 1-6 or 1-7 floor drain sump in the Reactor Building basement. Check valves are located in the floor drains of the NW and SW corner rooms, which allow drain flow from the corner rooms into the Torus room but prevent flooding of the corner rooms from the Torus room. Air operated isolation valves are located in the lines to the 1-6 and 1-7 floor drain sumps, which close on high-high 1-7 floor drain sump level. These valves isolate the sumps from the Torus room, which prevents flooding the NE and SE corner rooms where the sumps are located. The 1-6 floor drain sump gravity drains to the 1-7 floor drain sump through a crosstie header, which has air operated valves located on either end. These valves also close on high-high 1-7 floor drain sump level to isolate the 1-6 and 1-7 floor drain sumps. Duplex pumps transfer the 1-7 sump contents to the Chemical Waste Floor Drain Collection Tanks (evaluated with the Radwaste System).

Equipment drain lines are collected by a ring header located below the Reactor Building first floor and drained to the Reactor Building Equipment Drain Tank. This tank also collects water from the scram discharge headers after a scram is reset. The tank is vented to the stack through ventilation ducts. One pump transfers the drainage from the tank to either of the high purity waste collection tanks in the Radwaste System. The equipment drain tank, drain tank pump, and sump pumps are controlled from the radwaste control panel.

The floor drain from the cask decontamination area empties into the laundry drain tank (evaluated with the Miscellaneous Floor and Equipment Drain Systems).

Each level of the Reactor Building with the exception of El. 119’ is equipped with sufficient floor drainage capability to pass the maximum credible floor drain flow rate resulting from actuation of the Fire Suppression System or a pipe break. Elevation 119’ does not require a floor drain network, as stairwells and equipment storage pools are sufficient to prevent flooding of this area.

For more detailed information, see UFSAR section 9.3.3.

System Boundary

The license renewal scoping boundary of the RFED begins with the individual floor and equipment drains located in the Reactor Building outside of the primary containment, and continues through gravity lines to the Reactor Building Floor Drain Sumps and Reactor Building Equipment Drain Tank. Duplex pumps at the 1-7 sump discharge the drainage through pressure piping to the attachment point on the discharge piping from the Drywell Floor and Equipment Drains system floor drain sump pumps. A single pump at the Reactor Building equipment drain tank discharges the drainage through pressure piping to the attachment point on the pump discharge piping from the Drywell Equipment Drain Tank. (These discharge pipes continue as part of the Drywell Floor and Equipment Drains system to the various Radwaste System collection tanks.) Included in this boundary are the gravity-fed floor drains and floor drain check valves relied on to prevent flooding of the Reactor Building areas by actuation of the Fire Protection System. Also included in this boundary is that portion of the system that is located in proximity to equipment performing a safety-related function. This includes the various valves, fittings, and other pressure retaining components relied upon to preserve the leakage boundary intended function of the system. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Not included in the scope of license renewal are equipment drain portions of the RFED that are encased in concrete, as leakage in this environment does not have the potential for spatial interaction, and equipment drains are not relied on to prevent flooding from Fire Protection System water. Not included in the RFED boundary are the following systems, which are separately evaluated as license renewal systems:
Radwaste System
Miscellaneous Floor and Equipment Drain Systems
Drywell Floor and Equipment Drains
Fire Protection System

Reason for Scope Determination

The Reactor Building Floor and Equipment Drains system does not meet 10 CFR 54.4(a)(1) because it is not a safety related system that is relied upon to remain functional during and following design basis events. It does meet 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for fire protection (10 CFR 50.48). The Reactor Building Floor and Equipment Drains system is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for environmental qualification (10 CFR 50.49), ATWS (10 CFR 50.62), or station blackout (10 CFR 50.63).

System Intended Functions

1. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The RFED have the potential for spatial interaction with safety-related equipment within the Reactor Building. 10 CFR 54.4(a)(2)
2. Relied upon 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). Portions of the RFED are relied upon to remove credible water flow due to actuation of the Fire Protection System in the Reactor Building. 10 CFR5 4.4(a)(3)

UFSAR References

9.3.3

License Renewal Boundary Drawings

LR-JC-147434 sheet 2
LR-JC-147434 sheet 3
LR-GE-148F437 sheet 2
LR-BR-2002 Sheet 2
LR-BR-2006 Sheet 1
LR-BR-M0012
LR-GE-148F262
LR-GE-148F444
LR-GE-148F711
LR-GE-197E871
LR-GE-237E487
LR-GE-237E756
LR-GE-885D781

Table 2.3.3.30 Reactor Building Floor and Equipment Drains
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Piping and fittings	Leakage Boundary
	Pressure Boundary
Pump Casing (RBEDT pump)	Leakage Boundary
Tanks (RBEDT)	Leakage Boundary
Valve Body	Leakage Boundary
	Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.30 Reactor Building Floor and Equipment Drains
-Summary of Aging Management Evaluation

2.3.3.31 Reactor Building Ventilation System

System Purpose

The Reactor Building Ventilation System (RBVS) is a continuously operating ventilation system with primary containment purge capability and an isolation mode. The system is designed to provide a controlled environment so that the maximum allowable ambient temperature for standard rated electrical equipment is not exceeded. It also regulates the static pressure within certain areas of the plant, so as to minimize the spread of airborne radioactive contamination from controlled to uncontrolled areas and provides for safe disposal of airborne contaminants. It accomplishes the above by maintaining a negative pressure within the Reactor Building with respect to outside atmosphere while ventilating the Reactor Building with fresh tempered air and by exhausting through the Ventilation Stack. The RBVS is also used during inerting and deinerting of primary containment and provides the flow paths for the Standby Gas Treatment System (SGTS) and the Containment Inerting System (CIS) for design basis events.

During normal operation, the RBVS is operating and the SGTS is in standby. During a Design Basis Accident the RBVS secondary containment isolation valves are closed, the RBVS fans stopped and the SGTS fans are automatically started and effluents are filtered prior to elevated release through the Ventilation Stack.

System Operation

The RBVS supply and exhaust is comprised of one air washer, three 50% capacity supply fans, a steam heating coil bank, supply & exhaust headers and ducts, secondary containment isolation valves, primary containment isolation valves, booster fans, Reactor Building normal and standby exhaust fans with separate duct exhausts to the Ventilation Stack and associated dampers, flexible connections and penetration piping. The trunnion room cooling consists of two recirculation fans with cooling coils and each of the four containment spray and core spray pump rooms consists of a recirculation fan with cooling coils.

The Reactor Building negative pressure monitoring instrumentation consists of local and control room indication of differential pressure between the Reactor Building and the outside atmosphere.

Air entering the system is cooled by an air washer or heated by steam coils prior to being drawn through the supply fans and discharged into two supply headers. Paired supply ducts distribute air throughout the buildings major elevations. The system also uses two isolation valves in series in each supply duct for secondary containment isolation. The operating exhaust fan draws building air into exhaust vents located throughout the building and discharge it through the Ventilation Stack. The normal ventilation exhaust ducts for the spent fuel, reactor cavity and dryer/separator pool area is arranged to take suction through multiple inlets around the periphery of the pools above the water line. Two isolation valves are installed in series in the main exhaust duct upstream of the exhaust fans air intake and downstream of any branch connections to the exhaust duct plenum. The operating exhaust fan pulls the discharge stream from this Reactor Building plenum through a fan inlet damper and discharge backdraft damper before discharge into the Ventilation Stack. The RBVS is also used during inerting to vent and during deinerting to purge and vent the primary containment when the reactor is shutdown for refueling or when primary containment access is required. During a

Design Basis Accident the operating RBVS supply and exhaust fans trip and lock out, and the isolation valves close on high drywell pressure or low-low reactor water level or high radiation levels in the Reactor Building. The SGTS starts automatically and draws from the RBVS exhaust ducts upstream of the isolation dampers. The RBVS is also used for post LOCA venting in conjunction with the SGTS and CIS.

The RBVS also includes the trunnion room recirculation fans which run during power operation and the containment spray, core spray and Control Rod Drive (CRD) pump room recirculation fans which operate with their corresponding pumps.

For more detailed information, see UFSAR Section 9.4.2.

System Boundary

The Reactor Building Ventilation System (RBVS) supply boundary begins at the inlet louver of the single intake and passes through an inlet damper, a wet cell air washer, a heating coil and into an intake plenum. The spray washers and the heating coils in the RBVS supply duct are supplied with water and steam from the Water Treatment & Distribution and Heating & Process Steam systems respectively. The spray nozzles, coils and connected piping are included and evaluated with their respective systems for license renewal. Three 50% supply fans in parallel draw air from the intake plenum and through air operated backdraft and balancing dampers before discharge into a common supply plenum feeding the Reactor Building supply air headers. The two supply headers feed the upper four elevations of the Reactor Building with parallel ducts to the five major elevations of the Reactor Building. As the supply ducts pass through the Reactor Building boundary they each contain a pair of Secondary Containment Isolation valves in series. Ductwork equipped with fire dampers then supplies the remaining elevations. A single duct also supplies the Drywell. The duct passes through the secondary containment isolation valves in series and drywell purge primary containment isolation valves in series and ends at the primary containment penetration. A pipe section of this supply downstream of the inboard drywell purge containment isolation valve, connects with the nitrogen supply of the CIS. Not included in the RBVS scoping boundary is the portion of this nitrogen supply piping upstream of the containment isolation valve leak test connection, which is evaluated as part of the CIS.

The RBVS exhaust duct boundary begins at the inlet registers at the major elevations and are joined by ducts from the piping penetrations from the drywell and torus. A single exhaust header that contains flow dampers and fire dampers connects through a locked open damper to the suction line of the parallel SGTS exhaust path before passing through the two secondary containment isolation valves in series and into a stack exhaust inlet plenum. The plenum connects to three exhaust ducts, each equipped with an exhaust fan, one for the Reactor Building, one for the Turbine Building and a standby, which discharge into the three exhaust ducts. All three of these separate fan exhaust ducts from the backdraft dampers are included in the RBVS scoping boundary which ends at the RBVS connection to the Ventilation Stack. Not included in the scoping boundary of the RBVS is the Turbine building exhaust fan, which is evaluated with the Turbine Building Ventilation System for license renewal scoping. The discharge duct of the standby exhaust fan connects with the discharge of the SGTS and the Radwaste Area Heating and Ventilation System prior to discharge to the Ventilation Stack. Not included in the scoping boundary of the RBVS are the discharge ducts from SGTS and Radwaste Area Heating and Ventilation System, which are evaluated with their respective systems for license renewal.

Additionally, the RBVS boundary also includes exhaust ducts connected with booster fans from the reactor water sample station of the Process Sampling System and the CRD rebuild room. Also included are the exhaust ducts from the Reactor Building Equipment Drain Tank of the Reactor Building Floor and Equipment Drains System and from the Post Accident Sampling System (PASS) room sample hoodof the Main Office Building.

Included in the RBVS boundary are the containment spray, core spray and CRD pump room recirculation fans and the trunnion room recirculation fans. The coils within the recirculation fans are supplied cooling water from the Reactor Building Closed Cooling Water (RBCCW) system. The cooling coils and connected RBCCW piping are included and evaluated with the RBCCW license renewal system.

Also contained within the RBVS is the Reactor Building negative pressure monitoring instrumentation.

Not included in the RBVS scoping boundary are the following systems, which are separately evaluated as license renewal systems:
Standby Gas Treatment System
Containment Inerting System
Radwaste Area Heating and Ventilation System
Containment Vacuum Breakers
Reactor Building Closed Cooling Water System

Not included in the scoping boundary of the RBVS are the drywell nitrogen relief vent valves and their associated piping up to the connections to the Reactor Building Ventilation System, which are evaluated with Containment Inerting System for license renewal scoping.

The Reactor Building Ventilation System supports the intended functions of primary and secondary containment boundary and control of combustible gas mixtures in the primary containment under accident conditions. The portion of the Reactor Building Ventilation System in scope for License Renewal includes the secondary containment isolation valves in series on the supply ducts from the Reactor Building wall to the valves and all duct and fittings between them. Also included are the primary containment purge and vent isolation valves and all pipe and fittings from the primary containment penetrations to the second outboard isolation valve and the RBVS torus ventilation exhaust line from the connection to the Containment Vacuum Breakers, including the torus ventilation exhaust valves. Additionally included are the exhaust ducts in the Reactor Building from the upper elevations to the in series secondary containment isolation valves, all ducts, dampers and fittings between them, a branch connection ending at the suction of the SGTS and the three stack exhaust system ducts from the fan exhaust backdraft dampers to the connections to the Ventilation Stack.

The exhaust ducts connected with booster fans from the reactor water sample station of the Process Sampling System and the CRD rebuild room along with the exhaust duct from the Reactor Building Equipment Drain Tank of the Reactor Building Floor and Equipment Drains System are not required to support intended functions. This portion of the Reactor Building Ventilation System exhaust is not included within the scope of license renewal.

Reason for Scope Determination

The Reactor Building Ventilation System meets 10 CFR 54.4(a)(1) because portions of the system are safety related and relied on to remain functional during and following design basis events. The Reactor Building Ventilation System is in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The Reactor Building Ventilation System meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for Equipment Qualification (10 CFR 50.49) and for Fire Protection (10 CFR 50.48). The Reactor Building Ventilation System is not relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Provide primary containment boundary. (Drywell and Torus purge and vent valves provide primary containment isolation.) 10 CFR54.4(a)(1)
2. Provide secondary containment boundary. (Supply and exhaust ducts and isolation dampers minimize ground level release of airborne radioactive materials under accident conditions by limiting potential paths to the environment. Exhaust ducts direct airborne radioactive materials to SGTS before elevated release at the Ventilation Stack.) 10 CFR 54.4(a)(1)
3. Control combustible gas mixtures in the Primary Containment atmosphere. (The RBVS supports CIS for post accident combustible gas control of the containment atmosphere.) 10 CFR 54.4(a)(1)
4. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. 10 CFR 54.4(a)(2) (The Reactor Building Ventilation System outdoor exhaust ducts connect to and support the Ventilation Stack boundary and are required to maintain their pressure boundary integrity to prevent the backflow of gas effluents and unmonitored releases to the environment.)
5. Relied upon 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). (Fire dampers provide isolation to prevent spread of a fire, RBVS supports CIS with establishing the inert drywell environment in which a design basis fire cannot occur. The RBVS is not required to function during a fire or survive a fire.) - 10 CFR 54.4(a)(3)

6. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Environmental Qualification (10 CFR 50.49). The limit switches associated with the Primary Containment isolation valves are Environmentally Qualified - 10 CFR 54.4(a)(3)

UFSAR References

9.4.2
11.3.2.5

License Renewal Boundary Drawings

LR-BR-2011 sheet 2
LR-BR-2009 sheet 2

LR-GU-3E-243-21-1000

Table 2.3.3.31 Reactor Building Ventilation System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Closure bolting (Containment Isolation Components)	Mechanical Closure
Damper housing	Pressure Boundary
Door Seal	Pressure Boundary
Ductwork	Pressure Boundary
Piping and fittings	Pressure Boundary
Piping and fittings (Primary Containment Isolation Valves)	Pressure Boundary
Sensor Element (Temperature)	Pressure Boundary
Valve Body	Pressure Boundary
Valve Body (Primary Containment Isolation)	Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.31 Reactor Building Ventilation System
-Summary of Aging Management Evaluation

2.3.3.32 Reactor Water Cleanup System

System Purpose

The Reactor Water Cleanup (RWCU) System is a filtration and demineralization system that maintains the purity of the water in the Reactor Coolant System. It can be operated during startup, shutdown, and refueling modes, as well as during power operation.

The purpose of the Reactor Water Cleanup System is to: reduce the deposition of water impurities on fuel surfaces, thus minimizing heat transfer surface fouling; reduce secondary sources of beta and gamma radiation by removing corrosion products, impurities and fission products from the reactor coolant; reduce the concentration of chloride ions to protect steel components from chloride stress corrosion; and maintain or lower water level in the reactor vessel during startup, shutdown and refueling operations, in order to accommodate reactor coolant swell during heatup and to accommodate water inputs from the Control Rod Drive System and the Head Cooling System.

Portions of the RWCU System are considered reactor coolant system pressure boundary. The RWCU System will automatically undergo partial or complete isolation depending upon the initiating event. Partial isolation removes the system from service without fully isolating it from the Reactor Coolant Pressure Boundary (closure of RWCU supply valve only). Partial isolation will occur for RWCU System/component protection in response to RWCU system anomalies (discussed further in System Operation section), or, for Standby Liquid Control (Liquid Poison) System flow. Full isolation of the RWCU System from the Reactor Coolant Pressure Boundary (closure of RWCU supply and return valves) occurs in response to low-low reactor water level or high drywell pressure RPS engineered safety feature system actuation parameters, or, indication of an RWCU High Energy Line Break (HELB).

System Operation

The RWCU System consists of a regenerative heat exchanger, a non regenerative heat exchanger, a pressure reducing station, cleanup filters and auxiliaries (e.g., precoat tank, precoat pump, filter aid pump, etc.), a cleanup demineralizer, cleanup pumps, a surge tank, a flow control station, a reactor drain station, isolation valves, and piping.

Reactor coolant flows under reactor pressure from the suction of Reactor Recirculation Pump B, through the RWCU supply isolation valves, is cooled in the regenerative and non regenerative heat exchangers (in series), is pressure reduced, filtered, demineralized, and pumped through a flow control valve and the regenerative heat exchanger, through the RWCU return isolation valves, to the discharge of Reactor Recirculation Pump B. When reactor pressure is insufficient to maintain the required suction pressure at the cleanup recirculation pump, an auxiliary cleanup pump is placed in operation. The RWCU System simultaneously takes suction from the Reactor Vessel bottom drain. Flow from this low point assists in preventing thermal stratification in the lower vessel head region and removes any impurities that may settle in the lower head region. The RWCU System can be used to remove excess water from the reactor in order to maintain reactor water level during startup, shutdown, and refueling evolutions. To lower reactor level, some of the cleanup system effluent flow is directed to the Condensate System or to the Radwaste System.

The RWCU System supply piping off of the Reactor Recirculation Pump B suction piping has an AC motor operated isolation valve inside the drywell and two parallel DC motor operated valves outside the drywell. The RWCU System return piping to the discharge of Reactor Recirculation Pump B has one AC motor operated valve outside the drywell and one check valve inside the drywell. The RWCU system supply isolation valves will close, and the cleanup pumps will stop automatically, under any of the following conditions: high drywell pressure, low-low reactor water level, high area temperature (RWCU HELB isolation signal), Standby Liquid Control System (Liquid Poison System) flow, or for RWCU System protection (e.g., low cleanup filter flow, high auxiliary pump cooling water outlet temperature, high non regenerative heat exchanger outlet temperature (reactor coolant), high pressure from the pressure reducing station). The RWCU System return isolation valve will close, and the cleanup pumps will stop automatically, under any of the following conditions: high drywell pressure, low-low reactor water level, high area temperature (RWCU HELB isolation signal).

The Noble Metals Monitoring System (NMMS) draws a small bypass flow of reactor coolant from around the RWCU Regenerative and Non-Regenerative Heat Exchangers. The NMMS is evaluated as its own License Renewal System.

For more detailed information, see UFSAR Section 5.4.

System Boundary

The RWCU System boundary starts at the attachment to the Reactor Recirculation Pump B suction piping and the attachment to the Reactor Vessel bottom drain. The boundary continues through the RWCU supply isolation valves, cleanup auxiliary pump, tube sides of the regenerative heat exchangers, tube sides of the non regenerative heat exchangers (the shell sides of the non regenerative heat exchangers are evaluated with the Reactor Building Closed Cooling Water System), pressure reducing station, cleanup filters (including filter auxiliaries), cleanup demineralizer, cleanup recirculation pumps, flow control station, shell sides of the regenerative heat exchangers, RWCU return isolation valves, and back to the attachment to the Reactor Recirculation Pump B discharge piping. Also included within the RWCU System boundary is the RWCU piping relief valve discharge line up to the suppression pool, the RWCU discharge (letdown) line to the Condensate System, the RWCU discharge (letdown) line to the Radwaste System, and the spent resin and waste filter sludge lines to the Radwaste System. All associated piping and components contained within the flowpaths described above are included in the RWCU boundary.

Included in the license renewal boundary of the RWCU System are those portions of nonsafety-related piping and equipment that extend beyond the safety-related/nonsafety-related interface up to the location of the first seismic anchor, or to a point no longer in proximity to equipment performing a safety-related function, whichever extends furthest. This includes the nonsafety-related portions of the system located within the Reactor Building outboard of the Primary Containment isolation valves. Also included in the boundary are pressure retaining components located in the Reactor Building, Turbine Building, and Exhaust Tunnel relied upon to preserve the leakage boundary intended function of the system. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Not included in the RWCU System scoping boundary are the following interface systems, which are separately evaluated as license renewal systems:
Reactor Recirculation System
Noble Metals Monitoring System
Condensate System

Radwaste System
Reactor Building Closed Cooling Water System

Reason for Scope Determination

The Reactor Water Cleanup (RWCU) System meets 10 CFR 54.4(a)(1) because portions of the system are safety related and relied on to remain functional during and following design basis events. The RWCU System meets 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48) and environmental qualification (10 CFR 50.49). The RWCU system is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Introduce emergency negative reactivity to make the reactor subcritical. The RWCU System trips and partially isolates from the RCPB upon Standby Liquid Control (Liquid Poison) flow. - 10 CFR 54.4(a)(1)
2. Provide reactor coolant pressure boundary. The RWCU System trips and fully isolates from the RCPB upon indication of a RWCU HELB. - 10 CFR 54.4(a)(1)
3. Provide primary containment boundary. The RWCU System trips and fully isolates from the Primary Containment due to reactor low-low level or hi drywell pressure (RPS). - 10 CFR 54.4(a)(1)
4. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The RWCU System contains non-safety related water filled lines in the Reactor Building, Turbine Building, and Exhaust Tunnel which have spatial interactions (spray or leakage) with safety related SSCs. - 10 CFR 54.4(a)(2)
5. Relied upon 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). The RWCU isolation valves are credited as high/low pressure interfaces. - 10 CFR 54.4(a)(3)
6. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Environmental Qualification (10 CFR 50.49). The Primary Containment isolation valves within the RWCU System are Environmentally Qualified. - 10 CFR 54.4(a)(3)

UFSAR References

5.4.3
5.4.8
6.2.4

License Renewal Boundary Drawings

LR-GE-148F444
LR-BR-2003
LR-GE-237E798
LR-GU-3E-243-21-1000
LR-BR-2013 sheet 6
LR-BR-2004 sheet 2

Table 2.3.3.32 Reactor Water Cleanup System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Coolers (Cleanup Pre-coat Pump)	Leakage Boundary
Coolers (Cleanup Recirc. Pumps Lube Oil)	Leakage Boundary
Demineralizer (Cleanup Demineralizer)	Leakage Boundary
Filter Housing (Cleanup Filter)	Leakage Boundary
Flow Element	Leakage Boundary
Gauge Snubber	Leakage Boundary
Heat Exchangers (Cleanup Non-Regenerative)	Leakage Boundary
Heat Exchangers (Cleanup Regenerative)	Leakage Boundary
Piping and fittings	Leakage Boundary
	Pressure Boundary
Pump Casing (Cleanup Auxiliary Pump)	Leakage Boundary
Pump Casing (Cleanup Filter Aid Pumps)	Leakage Boundary
Pump Casing (Cleanup Filter Precoat Pump)	Leakage Boundary
Pump Casing (Cleanup Recirc Pumps)	Leakage Boundary
Pump Casing (Cleanup Sludge Pump)	Leakage Boundary
Restricting Orifice	Leakage Boundary
Sensor Element	Leakage Boundary
Sight Glasses	Leakage Boundary
Strainer Body	Leakage Boundary
Tanks (Cleanup Backwash Tank)	Leakage Boundary
Tanks (Cleanup Filter Aid Mix Tank)	Leakage Boundary
Tanks (Cleanup Filter and Precoat Tank)	Leakage Boundary
Tanks (Cleanup Filter Sludge Receiver)	Leakage Boundary
Tanks (Cleanup Recirc. Pump Surge Tank)	Leakage Boundary
Tanks (Cleanup Recirc. Pumps Lube Oil)	Leakage Boundary
Thermowell	Leakage Boundary
Valve Body	Leakage Boundary
	Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.32 Reactor Water Cleanup System
-Summary of Aging Management Evaluation

2.3.3.33 Roof Drains and Overboard Discharge

System Purpose

The Roof Drains and Overboard Discharge System (RDODS) is a passive drainage system designed to collect and discharge effluents from the plant to the discharge canal. The purpose of the RDODS is to collect and discharge effluents from plant open cooling water systems, plant building drainage systems, and yard area storm drains. The RDODS accomplishes this through a 30" overboard discharge line that starts outside of the Reactor Building and runs to the discharge canal. It carries Service Water discharge from the Reactor Building Closed Cooling Water heat exchangers, Emergency Service Water from the Containment Spray System heat exchangers, Turbine Building sump 1-5 effluent, roof/floor/equipment drainage from various plant buildings, and yard area storm water.

System Operation

The RDODS is comprised of a 30" overboard discharge line that starts at the seal well (evaluated with Miscellaneous Yard Structures) outside of the Reactor Building. Service Water Discharged from the Reactor Building Closed Cooling Water heat exchangers enters the overboard discharge line through the seal well. Emergency Service Water from the Containment Spray System heat exchangers, Turbine Building sump 1-5 effluent, plant building roof/floor/equipment drainage, and plant yard area storm water drains enter the overboard discharge line at various locations along its length. The overboard discharge line runs below grade and terminates at the discharge canal.

The RDODS does not include process liquid monitoring. Process liquid monitoring is performed prior to the effluents entering the overboard discharge line. The Process Liquid Monitoring Subsystems (evaluated with Radiation Monitoring System) are comprised of the Reactor Building Closed Cooling Water Monitor, the Service Water Radiation Monitor and the Turbine Building sump 1-5 Radiation Monitor. These subsystems have been designed to continuously measure, indicate, and record the radioactivity concentration levels of major process system discharge streams. These monitors ensure that plant releases do not exceed the limits specified in 10CFR20 and 10CFR50 Appendix I.

For additional information, see UFSAR Section 9.3.3.2.9.

System Boundary

The overboard discharge portion of the RDODS boundary begins at the seal well outside of the Reactor Building and ends at the discharge canal. Also included in the RDODS boundary are the portions of the roof drain system relied upon to preserve the leakage boundary intended function of the roof drain piping and the portions of the Office Building roof drain system relied upon for drainage of Fire Protection System deluge spray from the New Cable Spreading Room floor drains.

Not included in the RDODS license renewal scoping boundary are the following systems, which are separately evaluated as license renewal system:
Miscellaneous Yard Structures (seal well, storm sewers and yard drainage)
Service Water System
Emergency Service Water System

Radiation Monitoring System
Discharge Structure and Canal
Miscellaneous Floor and Equipment Drain System

The RDODS supports the Emergency Service Water System by providing a flowpath for the Emergency Service Water System from the Containment Spray heat exchangers. The RDODS supports the Service Water System by providing a flowpath for the Service Water System from the Reactor Building Closed Cooling Water heat exchangers. The RDODS supports the Miscellaneous Floor and Equipment Drain System by providing a flowpath for Fire Protection System deluge spray from the New Cable Spreading Room floor drain system.

The non-safety related exposed roof drain piping located in the Reactor Building, Turbine Building, and Office Building is in scope for spatial interaction (leakage or spray). The portions of the roof drain system that are underground or embedded in concrete are not in scope since leakage in these environments does not have the potential for spatial interaction.

Reason for Scope Determination

The Roof Drains and Overboard Discharge System is not in scope under 10 CFR 54.4(a)(1) because no portions of the system are safety related or relied on to remain functional during and following design basis events. The Roof Drains and Overboard Discharge System meets 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The Roof Drains and Overboard Discharge System also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for Fire Protection (10 CFR 50.48). The Roof Drains and Overboard Discharge System is not relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for ATWS (10 CFR 50.62), Station Blackout (10 CFR 50.63), or Environmental Qualification (10 CFR 50.49).

System Intended Functions

1. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The Roof Drains and Overboard Discharge System carries Emergency Service Water from the Containment Spray Heat Exchangers. The Roof Drains and Overboard Discharge System carries Service Water from the Reactor Building Closed Cooling Water Heat Exchangers which are used to cool the Spent Fuel Pool Cooling and Augmented Spent Fuel Pool Cooling Heat Exchangers. The Reactor Building, Turbine Building, and Office Building roof drain systems have potential spatial interaction (leakage/spray) with safety related equipment within these structures. - 10 CFR 54.4(a)(2)
2. Relied upon 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). The Roof Drains and Overboard Discharge System carries Service Water from the Reactor Building Closed Cooling Water Heat Exchangers which are used to cool the Shutdown Cooling System. The Roof Drains and Overboard Discharge System carries Fire Protection System deluge spray from the Miscellaneous Floor and Equipment Drain System. - 10 CFR 54.4(a)(3)

UFSAR References

9.3.3.2.9

License Renewal Boundary Drawings

LR-BR-2005 sheet 2

Table 2.3.3.33 Roof Drains and Overboard Discharge Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Piping and fittings	Leakage Boundary
	Pressure Boundary

The aging management review results for these components are provided in Table 3.3.2.1.33 Roof Drains and Overboard Discharge -Summary of Aging Management Evaluation

2.3.3.34 Sanitary Waste System

System Purpose

The intended function of the Sanitary Waste System for license renewal is to maintain leakage boundary integrity to preclude system interactions as described in ISG-09, Guidance on the Identification of Structures, Systems, and Components that meet 10 CFR 54.4(a)(2), dated March 15, 2002. For this reason, this system's pressure retaining components located in proximity to other components performing safety-related functions have been included in the scope of license renewal. This system is not required to operate to support license renewal intended functions, and is in scope for potential spatial interaction.

The Sanitary Waste System consists of the Plumbing and Drainage System and the Sewage Lift Station System.

The Sanitary Waste System is designed for the collection of all plant sanitary waste drains and direct them to a controlled collection point. The purpose of the Sanitary Waste System is to provide the path for the sanitary waste and drains to the sewage collection tank.

System Operation

The Sanitary Waste System is comprised of sanitary waste piping and fixtures in the Office and TurbineBuildings, including floor drains in the Office Building. There are additional sanitary drains from the various plant buildings that join the main sanitary drain line. Domestic waste water from all plant locations enters a concrete equalizing tank. This tank discharges, through two self-priming diaphragm pumps (transfer pumps) to the Lacey Municipal Utilities Authority Sewer System and subsequently to the Ocean County Utilities Authority regional collection system via a gravity line.

A radiation monitoring system has been provided to continuously monitor radiation levels in the effluent of the transfer pumps. As a backup, manual samples may be taken from the sewage pit for laboratory analysis. The radiation monitor alarms below 50 percent of the 10 CFR 20, Appendix B, Table 1, Column 2, value for Co-60. Procedures require that the Control Room be immediately notified and that the alarm be investigated. If levels continue to rise, the sewage transfer pumps trip automatically below the 100 percent value of 10 CFR 20.

For more detailed information, see UFSAR Section 9.2.4.3 & 9.3.3.2.7.

System Boundary

The license renewal scoping boundary of the Sanitary Waste System encompasses the liquid filled portions of the system that are located in proximity to equipment performing a safety-related function. This is limited to the portions of the system located within the Turbine and Office Building. Included in this boundary are pressure-retaining components relied upon to preserve the leakage boundary intended function of this system. The sanitary vents are not included because they only contain sewer gas which does not impact safety-related components.

Not included in the scoping boundary of the Sanitary Waste System is the portion located in the areas beyond the Office and Turbine Buildings, as those portions of the system are not located within an area in proximity of components performing a safety-related function. Components that are not required to support the system leakage boundary intended function are not included in the scoping boundary of the Sanitary Waste System. Also not included are portions of the Sanitary Waste System that are encased in concrete, as leakage in this environment does not have the potential for spatial interaction.

Not included in the Sanitary Waste System scoping boundary is the following interfacing system, which is separately evaluated as a license renewal system:
Water Treatment & Distribution System

Reason for Scope Determination

The Sanitary Waste System is not in scope under 10 CFR 54.4(a)(1) because no portions of the system are safety related or relied on to remain functional during and following design basis events. The Sanitary Waste System is in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The Sanitary Waste System is not in scope under 10 CFR 54.4(a)(3) because it is not relied upon 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), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The Sanitary Waste System has potential for spatial interaction with safety related equipment within the Turbine and Office Building. 10 CFR 54.4(a)(2)

UFSAR References

9.2.4.3
9.3.3.2.7

License Renewal Boundary Drawings

None

Table 2.3.3.34 Sanitary Waste System
Components Subject to Aging Management Review

Component Type	Intended Functions
Piping and fittings	Leakage Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.34 Sanitary Waste System
-Summary of Aging Management Evaluation

2.3.3.35 Service Water System

System Purpose

The Service Water System (SWS) is an open loop cooling system designed to provide seawater to various users during normal plant operation and shutdown. The purpose of the SWS is to provide seawater cooling to the tube side of the two Reactor Building Closed Cooling Water (RBCCW) heat exchangers. The SWS accomplishes this by supplying seawater from the plant intake structure to the RBCCW System heat exchangers and transferring the heat energy to the environment through the Roof Drains and Overboard Discharge System. The SWS provides alternate seawater cooling to the tube side of the two Turbine Building Closed Cooling Water (TBCCW) System heat exchangers normally serviced by the Circulating Water System. The SWS accomplishes this by supplying seawater from the plant intake structure to the TBCCW System heat exchangers and transferring the heat energy to the environment through the plant Discharge Structure and Canal.

The SWS also is used to maintain the Emergency Service Water (ESW) side of the Containment Spray heat exchangers full. The SWS accomplishes this through a crosstie between the normally operating SWS and the standby ESW System.

System Operation

The SWS is comprised of pumps, heat exchangers, piping, valves, controls and instrumentation. Two half capacity SWS pumps discharge to a common header which branches to either the two half capacity RBCCW System heat exchangers or the two half capacity TBCCW System heat exchangers. From the RBCCW System heat exchangers, SWS flows into a common header, through a Seal Well, and terminates at the Roof Drains and Overboard Discharge System. From the TBCCW System heat exchangers, SWS flows into a common header, through the plant discharge tunnel, and terminates at the Discharge Structure and Canal. Water flow and temperature are controlled manually through manipulation of SWS valves.

For maintaining the ESW System side of the Containment Spray heat exchangers full, a line branches off of the SWS discharge header, splits, and connects to the discharge header of each ESW loop. Check valves (evaluated with the ESW System) are provided to prevent the loss of ESW System flow through the SWS.

The SWS has several interfaces with the Chlorination System. The Chlorination System injection system delivers sodium hypochlorite to the SWS headers for the control of biofouling. Additionally, the SWS provides the operating pressure for the Circulating Water and Service Water eductors (evaluated with the Chlorination System).

Process liquid monitoring (evaluated with the Radiation Monitoring System) is provided to monitor the gross radioactivity of the service water effluent from the RBCCW heat exchangers. Service Water radiation levels are recorded and alarmed in the Main Control Room.

During outages when performing maintenance on the SWS, the ESW System can be aligned to support the SWS loads through a cross-connect line between the ESW and SWS. The ESW connection is located upstream of the Containment Spray heat exchangers and the SWS connection is located upstream of the RBCCW heat exchangers. A normally closed manual valve (evaluated with the ESW System) provides isolation between the ESW and SWS headers during normal plant operation.

For additional information, see UFSAR Section 9.2.1.

System Boundary

The SWS boundary begins at the SWS pumps and continues through the tube side of the RBCCW System heat exchangers and the tube side of the TBCCW System heat exchangers. The boundary continues from the RBCCW and TBCCW System heat exchangers to the Roof Drains and Overboard Discharge System and the Discharge Structure and Canal. Included in the boundary are the branch connections to the ESW System up to the ESW System stayfull line check valves and up to the ESW/SWS cross-connect line manual isolation valve. Also included in the boundary are the branch connections to the Chlorination System up to the circulating water and service water eductors and from the service water eductor back to the SWS discharge header. All associated piping, components, and instrumentation contained within the flowpath described above are also included in the SWS boundary.

Included in the license renewal boundary of the SWS are those portions of nonsafety-related piping and equipment that extend beyond the safety-related/nonsafety-related interface up to the location of the first seismic anchor, or to a point no longer in proximity to equipment performing a safety-related function, whichever extends furthest. This includes the nonsafety-related portions of the system located within the Intake Structure and Reactor Building. Also included in the boundary are pressure retaining components located in the Turbine Building relied upon to preserve the leakage boundary intended function of this portion of the system. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Not included in the SWS license renewal scoping boundary are the following systems, which are separately evaluated as license renewal system:
Reactor Building Closed Cooling Water System
Turbine Building Closed Cooling Water System
Emergency Service Water System
Circulating Water System
Radiation Monitoring System
Roof Drains and Overboard Discharge System
Discharge Structure and Canal
Chlorination System

Not included in the scoping boundary of the SWS are the SW to ESW stayfull line check valves and the ESW/SW cross-connect line manual isolation valve which are evaluated with the ESW System. Not included in the scoping boundary of the SWS are the circulating water and service water eductors which are evaluated with the Chlorination System. Not included in the scoping boundary of the SWS is the in-line SW discharge radiation sampler chamber and detector which are evaluated with the Radiation Monitoring System.

The SWS supports the Spent Fuel Pool Cooling System in ensuring adequate cooling in the spent fuel pool to maintain stored fuel within acceptable temperature limits. This portion of the system includes that which must remain operational and pressurized to provide cooling water to the RBCCW System heat exchangers (RBCCW is the heat sink for the Spent Fuel Pool

Cooling heat exchangers). It includes the SWS pumps, the RBCCW System heat exchangers, and all piping and valves associated with establishing this flowpath.

The SWS supports the Fire Protection intended function. This portion of the system includes that which must remain operational and pressurized to provide cooling water to theRBCCW System heat exchangers (RBCCW provides cooling for the Shutdown Cooling System heat exchanger and pumps). It includes the SWS pumps, the RBCCW System heat exchangers, and all piping and valves associated with establishing this flowpath.

All other non-safety related SWS piping and components are in scope for spatial interaction (leakage or spray). This includes the portions of the SWS located in the Turbine Building associated with the TBCCW System heat exchangers.

Reason for Scope Determination

The Service Water System is not in scope under 10 CFR 54.4(a)(1) because no portions of the system are safety related or relied on to remain functional during and following design basis events. The Service Water System is in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The Service Water System meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for Fire Protection (10 CFR 50.48). The Service Water System is not relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for Environmental Qualification (10 CFR 50.49), ATWS (10 CFR 50.62), or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The SWS ensures that the Spent Fuel Pool Cooling and Augmented Spent Fuel Pool Cooling heat exchangers maintain stored fuel within acceptable limits by providing cooling water to the RBCCW System heat exchangers. The SWS contains non-safety related water filled lines throughout the Turbine Building which have spatial interactions (spray or leakage) with safety related SSCs. - 10 CFR 54.4(a)(2)
2. Relied upon 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). The SWS is credited for supporting the Reactor Building Closed Cooling Water (RBCCW) System. - 10 CFR 54.4(a)(3)

UFSAR References

9.2.1.1

License Renewal Boundary Drawings

LR-BR-2005 Sheet 2
LR-BR-2005 Sheet 4
LR-BR-2005 Sheet 6
LR-FP-SE-5419

Table 2.3.3.35 Service Water System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Eductor	Leakage Boundary
Expansion Joint	Pressure Boundary
Flow Element	Pressure Boundary
Gauge Snubber	Pressure Boundary
Heat Exchangers (RBCCW)	Heat Transfer
	Pressure Boundary
Heat Exchangers (TBCCW)	Leakage Boundary
Piping and fittings	Leakage Boundary
	Pressure Boundary
Pump Casing (Rad Monitor Sample Pump)	Pressure Boundary
Pump Casing (Service Water Pumps)	Pressure Boundary
Restricting Orifice	Pressure Boundary
	Throttle
Rotameter	Pressure Boundary
Sample Chamber	Pressure Boundary
Sight Glasses	Leakage Boundary
Strainer	Filter (Rad Monitor Duplex Strainer)
Strainer Body	Leakage Boundary
	Pressure Boundary (Rad Monitor Duplex Strainer)
Tanks (Service Water Pump Oil Reservoir)	Pressure Boundary
Thermowell	Leakage Boundary
	Pressure Boundary
Valve Body	Leakage Boundary
	Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.35 Service Water System
-Summary of Aging Management Evaluation

2.3.3.36 Shutdown Cooling System

System Purpose

The Shutdown Cooling System (SCS) is a high pressure system designed to remove fission product decay heat during shutdown. The system is normally isolated and not in-service during plant power operation. Immediately following shutdown of the reactor, the initial cooling and removal of decay heat is accomplished by means of the Turbine Bypass System, which directs steam to the Main Condenser. When coolant temperature has been reduced to the point where the Main Condenser can no longer be used as a heat sink, the SCS is placed in operation to reduce reactor coolant temperature and complete the cooling.

The purpose of the SCS is to remove decay heat during shutdown, providing a means of completing the cooldown of the reactor pressure vessel, and to maintain a reasonably low reactor coolant temperature throughout a refueling or maintenance period. The SCS accomplishes this purpose by circulating reactor coolant from the Reactor Recirculation system through the shutdown cooling heat exchangers. The heat is transferred in the heat exchangers to the Reactor Building Closed Cooling Water System (RBCCW).

The SCS is not an Emergency Core Cooling Syste (ECCS), however the SCS may be placed in service if available during emergencies, following initial reactor cooldown and depressurization, to assist the ECCS in removing decay heat.

System Operation

The SCS is comprised of three pumps, three heat exchangers, and associated controls, instrumentation, motors and valves. The portion of the system from the Reactor Recirculation System up to the inboard primary containment isolation valves is stainless steel, designed to the same temperature and pressure specifications as the reactor vessel. The rest of the system is carbon steel. The SCS inlet line is attached to the suction line of recirculation pump E upstream of its suction isolation valve, taking reactor water to the motor operated isolation valve inside containment. This line exits containment, branching into three trains, with each line directing flow to a SCS pump suction. The discharge of each pump continues through the tube side of a SCS heat exchanger. Downstream of the heat exchangers, the three lines combine into a single discharge header which re-enters the containment. A motor operated isolation valve is provided inside the drywell. This header attaches to the discharge pipe of recirculation loop E, downstream of its discharge isolation valve. Each of the three SCS pump and heat exchanger trains has a pump suction isolation valve, a motor operated throttling isolation valve downstream of the heat exchanger outlet, and a manually operated isolation valve downstream of the throttling isolation valve.

The two motor operated isolation valves inside containment are interlocked to prevent opening if the reactor water temperature at the suction of any recirculation pump exceeds the SCS maximum allowable inlet temperature. Interlocks also prevent opening, and automatically close these valves on either low-low reactor water level, or high drywell pressure.

Flow elements are installed downstream of the heat exchangers to provide local indication for each SCS loop. The pumps are provided with interlocks that prevent operation unless the minimum NPSH is available, and also to protect the system against inadvertent operation at excessive temperature. A minimum flow recirculation line connected from the outlet of the heat exchanger to the pump suction protects each pump. The shell side of the SCS heat exchangers is cooled by RBCCW, which also supplies cooling water to the pump bearings and seals.

The heat exchangers are of the horizontal U-tube type. Relief valves are provided on the shell and tube sides of the heat exchangers, discharging to the reactor building equipment drain tank (evaluated with the Reactor Building Floor and Equipment Drain System). SCS temperatures at inlet and outlet locations are indicated and a high temperature condition is alarmed.

For more detailed information, see UFSAR Section 5.4.7.

System Boundary

The SCS system boundary begins with the reactor coolant supply piping attachment on the suction line of recirculation pump E, upstream of the suction isolation valve. It exits the drywell into the reactor building and separates into three pump and heat exchanger trains. Each pump and heat exchanger train has a minimum flow line routed from the exit of the heat exchanger back to the inlet side of the pump, with an air-operated valve and flow-restricting orifice. Downstream of each heat exchanger is a flow-measuring element. The three trains combine into a single header, enter the drywell, and return to the reactor through the piping attachment on the discharge pipe of recirculation loop E, downstream of the discharge isolation valve. Included in this boundary are the SCS isolation valves, heat exchanger relief valve piping up to and including the relief valves, local drain and vent piping up to the normally closed valve(s), and the temperature sensing devices (switches and measuring elements), all of which are located in thermowells.

Also included in the license renewal scoping boundary of the SCS are those portions of nonsafety-related piping and equipment that extend beyond the safety-related/nonsafety-related interface up to the location of the first seismic anchor, or to a point no longer in proximity to equipment performing a safety-related function, whichever extends furthest. This includes the nonsafety-related portions of the system located within the Reactor Building. Included in this boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of this portion of the system. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Not included in the SCS scoping boundary is the cooling water supply to and return from the shell side of each heat exchanger (scoped with the RBCCW system), or the discharge piping from the heat exchanger relief valves to the reactor building equipment drain tank. Not included in the SCS scoping boundary are the following interfacing systems, which are separately evaluated as license renewal systems:
Reactor Recirculation System
Reactor Building Closed Cooling Water System
Reactor Building Floor and Equipment Drain System

Reason for Scope Determination

The Shutdown Cooling System meets 10 CFR 54.4(a)(1) because it is a safety related system that is relied on to remain functional during and following design basis events. It meets 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10

CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48), and environmental qualification (10 CFR 50.49). The Shutdown Cooling System is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for ATWS (10 CFR 50.62), or station blackout (10 CFR 50.63).

System Intended Functions

1. Provide reactor coolant pressure boundary. 10 CFR 54.4(a)(1)
2. Provides primary containment boundary isolation valves close on low-low reactor water level or high drywell pressure, however system is considered an extension of the primary containment boundary. 10 CFR 54.4(a)(1)
3. Relied upon 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). 10 CFR 54.4(a)(3)
4. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Environmental Qualification (10 CFR 50.49). 10 CFR 54.4(a)(3)
5. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. 10 CFR 54.4(a)(2)

UFSAR References

5.4.7

License Renewal Boundary Drawings

LR-GE-148F711
LR-BR-2006 Sheet 2
LR-BR-2015 Sheet 2
LR-BR-M0012
LR-GE-237E798

Table 2.3.3.36 Shutdown Cooling System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Coolers (Shutdown Cooling Pumps)	
Flow Element	Pressure Boundary
Heat Exchangers (Shutdown Cooling)	
Piping and fittings	Leakage Boundary
	Pressure Boundary
Pump Casing	Pressure Boundary
Restricting Orifice	Pressure Boundary Throttle
Thermowell	Pressure Boundary
Valve Body	Leakage Boundary
	Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.36 Shutdown Cooling System
-Summary of Aging Management Evaluation

2.3.3.37 Spent Fuel Pool Cooling System

System Purpose

The Spent Fuel Pool Cooling System (SFPCS) consists of two systems located in the reactor building that operate independently from each other except for a common suction flowpath and a common discharge flowpath. The first system is the SFPCS designed to remove heat from the spent fuel pool and maintain fuel storage pool water clarity. The other system is the Augmented SFPCS that was added after plant construction due to higher than anticipated spent fuel storage requirements. This system is operated during refueling operations due to the higher heat loads. This scoping evaluation does not include structures such as the spent fuel pool, reactor cavity, skimmer surge tanks and equipment storage cavity (evaluated with the Reactor Building Structure).

The purpose of the SFPCS is to remove decay heat from spent fuel assemblies that are stored within the Spent Fuel Storage Pool during all modes of operation, to remove decay heat from the water inventory contained within the reactor cavity and equipment storage cavity during refuel outages, to minimize thermal stresses within the floor and walls of the Spent Fuel Storage Pool and maintain the chemistry of the Spent Fuel Storage Pool water inventory within acceptable EPRI guidelines. It accomplishes this by delivering recirculated water from the fuel pool during normal operation as well as from the reactor cavity and equipment storage cavity during refueling outage, which is pumped through the SFPCS heat exchangers. The SFPCS heat exchangers then remove the heat from the pool and cavities and transfer it to a closed cooling water system.

System Operation

The SFPCS is comprised of two pumps, two heat exchangers, a filter, a demineralizer, associated piping and valves, and interconnections to Condensate Transfer System, Radwaste and the Condensate/Feedwater System. The Augmented SFPCS consists of two augmented pumps and one augmented heat exchanger. These components tie-in downstream of the skimmer surge tanks (common suction flowpath) and continue through the fuel pool filter and demineralizer or directly to the Spent Fuel Pool (common discharge flowpath).

For the SFPCS main flow path, water from the fuel storage pool overflows via scuppers and an adjustable weir into two cross-tied skimmer surge tanks (evaluated with the Reactor Building Structure). The skimmer surge tanks drain into a common suction header for the fuel pool cooling pumps. Two parallel flow paths exist from the header, each with a fuel pool cooling pump taking suction from the header and discharging through tube side of the fuel pool cooling heat exchanger. Cooling water to the shell side of the heat exchangers is supplied from the Reactor Building Closed Cooling Water System that in turn is cooled by the Service Water System. A crosstie line exists on the pump discharge piping in order to operate either pump with either heat exchanger. The heat exchangers discharge into a common header, that first flows through the fuel pool filter, and then through the fuel pool demineralizer. The fuel pool demineralizer discharges back into the fuel storage pool through two lines and diffusers at the bottom of the fuel pool. The demineralizer/filter can be bypassed when there is not an issue with water clarity. The return lines to the fuel storage pool enter near the top have check valves and openings in the piping below the pool surface to act as anti-siphon devices, to preclude uncontrolled draining of the pool during a pipe break.

The following components operate only during outage periods; the piping and components downstream of the reactor cavity recirc valve because they are normally isolated from the SFPCS by a normally closed reactor cavity recirc valve, the piping and components associated with the ractor cavity drains and equipment storage cavity liner drains. The Spent Fuel Pool liner drains are connected to the area under the fuel pool liner for leak detection.

During refueling operations, the Augmented SFPCS may be aligned by manual valves to discharge into the reactor cavity and equipment storage cavity. The reactor cavity and equipment storage cavity are filled, and the gates are removed between the Spent Fuel Pool and the reactor cavity. This allows the flow to continue to the reactor cavity via two diffusers and to the fuel pool through anti siphon check valves and diffusers within the fuel pool as previously mentioned above. The Augmented SFPCS removes decay heat from the spent fuel assemblies that are stored within the Spent Fuel Storage Pool, as well as, decay heat from the water inventory contained within the reactor cavity and equipment storage cavity. The system circulates the Spent Fuel Storage Pool water inventory and maintains the Spent Fuel Storage Pool water inventory at a predetermined temperature. Water flows from the Spent Fuel Storage Pool, over two adjustable skimmer weirs located in the Spent Fuel Storage Pool, four skimmer weirs located in the reactor cavity and skimmer weirs located in the equipment storage cavity and into the skimmer surge tanks. The water is pumped through the augmented heat exchanger. Cooling water to the shell side of the heat exchangers is supplied from the Reactor Building Closed Cooling Water (RBCCW) System with backup from the Turbine Building Closed Cooling Water System, when the RBCCW System is out of service for maintenance.

The SFPCS is designed for both normal and accident conditions. The accident considered is the loss of offsite power coincident with a single active component failure. The Augmented SFPCS is designed to provide a seismically qualified cooling loop, capable of providing cooling during a Loss of Offsite Power (LOOP) with a single active component failure. The system is designed to prevent reduction in fuel storage coolant inventory during accident conditions. In addition, the system is designed with sufficient monitoring systems to detect conditions that could result in the loss of decay heat removal, and to initiate appropriate safety actions. Telltale drains with annunciated flow indicating switches detect leakage through the bellows seal at the reactor vessel to drywell joint and detect leakage into the space between the refueling gates. There is a curb (evaluated with Reactor Building Structure) around the cavities to direct any overflow to drains.

Normal demineralized water makeup to the pool is provided from the Condensate Storage Tank by the Condensate Transfer System. Additional makeup can be provided from the Demineralized Water Storage tank by the demineralized water transfer pumps through the use of hoses. Other sources of water are also available through the use of fire pumps or portable pumps. The diesel driven fire pumps for the Fire Protection System can be used to provide makeup water from the Fire Pond to the Condensate Storage Tank through a permanent connection.

For more detailed information, See UFSAR Section 9.1.3.

System Boundary

The boundary of the SFPCS begins at the suction piping to the skimmer surge tanks. It continues through the SFPCS pumps, heat exchangers, a filter, a demineralizer and associated piping and valves, through anti-siphon check valves and to the bottom of the fuel pool via diffusers. The water spills over the Spent Fuel Pool weirs into the skimmer surge tanks.

In addition during refuel operations, there is a parallel Augmented SFPCS which begins at the common suction header from the skimmer surge tank through the augmented fuel pool cooling pumps and augmented fuel pool cooling heat exchanger and returns to the common discharge flow path downstream of the demineralizers. Included in the boundary is the piping that discharges into the reactor cavity, equipment storage cavity and spent fuel pool. Water returns to the skimmer surge tanks over the weirs in the spent fuel pool and through skimmer drain headers located in the reactor and equipment storage cavities during refuel operations.

The following items are not required for the cooling flow path for the SFPCS but are included in the SFPCS scoping boundary: skimmer drain header, equipment storage drains and spent fuel pool liner drains.

All associated piping, components and instrumentation contained within the flow path described above are included in the system evaluation boundary.

Not included in the scoping boundary of the SFPCS license renewal scoping boundary are items such as refueling bellows, fuel pool gates, reactor cavity, skimmer surge tank, equipment storage cavity, spent fuel pool and it's supporting structure, which are separately evaluated in the Reactor Building Structure.

Not included in the scoping boundary are the piping and components associated with the SFPCS filter and demineralizer that can be bypassed and are not required for the cooling flow path for the SFPCS intended function.

Not included in the SFPCS license renewal scoping boundary are the following interfacing systems, which are separately evaluated as license renewal systems:
Reactor Building Closed Cooling Water System
Turbine Building Closed Cooling Water System
Condensate Transfer System

Reason for Scope Determination

The Spent Fuel Pool Cooling System (SFPCS) is in scope under 10 CFR 54.4(a)(1) because it is relied on to remain functional during and following design basis events. The SFPCS is in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The SPFC is not in scope under 10 CFR 54.4(a)(3) because it is not relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48) and environmental qualification (10 CFR 50.49), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Ensure adequate cooling in the spent fuel pool to maintain stored fuel within acceptable temperature limits. The SFPCS operates continuously to circulate and cool the Spent Fuel Storage Pool water inventory and maintain the Spent Fuel Storage Pool water inventory at a predetermined temperature. 10 CFR 54.4 (a)(1)
2. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a

safety related function. 10 CFR 54.4(a)(2)

UFSAR References

1.2
3.1
3.2
7.5
9.1
11.1

License Renewal Boundary Drawings

LR-GE-237E756

Table 2.3.3.37 Spent Fuel Pool Cooling System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Diffuser	Direct Flow
Flow Element	Leakage Boundary
	Pressure Boundary
Piping and fittings	Leakage Boundary
	Pressure Boundary
Pump Casing (Fuel Pool Cooling Pumps & Augmented Fuel Pool Cooling Pumps)	Pressure Boundary
Thermowells	Pressure Boundary
Valve Body	Leakage Boundary Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.37 Spent Fuel Pool Cooling System
-Summary of Aging Management Evaluation

2.3.3.38 Standby Liquid Control System (Liquid Poison System)

System Purpose

The Standby Liquid Control System (SLCS), or Liquid Poison System, is a standby and redundant sodium pentaborate injection system. The system is designed to bring the reactor to a shutdown condition at any time in core life independent of control rod capabilities. The SLCS operates independently from the Control Rod Drive System. The most severe requirement for which the system is designed is shutdown from a full power operating condition assuming complete failure of the Control Rod Drive System to respond to a scram signal.

The purpose of the SLCS is to provide sufficient capacity for controlling the reactivity difference between the steady state rated operating condition of the reactor and the cold shutdown condition, including shutdown margin, thereby ensuring complete shutdown capability from the most reactive condition, at any time in core life. The SLCS accomplishes this purpose by injecting sodium pentaborate solution into the reactor vessel to absorb thermal neutrons. The SLCS is not provided as a backup for reactor trip functions, since most transient conditions that require reactor trip occur too rapidly to be controlled by the SLCS.

The SLCS is capable of satisfying the requirements of the SLCS generic design basis as well as the requirement for the reduction of risks from an anticipated transient without scram (ATWS) as specified in 10CFR50.62(c)(4) (ATWS Rule).

System Operation

The SLCS is comprised of an atmospheric pressure tank for sodium pentaborate solution storage (Liquid Poison Tank), a common pump suction header feeding two parallel full capacity high pressure positive displacement pumps, two accumulators, two explosive actuated shear plug valves, a common discharge header and poison sparger ring, a test tank, and associated piping and valves. The SLCS is manually initiated from the main control room through the use of a keylock switch which starts the selected pump and actuates its explosive actuated valve. This ensures that switching on the system is a deliberate act.

Suction to the SLCS pumps is from the Liquid Poison Tank through a common suction header. Flow is provided by one of two full capacity positive displacement pumps. Accumulators are installed in each pump discharge line to absorb pressure pulsations from the positive displacement pumps. The pumps and piping are protected by overpressure by relief valves which discharge back to the Liquid Poison Tank. Following system initiation, the explosive valve associated with the selected pump is actuated to provide a flowpath to the Reactor Vessel. The sodium pentaborate solution is pumped to the vessel through a common discharge header, through two (2) check valves, and delivered to the vessel through a sparger ring (evaluated with Reactor Internals System) near the bottom of the core shroud so that it mixes with cooling water rising through the core.

An electric heater is installed in the Liquid Poison Tank and the pump suction lines are provided with electrical heat tracing and thermal insulation to prevent crystallization of the sodium pentaborate solution. Provisions for recirculating the sodium pentaborate solution are included to assure the readiness of the Liquid Poison Tank and the pump suction. A test tank (with demineralized water) is provided for functional testing of the standby liquid control pumps, injection valves, and sparger without injecting boron solution.

A flow switch in the injection line will provide a signal to trip the Reactor Water Cleanup System to prevent loss or dilution of the boron in the vessel through the Reactor Water Cleanup System demineralizers or through Reactor Water Cleanup System letdown.

The SLCS injection piping containment penetration is provided with two (2) normally closed check valves in series which are included in the license renewal boundary for SLCS.

The SLCS injection piping can be used by the Post Accident Sampling System (PASS) to provide a backup reactor water sample when SLCS is not in service. The PASS piping up to the SLCS injection piping is evaluated with the Post Accident Sampling System.

For more detailed information, see UFSAR Section 9.3.5.

System Boundary

The boundary of the SLCS begins with the Liquid Poison Tank and includes the SLCS positive displacement pumps, relief valves, accumulators, pump discharge check valves, explosive actuated valves, injection piping check valves, and the piping to the reactor vessel. The boundary includes the Liquid Poison Tank heaters, heat trace, the SLCS test tank and demineralized water lines, system drain lines, drain tank and drain manifold.

The SLCS boundary also includes the demineralized water supply line and control air supply line attached to the Liquid Poison Tank used for the filling and mixing of the boron solution through the Liquid Poison Tank air sparger. This portion of the boundary extends from the Liquid Poison Tank out to the SLCS check valves located on the demineralized water and control air supply lines (evaluated with the Water Treatment & Distribution System and Instrument (Control) Air System).

All associated piping, components, and instrumentation contained within the flowpath described above are included in the SLCS boundary.

Included in the license renewal boundary of the SLCS are those portions of nonsafety-related piping and equipment that extend beyond the safety-related/nonsafety-related interface up to the location of the first seismic anchor, or to a point no longer in proximity to equipment performing a safety-related function, whichever extends furthest. This includes the nonsafety-related portions of the system located within the Reactor Building. Also included in the boundary are pressure retaining components located in the Reactor Building relied upon to preserve the leakage boundary intended function of the system. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Not included in the SLCS license renewal scoping boundary are the following systems, which are separately evaluated as license renewal systems:
Water Treatment & Distribution System
Instrument (Control) Air System

Not included in the scoping boundary of the SLCS is the poison sparger ring which is evaluated with the Reactor Internals System for license renewal scoping. Not included in the scoping boundary of the SLCS is the Post Accident Sampling System piping up to the SLCS injection piping which is evaluated with the Post Accident Sampling System for license renewal scoping.

Reason for Scope Determination

The Standby Liquid Control (Liquid Poison) System meets 10 CFR 54.4(a)(1) because it is a safety related system that is relied on to remain functional during and following design basis events. The Standby Liquid Control System meets 10 CFR 54.4(a)(2) because failure of the non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for ATWS (10 CFR 50.62). The Standby Liquid Control System is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49), or SBO (10 CFR 50.63).

System Intended Functions

1. Provide reactor coolant pressure boundary. - 10 CFR 54.4(a)(1)
2. Provide primary containment boundary. The SLCS injection piping contains valves which are considered containment isolation devices. - 10 CFR 54.4(a)(1)
3. Introduce emergency negative reactivity to make the reactor subcritical. Brings the reactor to a shutdown condition at any time in core life, independent of control rod capabilities. Provides flow signal to RWCU isolation circuitry. - 10C FR 54.4(a)(1)
4. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Anticipated Transients without Scram (10 CFR 50.62). - 10 CFR 54.4(a)(3)
5. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The SLCS is located within the Reactor Building and contains non-safety related water filled lines which have potential spatial interaction (spray or leakage) with safety related SSC's, and, it contains non-safety related piping that provides structural support for safety related piping. - 10 CFR 54.4(a)(2)

UFSAR References

3.1
4.6.4.1
7.4.1
9.3.5
15.8

License Renewal Boundary Drawings

LR-GE-148F723
LR-GE-148F712

Table 2.3.3.38 Standby Liquid Control System (Liquid Poison System) Components Subject to Aging Management Review

Component Type	Intended Functions
Accumulator	Pressure Boundary
Closure bolting	Mechanical Closure
Flow Element	Leakage Boundary
	Pressure Boundary
Piping and fittings	Leakage Boundary
	Pressure Boundary
	Structural Support
Pump Casing	Pressure Boundary
Tanks (Liquid Poison Tank)	Pressure Boundary
Tanks (Liquid Poison Test Tank)	Leakage Boundary
Thermowell	Pressure Boundary
Valve Body	Leakage Boundary
	Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.38 Standby Liquid Control System (Liquid Poison System)
-Summary of Aging Management Evaluation

2.3.3.39 Traveling In-Core Probe System

System Purpose

The Traveling In-Core Probe (TIP) System is an electrical instrumentation system designed to provide neutron flux data to be used for calibration of the LPRM (Local Power Range Monitor) detectors and to determine axial neutron flux levels for core power distribution measurements.

The purpose of the TIP system is to measure core neutron flux at various positions throughout the core. The TIP system accomplishes its purpose by utilizing a set of fission chamber detector instruments identical to those used by the LPRM system, and a positioning system capable of moving the fission chamber detectors to various locations in the core corresponding to the locations of the LPRM detectors. The moveable TIP detectors, as with the fixed LPRM detectors, generate signals that are processed to indicate neutron flux levels in the vicinity of each detector.

Since the TIP detectors are capable of being fully withdrawn from the core and outside of primary containment, the TIP system contains mechanical components designed to assure primary containment integrity. The TIP system does not generate any rod block or scram signals for protection of the reactor, however the portion responsible for providing primary containment integrity is in scope for license renewal. The TIP system is not credited with a reactor coolant pressure boundary (RCPB) integrity function since the in-vessel located dry tubes that provide the RCPB boundary are evaluated with the Reactor Internals system. The majority of the TIP system is not in scope for license renewal.

System Operation

The TIP system is comprised of four trains, each consisting of a fission chamber detector identical to the LPRM fission chamber detectors, attached to a triaxial drive and signal cable which is helically wrapped in carbon steel.

Each detector is driven by a drive mechanism consisting of a drive reel assembly capable of inserting and withdrawing the detector at either a low or high drive speed. A digital position indicator provides core top and bottom indication, and continuous digital indication of detector position.

A storage pig consisting of a cylindrical cask filled with lead shot is associated with each detector and drive mechanism. It houses and shields the detector when fully withdrawn from the drywell.

TIP guide tubing provides a guide for the TIP detector throughout its travel from the storage pig to the core top position inside the reactor vessel. The dry tubes inside the reactor vessel are evaluated with the Reactor Internals system.

An indexing mechanism associated with each detector allows the selection of any of 10 locations for each detector, including a core location common to all four detectors for purposes of calibration.

The TIP flux probe monitor consists of a dual channel amplifier and a power supply. The amplifier conditions the detector signal to provide an input to the plant computer for determining flux level. The power supply provides operating power to the flux amplifier and to the detector for biasing.

The drive control unit provides control of detector insertion and retraction. It determines and displays detector position in the core, monitoring the TIP detector throughout its operation with status lights.

The isolation valve system consists of a ball valve and explosive-actuated shear (squib) valve located outside the drywell for each of the four TIP drive systems. The ball valve is normally closed except when the detector is inserted. The ball valve can be manually controlled, but is normally opened and closed automatically, with interlocks to open the valve when the detector leaves the shield, and to deenergize the drive mechanism should the ball valve not open after the insert operation is selected for the TIP detector. Upon receipt of a containment isolation signal, an inserted TIP detector is fully retracted at the high travel speed and the ball valve automatically closes when the detector reaches the storage pig. The shear valve is used only to isolate a leak while a detector is inserted and power is lost to the drive mechanism, or some other fault has occurred which prevents retraction of the TIP. A keylock switch manually activates the shear valve. When actuated, a guillotine will cut the TIP guide tube and detector cable inside it and will seal the guide tube. The valve control monitor controls the valve interlocks and indicates position of the ball and shear valves. The keylock operator for the explosive actuated shear valve is located and powered from the valve control monitor.

The TIP purge system provides a dry environment for the TIP detectors and cables. The Nitrogen Supply System provides nitrogen to the TIP indexers and guide tubing when the containment is inerted, and instrument air when not inerted. The containment isolation function of the TIP purge system is evaluated with the Nitrogen Supply System.

For more detailed information, see UFSAR section 7.5.1.8.8.

System Boundary

The TIP system boundary for each of the four TIP trains begins with the storage pig outside the primary containment where the detector is stored when fully retracted, and continues through the TIP guide tubing to the isolation valve system and to the containment penetration. Inside the primary containment, the TIP guide tubing continues to the indexer, from which multiple TIP guide tubes proceed to the reactor vessel, ending at the core top position inside the vessel. Included in the TIP system boundary are the drive mechanisms, TIP guide tubes, storage pigs, isolation valve systems, indexers, four-way connector (which provides a pathway for each indexer to send a detector to the same location for calibration), triaxial drive and signal cables, detectors, and electronic equipment necessary to obtain and process the TIP signals.

Not included in the scoping boundary of the TIP System are the dry tubes inside the reactor vessel, which are included in the Reactor Internals scoping boundary, and the TIP guide tube containment penetrations, which are included with the Primary Containment. Also not included is the containment isolation function of the TIP purge system, which is evaluated with the Nitrogen Supply System. Not included in the TIP System scoping boundary are the following interfacing systems, which are separately evaluated as license renewal systems:
Reactor Internals
Primary Containment
Nitrogen Supply System

Instrument (Control) Air System

The portion of the TIP system boundary that is in scope for license renewal provides the primary containment boundary. It is comprised of the TIP guide tubing from the interface with the primary containment penetration to and including the shear valve on each of the four TIP system trains. This boundary includes the ball valve associated with each train, which is located between the shear valve and the primary containment penetration. All other portions of the TIP system are not in scope for license renewal as they are not required to support the intended function of providing primary containment boundary.

Reason for Scope Determination

The Traveling In-Core Probe System meets 10 CFR 54.4(a)(1) because it is a safety related system that is relied upon to remain functional during and following design basis events. It does not meet 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It does not meet the requirements of 10 CFR 54.4(a)(3) since it is not required to demonstrate compliance with the Commission's regulations for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49), ATWS (10 CFR 50.62), or station blackout (10 CFR 50.63).

System Intended Functions

1. Provide primary containment boundary. Shear valves, ball valves, and interconnecting tubing to the containment penetration provide primary containment isolation. 10 CFR 54.4(a)(1)

UFSAR References

7.5.1.8

License Renewal Boundary Drawings

LR-SN-13432.19-1

Table 2.3.3.39 Traveling In-Core Probe System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Piping and fittings	Pressure Boundary
Valve Body	Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.39 Traveling In-Core Probe System
-Summary of Aging Management Evaluation

2.3.3.40 Turbine Building Closed Cooling Water System

System Purpose

The intended function of the Turbine Building Closed Cooling Water (TBCCW) System for license renewal is to maintain leakage boundary integrity to preclude system interactions as described in ISG-09, "Guidance on the Identification of Structures, Systems, and Components that meet 10CFR54.4(a)(2)", dated March 15, 2002. For this reason, this system's pressure retaining components located in proximity to other components performing safety-related functions have been included in the scope of license renewal. This system is not required to operate to support license renewal intended functions, and is in scope for potential spatial interaction.

The TBCCW System is a closed-loop system designed to provide inhibited demineralized cooling water to the reactor recirculation pump MG sets and Turbine Building equipment that is not subject to radioactive contamination. Included in the TBCCW System is a corrosion inhibiting chemical treatment system designed for intermittent injection of a chemical solution into the demineralized water contained within the system.

The purpose of the TBCCW System is to remove heat from the following loads during all modes of reactor operation: Reactor Recirculation System (reactor recirculation pump MG sets), Main Generator and Auxiliary System (stator winding liquid coolers, hydrogen coolers, generator bus heat exchanger), Main Turbine and Auxiliary System (turbine lube oil coolers), Main Condenser Air Extraction System (condenser vacuum pump exhauster cooler), Service Air System (air compressors and coolers), Condensate System (condensate pump motor coolers), Feedwater System (reactor feed pump lube oil coolers), Process Sampling System (final feedwater facility/thermal control unit, feedwater and main steam sample coolers), and Control Room HVAC (control room air conditioner). The TBCCW System accomplishes this by transferring heat from these loads to either the Circulating Water System (normal cooling water supply to TBCCW heat exchangers) or the Service Water System (alternate cooling supply to TBCCW heat exchangers) through the TBCCW heat exchangers. Except for TBCCW flow to the hydrogen coolers, all system valving is manual. TBCCW flow to the hydrogen coolers is through an air operated valve that can be operated in a temperature regulated automatic mode or manual mode.

System Operation

The TBCCW System is comprised of pumps, heat exchangers, chemical addition equipment, a surge tank, and necessary controls and support equipment. Three parallel half capacity TBCCW pumps discharge to a common header which branches into the two half capacity TBCCW heat exchangers. Cooling water from the TBCCW heat exchangers flows to a common header and is distributed to the components cooled by the TBCCW System. Cooling water from the equipment being cooled flows into a common return header and is routed to the pump's suction. A surge tank is provided at the high point of the system and is sized to hold the expected maximum expansion of the TBCCW System. A bypass line is also provided from the pump discharge header to the heat exchanger discharge header to compensate for fluctuations in circulating water temperature.

The chemical treatment system is comprised of a mixing tank and a chemical feed pump. Water is drawn from the discharge header of the TBCCW pumps and the solution is injected upstream of the pumps in the common pump suction header.

For additional information, see UFSAR Section 9.2.1.

System Boundary

The license renewal scoping boundary of the TBCCW System encompasses the liquid-filled portion of the system that is located in proximity to equipment performing a safety-related function. This includes the liquid-filled portions of the system located within the Turbine Building and Reactor Building. Included in this boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of this system. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Not included in the scope of license renewal is the portion of the TBCCW System associated with the vacuum priming pump cooler and the Office Building Chiller. These portions of the TBCCW System are drained and abandoned in-place.

The TBCCW System is designed to be a backup cooling water supply for the Spent Fuel Pool Cooling System (augmented spent fuel pool cooling heat exchanger). However, this TBCCW function is only performed when the Reactor Building Closed Cooling Water (RBCCW) System is unavailable and the plant is shutdown. Therefore, this backup function is not considered an intended function for License Renewal.

Not included in the TBCCW System scoping boundary are the following interface systems, which are separately evaluated as license renewal systems:
Reactor Recirculation System
Main Generator and Auxiliary System
Main Turbine and Auxiliary System
Main Condenser Air Extraction System
Service Air System
Condensate System
Feedwater System
Process Sampling System
Control Room HVAC
Miscellaneous HVAC System
Spent Fuel Pool Cooling System
Fire Protection System

Reason for Scope Determination

The TBCCW System is not in scope under 10 CFR 54.4(a)(1) because no portions of the system are safety related or relied on to remain functional during or following design basis events. The TBCCW System is in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The system is not in scope under 10 CFR 54.4(a)(3) because it is not relied upon 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), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The TBCCW System contains non-safety related water filled lines throughout the Turbine Building and the Reactor Building which have potential spatial interaction (spray or leakage) with safety related SSCs. - 10 CFR 54.4(a)(2)

UFSAR References

9.2
10.4
5.4
9.1

License Renewal Boundary Drawings

LR-BR-2006 sheet 4
LR-BR-2006 sheet 5
LR-GE-234R166
LR-GU-3E-551-21-1000
LR-JC-19479 sheet 3

Table 2.3.3.40 Turbine Building Closed Cooling Water System Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Coolers (Condensate Pump Motor)	Leakage Boundary
Coolers (Condenser Vacuum Pump)	Leakage Boundary
Coolers (Control Room AC)	Leakage Boundary
Coolers (Feedwater and Main Steam Sample)	Leakage Boundary
Coolers (Feedwater Pump Lube Oil)	Leakage Boundary
Coolers (Final Feedwater Facility)	Leakage Boundary
Coolers (Hydrogen)	Leakage Boundary
Coolers (Reactor Recirculation Pump M-G Sets)	Leakage Boundary
Coolers (Service Air Compressor Aftercooler)	Leakage Boundary
Coolers (Service Air Compressor Cylinders)	Leakage Boundary
Coolers (Service Air Compressor InterCooler)	Leakage Boundary
Coolers (Stator Winding Liquid)	Leakage Boundary
Coolers (Thermal Control Unit)	Leakage Boundary
Coolers (Turbine Lube Oil)	Leakage Boundary
Filter Housing	Leakage Boundary
Flexible Connection	Leakage Boundary
Flow Element	Leakage Boundary
Flow Glass	Leakage Boundary
Gauge Snubber	Leakage Boundary
Heat Exchangers (Generator Bus)	Leakage Boundary
Heat Exchangers (TBCCW)	Leakage Boundary
Level Glass	Leakage Boundary
Piping and fittings	Leakage Boundary
Pump Casing (TBCCW Pumps, Chemical Feed Pump)	Leakage Boundary
Strainer Body	Leakage Boundary
Tanks (Surge, Chemical Mixing, Closed Cooling Water)	Leakage Boundary
Thermowell	Leakage Boundary
Valve Body	Leakage Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.40 Turbine Building Closed Cooling Water System
-Summary of Aging Management Evaluation

2.3.3.41 Water Treatment & Distr. System

System Purpose

The Water Treatment & Distr. System consists of the following subsystems: Pretreatment subsystem, Domestic Water (DW) and Domestic Water Distribution (DWD) subsystem, Makeup Demineralizer (MUD) subsystem and Demineralizer Water Transfer (WD) subsystem. The purpose of the Water Treatment & Distribution system is to be the source of all potable water, demineralized water and condensate for the station. It accomplishes this by drawing fresh water from a deep well and processing in the pretreatment system. After treatment, part of the water goes to the domestic water system and the rest is further treated in the Makeup Demineralizer System.

System Operation

Pretreatment Subsystem
The Pretreatment System is a trailer mounted system. The Pretreatment system is designed to filter the raw water that is drawn from the water well pit by the Deep Well Pumps. The pretreatment system consists of a fiberglass chemical tank, in which hypochlorite is injected upstream of two parallel filters. Chlorides and iron form ferric oxide floc which is removed by the filters. After passing through the filters the water is routed to either the clearwell tank or demineralizer trailer. The clearwell tank satisfies station demands for domestic water and makeup water. Three filtered water pumps remove the water from the clearwell tank. One pump operates as required to maintain the proper level in the Domestic Water Tank. The other two pumps are not automatic and operate in association with the MUD System.

The Pretreatment subsystem is not required to operate to support license renewal intended functions, and is not included in the scope of license renewal as this liquid filled subsystem is not located within an area in proximity of components performing a safety related function. Portions of this subsystem are located in the Pretreatment Building and Yard Area.

Domestic Water and Domestic Water Distribution Subsystems
The Domestic Water (MD) System is designed to provide a supply of fresh water for use by all site facilities including laundry, drinking fountains, kitchens, bathrooms, eye wash stations, decontamination showers, HVAC (Air washers and SEB Computer room), select sump pump bearing coolers, and the MUD system. The Domestic Water system consists of two subsystems, the Original Domestic water system and the North Yard domestic water system. The two subsystems are normally operated independently but can be cross connected to support shutdown of either subsystem for maintenance.

The Domestic Water Distribution System (DWD) system is designed to distribute potable water throughout the facility. The system consists of a water storage tank in the Pretreatment Building and in the North Yard Domestic Water Facility as well as electric hot water heaters in the Office Building, Plant Engineering Building, Site Emergency Building, New Site Administration Building and the Machine Shop. Additionally, it has a booster subsystem in the Maintenance Building and the Site Emergency Building.

A chemical feed subsystem treats the original domestic water prior to use. This system uses the differential pressure across the original Domestic Water Tank inlet isolation valve to provide the necessary driving force. The chemical feeder is filled with polyphosphate, a phosphate glass that dissolves slowly in water and serves to inhibit scale production, corrosion and red water formation in the domestic water piping. The North Yard Domestic Water facility has a water softener and adds soda ash to neutralize the ph to reduce corrosion and satisfy potable water standards. A Sodium Hypochlorite Injection System has been added to ensure that the North Yard Domestic Water System is bacteriologically sterile for human consumption and to oxidize and precipitate remaining dissolved iron and eliminate any traces of hydrogen sulfide. To ensure that any precipitated iron is removed a particulate filter is installed prior to distribution to the Domestic Water System. The original Domestic Water System also has a soda ash injection system, similar to the North Yard. Both tanks "float" on the domestic water distribution piping. Makeup water to the original tank is from the DWD System. Makeup water to the North Yard tank is from a deep well just north of the Domestic Water Facility. Water is automatically added as required to maintain levels in the tanks.

The main domestic water line for building services runs below grade from the pretreatment building to the turbine building basement. The North Yard Domestic Water Facility has a line that ties into the existing domestic water header north of the turbine building. Additionally a line is installed to directly supply the New Administration Building that also cross ties into the original Domestic Water System between the plant engineering and site emergency buildings. The North Yard System will be the designated source of potable water for the New Administration Building, however, it can also be lined up to supply other parts of the original system through either its north or south site tie-in points.

The Domestic Water and Domestic Water Distribution subsystems are not required to operate to support license renewal intended functions, but are included in the scope of license renewal as these liquid filled subsystems are located within an area in proximity of components performing a safety related function. Portions of this subsystem are located in the Turbine Building and Office Building.

Makeup Demineralizer Subsystem
The Makeup Demineralizer (MUD) system is designed to take pretreated water from the DW System and processes it to meet the high purity standards of water for makeup purposes. The original MUD system was replaced by a mobile demineralizer unit for purifying filtered well water before transfer to the demineralized water storage tank (DWST). The MUD System outflow is pumped to the DWST where it is stored until needed. The DWST is located outside the northwest corner of the Turbine Building, near the Condensate Storage Tank (CST).

This Makeup Demineralizer subsystem is not required to operate to support license renewal intended functions, but is included in the scope of license renewal as this liquid filled subsystem is located within an area in proximity of components performing a safety related function. Portions of this subsystem are located in the Turbine Building.

The Demineralized Water Transfer Subsystem
The Demineralized Water Transfer System is designed to provide the storage of demineralized water in the DWST and to supply an adequate amount of demineralized water for the following plant uses:

1. Initial fill up and makeup to: the Condensate Storage Tank, the Reactor Building Closed Cooling Water System, the Turbine Building Closed Cooling Water System, the Augmented Offgas Closed Cooling Water System, the New Radwaste Closed Cooling Water System, the Heating Boiler Deaerator, the Solid Radwaste System in the New Radwaste Building.

2. Supply of demineralized water to the chemical laboratory and the Maintenance Building.
3. Supply of demineralized water to the New Radwaste Building's Chemical Addition Tank, and personnel emergency shower and eyewash.
4. Cleaning and flushing via hose stations in the Turbine Building, Reactor Building, New and Old Radwaste Buildings, and Offgas Building.
5. System rinsing for the Solid Radwaste System in the New Radwaste Building.
6. Decontamination of the sampling stations.
7. Other miscellaneous uses.

The system consists of an outdoor storage tank (DWST), two full capacity transfer pumps, and associated piping and valves. Demineralized water from the MUD System enters the WD System at the DWST. Water is drawn from the tank through the WD pumps and into the system supply header. The pump suction line and the return line to the DWST are provided with locked open manually operated gate type block valves. These valves can be closed to mitigate the effects of leaks in any connecting pipe. The pump suction and return line are isolated from their surroundings by insulating tape wrap, and all flanges and penetrations which could contact dissimilar metals are also insulated. A cathodic protection system for buried piping, consisting of sacrificial anodes, is incorporated for corrosion protection. The DWST is electrically grounded, and is provided with an overflow line and a drain to the Turbine Building basement.

The WD System is normally kept in operation at all times. During loss of offsite power, either transfer pump may be started manually and operated from the Emergency Diesel Generators, if there is a demand on the system. There is no need to operate a transfer pump merely to fill the CST. During failure of normal auxiliary power, the DWST has enough reserve for anticipated requirements.

The WD subsystem is required to operate to support license renewal intended functions, and is included in the scope of license renewal as this liquid filled subsystem is located within an area in proximity of components performing a safety related function. Penetration X-23 will be assessed under License Renewal Structure Primary Containment. However V-12-217 and the piping on either side of the penetration up to the first flange connection on either side of the penetration will be assessed as part of water treatment and distribution for (a)(1) Primary Containment function. The removable spool piece and transition piece are installed for outage use only. The penetration is blind flanged on either side during normal operation.

Portions of this subsystem are located in the Reactor and Turbine Buildings.

For more detailed information, see UFSAR Section 9.2.3.

System Boundary

The license renewal scoping boundary of the Water Treatment & Distr. System encompasses the liquid filled portions of the system that are located in proximity to equipment performing a safety-related function. This includes the liquid filled portions of the Domestic Water and Domestic Water Distribution subsystem, Makeup Demineralizer subsystem and Demineralizer Water Transfer subsystem located within the Reactor, Turbine and Office Buildings. Included in this boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of this system. For more information, refer to the License Renewal Boundary Drawings for identification of this boundary, shown in red.

Penetration X-23 will be assessed under the License Renewal Structure Primary Containment. However V-12-217 and the piping on either side of the penetration up to the first flange connection on either side of the penetration will be assessed as part of the Water Treatment & Distr. System for (a)(1) Primary Containment function.

Components and subsystems that are not required to support the system's (a)(1) or leakage boundary intended functions are not included in the scope of license renewal. This includes the Pretreatment subsystem.

Not included in the Water Treatment & Distr. System scoping boundary are the following interfacing systems, which are separately evaluated as license renewal systems:
Standby Liquid Control System (Liquid Poison System)
Condensate Transfer System
Reactor Building Closed Cooling Water System
Turbine Building Ventilation System
Sanitary Waste System
Main Condenser Air Extraction System
Reactor Building Ventilation System
Miscellaneous Floor and Equipment Drain System
Service Air System
New Radwaste Closed Cooling Water System
Turbine Building Closed Cooling Water System
Miscellaneous HVAC System
Radwaste System
Primary Containment Structure

Reason for Scope Determination

The Water Treatment & Distr. System is in scope under 10 CFR 54.4(a)(1) because portions of the system are safety related or relied on to remain functional during and following design basis events. The Water Treatment & Distr. System is in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The system is not in scope under 10 CFR 54.4(a)(3) because it is not relied upon 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) and environmental qualification (10 CFR 50.49), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Provide primary containment boundary. 10 CFR 50.54(a)(1)
2. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The Water Treatment & Distr. System has the potential for spatial interaction with safety related equipment located in the vicinity to water filled process sampling piping. 10 CFR 54.4(a)(2).

UFSAR References

9.2.3
6.4.2.1

License Renewal Boundary Drawings

LR-BR-2004 sheet 1
LR-GU-3E-871-21-1000 sheet 1
LR-GU-3E-871-21-1000 sheet 2
LR-GE-148F723
LR-BR-2006 sheet 1
LR-BR-2006 sheet 5
LR-BR-2015 sheet 4
LR-GE-234R166

Table 2.3.3.41 Water Treatment & Distr. System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Filter Housing (including Purifier M-12-1)	Leakage Boundary
Flexible Hose	Leakage Boundary
Flow Element	Leakage Boundary
Flow Meter	Leakage Boundary
Piping and fittings	Leakage Boundary
	Pressure Boundary
Restricting Orifice	Leakage Boundary
Tanks (including Hot Water Heater H-12-1)	Leakage Boundary
Valve Body	Leakage Boundary
	Pressure Boundary

The aging management review results for these components are provided in
Table 3.3.2.1.41 Water Treatment & Distr. System
-Summary of Aging Management Evaluation

2.3.4 STEAM AND POWER CONVERSION SYSTEMS

The following systems are addressed in this section:

Condensate System (Section 2.3.4.1)
Condensate Transfer System (Section 2.3.4.2)
Feedwater System (Section 2.3.4.3)
Main Condenser (Section 2.3.4.4)
Main Generator and Auxiliary System (Section 2.3.4.5)
Main Steam System (Section 2.3.4.6)
Main Turbine and Auxiliary System (Section 2.3.4.7)

2.3.4.1 Condensate System

System Purpose

The intended function of the Condensate System (CNDS) for license renewal is to maintain leakage boundary integrity to preclude system interactions as described in ISG-09, Guidance on the Identification of Structures, Systems, and Components that meet 10 CFR 54.4(a)(2), dated March 15, 2002. For this reason, this system's pressure retaining components located in proximity to other components performing safety-related functions have been included in the scope of license renewal. This system is not required to operate to support license renewal intended functions, and is in scope for potential spatial interaction.

The CNDS is designed to transfer sub-cooled condensate from the main condenser hotwell to the Feedwater System. It provides the ability to transfer condensate water from the Main Condenser, through the condensate demineralizer and supply the Reactor Feed Pump at a suitable pressure and required purity level. The CNDS includes the Condensate System and the Condensate Demineralizer System.

During normal plant operations, the purpose of the CNDS is to purify condensate by removing corrosion products, dissolved solids, chemicals and other impurities that may enter the reactor coolant cycle. The CNDS accomplishes this purpose by processing the condensate through demineralizers. In the likely event that station auxiliary power is available, the Condensate and Feedwater Systems provide additional emergency core cooling capability.

System Operation

The CNDS is comprised of three condensate pumps, steam packing exhauster, seven mixed bed demineralizer units (includes one spare), one recycle pump and the required piping, valves, instrumentation and controls. Demineralizer resins are no longer chemically regenerated and reused.

The CNDS begins with two lines from each of the three Main Condenser hotwells that discharge into a common condensate supply header. The condensate pumps take suction from the condensate supply header and discharge into a common header that branches to provide cooling flow to the three intercondensers and three aftercondensers (scoped in the Main Condenser Air Extraction System) of the steam jet air ejector (SJAE) units. These six condensers are arranged in parallel. Manually operated isolation valves are provided on the suction and discharge lines for each condensate pump, a check valve is provided on each condensate pump discharge line.

The three sets of inter/after condensers for the SJAE units are provided with motor operated isolation valves at their intake and discharge lines. The flow recombines downstream of the SJAE condensers, passes through the steam packing exhauster and enters the condensate demineralizers. Upstream of the demineralizers, a branch line is provided for demineralizer backwash and a branch line to condensate pump seals. Downstream of the demineralizers, branch lines are provided to the reactor feedwater pump seals, the low pressure turbine exhaust hood sprays, the condensate pump seals, the Control Rod Drive System and the Condensate Transfer System. The CNDS flow path ends at the inlet isolation valves of the Feedwater Heaters.

For additional information, see UFSAR Section 10.4.6, 10.4.7.

System Boundary

The license renewal scoping boundary of the Condensate System (CNDS) encompasses the liquid filled portion of the system that is located in proximity to equipment performing a safety-related function. This includes the liquid filled portions of the CNDS located within the Turbine Building. Included in this boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of this system. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Components that are not required to support the system's leakage boundary intended function are not included in the scope of license renewal.

Not included in the CNDS scoping boundary are the following interfacing systems, which are separately evaluated as license renewal systems:
Condensate Transfer System
Control Rod Drive System
Core Spray System
Instrument (Control) Air System
Feedwater System
Main Condenser Air Extraction System
Hydrogen Water Chemistry
Process Sampling

Reason for Scope Determination

The Condensate System (CNDS) is not in scope under 10 CFR 54.4(a)(1) because no portions of the system are safety related or relied on to remain functional during and following design basis events. The CNDS is in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The system is not in scope under 10 CFR 54.4(a)(3) because it is not relied upon 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) and environmental qualification (10 CFR 50.49), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The CNDS has potential for spatial interaction with safety related equipment within the Turbine Building. 10 CFR 54.4(a)(2)

UFSAR References

10.1
10.4.6
10.4.7

License Renewal Boundary Drawings

LR-BR-2003 Sheet 1
LR-GE-148F444
LR-GE-148F437 Sheet 12
LR-JC-147434 Sheet 1

Table 2.3.4.1 Condensate System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Expansion Joint	Leakage Boundary
Filter Housing	Leakage Boundary
Flow Element	Leakage Boundary
Heat Exchangers	Leakage Boundary
Piping and fittings	Leakage Boundary
Pump Casing	Leakage Boundary
Restricting Orifice	Leakage Boundary
Sensor Element	Leakage Boundary
Sight Glasses	Leakage Boundary
Strainer Body	Leakage Boundary
Tanks	Leakage Boundary
Thermowell	Leakage Boundary
Valve Body	Leakage Boundary

The aging management review results for these components are provided in
Table 3.4.2.1.1 Condensate System
-Summary of Aging Management Evaluation

2.3.4.2 Condensate Transfer System

System Purpose

Condensate Transfer (CT) System is a condensate storage, makeup and supply system designed to distribute water to the Control Rod Drive, Core Spray, Condensate, Isolation Condenser, Reactor Water Clean Up, Spent Fuel Pool Cooling, Radwaste and the Heater, Drains and Vent and Pressure systems. The system is normally filled by the Demineralized Water Transfer System and has an emergency fill from the Fire Protection System. The system operates continuously during plant power operation and is credited to support Isolation Condensers for plant shutdown.

The purpose of the Condensate Transfer System is to provide for bulk storage of condensate, surge volume capability for the Condensate system, condensate supply for the condensate demineralizer resin transfer, flushing, resin regeneration and makeup to the Isolation Condensers and spent fuel pool. Condensate is also supplied by the CT system for pump bearing cooling in various systems and makeup supply for various plant systems. It accomplishes these features by continuously delivering condensate from the condensate transfer pumps to individual plant systems. It also provides a flow path between plant water supplies and various pumps and equipment when the appropriate manual or remote manual line-ups are made.

System Operation

The Condensate Transfer system is a normally operating condensate delivery system comprised of the Condensate Storage Tank (CST), condensate transfer pumps, condensate supply header and condensate branch lines that provide flow to various plant systems and components. It also is used to deliver water through its piping system to support various plant functions and it provides a surge volume for the Condensate System.

The CT system is relied on to provide a flow path for makeup to the Isolation Condensers through the Reactor Building header. This path allows makeup water from the CST via the CT pumps, backup source of makeup water from the Fire Protection system diesel and motor operated pumps and from the torus utilizing the Core Spray pumps. All these modes of operation utilize the same two air operated makeup control valves. When aligned to allow flow from the suppression pool through the Core Spray pumps to the Isolation Condensers, the Reactor Building header isolation valve is closed. The system is relied on to supply the Control Rod Drive System (CRDS) with condensate from the Condensate system directly or from the CST. The same transfer line supplies the Core Spray System. The CT system also provides makeup to the spent fuel pool.

The Condensate Transfer (CT) system consists of three basic flow paths. The condensate transfer pumps supply, the Condensate Storage Tank (CST) fill and transfer line and the CST to CRD and Core Spray suction line.

The condensate transfer pumps take suction from a common header supplied by the CST through the tank isolation valve. The water flows from the header into the individual pump suction lines and on to the pumps. The pumps then discharge to a common discharge header. Normally one pump operates continuously to supply system demands and the other pump is placed on standby. A recirculation line from the discharge of each pump directs a portion of the pumps discharge back to the CST. Recirculation flow is necessary during periods of low system demand to ensure that pump minimum flow requirements are met. Condensate from the combined pump discharge header exits the Condensate Transfer Building and flows to the Turbine, Reactor and Radwaste Buildings. Building branch lines from these headers supply systems and components with the required water. Flows to the Radwaste Buildings and Reactor Building are controlled by two manually operated butterfly valves. The two valves, located in the respective buildings, permit complete isolation of the loads in each building. Flow to the New Radwaste Building is from the header in the Old Radwaste Building and is controlled by a manually operated valve located in the Old Radwaste Building.

The CST provides bulk storage of condensate for use throughout the plant. Water for filling the CST is supplied from the Demineralized Water system or the Fire Protection system through a manually operated valve isolating the CST from the CST fill and transfer line. Since water from the Fire Protection system does not meet the purity requirements of condensate, filling the CST from the Fire Protection system is performed only in emergencies when no demineralized water is available and CST water is required to prevent uncovering the reactor fuel.

The CST to CRD and Core Spray suction line also provides the CRD System with condensate from the Condensate system directly or from the CST. The same line supplies the Core Spray System.

The condensate transfer pumps are controlled by individual pump control switches on a control room panel. Alternate controls and indicators for one of the transfer pumps are located on a local shutdown panel outside the north wall of the Chlorination Building. The Condensate Storage Tank is vented to the atmosphere. Tank level is indicated remotely on a control room panel and locally at the tank.

For additional information, see UFSAR Section 10.4.7.2.

System Boundary

The boundary of the CT pump supply path begins at the CST and continues down the suction header to the two parallel transfer pump suction lines and on through the pumps to the common discharge header. Both recirculation lines, all valves and in-line instruments are in included in the system boundary. The system continues through the main header in the Turbine Building and splits into the Reactor and Radwaste Building headers.

The Reactor Building header includes the piping up to the connections with the Core Spray fill and makeup valves and Fire Protection systems prior to terminating at the supply connection to the Isolation Condensers makeup lines. Off the header are additional piping that ends at the connections to the Reactor Water Clean Up and Spent Fuel Pool Cooling systems. The boundary also includes individual hose stations throughout the Reactor Building. The header into the Radwaste Buildings terminates at the connections to the Radwaste System. Small bore lines that branch off the header in the Turbine Building are in the boundary up to the connections to the Heater, Drains, Vent and Pressure Relief and Condensate systems. Included within the boundary are the individual hose stations throughout the Turbine Building.

The boundary of the CST fill and transfer line begins at the header connection to the CST continues through the fill lines and ends at the connection to the Fire Protection, Condensate and Demineralizer Water Transfer systems.

The boundary of the CST to CRD and Core Spray suction line begins at the CST and ends at the connections to the CRD, Core Spray and Condensate systems. The boundary also includes the CRD recirculation line up to the connection to the CRD system and the instrumentation to the CST. The CST and its vent and overflow lines are contained within the scoping boundary.

Not included in the Condensate Transfer System scoping boundary are the Control Rod Drive, Core Spray, Condensate, Isolation Condenser, Reactor Water Clean Up, Spent Fuel Pool Cooling, Radwaste, Fire Protection, Demineralized Water Transfer and the Heater Drains, Vent and Pressure Relief systems which are separately evaluated as their own license renewal systems.

The portion of the CT System in scope for license renewal includes the CST, the CT pumps, instrumentation and all piping to the CT Isolation Condenser makeup valves, the connections to the Core Spray pump discharges and Fire Protection System and the connection with the spent fuel pool. Also included are the CST fill and transfer line, the CRD and Core Spray suction line and the CRD recirculation line.

Also included in the portion of the CT system in scope for license renewal are those portions of nonsafety-related piping and equipment that extend beyond the safety-related/nonsafety-related interface up to the location of the first seismic anchor, or to a point no longer in proximity to equipment performing a safety-related function, whichever extends furthest. This includes the nonsafety-related portions of the system located within the Reactor Building and Turbine Building. Included in this boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of this portion of the system. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

The piping downstream of the radwaste header isolation valve supplying the Radwaste System is not required to support intended functions. This portion of the CT System is not included within the scope of license renewal. The overflow piping from the connection to the CST is not required to support intended functions and is not with the scope of license renewal.

Reason for Scope Determination

The Condensate Transfer System meets 10 CFR 54.4(a)(1) because it is relied on to remain functional during and following design basis events. It does meet 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for fire protection (10 CFR 50.48) and SBO (10 CFR 50.63). The Condensate Transfer System is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for environmental qualification (10 CFR 50.49) or ATWS (10 CFR 50.62).

System Intended Functions

1. Remove residual heat from the reactor coolant system. Supports makeup to the Isolation Condensers by use of CT piping and Isolation Condenser makeup valves. Supports Core Spray by maintaining system pressure boundary with closed Core Spray fill and makeup valves. 10 CFR 54.4(a)(1)
2. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The CT system provides makeup to the spent fuel pool. The CT system has potential for spatial interaction with safety related equipment within Turbine Building and Reactor Building. 10 CFR 54.4(a)(2)
3 Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Station Blackout (10 CFR 50.63). Supports makeup to the Isolation Condensers by use of CST, Core Spray pump connections, fire protection connection and CT piping and Isolation Condenser makeup valves and makeup to the Reactor Vessel from CST through CT piping to CRD. 10 CFR 54.4(a)(3)
4 Relied upon 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). Supports makeup to the Isolation Condensers by use of CST, CT pumps and piping, fire protection connection and Isolation Condenser makeup valves and permits makeup to the Reactor Vessel from CST and Condensate System through CT piping to CRD. 10 CFR 54.4(a)(3)

UFSAR References

10.4.7
7.4
6.3
15.2.6
9.1

License Renewal Boundary Drawings

LR-BR-2004 sheet 1
LR-BR-2004 sheet 2
LR-BR-2003
LR-BR-2007 sheet 2
LR-BR-2007 sheet 3
LR-JC-19479 sheet 3
LR-JC-147434 sheet 1
LR-GE-885D781
LR-GE-237E487
LR-GE-237E756
LR-GE-148F444

Table 2.3.4.2 Condensate Transfer System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Expansion Joint	Pressure Boundary
Flow Element	Leakage Boundary
	Pressure Boundary
Gauge Snubber	Pressure Boundary
Piping and fittings	Leakage Boundary
	Pressure Boundary
Pump Casing	Pressure Boundary
Restricting Orifice	Leakage Boundary
	Pressure Boundary
	Throttle
Tanks	Pressure Boundary
Valve Body	Leakage Boundary
	Pressure Boundary

The aging management review results for these components are provided in
Table 3.4.2.1.2 Condensate Transfer System
-Summary of Aging Management Evaluation

2.3.4.3 Feedwater System

System Purpose

The Feedwater System (FS) is a reactor water level control system that provides reheated condensate water to the Reactor Pressure Vessel (RPV) during normal operation. It provides water to the reactor at a flow rate equivalent to what is being generated into steam by boil-off and removed by the main steam system. The FS is essential for power operations.

The FS provides cooling water to the core during a Loss of Coolant Accident (LOCA) but is not credited in the accident analyses and is not considered part of the Emergency Core Cooling System (ECCS) or credited to support safe shutdown.

The FS includes the Feedwater Control System, the Reactor Feed Pump Lube Oil System, and the Zinc Injection System.

System Operation

The Feedwater System (FS) is comprised of three separate feedwater heating strings, and has been sized with three one-third capacity Reactor Feedwater Pumps (RFP). All three RFPs need to be in service during normal full load operation. Each string contains a drain cooler, Low Pressure (LP) heater, Intermediate Pressure (IP) heater, Reactor Feedwater Pump (RFP), flow element and High Pressure (HP) heater. The system also includes the required piping, valves, instrumentation and controls.

The RFPs take suction on a common header upstream of the drain coolers. The normal flowpath is through the drain cooler, LP heater tubes, IP heater tubes, RFP, RFP discharge check valve, regulating valve and heater string flow element. Flow then goes through the HP heater tubes and heater string outlet valve into a common header. Flow continues through a total feedwater system flow element then splits into two lines with an outboard isolation check valve, one inboard isolation check valve, and an inboard manual isolation valve for each line. Finally feedwater flow is directed into the reactor vessel (evaluated with the Reactor Pressure Vessel). The shell side of the heaters receives turbine extraction steam and heater drains to preheat the condensate (evaluated with the Main Turbine and Auxiliary System) prior to delivery to the RPV.

The Feedwater Control System is a digital control function of the FS. Reactor water level is controlled by positioning the Low Flow Regulating Valves (LFRVs) or the Main Feedwater Regulating Valves (MFRVs) to control feedwater flow rate to the reactor vessel. The digital control system consists of two computers with dual links to the digital controllers. The computers contain the feedwater logic software. It uses redundant, calculated and then default inputs to ensure reliability.

Each pump has a minimum flow line, for pump protection, routed from the discharge of the reactor feed pump to each condenser shell. The Hydrogen Water Chemistry System connects at the suction side of the RFP's and injects gaseous hydrogen into the Feedwater System in order to suppress the dissolved oxygen in the reactor coolant by promoting the recombination of hydrogen and oxygen back into water.

The Zinc Injection System is provided to reduce the deposited activity and shutdown dose rates in reactor coolant system piping and components by injecting depleted zinc oxide into the reactor coolant system. The Zinc Injection System uses the differential pressure between the discharge and the suction of the "A" Feedwater Pump as its driving force. Flow is taken from the discharge side of the "A" Feedwater Pump, is routed through a dissolution column containing depleted zinc oxide pellets, and returned to the suction side of the "A" Feedwater Pump. The Zinc Injection System is comprised of a dissolution vessel, a local instrument panel, manual flow control valves, manual system isolation valves and associated piping. Operation of the Zinc Injection System is through manual valves and requires that the A Feedwater Pump is in service. Manual flow control valves are adjusted as necessary to achieve the desired reactor water and feedwater zinc concentrations as determined by Chemistry.

Feedwater is supplied to spargers (evaluated with the Reactor Internals) at four points, 90 degrees apart. These spargers distribute feedwater in a manner that prevents feedwater spray directly on the reactor vessel wall, which minimizes thermal stressing. Each feed pump has a RFP Lube Oil System that consists of a shaft-driven oil pump, motor-driven auxiliary oil pump, reservoir and filter cooler. Cooling water is supplied to the lube oil coolers from the Turbine Building Closed Cooling Water (TBCCW) System.

For additional information, see UFSAR Section 7.7, 10.1, 10.4.7, 15.1 & 15.2.

System Boundary

The Feedwater System (FS) begins at the inlet to the drain coolers and ends with the reactor feedwater connection at the Reactor Pressure Vessel (RPV) nozzles (evaluated with the Reactor Pressure Vessel System). The system includes drain coolers, LP heaters, IP heaters and the reactor feedwater pumps. Downstream of each pump is a regulating valve, flow element and then the tube side of the HP heater in each string. The reactor feed pump discharge feedwater flow element is considered part of the feedwater control system and evaluated as part of the feedwater system. The three strings combine into a common header downstream of the HP heater outlet valves. A total system flow element exists in the common header. Four lines penetrate the RPV and direct feedwater to the reactor via feedwater spargers (evaluated with the Reactor Internals). All associated piping, components and instrumentation contained within the flowpath described above are included in the system evaluation boundary.

Also included in the license renewal scoping boundary of the FS are those portions of nonsafety-related piping and equipment that extend beyond the safety-related/nonsafety-related interface up to the location of the first seismic anchor, or to a point no longer in proximity to equipment performing a safety-related function, whichever extends furthest. This includes the nonsafety-related portions of the system located within the Turbine Building. Included in this boundary is the Depleted Zinc Injection Skid and other pressure retaining components relied upon to preserve the leakage boundary intended function of the FS. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Not included in the scoping boundary are the following interfacing systems that are separately evaluated as license renewal systems:
Main Turbine and Auxiliary System
Turbine Building Closed Cooling Water System
Reactor Pressure Vessel

Reactor Internals
Condensate System
Hydrogen Water Chemistry System

Reason for Scope Determination

The Feedwater System meets 10 CFR 54.4(a)(1) because it is a safety related system that is relied on to remain functional during and following design basis events. The Feedwater System meets 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The system is in scope under 10 CFR 54.4(a)(3) because it is relied upon 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). The Feedwater System is not relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for environmental qualification (10 CFR 50.49), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The FS has potential for spatial interaction with safety related equipment within Turbine Building. 10 CFR 54.4(a)(2)
2. Provide reactor coolant pressure boundary. 10 CFR 54.4(a)(1)
3. Provide primary containment boundary. Piping for the feedwater system exits the containment and has a check valve outside containment. 10 CFR 54.4(a)(1)
4 Relied upon 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). 10 CFR 50.54(a)(3).

UFSAR References

7.6.1.1
7.7.1.4
10.1
10.4.7
15.1

License Renewal Boundary Drawings

LR-BR-2003

Table 2.3.4.3 Feedwater System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Dissolution Column	Leakage Boundary
Expansion Joint	Leakage Boundary
Filter Housing	Leakage Boundary
Flow Element	Leakage Boundary
	Pressure Boundary
Heat Exchangers	Leakage Boundary
Piping and fittings	Leakage Boundary
	Pressure Boundary
Pump Casing	Leakage Boundary
Strainer Body	Leakage Boundary
Tanks	Leakage Boundary
Thermowell	Leakage Boundary
	Pressure Boundary
Valve Body	Leakage Boundary
	Pressure Boundary

The aging management review results for these components are provided in
Table 3.4.2.1.3 Feedwater System
-Summary of Aging Management Evaluation

2.3.4.4 Main Condenser

System Purpose

The Main Condenser is 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 designed:
a. To accept a portion of turbine bypass steam flow without exceeding the turbine exhaust pressure and temperature limitations.
b. To receive, in addition to the main turbine exhaust, vents and drains from the regenerative feedwater heating system and from various other components and systems of the heat cycle.
c. To provide time for radioactive isotope decay by retaining sufficient water in the hotwell, without makeup and with turbine throttle valves wide open.

The purpose of the system is to condense Low Pressure (LP) turbine exhaust from each of the LP turbines and allow for the decay of short-lived isotopes. The main condenser accomplishes this by transferring heat to the circulating water system and by ensuring sufficient retention time in the hotwell to allow for the decay of short lived isotopes.

System Operation

The Main Condenser is comprised of three single pass shells, with divided waterboxes, one each for the three low pressure (LP) sections of the main turbine. Each shell is rigidly supported on a concrete foundation and is connected to the corresponding LP turbine cylinder casing by means of an expansion joint.

Equalizing connections between condenser shells limit the pressure differential between adjacent shells. These connections also allow use of one single vacuum breaker for all three shells.

During normal operation, steam, after expanding through the LP turbine, exhausts directly downward, through exhaust openings in the turbine casings into the condenser shells. The steam passes over the outside of the tubes and forms condensate that enters the hotwell and flows to the suction of the condensate pumps. The inside of the tubes have water from the Circulating Water System passing through them for heat rejection. The Circulating Water System has divided waterboxes, each provided with inlet and outlet circulating water valves, permitting individual operation, removal from service of one half shell for maintenance, or backwashing of either half shell. The steam packing exhauster and the steam jet air ejectors are provided to obtain the minimum vacuum that will prevent steam from leaking past the packing and into the turbine building.

During abnormal conditions, the Main Condenser receives, although not simultaneously, flows from the Turbine Bypass System, feedwater heater drains, and relief valve discharges from various steam lines. There are also other intermittent flows into the Main Condenser, such as condensate and reactor feedwater pumps minimum recirculation flows.

Makeup from the Condensate Storage Tank is evenly divided between the operating condenser shells. At each condenser, a line supplies make-up to a spray nozzle at the elevation of the drain coolers. Makeup thus enters the steam space to ensure deaeration before it mixes with condensate in the hotwell.

The condenser shells and turbine casings are protected by relief diaphragms, which will open in the event of failure of a turbine bypass valve to close on loss of condenser vacuum. The steam released from a ruptured diaphragm is discharged to the local area and then to the Turbine Building stack through the ventilating system.

Hotwell level is monitored and alarms are provided for both low and high level. Local temperature indication is also provided. Condenser vacuum is indicated in the control room. Vacuum pressure monitors provide alarm and trip signals to the main turbine and for the turbine bypass valves for loss of vacuum.

There are generally two types of valve trip events which can occur at the Oyster Creek Generating Station. The first will trip closed the main stop valves, reheat stop valves, main control valves, intercept valves, and extraction check valves and opens the bypass valves to provide a flow path of reactor steam through the bypass valve assembly to the Main Condenser. The second type of valve trip will close the bypass valves on low condenser vacuum, thereby protecting against an overpressurization of the Main Condenser. Bypass trip oil is used to actuate the bypass valve trip, independent of the turbine trip oil, via the bypass valve relay.

Air can be removed from the Main Condenser by a mechanical vacuum pump (evaluated with the Main Condenser Air Extraction System), which discharges to the gland seal holdup pipe and through the plant stack. This pump is used for evacuating the condenser during plant startup and for purging the condenser after plant shutdown.

Oyster Creek has made revisions to its LOCA accident source term in design basis radiological consequences analyses, but has not yet submitted a license amendment application under 10CFR50.67 for other accidents. The Main Condenser and portions of the Main Steam system are credited for radiological plate out and holdup for the Control Rod Drop Accident (CRDA). For the purpose of CRDA, it is not required that the condenser be safety related per SRP 15.4.9.

Components of the condensate and condensate storage system, condensate demineralizer subsystem, main steam, mechanical vacuum pumps, steam jet air ejector subsystem, turbine bypass subsystem and the circulation water system are evaluated with their respective license renewal systems.

Due to the location of the condenser in the Turbine Building any flooding resulting from circulating water side or steam side condenser failure will not affect the operation of any safety related equipment.

For more detailed information, See UFSAR section 10.4.1 and 10.4.2.2.

System Boundary

The boundary of the main condenser begins with the low-pressure turbine exhaust inlets and includes the main steam drain line inlets and ends at the condenser hotwell. The boundary includes the main condenser shell, condenser tubes and waterboxes.

Not included in the Main Condenser are the following interfacing systems, which are separately evaluated as license renewal systems:
Condensate System
Feedwater System
Condensate Transfer System
Main Steam System
Main Condenser Air Extraction System
Main Turbine and Auxiliaries
Circulating Water System

Reason for Scope Determination

The Main Condenser System does not meet 10 CFR 54.4(a)(1) because it is a non-safety related system and is not relied upon to remain functional during or following a design basis event. The Main Condenser System meets the scoping requirements of 10 CFR 54.4(a)(2) because it is relied on for post accident containment, holdup and plateout of MSIV bypass leakage. It does not meet 10 CFR 54.4(a)(3) since it is not relied upon in the safety analyses and 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), ATWS (10 CFR 50.62), or station blackout (10 CFR 50.63).

System Intended Functions

1. Post accident containment holdup and plate out of MSIV bypass leakage. The main condenser provides for post accident containment, holdup and plateout of MSIV bypass leakage. 10 CFR 54.4(a)(2)

UFSAR References

10.4.1

License Renewal Boundary Drawings

LR-BR-2002 Sheet 2
LR-BR-2002 Sheet 3
LR-BR-2002 Sheet 4
LR-BR-2003
LR-BR-2005 Sheet 6
LR-BR-2007 Sheet 1
LR-BR-2007 Sheet 2
LR-BR-2008 Sheet 1

Table 2.3.4.4 Main Condenser
Components Subject to Aging Management Review

Component Type	Intended Functions
Main Condenser Shell	Containment, Holdup and Plateout
Main Condenser Tubes	Containment, Holdup and Plateout
Main Condenser Tubesheet	Containment, Holdup and Plateout

The aging management review results for these components are provided in
Table 3.4.2.1.4 Main Condenser
-Summary of Aging Management Evaluation

2.3.4.5 Main Generator and Auxiliary System

System Purpose

The intended function of the Main Generator and Auxiliary Systems (MGAS) for license renewal is to maintain leakage boundary integrity to preclude system interactions as described in ISG-09, Guidance on the Identification of Structures, Systems, and Components that meet 10CFR54.4(a)(2), dated March 15, 2002. For this reason, this system's pressure retaining components located in proximity to other components performing safety-related functions have been included in the scope of license renewal. This system is not required to operate to support license renewal intended functions, and is in scope for potential spatial interaction.

The MGAS is a normally operating system designed to convert the mechanical energy of the turbine into electrical energy, which is fed to the main transmission lines, and is also used to satisfy in-house loads. The MGAS system is comprised of the following subsystems: Main Generator, Main Generator Exciter, Stator Cooling, Hydrogen Cooling, Hydrogen Seal Oil and the generator Isolated Phase Bus.

The purpose of the MGAS is to produce electricity. The system accomplishes the generation of electricity by converting mechanical energy, supplied by the main turbine, into electrical energy. The electrical energy produced by the main generator is transmitted to the power system grid via the main transformers, and to station loads via the auxiliary transformer.

System Operation

The Main Generator consists of a casing, rotor and stator. The casing forms a gas tight boundary. The rotor consists of the rotor body with two shaft extensions. Hydrogen flows into the rotor near each retaining ring to cool the copper windings. Two axial blower type fans, one at each end of the rotor, provide the circulation of cooling hydrogen gas around the generator and through the coolers. The stator contains the armature windings for the Main Generator. It consists of the stator core and stator windings. The stator windings are direct-water cooled by Stator Cooling Water. The Stator Cooling Water removes heat produced in the stator bars of the Main Generator. Without cooling, output must be reduced. Stator Cooling Water uses the Turbine Building Closed Cooling Water System as the heat sink.

The Main Exciter supplies the Main Generator field with excitation voltage through slip ring/brush rigging arrangement and the main exciter output circuit breaker. The main exciter is an air-cooled, DC generator driven by a reduction gear connected to the main generator rotor through a flexible coupling. The magnitude of the exciter output, and thus generator main field excitation, is controlled by a motor-driven rheostat or by an amplidyne.

The Hydrogen Seal Oil subsystem maintains the hydrogen inside the generator casing. Seal oil seals the Main Generator casing to prevent the hydrogen gas from exiting to the atmosphere at the points where the rotor penetrates the casing.

Regulating the field applied to the main exciter changes the field applied to the rotor and controls output voltage. A motor operated rheostat in series with the exciter field accomplishes manual regulation. An Amplidyne voltage regulator provides automatic regulation. The high voltage bushings connect the generator phases to the isolated phase buses. The isolated phase bus connects the main generator to the main transformers, auxiliary transformer, and generator neutral connection.

For more detailed information, see UFSAR Sections 8.2, 9.2.1.6, 10.2.

System Boundary

The license renewal scoping boundary of the Main Generator and Auxiliary Systems (MGAS) encompasses the liquid-filled portion of the system that is located in proximity to equipment performing a safety-related function. This includes the liquid-filled portions of the system located within the Turbine Building. Included in this boundary are pressure-retaining components relied upon to preserve the leakage boundary intended function of this system. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Components that are not required to support the system leakage boundary intended function are not included in the scope of license renewal. These include the main generator, main generator exciter, hydrogen cooling and generator isolated phase bus.

Not included in the MGAS scoping boundary are the following interfacing systems, which are separately evaluated as license renewal systems:
Turbine Building Closed Cooling Water System
Main Turbine and Auxiliary System
Main Steam System
Water Treatment & Distribution System

Reason for Scope Determination

The Main Generator and Auxiliary System (MGAS) is not in scope under 10 CFR 54.4(a)(1) because no portions of the system are safety related or relied on to remain functional during and following design basis events. The MGAS is in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The system is not in scope under 10 CFR 54.4(a)(3) because it is not relied upon 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), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The MGAS has potential for spatial interaction with safety related equipment within Turbine Building. 10 CFR 54.4(a)(2)

UFSAR References

8.1.2
8.2.1
8.3.1.1
9.2.1
10.2.2

License Renewal Boundary Drawings

LR-GE-234R166
LR-GE-865D741

Table 2.3.4.5 Main Generator and Auxiliary System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Filter Housing	Leakage Boundary
Flow Element	Leakage Boundary
Gauge Snubber	Leakage Boundary
Heat Exchangers	Leakage Boundary
Piping and fittings	Leakage Boundary
Pump Casing	Leakage Boundary
Restricting Orifice	Leakage Boundary
Sensor Element (CE)	Leakage Boundary
Sight Glasses	Leakage Boundary
Strainer Body	Leakage Boundary
Tanks	Leakage Boundary
Valve Body	Leakage Boundary

The aging management review results for these components are provided in
Table 3.4.2.1.5 Main Generator and Auxiliary System
-Summary of Aging Management Evaluation

2.3.4.6 Main Steam System

System Purpose

The Main Steam System (MSS) is a normally pressurized system that is designed to deliver steam generated from the Reactor Pressure Vessel System to the Main Turbine and Auxiliary System. The MSS is in scope for License Renewal.

The purpose of the MSS is to provide a primary containment and reactor coolant pressure boundary function; it serves as the pressure relief system, and is a steam distribution system. It accomplishes the primary containment and reactor coolant pressure boundary function by utilizing piping and valves to limit radiation release rates from the primary Containment below the 10CFR100 guidelines. It accomplishes the pressure relief function for the reactor coolant pressure boundary by way of automatic and manual actuation of relief valves. It also provides manual and automatic emergency depressurization by way of relief valves to support the Core Spray System. Distribution of steam to the Main Turbine and Auxiliary System is accomplished by piping distribution branches in the turbine building.

System Operation

The system is comprised of both small bore and large bore piping, pneumatically actuated isolation valves, spring type safety valves, electrically actuated relief valves, and vacuum breaking check valves to accomplish its designed functions. The MSS transports steam generated by the reactor through the reactor pressure vessel nozzles to the main turbine via Main Steam Isolation Valves (MSIVs) in each of the two main steam lines. Two main steam lines each attached to a reactor vessel nozzle have branch connections on the main steam line for safety relief valves (SRVs), and electromatic relief valves (EMRVs). Integral with the piping in the primary containment are flow restrictors inside the piping along with sensing lines to monitor differential pressure. Two isolation valves on each steam line, one inside and one outside of primary containment, provide primary containment and reactor coolant boundary requirements. The two main steam lines terminate at an equalization header in the Turbine Building which distributes the steam to the Main Turbine and Auxiliary Systems including the turbine stop valves, turbine bypass valves, turbine steam seals, and steam jet air ejectors.

The Main Steam System provides the pressure relief function with the nine SRVs installed on the main steam lines on the branch connections. When actuated, the SRVs discharge steam to the drywell. The SRVs are spring-type safety valves sized and provided with set points which maintain reactor vessel pressures within design conditions.

The main steam lines have five EMRVs, which provide a pressure relief function actuated by way of pressure switches in the Automatic Depressurization System (evaluated with the Automatic Depressurization System). In addition they are automatically or manually actuated by the Automatic Depressurization System to depressurize the reactor vessel to support the Core Spray System in an emergency depressurization function. The EMRVs open to discharge the steam to the pressure suppression chamber (evaluated with the Primary Containment Structure).

Integral with the main steam line piping are flow restrictors on each steam line inside the drywell. The flow nozzles provide a differential pressure which is sensed through small diameter piping leading to pressure and flow instrumentation systems evaluated with the

Nuclear Boiler Instrumentation System, which provide indication and alarm for main steam line flow rate during normal and transient conditions. Actuation of safety signals on high flow is provided to the Reactor Protection System. The flow restrictors limit the maximum possible flow through the steam lines and in conjunction with the MSIVs limit the loss of reactor coolant, reduce the amount of moisture carryover, and reduce the possibility of forming high velocity water slugs in the main steam lines during a postulated severance of the main steam line outside the drywell.

The MSIVs are pneumatic piston actuated valves, utilizing Instrument (Control) Air System and the Nitrogen Supply System to assist closing the valves when required. The valves are provided automatic isolation signals to close from the Reactor Protection System, and manual actuation from the control room. Solenoid valves powered from both the 125 V Station DC and the 120 VAC Vital Power Systems operate the valves. The MSIV's have position sensing switches as part of the Reactor Protection System to provide a reactor scram on sensed start of closure of the valves.

One of the main steam lines downstream of the MSIV provides the vent path for the Isolation Condenser vents.

Sensing lines and condensing pots for the main steam line low pressure sensors are downstream of the MSIVs to sense a main steam line break and provide a signal for closure of the MSIVs.

The turbine bypass valves provide a reactor pressure control function, turbine steam seals minimize air in leakage to the main condenser, and the Steam Jet Air Ejector (SJAE) steam supply provides motive force for the air extraction function, none of which are relied upon to provide a safety function.

Under post accident conditions the piping and components downstream of the MSIVs provides containment, holdup, and plate out for MSIV bypass leakage.

Oyster Creek has made revisions to its LOCA accident source term in design basis radiological consequences analyses, but has not yet submitted a license amendment application under 10CFR50.67 for other accidents. The Main Condenser and portions of the Main Steam system are credited for radiological plate out and holdup for the Control Rod Drop Accident (CRDA).

Draining of the main steam lines is accomplished by the drain lines routed to either the Drywell Floor and Equipment Drains System or the Main Condenser System.

Piping is installed on the reactor vessel head, and connected to the main steam lines to provide venting of non-condensable gases from the reactor vessel during operation. Another branch connection off the reactor vessel head vent line provides steam to the wide range level indication condensing pot within the Nuclear Boiler Instrumentation System. Another branch connection with solenoid operated isolation valves provides a vent path for the reactor vessel to the Drywell Floor and Equipment Drains System.

For more detailed information, see UFSAR Sections, 5.2, 5.4, 6.3, 7.3, 10.3, 15.1,15.2

System Boundary

The Main Steam System begins with the two parallel pipes each connected to a reactor vessel nozzle, proceeds through the drywell and drywell penetrations into the turbine building, and terminates at the connections to the main turbine stop valves and bypass valves via an equalization header and at other main turbine auxiliaries. Each main steam line is equipped with safety valves, EMRVs, and flow restrictor, followed by an MSIV inside and outside the primary containment. The evaluation boundary includes piping between the reactor pressure vessel and the outboard isolation valve, including the main steam line drain piping. Included is discharge piping from the EMRV valves, which is routed through the drywell, the pressure suppression chamber (Torus) vent header, and terminates at the quencher located in the pressure suppression chamber (Torus). Included in the MSS is the reactor vessel head vent beginning at the reactor head nozzle pipe- to-nozzle weld and terminating at the main steam piping, the head vent piping to the Drywell Floor and Equipment Drains System terminating at the second reactor head vent isolation valve, and head vent piping terminating at the condensing pot for the wide range level instrument in the Nuclear Boiler Instrumentation System. Included is the branch connection from the main steam line for the Isolation Condenser System vents up to the manual isolation valve. Included is the piping to the main turbine stop valves, main turbine bypass valves, steam seal regulator, and SJAEs, steam supply isolation valves; all downstream of the MSIVs in the turbine building. All associated piping, components, and instrumentation contained within the flow path described above are included in the system evaluation boundary.

Not included in the scoping boundary are the EMRV solenoids, and associated logic and power evaluated as part of the Automatic Depressurization System. Not included in the scoping boundary is the instrumentation associated with the monitoring of leakage from EMRV and safety valves, which is included in the evaluation of Post Accident Monitoring System. Not included in the Main Steam System license renewal scoping boundary are the following interfacing systems, which are separately evaluated as license renewal systems: Nuclear Boiler Instrumentation, Drywell Floor and Equipment Drains, Automatic Depressurization System, Instrument (Control) Air System, Nitrogen Supply System, Post- Accident Monitoring System, and Main Turbine and Auxiliary System.

The boundary portion of the MSS that is in scope for license renewal starts at the reactor vessel nozzle, and ends with the main turbine stop valves, the SJAEs, the main turbine bypass valves, and the seal steam pressure regulator. It includes the EMRVs and safety valves as branches to the piping internal to the primary containment.

Reason for Scope Determination

The Main Steam System meets 10 CFR 54.4(a)(1) because it is a safety related system that is relied on to remain functional during and following design basis events. It meets 10 CFR 54.4 (a)(2) because failure of non-safety related portions of the system could prevent accomplishment of function(s) identified for 10 CFR 54.4 (a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform functions that demonstrate compliance with the Commission’s regulations for fire protection (10 CFR 50.48) and environmental qualification (10 CFR 50.49). The Main Steam System is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission’s regulation for ATWS (10 CFR 50.62), or station blackout (10 CFR 50.63)

System Intended Functions

1. Provide reactor coolant pressure boundary. 10 CFR 54.4 (a)(1)
2. Sense process conditions and generate signals for reactor trip or engineered safety features actuation. 10 CFR 54.4 (a)(1)
3. Provide primary containment boundary. 10 CFR 54.4 (a)(1)
4. Relied upon 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). 10 CFR 54.4 (a)(3)
5. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Environmental Qualification (10 CFR 50.49). 10 CFR 54.4 (a)(3)
6. Provides emergency core cooling where the equipment provides coolant directly to the core. Works in concert with Core Spray System to provide injection following a LOCA. 10 CFR 54.4 (a)(1)
7. Post accident containment holdup and plate out of MSIV bypass leakage. The main steam lines and drains provide for post accident containment, holdup and plateout of MSIV bypass leakage. 10 CFR 54.4 (a)(2)
8. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The system has spatial relationship with safety-related SSCs such that its failure could adversely impact performance of an intended function. 10 CFR 54.4(a)(2)

UFSAR References

5.2.2
5.2.6.2
5.4.4
5.4.5
6.3.1.2
7.3
10.3
15.1.5

License Renewal Boundary Drawings

LR-BR-2002, Sheet 1
LR-BR-2002, Sheet 2
LR-BR-2008, Sheet 1
LR-GE-148F712
LR-GE-713E802
LR-JC-19616

Table 2.3.4.6 Main Steam System
Components Subject to Aging Management Review

Component Type	Intended Functions
Closure bolting	Mechanical Closure
Condensing chamber	Pressure Boundary
Coolers (Sample)	Pressure Boundary
Eductor	Leakage Boundary
Expansion Joint	Pressure Boundary
Flow Element (Main Steam Line)	Pressure Boundary
	Throttle
Gauge Snubber	Pressure Boundary
Piping and fittings	Leakage Boundary
	Pressure Boundary
Sparger (Y-Quencher)	Pressure Boundary
Steam Trap	Leakage Boundary
	Pressure Boundary
Strainer Body	Leakage Boundary
Thermowell	Pressure Boundary
Valve Body	Leakage Boundary
	Pressure Boundary
Valve Body (Bypass Valves)	Pressure Boundary
Valve Body (Steam Chest)	Pressure Boundary

The aging management review results for these components are provided in
Table 3.4.2.1.6 Main Steam System
-Summary of Aging Management Evaluation

2.3.4.7 Main Turbine and Auxiliary System

System Purpose

The intended function of the Main Turbine and Auxiliary Systems (MTAS) for license renewal is to maintain leakage boundary integrity to preclude system interactions as described in ISG-09, Guidance on the Identification of Structures, Systems, and Components that meet 10CFR54.4(a)(2), dated March 15, 2002. For this reason, this system's pressure retaining components located in proximity to other components performing safety-related functions have been included in the scope of license renewal. This system is not required to operate to support license renewal intended functions, and is in scope for potential spatial interaction.

The MTAS is a normally operating system designed to convert the thermodynamic energy of reactor steam into rotational mechanical energy to drive the Main Generator.

The Main Turbine and Auxiliary Systems (MTAS) consists of the following subsystems. These subsystems are: Main Turbine (High and low pressure turbine sections), Mechanical-Hydraulic Controls Front Standard, Heater Drains, Vent and Pressure Relief, Moisture Separators, Reheaters, Turbine Lubrication Oil, Lubrication Oil Purification and Transfer, Steam Seal, Turning Gear and Lift Pumps, Exhaust Hood Spray and Turbine Hood Spray, Reheat Steam, Turbine Extraction, Turbine Bypass System and the necessary control and protective devices, operating and supervisory instrumentation.

The purpose of the MTAS is to produce rotational energy from the steam generated in the reactor, and to discharge exhaust steam into the main condenser.

The system accomplishes the purpose by extracting energy from the reactor steam entering the High Pressure (HP) turbine through the Main Stop Valves and Control Valves. Some of the steam is extracted and sent to the first stage reheater. The remaining steam exhausts to the moisture separators and then to the reheaters. Superheated steam from the reheaters is directed to the Low Pressure (LP) turbines through the Combined Reheat Intercept/Stop Valves. From there the steam is exhausted to the Main Condenser (evaluated as a separate system for license renewal).

System Operation

The MTAS is comprised of one high and three low pressure turbine sections, stop valves, control valves, combined reheat valves, drain tanks, flash tanks, control and protective devices, operating and supervisory instrumentation and associated support equipment. The turbine is of conventional design for saturated steam conditions; it consists of a double flow high pressure section followed by three double flow low-pressure sections, each served by a separate divided water box condenser.

The system begins downstream of the main turbine stop valves in the steam chest that direct saturated steam from the Main Steam System through control valves to the high-pressure turbine section. Steam from the high-pressure section exits into the moisture separators, where steam drying occurs. Downstream of the Moisture Separators, steam for heating the Feedwater and first stage reheater is supplied from turbine extractions. The Reheat System dries the steam leaving the high-pressure turbine and superheats the steam before it enters the low-pressure stages. The first stage reheaters handle the flow from the Moisture

Separators. The first stage reheater is heated by steam from the third stage extraction of the high-pressure turbine. Steam from the first stage reheaters flows into the second stage reheaters. The second stage reheaters are heated with steam from the steam chest.

After being reheated, the steam from each second stage reheater is admitted to the center sections of the three low pressure turbines by way of three pairs of combined reheat intercept stop valves. The extraction steam lines from each of the turbine low-pressure stages provide steam to the shell side of three parallel strings of feedwater heaters. Cascading drains from the reheaters and moisture separators drain tank also go into three parallel strings of the feedwater heaters.

Normally, the turbine utilizes all the steam being generated by the reactor. However, under certain operating transients, excess steam is generated. An automatic pressure controlling Turbine Bypass System is provided to discharge excess steam up to 40 percent of the turbine steam flow at design power level directly to the main condenser. The Turbine Bypass System is designed to control pressure by dumping excess steam during startup, shutdown, and during power operation, when the reactor steam generation exceeds the transient turbine steam requirements.

The feedwater heaters are shell and tube type heat exchangers with reactor feedwater flowing through the tube side and the cascading drains on the shell side. Extraction steam from the turbine is supplied to the shell of each feedwater heater. The shell side is vented into the condenser. The low-pressure heaters and drain coolers are contained within the necks of each of the three sections of the Main Condenser. From the low-pressure stages the steam is exhausted into the Main Condenser where it is condensed and deaerated, and then returned to the cycle as condensate. The system ends at the Main Condenser (evaluated as a separate system for license renewal).

The Main Turbine is supported by other auxiliary systems: The turbine Steam Seal System provides sealing steam to the high-pressure and low-pressure turbines to prevent steam leakage to the atmosphere or air in-leakage to the condenser. The MHC System provides hydraulic fluid and mechanical linkage to control certain valves and the reactor pressure through pressure regulators. The Turbine Lubrication Oil System provides clean, purified oil to the turbine bearings to minimize friction. A loss of Turbine Lubrication Oil causes a turbine trip due to low pressure at the thrust bearing wear detector. The Lubrication Oil Purification and Transfer System provides make-up capability to the Turbine Lubrication Oil System. The Exhaust Hood Spray System provides cooling water to the turbine exhaust hood for blade cooling. The Turning Gear and Lift Pump System is a motor operated turning gear for both remote manual start and automatic operation. The Turbine Extraction System refers to any steam removed from the turbine during its flow through the high and low-pressure sections. The steam is supplied to the three parallel strings of three feedwater heaters. The system also includes the vent lines from flash tanks and discharge in parallel to the high-pressure heaters. The steam returns and flows into the Main Condenser.

For more detailed information, see UFSAR Section 7.7.1.5, 10.2, 10.4 and 15.2.

System Boundary

The license renewal scoping boundary of the Main Turbine and Auxiliary Systems encompasses that portion of the system that is located in proximity to equipment performing a safety-related function. This includes the portions of the system located within the Turbine

Building and Office Building. Included in this boundary are pressure retaining components relied upon to preserve the leakage boundary intended function of this system. For more information, refer to the License Renewal Boundary Drawing for identification of this boundary, shown in red.

Components that are not required to support the system's leakage boundary intended function are not included in the scoping boundary of the Main Turbine and Auxiliary Systems.

Not included in the Main Turbine and Auxiliary Systems scoping boundary are the main turbine stop valves (steam chest) and main turbine bypass valves which are included in the Main Steam System.

Not included in the Main Turbine and Auxiliary Systems scoping boundary are the following interfacing systems, which are separately evaluated as license renewal systems:
Main Steam System
Main Generator and Auxiliary System
Main Condenser
Condensate System
Feedwater System

Reason for Scope Determination

The Main Turbine and Auxiliary Systems is not in scope under 10 CFR 54.4(a)(1) because no portions of the system are safety related or relied on to remain functional during and following design basis events. The Main Turbine and Auxiliary Systems is in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The system is not in scope under 10 CFR 54.4(a)(3) because it is not relied upon 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), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. The MTAS has potential for spatial interaction with safety related equipment within Turbine Building and Office Building. 10 CFR 54.4(a)(2)

UFSAR References

3.5
7.7.1.5
10.1
10.2
10.3
10.4
15.1
15.2

License Renewal Boundary Drawings

LR-BR-2002 Sheet 2
LR-BR-2002 Sheet 3
LR-BR-2002 Sheet 4
LR-BR-2007 Sheet 1
LR-BR-2007 Sheet 2
LR-BR-2007 Sheet 3
LR-BR-2007 Sheet 4
LR-BR-2014
LR-SN-13432.19-1
LR-GE-713E802

Table 2.3.4.7 Main Turbine and Auxiliary System
Components Subject to Aging Management Review

Component Type	Intended Functions
Accumulator	Leakage Boundary
Closure bolting	Mechanical Closure
Coolers	Leakage Boundary
Expansion Joint	Leakage Boundary
Filter Housing	Leakage Boundary
Flexible Hose	Leakage Boundary
Flow Element	Leakage Boundary
Heat Exchangers	Leakage Boundary
Piping and fittings	Leakage Boundary
Pump Casing	Leakage Boundary
Restricting Orifice	Leakage Boundary
Sight Glasses	Leakage Boundary
Steam Trap	Leakage Boundary
Strainer Body	Leakage Boundary
Tanks	Leakage Boundary
Thermowell	Leakage Boundary
Turbine Casing	Leakage Boundary
Valve Body	Leakage Boundary

The aging management review results for these components are provided in
Table 3.4.2.1.7 Main Turbine and Auxiliary System
-Summary of Aging Management Evaluation

2.4 SCOPING AND SCREENING RESULTS: STRUCTURES

The following structural components are addressed in this section:

- Primary Containment (Section 2.4.1)
- Reactor Building (Section 2.4.2)
- Chlorination Facility (Section 2.4.3)
- Condensate Transfer Building (Section 2.4.4)
- Dilution Structure (Section 2.4.5)
- Emergency Diesel Generator Building (Section 2.4.6)
- Exhaust Tunnel (Section 2.4.7)
- Fire Pond Dam (Section 2.4.8)
- Fire Pumphouses (Section 2.4.9)
- Heating Boiler House (Section 2.4.10)
- Intake Structure and Canal (Ultimate Heat Sink) (Section 2.4.11)
- Miscellaneous Yard Structures (Section 2.4.12)
- New Radwaste Building (Section 2.4.13)
- Office Building (Section 2.4.14)
- Oyster Creek Substation (Section 2.4.15)
- Turbine Building (Section 2.4.16)
- Ventilation Stack (Section 2.4.17)
- Component Supports Commodity Group (Section 2.4.18)
- Piping and Component Insulation Commodity Group (Section 2.4.19)

2.4.1 Primary Containment

System Purpose

The Primary Containment Structure is comprised of the primary containment, containment penetrations, and internal structures. The structure is enclosed by the Reactor Building, which provides secondary containment, structural support, shielding, shelter, and protection, to the containment and components housed within, against external design basis events.

The primary containment is a General Electric Mark I design and consists of a drywell, a pressure suppression chamber, and a vent system connecting the drywell and the suppression chamber. It is designed, fabricated, inspected, and tested in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section VIII, and Nuclear Code Cases1270N-5, 1271N and 1272N-5. The containment is safety related, classified Seismic Class 1 structure.

The drywell is a steel pressure vessel, in the shape of an inverted light bulb, with a spherical lower section and a cylindrical upper section. The lower spherical section is embedded externally in the reinforced concrete foundation and covered internally by a fill slab at the bottom of the drywell. The top portion of the drywell vessel consists of a steel head that is removed during refueling operations. The head is bolted to the drywell flange and is sealed with a double seal arrangement. Access into the drywell is through a personnel airlock/equipment hatch, with two mechanically interlocked doors, and other access hatches. The drywell houses the reactor pressure vessel, the reactor coolant recirculation system, safety relief valves, electromatic relief valves (EMRVs), branch connections of the reactor primary system, containment drywell spray header, and internal structures discussed below. The drywell shell and the enclosing reactor building concrete are separated by an air gap to allow for differential thermal expansion between the shell and the concrete during any mode of plant operation.

The pressure suppression chamber is a toroidal shaped, steel pressure vessel encircling the base of drywell. The suppression chamber, commonly called the torus, is partially filled with demineralized water and includes internal steel framing, and access hatches. The suppression chamber is mounted on support structures that transmit loads to the reactor building foundation. Major components inside the suppression chamber include Emergency Core Cooling Systems (ECCS) suction strainers, which are connected to the ECCS suction header located outside the chamber, torus spray header, and Y-Quenchers.

The vent system consists of ten circular vent lines, which form a connection between the drywell and the pressure suppression chamber. The lines enter the suppression chamber through penetrations provided with expansion bellows and join into a common header contained within the air space of the suppression chamber. The header discharge is through 120 downcomer pipes, which terminate below the water level in the torus. The header and the downcomer pipes are supported from the suppression chamber shell.

The primary containment is provided with a vacuum breaker system to equalize the pressure between the drywell and the suppression chamber, and between the suppression chamber and the reactor building. The vacuum breaker system assures that the external design pressure limits of the two chambers are not exceeded.

The primary containment is penetrated at several locations by piping, instrument lines, ventilation ducts, and electric leads. The penetrations consist of sleeves welded to drywell vessel or suppression chamber and are of two general types. Those required to accommodate thermal movements; and those, which experience relatively little thermal stress. Penetrations required to accommodate thermal movements are provided with expansion bellows.

Internal structures consist of a fill slab, reactor pedestal, biological shield wall and its lateral support, and structural steel. The fill slab is reinforced concrete placed in the bottom of the drywell to provide a working base for supporting the reactor pedestal and other structures and components inside the drywell.

The reactor pedestal is a reinforced concrete cylinder with an outside diameter of 26 feet. The pedestal provides structural support to the reactor pressure vessel, the biological shield wall, and floor framing. The biological shield wall extends above the reactor pedestal and is a composite steel, concrete cylinder with an inside diameter of approximately 21 feet. The wall is framed with steel columns covered with steel plate on each face and filled partly with normal density concrete and partly with high-density concrete. The top of the wall is capped with a steel plate and laterally braced to the drywell vessel.

Structural steel includes floor framing steel for the platforms inside the drywell, and a catwalk inside the suppression chamber. It also includes miscellaneous steel inside the containment such as grating, ladders, connection plates; electrical cable trays, and electrical conduits.

The purpose of the primary containment is to accommodate, with a minimum of leakage, the pressures and temperatures resulting from the break of any enclosed process pipe; and thereby, to limit the release of radioactive fission products to values, which will insure offsite dose rates well below 10CFR100 guideline limits. It also provides a source of water for ECCS and for pressure suppression in the event of a loss-of-coolant accident. The primary containment and internal structures also provide structural support to the reactor pressure vessel, the reactor coolant systems, and other safety and nonsafety related systems, structures, and components housed within. The biological shield wall provides the added function of radiation shielding to maintain drywell environment within equipment qualification parameters.

Included in the evaluation boundary of the Primary Containment are the drywell, drywell head, suppression chamber, vent lines, downcomers, drywell and suppression chamber penetrations, vent line bellows, drywell penetration bellows, personnel air lock/equipment and other hatches, pressure retaining bolting, thermowells, and internal structures listed above.

Not included in the evaluation boundary of the Primary Containment are safety relief valves and EMRVs, EMRV discharge lines, Y-Quenchers, drywell and torus spray headers, vacuum breakers, ECCS suction strainers and header, downcomer bracing, suppression chamber (torus) supports, and other component supports. These components are separately evaluated with their respective license renewal systems. That is, safety relief valves, EMRVs, EMRV discharge lines, and Y-Quenchers are evaluated with Main Steam System. Drywell and torus spray headers, and ECCS suction strainers and header are evaluated with the Containment Spray System. Vacuum breakers are evaluated with the Containment Vacuum Breakers System. Downcomer bracing, suppression chamber supports, and other component supports are evaluated with the Component Supports Commodity Group.

For more detailed information, see UFSAR Sections 3.8 and 6.2

Reason for Scope Determination

The Primary Containment meets the scoping requirements of 10 CFR 54.4(a)(1) because it is a safety-related structure which is relied upon to remain functional during and following design basis events. It meets 10 CFR 54.4(a)(2) because failure of nonsafety related portions of the structure could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48), ATWS (10 CFR 50.62), and Environmental Qualification (10 CFR 50.49). The Primary Containment is not relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with Station Blackout (10 CFR 50.63).

System Intended Functions

1. Controls the release of fission products to the secondary containment in the event of design basis loss-of-coolant accidents (LOCA) so that off site consequences are within acceptable limits. (10 CFR 54.4(a)(1))
2. Provides sufficient air and water volumes to absorb the energy released to the containment in the event of design basis event so that pressure is within acceptable limits. (10 CFR 54.4(a)(1))
3. Provides a source of water for core spray, containment spray, and condensate transfer systems. (10 CFR 54.4(a)(1))
4. Provides physical support, shelter, and protection for safety related systems, structures, and components (SSCs). 10 CFR 54.4(a)(1)
5. Provides physical support, shelter, and protection for nonsafety related systems, structures, and components (SSCs) whose failure could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). 10 CFR 54.4(a)(2)
6. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Anticipated Transients without Scram (10 CFR 50.62). 10 CFR 54.4(a)(3)
7. Relied upon 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). 10 CFR 54.4(a)(3)
8. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Environmental Qualification (10 CFR 50.49). 10 CFR 54.4(a)(3)

UFSAR References

3.8
6.2

License Renewal Boundary Drawings

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Table 2.4.1 Primary Containment
Components Subject to Aging Management Review

Component Type	Intended Functions
Access Hatch Covers	Pressure Boundary
Beam Seats	Structural Support
Biological Shield Wall - Concrete	Shielding
Biological Shield Wall - Lateral Support	Structural Support
Biological Shield Wall - Liner Plate	Structural Support
Biological Shield Wall - Structural Steel	Structural Support
Cable Tray	Structural Support
Class MC Pressure Retaining Bolting	Pressure Boundary
Concrete embedment	Structural Support
Conduits	Enclosure Protection
	Structural Support
Downcomers	Pressure Boundary
Drywell Head	Pressure Boundary
	Structural Support
Drywell Penetration Bellows	Pressure Boundary
Drywell Penetration Sleeves	Pressure Boundary
	Structural Support
Drywell Shell	Pressure Boundary
	Structural Support
Drywell Support Skirt	Structural Support
Liner (Sump)	Leakage Boundary
Locks, Hinges, and Closure Mechanisms	Pressure Boundary
	Structural Support
Miscellaneous Steel (catwalks, handrails, ladders, platforms, grating, and associated supports)	Structural Support
Panels and Enclosures	Enclosure Protection
	Structural Support
Penetration Closure Plates and Caps (spare penetrations)	Pressure Boundary
Personnel Airlock/Equipment Hatch	Pressure Boundary
Reactor Pedestal	Structural Support
Reinforced Concrete Floor Slab (fill slab)	Enclosure Protection
	Structural Support
Seals, Gaskets, and O-rings	Pressure Boundary
Shielding Blocks and Plates	Shielding
Structural Bolting	Structural Support
Structural Steel (radial beams, posts, bracing, plate, connections, etc.)	Structural Support
Suppression Chamber Penetrations	Pressure Boundary
	Structural Support
Suppression Chamber Ring Girders	Structural Support
Suppression Chamber Shell	Pressure Boundary

Suppression Chamber Shell	Structural Support
Suppression Chamber Shell Hoop Straps	Structural Support
Thermowells	Pressure Boundary
Vent Header Deflector	HELB Shielding
Vent Jet Deflectors	HELB Shielding
Vent line bellows	Pressure Boundary
Vent line, and Vent Header	Pressure Boundary

The aging management review results for these components are provided in Table 3.5.2.1.1 Primary Containment -Summary of Aging Management Evaluation

2.4.2 Reactor Building

System Purpose

The Reactor Building is designed to completely enclose both the reactor pressure vessel and the primary containment structure thereby providing a secondary containment. The Reactor Building, in conjunction with Standby Gas Treatment System, provides a secondary containment function to limit the release of radioactive materials ensuring that offsite dose resulting from a postulated design basis accident will remain below 10 CFR 100 guideline values. The building also houses the spent fuel pool, the steam dryer/moisture separator storage pool, the new fuel storage vault, reactor cavity, reactor auxiliary equipment, refueling equipment, and reactor servicing equipment. Systems housed in the building include the Isolation Condenser System, Standby Liquid Control System, Core Spray, Containment Spray, Control Rod Hydraulic System equipment, and components of electrical systems.

The building is designed to Seismic Class I criteria and is constructed of reinforced concrete to the refueling floor level. Above the refueling floor, the structure is steel framework with insulated, corrosion resistant metal siding . The building roof consists of built-up roofing over lightweight concrete on metal roof decking. The foundation consists of a reinforced concrete mat founded on highly compacted Cohansey sand. The mat also supports the primary containment structure and its internals, including the reactor vessel pedestal. Exterior walls of the building and some interior walls are cast-in-place concrete designed in accordance with ACI requirements. Some interior walls are constructed of masonry block, mortar and grout. The building is designed to contain positive internal pressure without loss of function.

The purpose of the Reactor Building is to provide secondary containment when the primary containment is in service and to provide primary containment during reactor refueling and maintenance operations when the primary containment system is open. The primary objective of the building is to minimize ground level release of airborne radioactive materials, and to provide for controlled, elevated release through the Ventilation Stack of the building's atmosphere under accident conditions. The building also provides structural support, shelter, and protection to systems, structures, and components housed within, during normal plant operation, and during and following postulated design basis accidents and extreme environmental conditions.

The secondary containment function of the Reactor Building is achieved through design and construction of low leakage of air through the interlock/air lock access control doors; pipe and electrical penetration seals; and the building walls, siding, and roof. Access openings to the building are provided with interlocked double doors to minimize reactor building leakage. The exception is the entrance to the trunnion room which has only a single door for entry from the turbine building. The door design has been considered within the capability of the Standby Gas Treatment System and the Reactor Building Ventilation System to maintain reactor building leakage within the designed maximum. Passage through any of the double door entrances to the Reactor Building can occur without loss of secondary containment integrity since only one door is open at a time.

During normal plant operation, pressure in the building is maintained at a slight negative pressure, by the Reactor Building Heating and Ventilation System, so that any leakage is into the building. In an emergency condition, Reactor Building Heating and Ventilation System is isolated and the Standby Gas Treatment System serves the building. All air is exhausted to the Ventilation Stack.

Components evaluated in the Reactor Building include the foundation, all structural elements of the building, the spent fuel pool, the new fuel storage vault, the steam dryer/moisture separator storage pool, refueling bellows, structural steel, metal siding, metal deck for the roof, and roofing. In addition, the evaluation boundary includes walls, slabs, platforms, missile barriers, flood barriers, penetrations seals, structural seals, doors, miscellaneous steel, and embedments. Structural commodities considered structures, such as electrical and I&C enclosures, cable trays, electrical conduits, etc., within the building are also included in the building boundary. Components and commodities in the evaluation boundary of the building are in the scope of license renewal and subject to aging management review; except for the refueling bellows. The refueling bellows are classified non-safety related and perform their design function only when the plant is shutdown for refueling. The refuelings bellows are not credited in the current licensing basis (CLB) for design basis events or accidents and their failure would not impact a safety function. As a result scoping determined that the refueling bellows do not perform an intended function delineated in 10 CFR 54.4 (a).

Reactor building structural items separately evaluated with other license renewal systems include the reactor building crane and rail system (Cranes and Hoists), the refueling platform, new fuel storage racks, and spent fuel storage racks(Fuel Storage and Handling System), Fire barriers (Fire Protection System), and component supports (Component Supports Commodity Group).

For more detailed information see UFSAR Sections 1.2.2, 3.8.4, 6.2.3

Reason for Scope Determination

The Reactor Building meets the scoping requirements of 10 CFR 54.4(a)(1) because it is a safety-related structure which is relied upon to remain functional during and following design basis events. It meets 10 CFR 54.4(a)(2) because failure of nonsafety related portions of the structure could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48), ATWS (10 CFR 50.62), Environmental Qualification (10 CFR 50.49), and Station Blackout (10 CFR 50.63).

System Intended Functions

1. Controls the potential release of fission products to the external environment so that offsite consequences of design basis events are within acceptable limits. The Reactor Building provides secondary containment function when the Primary Containment System is required to be in service and provides primary containment function during refueling and maintenance operations when the Primary Containment System is open. 10 CFR 54.4(a)(1)
2. Provides physical support, shelter, and protection for safety related systems, structures, and components (SSCs). 10 CFR 54.4(a)(1)
3. Provides protection for safe storage of new and spent fuel. 10 CFR 54.4 (a)(1)
4. Provides physical support, shelter, and protection for nonsafety related systems, structures, and components (SSCs) whose failure could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). 10 CFR 54.4(a)(2)
5. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates

compliance with the commission's regulations for Station Blackout (10 CFR 50.63). 10 CFR 54.4(a)(3)

6. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Anticipated Transients without Scram (10 CFR 50.62). 10 CFR 54.4(a)(3)
7. Relied upon 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). 10 CFR 54.4(a)(3)
8. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Environmental Qualification (10 CFR 50.49). 10 CFR 54.4(a)(3)

UFSAR References

1.2.2.2
2.5.3
3.2
3.1.53
3.7
3.8.4.1
6.2.3

License Renewal Boundary Drawings

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Table 2.4.2 Reactor Building
Components Subject to Aging Management Review

Component Type	Intended Functions
Cable Tray	Structural Support
Concrete Embedments	Structural Support
Conduits	Enclosure Protection
	Structural Support
Curb	Direct Flow
Door	Flood Barrier
	HELB Shielding
	Leakage Boundary (Secondary Containment)
Equipment Foundation	Structural Support
Fuel Pool Gates	Water retaining boundary
Fuel Pool Liner	Water retaining boundary
Fuel Pool Skimmer Surge Tank Liner	Water retaining boundary
Hatch Plugs	Enclosure Protection
	Shielding
	Structural Support
Instrument Racks	Structural Support
Liner (Sump)	Leakage Boundary
Masonry Block Walls	Structural Support
Metal Deck (Roof)	Structural Support
Metal Siding	Enclosure Protection
	Leakage Boundary (Secondary Containment)
	Pressure Relief
Miscellaneous Steel: Catwalks, Handrails, Ladders, Platforms, Grating	Structural Support
Panels and Enclosures	Enclosure Protection
	Structural Support
Penetration Seals	Flood Barrier
	HELB Shielding
	Leakage Boundary (Secondary Containment)
Pipe Whip Restraints	Pipe Whip Restraint
Reinforced Concrete Foundation	Structural Support
Reinforced Concrete Walls (above and below grade)	Enclosure Protection
	Flood Barrier
	Missile Barrier
	Shielding

Reinforced Concrete Walls (above and below grade)	Structural Support
Reinforced Concrete: Beams, Columns	Structural Support
Reinforced Concrete: Walls, Slabs, Drywell Shield Wall	Enclosure Protection
	Flood Barrier
	HELB Shielding
	Leakage Boundary (Secondary containment)
	Missile Barrier
	Shielding
	Structural Support
Roofing	Enclosure Protection
Scuppers: Pipe Sleeve, Flashing, Bolts	Leakage Boundary
Seals	Leakage Boundary
Spray Shields	Enclosure Protection
Structural Bolts	Structural Support
Structural Steel: Beams, Columns, Girders, Plates, Bracing, Trusses	Structural Support
Tube Tray	Structural Support

The aging management review results for these components are provided in
Table 3.5.2.1.2 Reactor Building
-Summary of Aging Management Evaluation

2.4.3 Chlorination Facility

System Purpose

The Chlorination Facility consists of the chlorination building, spill retention pit, foundation pad for hypochlorite storage tanks, and foundation pads required to support Chlorination System components. The building is a single story steel structure, with insulated metal siding, located west of the reactor building. The base slab is founded on reinforced concrete piers supported from the circulating water tunnel, located directly below the building. Foundations for the hypochlorite tanks and other equipment are reinforced concrete pads founded on a common slab with the building and piers supported from the circulating water tunnel. The facility is nonsafety related, Seismic Class II structure

The purpose of the chlorination facility is to provide structural support, shelter, and protection to the Chlorination System, and a 480V motor control center (MCC), which provides power to the condensate transfer pumps located in the adjacent Condensate Transfer Building. The Chlorination System does not meet the scoping criteria of 10CFR54.4 and is not in scope license renewal. The MCC is in scope of license renewal because the Condensate Transfer System is relied upon to provide makeup water to the isolation condenser system to achieve hot shutdown in the event of fire and also provide makeup water to the spent fuel pool cooling system. Thus, only those portions of the building that provide structural support to the MCC and its associated electrical cables are in scope of license renewal. The remaining parts of the building, the spill retention pit, and the equipment and tank foundations perform no intended function and are not in scope of license renewal.

Components included in the scope of license renewal include concrete and structural steel, structural bolts, metal siding, metal deck, seals, the MCC enclosure, and electrical conduits. These components provide structural support, shelter, and protection to the 480V MCC,

Not included in Chlorination Facility scoping boundary are the supports for electrical conduits and the anchors for the MCC, which are separately evaluated with the license renewal Component Supports Commodity Group.

For more detailed information see UFSAR Sections 3.8.4, and 10.4.5

Reason for Scope Determination

The Chlorination Facility meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for fire protection (10 CFR 50.48).

The facility does not meet 10 CFR 54.4(a)(1) because it is not a safety related structure that is relied on to remain functional during and following design basis events. It does not meet 54.4(a)(2) because failure of non-safety related portions of the structure would not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The Chlorination Facility is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for environmental qualification (10 CFR 50.49) , ATWS (10 CFR 50.62), or station blackout (10 CFR 50.63).

System Intended Functions

1. Relied upon 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). The structure provides structural support, shelter, and protection for components credited in plant fire safe shutdown analysis. 10 CFR 54.4(a)(3)

UFSAR References

3.8.4
10.4.5.2

License Renewal Boundary Drawings

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Table 2.4.3 Chlorination Facility
Components Subject to Aging Management Review

Component Type	Intended Functions
Conduits	Enclosure Protection
	Structural Support
Door	Enclosure Protection
Metal Deck	Enclosure Protection
Metal Siding	Enclosure Protection
Panels and enclosures	Enclosure Protection
	Structural Support
Reinforced concrete foundation	Structural Support
Seals	Enclosure Protection
Structural Bolts	Structural Support
Structural steel: Beams, Columns	Structural Support

The aging management review results for these components are provided in

Table 3.5.2.1.3 Chlorination Facility
-Summary of Aging Management Evaluation

2.4.4 Condensate Transfer Building

System Purpose

The Condensate Transfer Building is a single story steel structure, with metal siding, located west of the reactor building. The base slab is founded on reinforced concrete piers supported from the circulating water tunnel, located directly below the building. A half Ton hoist is incorporated in the design of the structure to facilitate removal and maintenance of equipment. The structure is classified nonsafety related, Seismic Class II.

The purpose of the Condensate Transfer Building is to provide structural support, shelter, and protection for the condensate transfer pumps, demineralized water transfer pumps, and service water booster pump. The condensate transfer pumps are in scope of license renewal because the Condensate Transfer (CT) System is relied upon to provide makeup water to the isolation condenser system to achieve hot shutdown in the event of fire and also provide makeup water to the spent fuel pool cooling system. Demineralized water transfer pumps and components, and service water booster pump and components, within the building, are not in scope of license renewal. Thus, only those portions of the building that provide structural support to the condensate transfer pumps, components, and supporting 480V electrical system components, are in scope of license renewal. The remaining parts of the building do not perform an intended function and are not in scope of license renewal.

Included in the evaluation boundary of the Condensate Transfer Building are concrete and structural steel elements of the structure, equipment foundation, and electrical conduits. Elements of the structure that provide structural support to the condensate transfer pumps, piping, components, and electrical conduits that energize the pump motors, are in scope of license renewal. Elements of the building that do not contribute to the structural support of the condensate transfer pumps do not perform an intended function and are not in scope of license renewal.

Not included in the Condensate Transfer Building scoping boundary are component supports related to the Condensate Transfer System, conduit supports, and the half ton hoist. Supports are separately evaluated with the license renewal Component Supports Commodity Group, and the hoist is evaluated with the Cranes and Hoists license renewal system.

Reason for Scope Determination

The Condensate Transfer Building meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for fire protection (10 CFR 50.48).

The facility does not meet 10 CFR 54.4(a)(1) because it is not a safety related structure that is relied on to remain functional during and following design basis events. It does not meet 10 CFR 54.4(a)(2) because failure of non-safety related portions of the structure would not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The structure is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for environmental qualification (10 CFR 50.49) , ATWS (10 CFR 50.62), or station blackout (10 CFR 50.63).

System Intended Functions

1. Relied upon 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). The structure provides structural support, shelter, and protection for SSCs credited in plant fire safe shutdown analysis. 10 CFR 54.4(a)(3)

UFSAR References

None

License Renewal Boundary Drawings

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Table 2.4.4 Condensate Transfer Building
Components Subject to Aging Management Review

Component Type	Intended Functions
Conduits	Enclosure Protection
	Structural Support
Door	Enclosure Protection
Equipment Foundation	Structural Support
Metal Deck	Enclosure Protection
Metal Siding	Enclosure Protection
Panels and Enclosures	Enclosure Protection
	Structural Support
Reinforced Concrete Foundation (includes piers)	Structural Support
Seals	Enclosure Protection
Structural Bolts	Structural Support
Structural Steel: Beams, Columns	Structural Support

The aging management review results for these components are provided in
Table 3.5.2.1.4 Condensate Transfer Building
-Summary of Aging Management Evaluation

2.4.5 Dilution Structure

System Purpose

The Dilution Structure is located west of the Reactor Building, on the west bank of the intake canal. The structure is a reinforced concrete, approximate 83' long and divided into three bays, each having two trash racks and one dilution pump. The three dilution pumps discharge into a common reinforced concrete tunnel that delivers dilution water from the intake canal to the discharge canal. Sheet metal and wooden enclosures located on the top slab of the structure, at grade level, provide shelter for pump motors and other Dilution System components. Foundation for the structure consists of a reinforced concrete slab, with shear keys, founded on soil 30' below grade level. Stop logs are incorporated into the structure's design to isolate each bay from the intake canal. The structure is nonsafety related, classified seismic Class II.

The purpose of the Dilution Structure is to house the dilution system and its supporting systems. The structure provides physical support, shelter, and protection to nonsafety related components designed to divert water from the intake canal to the discharge canal for thermal dilution. Additionally, the structure in conjunction with earthen dikes forms the intake canal boundary and separates it from the discharge canal.

Included in the evaluation boundary of the Dilution Structure are structural elements of the structure, the discharge tunnel, sheet metal and wooden enclosures, component supports, equipment foundations, and miscellaneous steel within the structure. Concrete elements of the building that, are required to maintain separation between the intake canal, Ultimate Heat Sink (UHS), and the discharge canal are in scope of license renewal. These components are conservatively assumed to support UHS function, and their postulated failure may result in a breach of the UHS physical boundary. This separation is desirable during normal plant operation to prevent backflow of warm water from the discharge structure and canal into the adjacent intake structure. Other elements of the structure are not in scope of license renewal because the dilution system does not perform an intended function and thus the components do not perform or support an intended function.

Not included in the evaluation boundary of the Dilution Structure is the intake and the discharge canals dikes. The intake canal dikes are separately evaluated with Intake Structure and Canal license renewal structure and the discharge canal dikes are evaluated with the Discharge Structure and Canal license renewal structure.

For more detailed information, see UFSAR Section 10.4.5

Reason for Scope Determination

The Dilution Structure meets 10 CFR 54.4(a)(2) because failure of the nonsafety related structure could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1).

The Dilution Structure does not meet 10 CFR 54.4(a)(1) because it is not a safety related structure that is relied on to remain functional during and following design basis events. It also does not meet 10 CFR 54.4(a)(3) because it is not relied upon in the safety analyses and 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), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Provides source of cooling water for plant safe shutdown 10 CFR 54.4(a)(1)
2. Provides Ultimate Heat Sink (UHS) during design basis events 10 CFR 54.4(a)(1)
3. Provides physical support, shelter, and protection for nonsafety related systems, structures, and components (SSCs) whose failure could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). 10 CFR 54.4(a)(2)

UFSAR References

10.4.5

License Renewal Boundary Drawings

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Table 2.4.5 Dilution Structure
Components Subject to Aging Management Review

Component Type	Intended Functions
Reinforced concrete foundation	Structural Support
Reinforced concrete Walls	Water retaining boundary

The aging management review results for these components are provided in
Table 3.5.2.1.5 Dilution Structure
-Summary of Aging Management Evaluation

2.4.6 Emergency Diesel Generator Building

System Purpose

The Emergency Diesel Generator Building is a single story structure located southwest of the Reactor Building. The reinforced concrete structure consists of two compartments, one for each Emergency Diesel Generator (EDG), and an appendage vault to the building containing the diesel oil storage tank. Personnel entrances to the building are provided with reinforced concrete labyrinth walls for missile protection and a 6-inch high curb for flood protection. The building foundation is reinforced concrete slab on grade. The building is classified safety related, designed to Seismic Class I criteria.

The entrance to the tank compartment is raised above grade level, providing a 7’- 2” deep reservoir. An 18” reinforced concrete wall is provided between the oil tank area and the adjacent diesel generator compartment. The roof of the building compartments is provided with removable precast concrete sections, which are surfaced with paving material for weather protection. A 6’-6”diameter opening is provided in the roof of each diesel generator compartment for an exhaust stack. The building air intake and exhaust are through two openings on the roof of each compartment. The openings are covered with heavy grating.

The purpose of the Emergency Diesel Generator Building is to provide support, shelter, and protection for each EDG, the diesel oil storage tank, and components of fuel transfer system. Each EDG is also housed in a metal enclosure, which provides protection against rain, snow, and dust, that may enter the building through the air intake and exhaust openings on the roof. The building also houses and provides support to nonsafety related components such as grating, lighting conduit, and electrical enclosures.

Components evaluated in the Emergency Diesel Generator Building boundary include reinforced concrete and steel elements of the building, missile protection labyrinth walls, and the flood protection curbs. In addition, the evaluation boundary includes penetration seals, embedments, grating, the metal enclosure for each EDG, electrical I&C enclosures, and electrical conduits.

Not included in the Emergency Diesel Generator Building license renewal boundary are equipment supports, pipe supports, supports for electrical and I&C enclosures, EDG supports, conduit supports, and the diesel oil storage tank. The supports are separately evaluated with the Component Supports license renewal system. The diesel oil storage tank is separately evaluated with the Main Fuel Oil Storage & Transfer System license renewal system.

For more detailed information see UFSAR Sections 1.2.2 and 3.8.4.1.5

Reason for Scope Determination

The Emergency Diesel Generator Building meets the scoping requirements of 10 CFR 54.4(a)(1) because it is a safety-related structure, which is relied upon to remain functional during, and following design basis events. It meets 10 CFR 54.4(a)(2) because failure of nonsafety related portions of the structure could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for fire protection (10 CFR

50.48), and station blackout (10 CFR 50.63). The Emergency Diesel Generator Building is not relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for ATWS (10 CFR 50.62), or environmental qualification (10 CFR 50.49).

System Intended Functions

1. Provides physical support, shelter, and protection for safety related systems, structures, and components (SSCs). 10 CFR 54.4(a)(1)
2. Provides physical support, shelter, and protection for nonsafety related systems, structures, and components (SSCs) whose failure could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). 10 CFR 54.4(a)(2)
3. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Station Blackout (10 CFR 50.63). 10 CFR 54.4(a)(3)
4. Relied upon 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). 10 CFR 54.4(a)(3)

UFSAR References

1.2.2
3.8.4.1.5
8.3.1

License Renewal Boundary Drawings

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Table 2.4.6 Emergency Diesel Generator Building
Components Subject to Aging Management Review

Component Type	Intended Functions
Concrete embedments	Structural Support
Conduits	Enclosure Protection
	Structural Support
Curb	Direct Flow
Emergency Diesel Generator Enclosure	Enclosure Protection
Miscellaneous steel (catwalks, handrails, ladders, platforms, grating, and associated supports)	Structural Support
Panels and enclosures	Enclosure Protection
	Structural Support
Reinforced concrete foundation	Structural Support
Reinforced concrete Walls, Slabs (Includes Removable Roof Slab)	Enclosure Protection
	Flood Barrier
	Missile Barrier
	Structural Support
Structural Bolts	Structural Support
Structural Steel (Plate)	Structural Support

The aging management review results for these components are provided in
Table 3.5.2.1.6 Emergency Diesel Generator Building
-Summary of Aging Management Evaluation

2.4.7 Exhaust Tunnel

System Purpose

The Exhaust Tunnel consists of an underground reinforced concrete box that connects the Ventilation Stack, the Reactor Building, Turbine Building, and the Old Radwaste Building. The tunnel houses major components of the Standby Gas Treatment System (SGTS), with the exception of the exhaust fans and outlet valves. The tunnel is also used to route Reactor Building Ventilation, Turbine Building Ventilation, and Old Radwaste Building Ventilation exhaust ductwork to the Ventilation Stack, as well as process piping, and drain lines routed between the buildings. Also routed through the tunnel are 4160V AC system cables which feed core spray pumps, and 480V AC system power to the SGTS components. In addition, the tunnel contains heating steam piping routed from Heating Boiler House to the buildings. The Exhaust Tunnel is classified nonsafety related, Seismic Class II structure.

The purpose of the Exhaust Tunnel is to provide structural support, shelter, and protection to the SGTS components and ductwork, and to 4160V AC and 480V AC electrical cables. It also provides structural support, shelter, and protection for nonsafety related systems piping and ductwork routed within the tunnel.

Included in the evaluation boundary of the Exhaust Tunnel are reinforced concrete elements of the tunnel, door at the entrance to the tunnel, hatch covers, and electrical conduits. The tunnel which connects the Reactor Building and the Turbine Building to the Ventilation Stack is in scope of license renewal since it houses safety related SGTS components, and safety related electrical cables. The tunnel which connects the Ventilation Stack to the Old Radwaste Building does not contain any safety related components, or components relied upon to perform a function that demonstrates compliance with commission’s regulations for Fire Protection, Environmental Qualification, ATWS, or Station Blackout. This section of the tunnel is not in scope of license renewal. The door, hatch covers, and electrical conduits are in scope of license renewal.

Not included in the evaluation boundary of the Exhaust Tunnel are component supports, which are separately evaluated with Component Supports Commodity Group license renewal structure.

For more detailed information, see UFSAR Section 6.5.

Reason for Scope Determination

The Exhaust Tunnel meets 10 CFR 54.4(a)(2) because failure of the non-safety related structure could prevent satisfactory accomplishment of functions(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for fire protection (10 CFR 50.48), and Environmental Qualification (10 CFR 50.49).

The Exhaust Tunnel does not meet 10 CFR 54.4(a)(1) because it is not a safety related structure that is relied on to remain functional during and following design basis events. The tunnel is also not relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Provides physical support, shelter, and protection for safety related systems, structures, and components (SSCs). 10 CFR 54.4(a)(1)
2. Provides physical support, shelter, and protection for nonsafety related systems, structures, and components (SSCs) whose failure could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4 (a)(1). 10 CFR 54.4(a)(2)
3. Relied upon 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). 10 CFR 54.4(a)(3)
4. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Environmental Qualification (10 CFR 50.49). 10 CFR 54.4(a)(3)

UFSAR References

1.2
3.8
6.5.1.2

License Renewal Boundary Drawings

LR-JC-19702

Table 2.4.7 Exhaust Tunnel
Components Subject to Aging Management Review

Component Type	Intended Functions
Concrete embedments	Structural Support
Conduits	Enclosure Protection
	Structural Support
Curb	Direct Flow
Door	Enclosure Protection
Hatch Cover	Enclosure Protection
Masonry block walls	Enclosure Protection
Panels and enclosures	Enclosure Protection
	Structural Support
Penetration seals	Leakage Boundary
Reinforced concrete Slabs, Walls	Enclosure Protection
	Structural Support
Seals (Gap)	Leakage Boundary

The aging management review results for these components are provided in
Table 3.5.2.1.7 Exhaust Tunnel
-Summary of Aging Management Evaluation

2.4.8 Fire Pond Dam

System Purpose

The Fire Pond Dam is constructed across Oyster Creek stream outside the protected area and approximately ¼ mile from the Reactor Building. The dam is 130 feet long and consists of two parallel lines of tongue and grooved wood sheeting, 5 feet apart and driven into Oyster Creek channel bottom. The area between the upstream and downstream sheeting is lined with a four inch reinforced concrete slab which forms a shallow open channel that directs water flow to a 45 foot wide stream spillway. Rip-rap is placed downstream of the spillway to protect the stream from erosion. The pond formed by the dam covers over 6 acres of land and has a volume equivalent to 7.2 million gallons of water. The dam is classified "Safety Class III" and subject to State of New Jersey Department of Environmental Protection and Energy dam safety regulations.

The purpose of the Fire Pond Dam is to contain fresh water for use in the fire protection system. Water from the pond is supplied to the fire protection system by two pumps housed in the fresh water pump house adjacent to the dam.

Included in the evaluation boundary of the Fire Pond Dam are structural elements of the dam, consisting of tongue and grooved treated wood sheeting, treated wood piles and walers, connection bolts, and rip-rap.

Not included in the Fire Pond Dam scoping boundary are the fresh water pumphouse and pumps. The fresh water pumphouse is separately evaluated with the Fire Pumphouses license renewal structure. The pumps are separately evaluated with the Fire Protection license renewal system.

Reason for Scope Determination

The Fire Pond Dam meets 10 CFR 54.4(a)(3) because they are relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for fire protection (10 CFR 50.48).

The Fire Pond Dam does not meet 10 CFR 54.4(a)(1) because it is not safety related structure that is relied on to remain functional during and following design basis events. The dam does not meet 10 CFR 54.4(a)(2) because failure of non-safety related portions of the dam would not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The dam is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for Environmental Qualification (10 CFR 50.49), ATWS (10 CFR 50.62), or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Relied upon 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). The Fire Pond Dam retains fresh water used in the fire protection system. 10 CFR 54.4(a)(3)

UFSAR References

2.4.12
9.5.1.2

License Renewal Boundary Drawings

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Table 2.4.8 Fire Pond Dam
Components Subject to Aging Management Review

Component Type	Intended Functions
Fire Pond Dam	Water retaining boundary

The aging management review results for these components are provided in
Table 3.5.2.1.8 Fire Pond Dam
-Summary of Aging Management Evaluation

2.4.9 Fire Pumphouses

System Purpose

The Fire Pumphouses are comprised of the fresh water pumphouse and the redundant fire protection pumphouse. The fresh water pumphouse is located west of the reactor building, outside the protected area. It consists of a prefabricated sheet metal enclosure, an intake reinforced concrete structure, and foundations for two fuel oil tanks. The intake structure is divided into three separate pump intake bays, one for each of the two vertical centrifugal diesel engine driven fire pumps and one for two electric pond pumps. The inlet into the bays is protected with trash racks and stationary water screens. The two diesel driven pumps supply primary fire water, drawn from a pond formed by a small dam on the Oyster Creek, to the fire protection system. The two electric pond pumps are provided to maintain fire water system pressure. The pumps, the diesel engines, and their supporting systems are inside the enclosure, supported from the roof slab of the intake bays. The fuel oil tanks are located outside the enclosure within a diked area and are independently supported from reinforced concrete foundations. A monorail outside the enclosure, supported on structural frames, provides the means for cleaning and servicing the stationary water screens. The pumphouse and the tank foundations are classified nonsafety related, Seismic Class II.

The redundant fire protection pumphouse is located northwest of the Reactor Building, inside the protected area. It consists of a prefabricated sheet metal enclosure, foundation slab on grade, and foundation for the redundant fire protection water tank The structure houses a motor driven electric fire pump and its supporting electrical systems. This pump and its associated tank constitute an emergency supply when the primary supply is not available. The pumphouse is classified nonsafety related, Seismic Class II.

The purpose of the Fire Pumphouses is to provide structural support, shelter, and protection for Fire Protection System components, and for components which support the intended function of the system.

Included in the evaluation boundary of the Fire Pumphouses are reinforced concrete and steel elements of the pumphouses, equipment foundation, electrical conduits, electrical enclosures, component supports, tank foundations, trash racks and stationary water screens, and the monorail. Elements of the pumphouses, which provide structural support, shelter, and protection to fire protection components, including tanks are in scope of license renewal. Electrical enclosures and supports for systems and components which support the intended function of the fire protection system are also in scope of license renewal. Trash racks, stationary water screens, and supports for systems and components which do not support the intended function of the Fire Protection System are not in scope of license renewal.

Not included in the Fire Pumphouses scoping boundary are component supports, diesel engines, tanks, piping, pumps, motors and other fire protection system components, and the monorail. Component supports are separately evaluated with the Component Supports license renewal system. The diesel engines, tanks, piping, pumps, and other fire protection system components are separately evaluated with the Fire Protection license renewal system. The fresh water pumphouse monorail is separately evaluated with the Cranes and Hoists license renewal system.

Reason for Scope Determination

The Fire Pumphouses meet 10 CFR 54.4(a)(3) because they are relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48).

The pumphouses do not meet 10 CFR 54.4(a)(1) because they are not safety related structures that are relied on to remain functional during and following design basis events. The pumphouses do not meet 10 CFR 54.4(a)(2) because failure of non-safety related portions of the structures would not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The structures are not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for Environmental Qualification (10 CFR 50.49), ATWS (10 CFR 50.62), or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Relied upon 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). 10 CFR 54.4(a)(3)

UFSAR References

9.5.1.2.3

License Renewal Boundary Drawings

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Table 2.4.9 Fire Pumphouses
Components Subject to Aging Management Review

Component Type	Intended Functions
Conduits	Enclosure Protection
	Structural Support
Metal Deck	Enclosure Protection
Metal Siding	Enclosure Protection
Panels and Enclosures	Enclosure Protection
	Structural Support
Reinforced Concrete Foundation	Structural Support
Reinforced Concrete Slab	Structural Support
Reinforced Concrete Walls	Structural Support
Seals	Enclosure Protection
Structural Bolts	Structural Support
Structural Steel	Structural Support

The aging management review results for these components are provided in
Table 3.5.2.1.9 Fire Pumphouses
-Summary of Aging Management Evaluation

2.4.10 Heating Boiler House

System Purpose

The Heating Boiler House license renewal structure is comprised of the old heating boiler house and the new heating boiler house. Each heating boiler house is a single story steel structure, located southeast of the Reactor Building. The buildings are enclosed with insulated metal siding, roof metal deck, and built-up roofing. Foundations for the structures consist of reinforced concrete isolated footings and a reinforced concrete base slab on grade. The old heating boiler house is adjacent to, and provides access into the Ventilation Stack through a double door airlock. The two heating boiler houses are classified nonsafety related, Seismic Class II structures.

The purpose of the structures is to house the nonsafety related Heating & Process Steam System components and its supporting systems. Major components housed in the buildings include oil-fired boilers, heating boiler feed pumps, fuel oil pumps, Deaerator, chemical tanks and feed pumps, boiler condensate storage tank, and system piping. The old heating boiler house also houses two safety related electrical load centers, electrical panels and enclosures, a transformer, and electrical conduits required for the operation of the Standby Gas Treatment System fans. The new heating boiler house does not house any safety related systems, structures, or components.

Included in the evaluation boundary of Heating Boiler House are structural elements of the Houses. Structural elements of the old heating boiler house that provide shelter, protection, or physical support to the safety related load centers, electrical panels and enclosures, transformers, conduits, and fire protection piping, are in scope of license renewal. These elements include structural steel, reinforced concrete foundation, metal siding, metal deck, seals, doors, panels and enclosures, and conduits. Also included in the scope of license renewal are equipment foundations in the old heating boiler house, whose failure could adversely impact the intended function of the safety related components within the building. Structural elements of the new heating boiler house are not in scope of license renewal since the structure does not house safety related SSCs, or components relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Environmental Qualification, ATWS, Fire Protection, or Station Blackout.

Not included in the Heating Boiler House scoping boundary are component supports, and airlock doors. Component supports are separately evaluated with the license renewal Component Supports Commodity Group, and the airlock doors are evaluated with the Ventilation Stack license renewal structure.

Reason for Scope Determination

The Heating Boiler House meets 10 CFR 54.4(a)(2) because failure of the non-safety related structure could prevent satisfactory accomplishment of functions(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for fire protection (10 CFR 50.48).

The Heating Boiler House does not meet 10 CFR 54.4(a)(1) because it is not a safety related structure that is relied on to remain functional during and following design basis events. It is also not relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for environmental qualification (10 CFR 50.49), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Provides physical support, shelter, and protection for safety related systems, structures, and components (SSCs). 10 CFR 54.4(a)(2)
2. Provides physical support, shelter, and protection for nonsafety related systems, structures, and components (SSCs) whose failure could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4 (a)(1). 10 CFR 54.4(a)(2)
3. Relied upon 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). 10 CFR 54.4(a)(3)

UFSAR References

3.8.4

License Renewal Boundary Drawings

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Table 2.4.10 Heading Boiler House

Components Subject to Aging Management Review

Component Type	Intended Functions
Conduits	Enclosure Protection Structural Support
Door	Enclosure Protection
Equipment Foundation	Structural Support
Metal Deck	Enclosure Protection Structural Support
Metal Siding	Enclosure Protection
Panels and Enclosures	Enclosure Protection Structural Support
Reinforced Concrete Foundation	Structural Support
Removable Panel (in Siding)	Enclosure Protection
Seals	Enclosure Protection
Structural Bolts	Structural Support
Structural Steel: Beams, Columns, Girts, Bracing, Connection plates and angles	Structural Support

The aging management review results for these components are provided in
Table 3.5.2.1.10 Heating Boiler House
-Summary of Aging Management Evaluation

2.4.11 Intake Structure and Canal (Ultimate Heat Sink)

System Purpose

The intake structure is composed of reinforced concrete slabs, beams, and shear walls. The structure is largely buried underground or submerged in seawater. Its foundation is reinforced concrete mat founded on Cohansey sand, with a concrete apron that extends into and below the intake canal. The top slab of the structure is located at grade level, open, and serves as the operating floor for the circulating water pumps, service water pumps, new radwaste service water pumps, and the emergency service water pumps.

The structure is divided into two sections, each of which contains a three segment trash rack and three traveling water screens, a chamber for two emergency service water pumps, one service water pump, one new radwaste service water pump and one high pressure screen wash pump, and a separate chamber for each of two circulating water pumps. The north side also contains two low pressure screen wash pumps. The sectional arrangement of the screens and pumps allows the use of stop logs to permit maintenance of equipment without interruption of circulating and service water flow.

The intake structure was designated seismic Class II structure in the original design. However analysis performed to support Plant Systematic Evaluation Program (SEP), Topic III 7.B, concluded that elements of the structure that are required to support Emergency Service Water pumps are capable of withstanding Seismic Class I lateral earthquake loads. Those elements were reclassified Seismic Class I, and considered safety related.

The intake canal draws seawater from Barnegat Bay and conveys it to the intake structure. The canal is 140 feet wide, dredged to 10 feet below mean sea level and separated from the discharge canal by the Dilution Pump Structure, and an earthen dike at the intake structure. The canal banks are lined with asphalt bonded stone for protection against erosion.

The canal is the Ultimate Heat Sink (UHS), required to provide cooling water for emergency shutdown, as well as during normal plant operation. It is classified nonsafety related Seismic Class II structure. However, the canal was analyzed under various conditions for conformance to Atomic Energy Commission Guide 27 (Presently Regulatory Guide 1.27). The analysis included Probable Maximum Hurricane (PMH), high water, Safe Shutdown Earthquake (SSE), and failure of bridges over the canal The results show that considering the most adverse condition, the canal provides sufficient flow for emergency shutdown of the plant and that there is an extremely low probability of losing the capability of the canal as the Ultimate Heat Sink.

The purpose of the Intake Structure and Canal is to provide seawater to dissipate waste heat from the plant during normal, shutdown and accident conditions. The intake structure also provides structural support for pumps and components which deliver seawater to the plant. In addition the structure provides structural support and access to electrical, mechanical, and structural components required to support the function and operation of Circulating Water System, Service Water System, Emergency Service Water System, Screen Wash System, and New Radwaste Service Water System, including sluice gates, stop logs, trash racks, trash cart, traveling water intake screens, platforms, ladders, and stairs.

Components evaluated in this section determined to be in the scope of license renewal include reinforced concrete beams, slabs, walls, foundation, anchorage for emergency service water and service water pumps, trash racks, the intake canal slopes, and the earthen dike.

Components evaluated in this section determined not in the scope of license renewal are the Stop logs, trash cart, platforms, ladders, and stairs. These components are provided to facilitate maintenance activities, or provide access to the equipment. They do not perform a license renewal intended function and their failure will not prevent satisfactory accomplishment of a safety related function.

Not included in the boundary of the Intake Structure and Canal are sluice gates which are included in the Circulating Water System, and Screen Wash System Components, both evaluated as separate license renewal systems. Portions of the dilution pump structure which separate the intake canal from the discharge canal are evaluated with the Dilution Pump Structure and are not evaluated in this section.

For more detailed information see UFSAR Section 1.2.2, 9.2.5, 10.4

Reason for Scope Determination

The Intake Structure and Canal meets the scoping requirements of 10 CFR 54.4(a)(1) because portions of the intake structure is safety-related and relied upon to remain functional during and following design basis events. It meets 10 CFR 54.4(a)(2) because failure of nonsafety related portions of the structure could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for fire protection (10 CFR 50.48). The Intake Structure and Canal is not relied upon in any analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's Regulation for environmental qualification (10 CFR 50.49), ATWS (10 CFR 50.62), or station blackout (10 CFR 50.63).

System Intended Functions

1. Provides source of cooling water for plant safe shutdown. 10 CFR 54.4(a)(1)
2. Provides Ultimate Heat Sink (UHS) during design basis events. 10 CFR 54.4(a)(1)
3. Provides physical support for safety related systems, structures, and components (SSCs). 10 CFR 54.4(a)(1)
4. Provides physical support for nonsafety related systems, structures, and components (SSCs) whose failure could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). 10 CFR 54.4(a)(2)
5. Relied upon 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). 10 CFR 54.4(a)(3)

UFSAR References

1.2.2.2
2.4
9.2.5
10.4

License Renewal Boundary Drawings

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Table 2.4.11 Intake Structure and Canal (Ultimate Heat Sink) Components Subject to Aging Management Review

Component Type	Intended Functions
Conduits	Enclosure Protection
Earthen water control structures (intake canal, embankments)	Water retaining boundary
Reinforced concrete foundation	Structural Support
Reinforced concrete Slab	Structural Support
Reinforced concrete Walls	Structural Support
Trash Racks	Filter

The aging management review results for these components are provided in Table 3.5.2.1.11 Intake Structure and Canal (Ultimate Heat Sink) -Summary of Aging Management Evaluation

2.4.12 Miscellaneous Yard Structures

System Purpose

Miscellaneous Yard Structures are comprised of concrete and structural steel structures located throughout the yard area. Concrete structures include foundations for outdoor tanks, standby gas treatment (SGTS) fans pad, material storage area pads, foundation for transformers, electrical substation components, transmission towers, electrical bus duct supports, trailers, and lighting poles. Concrete structures also include Service Water System (SWS) seal well, Sanitary Waste System underground concrete tank, trenches, duct banks, manholes, drainage catch basins, concrete retaining walls, concrete curbs, and concrete dikes. Structural steel structures are comprised of trailers, transmission towers, component supports located in the yard (including supports for Offsite Power System and Station Blackout (SBO) components), electrical enclosures, 480V Switchgear Room Ventilation fan platform, and yard storm drainage piping.

The SWS seal well is a reinforced concrete box structure located outside and adjacent to the reactor building east wall. The 7'-2" x 7'-2"x 6'-6" deep box is elevated 8' above ground using reinforced concrete walls that are connected to the Exhaust Tunnel Structure roof slab, which is 6'-3" underground. The well is connected by a 30" pipe to the Roof Drains and Overboard Discharge System. It is the discharge point and flow path for SWS sea water returned to the Discharge Structure and Canal through the overboard discharge line. Miscellaneous Yard Structures, including the seal well, are classified non-safety related, Seismic Class II structures.

The purpose of Miscellaneous Yard Structures is to provide structural support, shelter, and protection for safety related and non-safety related components and commodities, including offsite power, station blackout (SBO), and components credited for fire protection. The purpose of SWS seal well is to reduce the head requirements of the SWS by providing a siphon discharge and provide a flow path for the Service Water System (evaluated with Service Water System). The purpose of curbs and dikes is to contain fluid spills for controlled release. The curb at the entrance to the Emergency Diesel Generator building prevents water intrusion into the building during high flood. Trailers provide additional office space and house nonsafety related equipment and components not in scope of license renewal.

Included in the evaluation boundary of Miscellaneous Yard Structures are reinforced concrete and steel structures located in the yard area. Miscellaneous Yard Structures that perform an intended function are in the scope of license renewal. These include the SWS seal well; and the foundations for SGTS fans, condensate water storage tank, nitrogen supply tank, fire water storage tank, and carbon dioxide tank. Also included in the scope of license renewal are duct banks, manholes, trenches, and conduits containing safety related, SBO, or fire protection cables. Other yard structures in the scope of license renewal are foundations for Offsite Power System and Station Blackout System components, the curb at the entrance to the Emergency Diesel Generator building, transmission towers, startup transformers enclosures, SBO transformer enclosure, and 480V Switchgear HVAC fan platform and foundation. Miscellaneous Yard Structures, other than those described in this paragraph, perform no intended function and thus are not included in the scope of license renewal.

Not included in the evaluation boundary of Miscellaneous Yards Structure are steel and aluminum tanks, electrical components and bus ducts, foundation for emergency diesel generator fuel oil tank, foundation for diesel driven fire pump tank, and components supports. The tanks are separately evaluated with their respective license renewal mechanical system and electrical components and bus ducts are separately evaluated with electrical commodities and Offsite Power System or SBO System. Foundation for the emergency diesel generator oil tank is evaluated with the Diesel Generator Building license renewal structure and the foundation for the diesel driven fire pump oil tank is evaluated with Fire Pumphouses license renewal structure. Component supports are separately evaluated with the Component Supports Commodity Group license renewal structure.

For more detailed information refer to UFSAR Sections 1.2, 3.8, and 9.2.

Reason for Scope Determination

Miscellaneous Yard Structures meet 10 CFR 54.4(a)(2) because failure of non-safety related portions of the structures could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The structures also meet 10 CFR 54.4(a)(3) because they are relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for fire protection (10 CFR 50.48) and Station Blackout (10 CFR 50.63).

Miscellaneous Yard Structures do not meet 10 CFR 54.4(a)(1) because they are not safety related structures that are relied on to remain functional during and following design basis events. The structures are not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for Environmental Qualification (10 CFR 50.49), or ATWS (10 CFR 50.62).

System Intended Functions

1. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. Miscellaneous Yard Structures provide structural support, flood protection, shelter, and protection to safety related cables, Nitrogen Supply System components, and SGTS components. 10 CFR 54.4(a)(2)
2. Relied upon 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). Miscellaneous Yard Structures provide structural support, shelter and protection to components credited for Fire Protection. The SWS seal well carries Service Water from the Reactor Building Closed Cooling Water Heat Exchangers. 10 CFR 54.4(a)(3).
3. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Station Blackout (10 CFR 50.63). Miscellaneous Yard Structures provide structural support, shelter and protection to components credited for SBO. 10 CFR 54.4(a)(3).

UFSAR References

1.2
3.8
9.2

License Renewal Boundary Drawings

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Table 2.4.12 Miscellaneous Yard Structures
Components Subject to Aging Management Review

Component Type	Intended Functions
Concrete Embedments	Structural Support
Conduits	Enclosure Protection
	Structural Support
Curb	Flood Barrier
Equipment and Component Foundations (Startup, Unit Substation, and SBO Transformers, N2 Supply, SGTS Fans and Motors, HVAC Components, etc.)	Structural Support
Miscellaneous Steel (Manhole Covers)	Enclosure Protection
Miscellaneous Steel (Platforms)	Structural Support
Panels and Enclosures (Startup, Unit Substation, and SBO Transformers)	Enclosure Protection
	Structural Support
Reinforced Concrete Trench, Manhole, Ductbank	Enclosure Protection
	Structural Support
Reinforced Concrete Walls, Slabs (SWS Seal Well)	Structural Support
	Water retaining boundary
Structural Bolts	Structural Support
Tank Foundations (CST, Fire Water, CO2, N2, Fuel Oil)	Structural Support
Transmission Towers	Structural Support

The aging management review results for these components are provided in
Table 3.5.2.1.12 Miscellaneous Yard Structures
-Summary of Aging Management Evaluation

2.4.13 New Radwaste Building

System Purpose

The New Radwaste Building is a three-story structure located Northeast of the Reactor Building. The building is rectangular in plan, constructed on a reinforced concrete foundation mat at grade resting on compacted backfill. Steel framing and metal decking are provided for support of the reinforced concrete floor slabs. Walls required to contain liquid radwaste within the building, in the event of liquid radwaste system components failure, are reinforced concrete. The other walls consist of insulated metal siding or of solid concrete block construction.

The purpose of the New Radwaste Building is to house the liquid radwaste system, which is classified non-safety related and designed in accordance with the requirements of Regulatory Guide 1.26 and 1.29. The building provides structural support, shelter and protection for the system components, and radiation protection during plant operating conditions. Some elements of the building (walls and slabs) are credited, in the Current Licensing Basis (CLB), for retention of liquid radwaste during Safe Shutdown Earthquake (SSE). These elements are designed to Seismic Class I criteria and sealed watertight. The Seismic Class I boundary is based on the volume required to contain the entire liquid inventory of the radwaste system, inside the building, and taking into account the effects of non-seismic elements of the building collapsing and displacing some of this liquid. This provides assurance that postulated failures of the non-seismic liquid radwaste components within the building will not result in uncontrolled releases of radioactivity in liquid form to the environment. The rest of the building is non-seismic, conventionally designed.

Structural components of the building evaluated in this section include both Seismic Class I and non-seismic portions of the building. Components classified Seismic Class I are conservatively included in scope of license renewal since their failure could result in uncontrolled release of liquid radioactive wastes to the environment during SSE. These components consist of the foundation slab, exterior walls up to the El 48.0', and the walls and the slab above this elevation that enclose the concentrated liquid waste tanks (UFSAR Fig. 11.2-1). In addition penetration seals, which form the leak tight boundary, are also included in scope of license renewal.

Non-seismic components of the building are not in scope of license renewal. These components are not required for liquid radwaste containment and their collapse is considered in the design and will not result in release of radioactive material, in liquid form to the environment.

For more detailed information see UFSAR Sections 3.8.4 and 15.7.2

Reason for Scope Determination

The New Radwaste Building meets the scoping requirements of 10 CFR 54.4(a)(2) because failure of Seismic Class I portion of the building, during SSE, could result in release of radioactive material in liquid form to the environment.

The New Radwaste Building does not meet 10 CFR 54.4(a)(1) because it is not a safety related structure that is relied upon to remain functional during and following design basis events. It also does not meet 10 CFR 54.4(a)(3) because it is not relied upon in the safety analyses and 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), ATWS (10 CFR 50.62), or station blackout (10 CFR 50.63)

System Intended Functions

1. Prevent liquid radioactive waste from being released to the environment in the event of a Safe Shutdown Earthquake (SSE). 10 CFR 54.4(a)(2)

UFSAR References

1.2.2.1
3.8.4
11.2
11.4
15.7

License Renewal Boundary Drawings

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Table 2.4.13 New Radwaste Building
Components Subject to Aging Management Review

Component Type	Intended Functions
Penetration Seals	Water retaining boundary
Reinforced concrete foundation	Structural Support
	Water retaining boundary
Reinforced concrete Walls (above and below grade)	Water retaining boundary

The aging management review results for these components are provided in
Table 3.5.2.1.13 New Radwaste Building
-Summary of Aging Management Evaluation

2.4.14 Office Building

System Purpose

The Office Building is a three story concrete structure between the Reactor Building and the Turbine Building. The building is erected partly on the reactor building and partly on a separate mat foundation slab on grade, separated from the reactor building by 1-1/2" gap to allow for differential settlement. The reactor building west wall and the torus area roof slab form the east wall of the office building and its first floor slab, respectively .

The building can be divided into offices, laboratories, and rooms containing recirculation pump motor generator sets, 480V switchgear, 125V main station batteries, and 120V system components. The building ventilation fans are located on the office building roof slab. The switchgear rooms and the battery room are classified safety related; other areas of the building are nonsafety related. The building was designed as a seismic Class II as specified in UFSAR Section 3.8.4.

The purpose of the building is to house and support recirculation pump motor generator sets, emergency switchgear, main station batteries, and their electrical and mechanical supporting systems, including ventilation systems. The building also provides offices for site management and plant support personnel, chemistry laboratory testing equipment, showers, and locker rooms. The building also provides a secondary access to controlled areas.

Included in the evaluation boundary of the Office Building are structural elements of the building, masonry block walls, electrical cable trays, conduit, and panels and enclosures. The portion of the building that contains safety related 480V switchgear rooms, main station battery room, and those areas that provide structural support, shelter, and protection to safety related systems, structures, and components are in scope of license renewal. Safety related cable trays, conduits, and supports for safety related systems, structures, and components (SSCs) are also in the scope of license renewal. In addition, supports for nonsafety related SSCs whose failure could interact with safety related SSCs are included in the scope of license renewal.

Less critical elements of the building, such as those areas used entirely for offices, laboratory, and other facilities, are not in scope of license renewal. The areas are nonsafety related, contain no components which perform a license renewal intended function, and their failure will not impact an intended function.

Not included in the evaluation boundary of the Office Building are fire barriers, components supports, and concrete elements which are common with the reactor building. Fire barriers are evaluated separately with the Fire Protection System, Component supports are separately evaluated with license renewal Component Supports Commodity Group, and components common with the reactor building are evaluated with the Reactor Building license renewal structure.

For more detailed information, see UFSAR Sections 1.2, and 3.8

Reason for Scope Determination

The Office Building meets scoping requirements of 10 CFR 54.4(a)(1) because portion of the building is a safety related structure that is relied on to remain functional during and following design basis events. It meets 10 CFR 54.4(a)(2) because failure of nonsafety related portions of the structure could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for fire protection (10 CFR 50.48).

The Office Building is not relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for Environmental Qualification (10 CFR 50.49), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Provides physical support, shelter, and protection for safety related systems, structures, and components (SSCs). 10 CFR 54.4(a)(1)
2. Provides physical support, shelter, and protection for nonsafety related systems, structures, and components (SSCs) whose failure could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4 (a)(1). 10 CFR 54.4(a)(2)
3. Relied upon 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). 10 CFR 54.4(a)(3)

UFSAR References

1.2
3.8.4

License Renewal Boundary Drawings

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Table 2.4.14 Office Building

Components Subject to Aging Management Review

Component Type	Intended Functions
Cable Tray	Structural Support
Concrete embedments	Structural Support
Conduits	Enclosure Protection
	Structural Support
Curb	Direct Flow
Masonry block walls	Structural Support
Panels and enclosures	Enclosure Protection
	Structural Support
Reinforced concrete foundation	Structural Support
Reinforced concrete Walls, Slabs, Beams	Enclosure Protection
	Structural Support

The aging management review results for these components are provided in
Table 3.5.2.1.14 Office Building
-Summary of Aging Management Evaluation

2.4.15 Oyster Creek Substation

System Purpose

The Oyster Creek Substation is located west of the Reactor Building adjacent to intake and discharge canals. The substation consists of a reinforced concrete slab on grade, the breaker switch control room, transmission towers and foundation for OCGS output power to the grid and for incoming offsite power system components. The breaker switch control room is a commercial grade steel enclosure with metal siding and metal deck supported on the substation concrete slab. The substation is non-safety related, seismic class II structure

The purpose of the substation is to provide structural support, shelter and protection to non-safety related electrical components and commodities.

Included in the evaluation boundary is the reinforced concrete foundation slab, equipment foundations, transmission towers, breaker switch control room, and concrete anchors. The reinforced concrete foundation slab and transmission towers, equipment foundation, and supports associated with Offsite Power System components credited for Station Blackout (SBO) are in scope of license renewal. Other components and structures in the substation do not perform an intended function and are not in the scope of license renewal.

Not included in the evaluation boundary of the Oyster Creek Substation are electrical components and commodities within the structure. These components and commodities are separately evaluated with the Offsite Power System and Electrical Commodities license renewal systems. Component supports are separately evaluated with the Component Supports Commodity Group.

For more detail information, refer to UFSAR Sections 8.1, and 8.2.

Reason for Scope Determination

The Oyster Creek Substation is not in scope under 10 CFR 54.4(a)(1) because no portions of the system are safety related or relied on to remain functional during and following design basis events. It is not in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the structure will not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The Oyster Creek Substation meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for SBO (10 CFR 50.63). The Station Blackout System is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49). or ATWS (10 CFR 50.62).

System Intended Functions

1. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Station Blackout (10 CFR 50.63). The substation provides structural support, shelter and protection for offsite power system components credited for SBO. 10 CFR 54.4(a)(3).

UFSAR References

8.1
8.2

License Renewal Boundary Drawings

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Table 2.4.15 Oyster Creek Substation
Components Subject to Aging Management Review

Component Type	Intended Functions
Conduits	Enclosure Protection
	Structural Support
Door	Enclosure Protection
Equipment Foundation	Structural Support
Metal Deck	Enclosure Protection
Metal Siding	Enclosure Protection
Reinforced Concrete Foundation	Structural Support
Seals	Enclosure Protection
Structural Bolts	Structural Support
Structural Steel	Structural Support
Transmission Towers	Structural Support

The aging management review results for these components are provided in
Table 3.5.2.1.15 Oyster Creek Substation
-Summary of Aging Management Evaluation

2.4.16 Turbine Building

System Purpose

The Turbine Building is a reinforced concrete and steel structure located directly west of the Reactor Building adjacent to the Office Building. The building foundation is reinforced concrete mat, founded on dense Cohansey sand 31 feet below grade level. Reinforced concrete walls extend from the top of the base mat level to the turbine generator operating floor 23 feet above grade level. Steel framework and insulated metal siding and built-up roofing enclose the turbine generator operating floor.

The building contains the plant control room, two cable spreading rooms, 4160-volt switchgear room, the “C” battery room, and a mechanical equipment room (HVAC) for the control room. The control room, the two cable spreading rooms, and the mechanical equipment room are located on the northeast corner of the building. The rooms are enclosed in reinforced concrete walls and slabs to protect safety related components and control room personnel from extreme environmental conditions and design basis events. Controlled access into the control room is provided from the turbine building and from the office building. The 4160 volt switchgear rooms and the “C” battery room are located on southwest corner of the building and also enclosed in reinforced concrete walls and slabs. A cable tray bridge tunnel, located on the roof, connects the building with the reactor building and the office building. The structural steel bridge tunnel is used to route electrical cables to the control room and the cable spreading rooms.

The rest of the building encloses steam and power conversion system and Turbine Building Closed Cooling Water (TBCCW) system, reactor protection system components, turbine building ventilation, hydrogen injection system, and supporting systems. Major components within the building include turbine generators, main condensers, moisture separators, reheaters, reactor feedwater pumps, main steam control and stop valves, condensate pumps, TBCCW heat exchangers, and their associated piping. Highly radioactive components are enclosed within heavy concrete walls with labyrinth entrances for shielding purpose. Several stairways, an elevator, and platforms allow movement within the building and access to the equipment. Equipment in the building is serviced by two cranes, the turbine building overhead bridge crane, and the heater bay overhead bridge crane.

The control room, switchgear rooms, cable spreading rooms, the 125 volt “C” battery room, and the cable tray bridge tunnel are classified safety related and meet Seismic Class I requirements. The rest of the building is classified nonsafety related, Seismic Class II. Seismic Class II portions of the building have been analyzed to demonstrate that their failure will not adversely impact Seismic Class I structures.

The purpose of the building is to provide structural support, shelter, and protection for safety and nonsafety related systems, structures, and components housed within. The control room in conjunction with Control Room HVAC system provides a habitable environment for plant operators so that the plant can be safely operated or shutdown under design basis accident conditions. The cable tray bridge tunnel provides structural support, shelter, and protection to safety related electrical cables.

Included in the evaluation boundary of the Turbine Building are structural elements of the building, including safety related rooms reinforced concrete walls, beams, and slabs, building foundation, concrete and masonry block walls, structural steel for the building and for the cable tray bridge tunnel, metal siding, metal deck, structural bolts, and the building roof. The boundary also includes penetration seals, seals, equipment foundations, concrete embedments, concrete anchors, electrical cable trays and conduits, panels and enclosures, bird screens, and miscellaneous steel. Structural elements of the building essential for structural support, shelter, and protection of safety related systems, structures, and components are in scope of license renewal. Similarly, elements of the building that provide structural support for components credited for fire protection, environment qualification, and station blackout are also included in the scope of license renewal. Internal structures that do not perform or support any of these functions, such as partitions, stairs and platforms, are not in scope of license renewal unless it is determined that their failure will impact a safety related function.

Not included in the evaluation boundary of the Turbine Building are component supports, turbine building and heater bay overhead bridge cranes, fire barriers, and the building elevator. Component supports are separately evaluated with the license renewal Component Supports Commodity Group. The overhead bridge cranes are separately evaluated with Cranes and Hoists, and the building elevator is separately evaluated with Elevators and Manlifts license renewal system. Fire barriers are separately evaluated with the Fire Protection system.

For more detailed information, see UFSAR Sections 3.1.1, 3.8.4, and 6.4

Reason for Scope Determination

The Turbine Building meets the scoping requirements of 10 CFR 54.4(a)(1) because it is a safety-related structure which is relied upon to remain functional during and following design basis events. It meets 10 CFR 54.4(a)(2) because failure of nonsafety related portions of the structure could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for fire protection (10 CFR 50.48), ATWS (10 CFR 50.62), Environmental Qualification (10 CFR 50.49), and Station Blackout (10 CFR 50.63).

System Intended Functions

1. Provides physical support, shelter, and protection for safety related systems, structures, and components (SSCs). 10 CFR 54.4(a)(1)
2. Provide centralized area for control and monitoring of nuclear safety related equipment. 10 CFR 54.4(a)(1)
3. Provides physical support, shelter, and protection for nonsafety related systems, structures, and components (SSCs) whose failure could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). 10 CFR 54.4(a)(2)
4. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Station Blackout (10 CFR 50.63) 10 CFR 54.4(a)(3)
5. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Anticipated Transients without Scram (10 CFR 50.62) 10 CFR 54.4(a)(3)

6. Relied upon 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) 10 CFR 54.4(a)(3)
7. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Environmental Qualification (10 CFR 50.49) 10 CFR 54.4(a)(3)

UFSAR References

1.2.2.1
3.7.2
3.8.4.1
6.4

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Table 2.4.16 Turbine Building
Components Subject to Aging Management Review

Component Type	Intended Functions
Bird Screen	Enclosure Protection
Cable Tray	Structural Support
Concrete embedments	Structural Support
Conduits	Enclosure Protection
	Structural Support
Equipment Foundation	Structural Support
Hatch Plugs	Enclosure Protection
	Shielding
	Structural Support
Masonry block walls	Structural Support
Metal Deck	Enclosure Protection
	Structural Support
Metal Siding	Enclosure Protection
Miscellaneous steel (catwalks, handrails, ladders, platforms, grating, and associated supports)	Structural Support
Panels and enclosures	Enclosure Protection
	Structural Support
Penetration seals	HELB Shielding
Reinforced concrete foundation	Structural Support
Reinforced Concrete Walls (above and below grade)	Flood Barrier
	Missile Barrier
	Structural Support
Reinforced concrete Walls, Slabs, Beams	Flood Barrier
	HELB Shielding
	Structural Support
Roofing	Enclosure Protection
Seals	Enclosure Protection
Structural Bolts	Structural Support
Structural steel: Beams, Columns, Girders, Plate	Structural Support

The aging management review results for these components are provided in
Table 3.5.2.1.16 Turbine Building
-Summary of Aging Management Evaluation

2.4.17 Ventilation Stack

System Purpose

The Ventilation Stack is a 394 foot high tapered reinforced concrete structure located southeast of the Reactor Building, and adjacent to the Standby Gas Treatment System, and the Heating Boiler House. Its base is 7' thick reinforced concrete slab, founded on very dense sand and buried 26' below grade. Internally, the structure is divided into three levels, formed by the base slab, an intermediate slab at ground level, and an upper slab, located 11'-6" above ground level . Access into the stack is provided from the old heating boiler house and from the Exhaust Tunnel. A caged ladder outside the stack provides access to a circular platform near the top of the stack and a local platform 277' above grade.

The stack is classified as a Seismic Class I structure, relied upon to elevate gaseous effluents during normal plant operation and during accident condition. It is linked to the Reactor Building, Turbine Building, Old Radwaste Building, and the New Radwaste Building, by the Exhaust Tunnel wherein piping and air ducts between the buildings and the stack are routed. The piping and air ducts exit the tunnel near the base of the stack and penetrate it from the outside approximately 24' above ground, except for the Main Condenser Air Extraction System piping which enter the stack underground, penetrate both internal slabs to discharge above the upper slab. The original design included a 30" diameter pipe within the stack. This pipe, which runs the full height of the stack, was used as the exhaust pipe for the heating boiler. Later the pipe was capped and abandoned in-place. Other items, which penetrate the stack, include the Augmented Offgas System piping, the hardened vent discharge line, and sensing and sampling lines for the Radioactive Gaseous Effluent Monitoring System (RAGEMS).

The purpose of the Ventilation Stack is to provide an elevated discharge point for gaseous effluents collected from the Standby Gas Treatment System, Reactor Building Ventilation System, Radwaste Area Heating and Ventilation System, Main Condenser Air Extraction System (includes turbine steam seals effluents), Augmented Offgas System, and Turbine Building Ventilation System. In addition, the stack in conjunction with the Hardened Vent System provides a secondary pressure vent path for primary containment in the event the torus vent path is unavailable. Effluents through the Ventilation Stack are monitored to ensure that the limits of 10CFR20, which apply to releases during normal operation, and the limits of 10CFR100 which apply to accidental releases, are not exceeded. The stack also provides structural support to the piping, tubing, and air ducts, which penetrate it, and to components inside it, including valves, absolute filter, and radiation monitors.

The Standby Gas Treatment System, the Reactor Building Ventilation System, the Radwaste Area Heating and Ventilation System, and the Hardened Vent System have been conservatively assumed to support the intended function of the stack. This is based on the rationale that a postulated failure of HVAC ducts and piping connected to the stack could adversely affect the elevated release intended function of the stack and result in an uncontrolled release of radioactive effluents to the environment. Similarly, the capped auxiliary boiler exhaust pipe, and capped penetration sleeves are considered a part of the stack and assumed to support the intended function of the stack for the same reason.

The Turbine Building Ventilation System, the Main Condenser Air Extraction System, RAGEMS, and the Augmented Offgas System interface with the stack but have been determined not to impact its intended function. The Turbine Building Ventilation System does not physically interface with the stack; instead, its flow path is through the reactor building ventilation ductwork. The Main Condenser Air Extraction System penetrates the stack underground which precludes discharge of effluents directly to the atmosphere. The Augmented Offgas System piping and RAGEMS tubing are small in diameter such that their postulated failure is judged not to impact the intended function of the stack.

Included in the evaluation boundary of the Ventilation Stack are concrete elements, capped auxiliary boiler exhaust pipe, penetration sleeves and cap plates, doors, seals, ladders, and platforms. Concrete elements, capped auxiliary boiler exhaust pipe, penetration sleeves, cap plates, and seals support the intended function of the structure and are included in scope of license renewal. The circular platform near the top of the stack is included in the scope of license renewal because its failure will impact safety related components located at the base of the stack. The door, ladders and other platforms only provide access to components inside or outside the stack. These components are not included in the scope of license renewal because they do not support the intended function of the stack and their failure will not impact a safety related function.

Not included in the Ventilation Stack evaluation boundary are hoists and the following systems or structures, which are separately evaluated as license renewal systems or structures.

Cranes and Hoists
The Exhaust Tunnel
Heating Boiler House
Reactor Building Ventilation System
Turbine Building Ventilation System
Radwaste Area Heating and Ventilation System
Augmented Offgas System
Main Condenser Air Extraction System
Standby Gas Treatment System
Hardened Vent System
Radiation Monitoring System

For more detailed information see UFSAR Sections 1.2, and 3.8.4.

Reason for Scope Determination

The Ventilation Stack meets 10 CFR 54.4(a)(1) because it is a safety related structure that is relied upon to remain functional during and following design basis events. The Ventilation Stack is in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the ventilation stack could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The Ventilation Stack is not in scope under 10 CFR 54.4(a)(3) because it is not relied upon 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) and environmental qualification (10 CFR 50.49), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Provides physical support for non safety related systems, structures, and components (SSCs) whose failure could prevent satisfactory accomplishment of function(s) identified for 10

CFR 54.4(a)(1). 10 CFR 54.4(a)(2)
2. Provides for the discharge of treated gaseous waste to meet the requirements of 10 CFR 100. 10 CFR 54.4(a)(1)

UFSAR References

1.2.2.2
2.1
3.8.4.1.4
6.2.7
11.3

License Renewal Boundary Drawings

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Table 2.4.17 <u>Ventilation Stack</u> Components Subject to Aging Management Review

Component Type	Intended Functions
Concrete embedments	Structural Support
Hatch cover	Leakage Boundary
Miscellaneous steel (catwalks, handrails, ladders, platforms, grating, and associated supports)	Structural Support
Penetration seals	Leakage Boundary
Penetration sleeve, cap plates, capped auxiliary boiler exhaust pipe	Leakage Boundary
Reinforced concrete foundation	Structural Support
Reinforced concrete Slabs	Structural Support
Reinforced concrete stack (above and below grade)	Gaseous Release Path
	Structural Support
Structural Bolts	Structural Support

The aging management review results for these components are provided in
Table 3.5.2.1.17 Ventilation Stack
-Summary of Aging Management Evaluation

2.4.18 Component Supports Commodity Group

System Purpose

The Component Support Commodity Group consists of structural elements and specialty components designed to transfer the load applied from a system, structure, or component (SSC) to the building structural element or directly to the building foundation. Supports include seismic anchors or restraints, frames, constant and variable spring hangers, rod hangers, sway struts, guides, stops, design clearances, straps, clamps, and clevis pins. Specialty components include snubbers, sliding surfaces, and vibration isolators. The commodity group is comprised of the following supports:

Supports for ASME Class 1, 2 and 3 piping and components, including reactor vessel stabilizer, reactor vessel skirt support, and Control Rod Drive (CRD) housing supports.

Supports for ASME Class MC components including suppression chamber seismic restraints, suppression chamber support saddles and columns, and vent system supports.

Supports for cable trays, conduit, HVAC ducts, tube track, and instrument tubing.

Supports for non-ASME piping and components, including emergency diesel generator supports.

Supports for racks, panels and enclosures.

Supports for spray shields, and masonry walls.

The purpose of a support is to transfer gravity, thermal, seismic, and other lateral loads imposed on or by SSC to the supporting building structural element or foundation. Sliding surfaces, when incorporated into the support design, permit release of lateral forces, but are relied upon to carry vertical load. Specialty supports such as snubbers only resist seismic forces. Vibration isolators are incorporated in the design of some vibrating equipment to minimize the impact of vibration. Other support types such as guides and position stops allow displacement in a specified direction or preclude unacceptable movements and interactions.

The Component Support Commodity Group includes supports for mechanical, electrical and instrumentation systems, components, and structures listed above that are in the scope of license renewal. The group also includes supports for SSCs, which are not in scope of license renewal, but their supports are required to restrain or prevent physical interaction with safety related SSCs (e.g. seismic II/I). The supports include support members, welded and bolted connections, Lubrite plates, vibration isolators, concrete anchors, concrete embedments, and grout.

Included in the evaluation boundary of the Component Supports Commodity Group are support members, welded and bolted connections, Lubrite plates, vibration isolators, grout for support base plates, and concrete anchors. Snubbers are also included in the evaluation boundary of this commodity group; however they are considered active components and are not subject to aging management review.

Not included in the evaluation boundary of component supports are concrete pedestals, concrete embedments, grout and anchors used for components other than supports listed herein. These commodities are evaluated separately with the license renewal structure that contains them.

Reason for Scope Determination

The Component Support Commodity Group meets the scoping requirements of 10 CFR 54.4(a)(1) because some supports are safety-related and relied upon to maintain structural integrity during, and following design basis events. The group meets 10 CFR 54.4(a)(2) because failure of nonsafety related supports could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it provides structural support to systems relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for Fire Protection (10 CFR 50.48), ATWS (10 CFR 50.62), Environmental qualification (10 CFR 50.49), and Station Blackout (10 CFR 50.63).

System Intended Functions

1. Provides structural support or restraint to SSCs in the scope of license renewal.10 CFR 54.4(a)(1), (a)(2), (a)(3)
2. Provides structural support or restraint to SSCs not in scope of license renewal to prevent interaction with safety related SSCs. 10 CFR 54.4(a)(2)

UFSAR References

None

License Renewal Boundary Drawings

None

Table 2.4.18 Component Supports Commodity Group
Components Subject to Aging Management Review

Component Type	Intended Functions
Building concrete at locations of expansion and grouted anchors; grouted pads for support base plates	Structural Support
Supports for ASME Class 1 Piping and Components (constant and variable load spring hangers, guides, stops, sliding surfaces, design clearances)	Structural Support
Supports for ASME Class 1 Piping and Components (support members, welds, bolted connections, support anchorage to building structure)	Structural Support
Supports for ASME Class 2 and 3 Piping and Components (constant and variable load spring hangers, guides, stops, sliding surfaces, design clearances)	Structural Support
Supports for ASME Class 2 and 3 Piping and Components (support members, welds, bolted connections, support anchorage to building structure)	Structural Support
Supports for ASME Class MC Components (guides, stops, sliding surfaces, design clearances)	Structural Support
Supports for ASME Class MC Components (support members, welds, bolted connections, support anchorage to building structure)	Structural Support
Supports for Cable Trays (support members, welds, bolted connections, support anchorage to building structure)	Structural Support
Supports for conduits (support members, welds, bolted connections, support anchorage to building structure)	Structural Support
Supports for HVAC Components (vibration isolation elements)	Vibration Isolation
Supports for HVAC Components, and Other Miscellaneous Mechanical Equipment (support members, welds, bolted connections, support anchorage to building structure)	Structural Support
Supports for HVAC ducts (support members, welds, bolted connections, support anchorage to building structure)	Structural Support
Supports for Masonry Walls (support members, welds, bolted connections, support anchorage to building structure)	Structural Support

Supports for Non-ASME Piping and Components (support members, welds, bolted connections, support anchorage to building structure)	Structural Support
Supports for Panels and Enclosures, Racks (support members, welds, bolted connections, support anchorage to building structure)	Structural Support
Supports for Platforms, Pipe Whip Restraints, Jet Impingement and Spray Shields, and Other Miscellaneous Structures (support members, welds, bolted connections, support anchorage to building structure)	Structural Support
Supports for Tube Track and Instrument Tubing (support Members, Welds, Bolted Connections, support anchorage to building structure)	Structural Support

The aging management review results for these components are provided in Table 3.5.2.1.18 Component Supports Commodity Group -Summary of Aging Management Evaluation

2.4.19 Piping and Component Insulation Commodity Group

System Purpose

The Piping and Component Insulation Commodity Group is comprised of pre-fabricated blankets, modules, or panels engineered as integrated assemblies to fit the surface to be insulated and to fit easily against the piping and components. The insulation includes originally installed metallic and nonmetallic materials and replacement materials.

Metallic insulation consists of stainless steel mirror insulation. Nonmetallic insulation consists of calcium silicate, asbestous, and light density, semi-rigid fibrous glass, quilted between two layers of glass scrim and encapsulated in a fiberglass cloth forming a composite blanket; or of pre-molded fiberglass modules and panels encased in fiberglass jackets. Anti-sweat insulation consist of closed cell, foamed plastic type (inside primary containment drywell) and fiberglass dual temperature or glass wool blanketing (outside primary containment drywell). Metal protective jackets are made from rolled aluminum or stainless steel. The insulation is not classified a safety related commodity.

The purpose of insulation is to improve thermal efficiency, minimize heat loads on the HVAC systems, provide for personnel protection, or prevent sweating of cold piping and components. The review of current licensing basis documents did not identify any insulation that performs a license renewal intended function. Specific areas reviewed include Environmental Qualification (EQ) basis documents, and documents associated with emergency core cooling system (ECCS) components including strainers. Heat load analysis for plant areas that contain EQ components and core spray and containment spray pumps did not credit insulation to ensure operability of the components during and post LOCA. The impact of insulation, inside the drywell, on Core Spray system suction strainers was evaluated in response to NRC Bulletin 96-03 “Potential Plugging of Emergency Core Cooling Suction Strainers by debris in Boiling Water Reactors”. Evaluation results are documented in the UFSAR, Table 6.3-3. The results did not credit insulation integrity to prevent clogging of the strainers. Instead it was concluded that the blowdown and transport of insulation debris to the torus is accounted for in the suction strainer design. On this basis it was determined that piping and component insulation is not required to be in scope of license renewal. However Oyster Creek recognized the importance of maintaining hot piping and component insulation integrity to protect nearby in-scope SSCs from overheating. As a result hot piping and component insulation is conservatively included in the scope of license renewal since its failure could impact a function defined for 10 CFR 54.4 (a)(1).

Included in the scoping boundary of the Piping and Component Insulation Commodity Group is insulation for all piping and components. Hot piping and component insulation located inside structures in the scope of license; excluding Miscellaneous Yard structures, is in the scope of license renewal under 10 CFR 54.4 (a)(2). Cold piping and component insulation does not perform an intended function and is not included in the scope of license renewal. Also hot piping and component insulation located inside structures that are not in scope of license renewal, or in Miscellaneous Yard structures is not in the scope of license renewal since failure of this insulation will not impact an intended safety related function.

Reason for Scope Determination

The Piping and Component Insulation Commodity Group is not in scope under 10 CFR 54.4(a)(1) because no portions of the insulation are safety related or relied on to remain functional during and following design basis events. The Piping and Component Insulation Commodity Group is in scope under 10 CFR 54.4(a)(2) because failure of the non-safety related commodity could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The insulation is not in scope under 10 CFR 54.4(a)(3) because it is not relied upon 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) and Environmental Qualification (10 CFR 50.49), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. Hot piping and components insulation protects nearby safety related SSCs from overheating. 10 CFR 54.4(a)(2)

UFSAR References

6.2.1.1.1
Table 6.3-3

License Renewal Boundary Drawings

None

Table 2.4.19 Piping and Component Insulation Commodity Group
Components Subject to Aging Management Review

Component Type	Intended Functions
Insulation	Thermal Insulation
Insulation Jacketing	Insulation Jacket Integrity

The aging management review results for these components are provided in
Table 3.5.2.1.19 Piping and Component Insulation Commodity Group
-Summary of Aging Management Evaluation

2.5 SCOPING AND SCREENING RESULTS: ELECTRICAL COMPONENTS

The determination of electrical systems that fall within the scope of License Renewal is made through the application of the process described in Section 2.1. The results of the electrical systems scoping review are contained in Section 2.2.

Subsection 2.1.6.1 provides the screening methodology for determining which component groups within the scope of 10 CFR 54.4 meet the requirements contained in 10 CFR 54.21(a)(1). The component groups that meet those screening requirements are identified in this section. These identified component groups consequently require an aging management review.

As described in Subsection 2.1.6.1, the screening for electrical components was performed on a commodity group basis for the in-scope electrical systems as well as the electrical component types associated with in-scope mechanical systems and civil structures listed in Table 2.2-1.

Components which support or interface with electrical components, for example, cable trays, conduits, instrument racks, panels and enclosures, are assessed as part of the Structural Component Support Commodity Group in Section 2.4.

2.5.1 ELECTRICAL SYSTEMS

This section provides a brief description of the Oyster Creek electrical systems determined to be in the scope of license renewal. Each description includes the system purpose, reason for scope determination, intended functions, UFSAR references and identification of applicable license renewal boundary drawings. The following systems are addressed in this section:

- 120/208 Volt Non-Essential Distribution System (Section 2.5.1.1)
- 120VAC Vital Power System (Section 2.5.1.2)
- 125V Station DC System (Section 2.5.1.3)
- 24/48V Instrument Power DC System (Section 2.5.1.4)
- 4160V AC System (Section 2.5.1.5)
- 480/208/120V Utility (JCP&L) Non-Vital Power (Section 2.5.1.6)
- 480V AC System (Section 2.5.1.7)
- Alternate Rod Injection System (ARI) (Section 2.5.1.8)
- Grounding and Lightning Protection System (Section 2.5.1.9)
- Intermediate Range Monitoring System (Section 2.5.1.10)
- Lighting System (Section 2.5.1.11)
- Local Power Range Monitoring System/Average Power Range Monitoring System (Section 2.5.1.12)
- Offsite Power System (Section 2.5.1.13)
- Post-Accident Monitoring System (Section 2.5.1.14)
- Radio Communications System (Section 2.5.1.15)
- Reactor Overfill Protection System (ROPS) (Section 2.5.1.16)
- Reactor Protection System (Section 2.5.1.17)
- Remote Shutdown System (Section 2.5.1.18)

- Station Blackout System (Section 2.5.1.19)

2.5.1.1 120/208 Volt Non-Essential Distribution System

System Purpose

The 120/208 Volt Non-Essential Distribution System is an electrical distribution system which receives power from 460 volt motor control centers and 460 volt distribution panels through dry type transformers. The system is designed to provide non-essential power to various non-safety related and auxiliary plant loads. The system consists of electrical equipment manufactured to industry standards. The non-safety related lighting, space heater and miscellaneous power panels have one, two and three pole breakers to supply power to various auxiliaries.

The purpose of the system is to distribute electrical power to station auxiliaries. The system accomplishes this with a number of miscellaneous panels that supply power to non-safety related loads. Some of the panels are powered from safety related sources, but they are isolated from the safety related source by isolation devices such as fuses, circuit breakers or open disconnect switches.

This system provides power to components that are relied upon to demonstrate compliance with the 10CFR50.48 (Fire Protection). Specifically, the system provides power to the 4160V Switchgear vault ventilation controls and also to local fire detection panels. The 4160V Switchgear Ventilation System is credited under 10CFR50.48 for smoke removal and 10CFR50.63 for heat removal. The 120/208 Volt Non-Essential Distribution System also provides power to a control room ventilation fan which is relied upon to perform 10CFR54.4(a)(1) functions for control room habitability.

The system is comprised of electrical panels, electrical transformers, cable and connectors, fuses, circuit breakers, and welding receptacles.

For more detailed information, see UFSAR Section 8.3.1.1.

Reason for Scope Determination

The 120/208 Volt Non-Essential Distribution System is not in scope under 10 CFR 54.4(a)(1) because no portions of the system are safety related or relied on to remain functional during and following design basis events. The 120/208 Volt Non-Essential Distribution System is in scope under 10CFR54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The system is in scope under 10 CFR 54.4(a)(3) because it is relied upon 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) and Station Blackout (10 CFR 50.63). The system is not relied upon to perform a function that demonstrates compliance with the commission's regulations for environmental qualification (10 CFR 50.49) or ATWS (10 CFR 50.62).

System Intended Functions

1. Resist non-safety related SSC failure that could prevent satisfactory accomplishment of a safety related function. This system provides electrical power to a control room ventilation fan. 10 CFR 54.4(a)(2).

2. Relied upon 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). 10 CFR 54.4(a)(3).
3. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Station Blackout (10 CFR 50.63). 10 CFR 54.4(a)(3).

UFSAR References

8.3.1.1.3

License Renewal Boundary Drawings

LR-BR-3000

2.5.1.2 120VAC Vital Power System

System Purpose

The 120 VAC Vital Power System is a Class 1E safety-related electrical distribution system that supplies 120 VAC power to various loads essential for operation, protection and safe shutdown of the plant. The system design incorporates redundant power sources and automatic bus transfer switches so that critical loads remain energized at all times.

The 120 Volt AC Vital Distribution System receives normal and alternate power from 460 Volt Vital Motor Control Centers 1A2 and 1B2. The system supplies this power to critical 120 VAC instrumentation, controls and auxiliaries. The system includes the Reactor Protection System (RPS) Motor Generator Sets, a Rotary Inverter motor generator set, Electrical Protection Assemblies (EPAs), 120 VAC distribution panels, transformers, transfer switches, cables, and raceway systems. The Rotary Inverter MG set 440 VAC motor is backed up by a 125 VDC motor, powered from the 125 VDC Distribution Center B.

Continuous Instrument Panel CIP-3 normally receives 120/208 VAC power from Rotary Inverter and alternate power from 460 V Vital Motor Control Center 1A2 via transformer through an auto transfer switch.

Protection System Panels 1 & 2 (PSP-1 and PSP-2) normally receive 120 VAC power from RPS Motor Generator Sets 1-1 and 1-2 respectively. The alternate source of power is available from 460 V Vital Motor Control Center (VMCC) 1A2 or 1B2 to any one of the two Protection System Panels (PSP-1 and PSP-2) via manual disconnect switches through a backup transformer. Normal and alternate power to PSP-1 and PSP-2 also pass through electrical protection assemblies (EPAs), two in series for each power source. The EPAs are circuit breakers equipped with overvoltage, undervoltage and under frequency trips. The devices protect the Reactor Protection System circuitry from voltage and frequency fluctuations.

Normal and alternate power to the Vital AC Power Panel (VACP-1) and Instrument Panels #4/4A/4B/4C are supplied from 460 V VMCCs 1A2 and 1B2 via auto transfer switches and transformers. Normal and alternate power to the Vital Lighting Distribution Panel (VLDP-1) is supplied from 460 V VMCCs 1A2 and 1B2 via auto transfer switches.

Post Accident Instrument Power Panels 1 and 2 (PDP-733-057 and PDP-733-058) receive power from 460 V VMCC 1A2 and 1B2 respectively through breakers and transformers. These panels do not have alternate power sources.

Local indication is provided at the automatic transfer switches, showing the availability of normal and alternate power. An alarm will annunciate in the Control Room when any of the auto transfer switches transfer power to alternate source.

120VAC Vital Power System components are located in the Reactor Building, Turbine Building and Main Office Building.

For additional detail, see UFSAR section 8.3.1.1.

Reason for Scope Determination

The 120 VAC Vital Power System meets 10 CFR 54.4(a)(1) because it is a safety related system that is relied on to remain functional during and following design basis events. The 120 VAC Vital Power System is not in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and 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), and station blackout (10 CFR 50.63). The system is not relied upon to perform a function that demonstrates compliance with the commission's regulations for ATWS (10 CFR 50.62).

System Intended Functions

1. Provide motive power to safety related components. 10 CFR 54.4(a)(1)
2. Relied upon 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). 10 CFR 54.4(a)(3)
3. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Environmental Qualification (10 CFR 50.49). 10 CFR 54.4(a)(3)
4. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Station Blackout (10 CFR 50.63). 10 CFR 54.4(a)(3)

UFSAR References

8.3.1.1.4

License Renewal Boundary Drawings

LR-BR-3000

2.5.1.3 125V Station DC System

System Purpose

The 125V Station DC System is an electrical DC power distribution system designed to provide power to safety and non-safety related loads.

There are three complete 125 VDC distribution systems that make up the 125V Station DC Power System at Oyster Creek. Two of these systems, designated as 125 VDC distribution systems A and B, are the originally installed systems. The third system, designated as 125 VDC distribution system C, was subsequently designed and installed as a modification.

The function of the Station DC Power System is to provide a continuous source of 125 VDC power. Safety loads are supplied from DC distribution systems B and C, with DC distribution system B supplying Division B safety related loads and DC distribution system C supplying Division A safety related loads. DC distribution system A is also used to supply non-safety loads.

The system accomplishes its purpose by providing three 125 VDC main station batteries, five AC powered battery chargers, three 125 VDC distribution centers, three power panels, three transfer switches and two motor control centers. The battery output circuit breakers are normally closed and one battery charger is operated in parallel with the battery to supply power to each DC distribution center (A, B, and C). During normal operation the battery chargers maintain their respective station battery in a fully charged state by keeping it on a float charge. The battery chargers supply normal system loads with the batteries acting as a standby source of DC power upon failure of the battery chargers or during high demand transients.

DC distribution center C in the Turbine Building 4160 VAC switchgear room is physically separated from DC distribution centers A and B, which are located in the Battery Room in the Main Office Building. All batteries are located in enclosed battery rooms provided with ventilation to minimize the buildup of hydrogen gas which is formed during battery charging operation, and to maintain temperatures within battery design limits.

The 125 VDC Power System is an ungrounded system. Ground detection devices are provided on the incoming battery feeders in each distribution center. Status indications and failure annunciation for each of the 125 VDC distribution systems are provided in the Control Room.

The batteries are sized to provide power to all connected loads while maintaining adequate voltage levels to all loads. The only exception are the motor-operated valves included in the GL 89-10 program which rely on the system battery chargers to provide adequate voltage for HELB isolation.

The battery chargers for DC Distribution Systems A & B are supplied with 480 VAC power from Division B MCCs 1B2 and 1B21. The battery chargers for DC Distribution Systems C are supplied with 480 VAC power from Division A MCC 1A2.

For additional information, see UFSAR Section 8.3.2.1.

Reason for Scope Determination

The 125V Station DC System meets 10 CFR 54.4(a)(1) because it is a safety related system that is relied on to remain functional during and following design basis events. The 125V Station DC System is not in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and 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), and station blackout (10 CFR 50.63). The system is not relied upon to perform a function that demonstrates compliance with the commission's regulations for ATWS (10 CFR 50.62).

System Intended Functions

1. Provide motive power to safety related components. 10 CFR 54.4(a)(1)
2. Relied upon 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) 10 CFR 54.4(a)(3)
3. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Environmental Qualification (10 CFR 50.49) 10 CFR 54.4(a)(3)
4. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Station Blackout (10 CFR 50.63) 10 CFR 54.4(a)(3)

UFSAR References

8.3.2.1

License Renewal Boundary Drawings

LR-BR-3000

2.5.1.4 24/48V Instrument Power DC System

System Purpose

A 24/48 VDC Power System is an electrical distribution system designed to supply power to the reactor nuclear instrumentation system and Radiation Monitoring system. The 24/48 VDC Power System is made up of two sub-systems with all components located in the lower cable spreading room. Each sub-system uses two 24 VDC battery/charger assemblies connected in series, with a center tap to form a three wire system of + 24 volts line-to-common or 48 volts line-to-line. The battery chargers supply normal system loads with the batteries acting as a standby source of DC power upon failure of the battery chargers or during high demand transients. Power is supplied to system loads by two power panels, one in each sub-system.

The 24 VDC chargers are used to maintain their associated batteries in a fully charged condition while supplying normal system loads. All chargers are supplied power from the 120 VAC Vital Power System.

For additional information, see UFSAR Section 8.3.2.2.

Reason for Scope Determination

The 24/48V Instrument Power DC System meets 10 CFR 54.4(a)(1) because it is a safety related system that is relied on to remain functional during and following design basis events. The 24/48V Instrument Power DC system is not in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The system is not in scope under 10 CFR 54.4(a)(3) because it is not relied upon 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), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Provide motive power to safety related components. Provides 24VDC power at the appropriate voltage level for the reliable operation of the IRMs. 10 CFR 54.4(a)(1)

UFSAR References

8.3.2.2

License Renewal Boundary Drawings

LR-BR-3000

2.5.1.5 4160V AC System

System Purpose

The 4160V AC System is an electrical distribution system designed to provide continuous electrical power necessary for plant operation, startup and shutdown.

The purpose of the 4160V AC System is to distribute electrical power to the station auxiliaries, including safety related loads. The system accomplishes this electrical distribution function utilizing metal clad switchgear, control and protective relays, current transformers, potential transformers, fuses, cable and cable connections.

The 4160V switchgear is comprised of four separate bus sections or lineups of switchgear. The four bus sections are identified as Bus Sections 1A, 1B, 1C and 1D with Bus Sections 1C and 1D being the essential or emergency switchgear lineups. All are located in the 4160V Switchgear Room of the Turbine Building, which is a vital security area. Essential Bus Sections 1C and 1D are physically isolated from each other, and from Bus Sections 1A and 1B, by two hour rated firewalls.

Bus Sections 1A and 1B are independently fed from either the Auxiliary Transformer Bank No. 4 or the Startup Transformer Banks Nos. 5 and 6. During station operation, Bus Sections 1A and 1B are normally energized and receive power from the Auxiliary Transformer, which receives its power from the 24 kV output of the Turbine Generator. During shutdown, startup, or loss of Auxiliary Transformer Power, Buses 1A and 1B are energized and receive power from the Startup Transformers, which receive their power from the 34.5 kV Oyster Creek substation. The 34.5 kV substation is supplied from either the 230 kV Oyster Creek substation, or from other 34.5 kV GPUE Transmission lines.

The 4160V AC System can also be fed from the Forked River combustion turbines, which is the OCNGS alternate AC power source during a Station Blackout event. The alternate AC source utilizes an independent connection diverse from the normal connection to the regional transmission grid. The routing is through a dedicated underground ductbank to the load break switches and SBO transformer located on site, and then through a cable trench to the switchgear breaker connection to the 4160V AC Bus 1B.

Both the non-essential and essential auxiliary loads are split between two independent radial systems. The general design requirement is to supply duplicate services from different buses. Essential Bus Sections 1C and 1D supply power to both non-essential loads and loads important to plant safety and vital to safe shutdown under accident conditions. These bus loads are redundant in that in the event of failure of either Bus Section 1C or 1D the remaining loads satisfy the requirements for a safe shutdown under accident conditions.

Emergency Bus Sections 1C and 1D are energized and receive power from Bus Sections 1A and 1B during periods of normal power availability. In the event of loss of normal or startup power to the essential 4160V switchgear Bus Sections 1C and 1D, these buses will separate from the 4160V switchgear Bus Sections 1A and 1B and the Emergency Diesel Generators will automatically start, accelerate and close in to the emergency buses. Once the diesel generators restore emergency power to Bus Sections 1C and 1D, vital loads will start automatically in a timed sequence to avoid overloading the diesel generator units on high starting current.

Since Bus Sections 1C and 1D are the station's essential buses, any nonessential auxiliary loads that they supply will be separated in the event of a loss of power. The design of the essential 4160V electrical system and the starting logic of the diesel generator units is such that a single failure will not disable both essential buses. At least one diesel generator unit will be capable of supplying power to its designated essential bus considering a Loss-of-Coolant Accident (LOCA), a Loss of Offsite Power (LOOP), and a single failure.

During a Station Blackout event, the 4160V AC System is powered from the Forked River combustion turbines through the SBO transformer to the 1B bus.

The 4.16 kV switchgear is of the metal clad magneblast design with stored energy mechanism. The circuit breakers receive 125 V dc control power from the station batteries of the same division as the safety related equipment being supplied with power.

For additional information, see UFSAR Section 8.3.1.

Reason for Scope Determination

The 4160V AC System is in scope under 10 CFR 54.4(a)(1) because it is a safety related system that is relied on to remain functional during and following design basis events. The 4160V AC system is not required under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system would not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for fire protection (10 CFR 50.48) and station blackout (10 CFR 50.63). The 4160V AC system is not required to demonstrate compliance with the Commission's regulations for Environmental Qualification (10 CFR 50.49) or ATWS (10 CFR 50.62).

System Intended Functions

1. Provide motive power to safety related components. 10 CFR 54.4(a)(1)
2. Relied upon 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). 10 CFR 54.4(a)(3)
3. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Station Blackout (10 CFR 50.63). 10 CFR 54.4(a)(3)

UFSAR References

8.3.1

License Renewal Boundary Drawings

LR-BR-3000

2.5.1.6 480/208/120V Utility (JCP&L) Non-Vital Power

System Purpose

The 480/208/120V Utility (JCP&L) Non-Vital Power System is an electrical distribution system designed to provide non-essential electrical power necessary for balance of plant equipment located throughout the site.

The purpose of the 480/208/120V Utility (JCP&L) Non-Vital Power System is to distribute electrical power to the station auxiliaries. The system accomplishes this electrical distribution function by utilizing offsite power and onsite metal clad switchgear, control and protective relays, cable and cable connections and transformers.

The 34.5 kV Oyster Creek offsite power substation Bus B contains the Lakeside Drive and Waretown lines (Line Nos. J69361 and R144) which deliver power to the 480/208/120V Utility (JCP&L) Non-Vital Power System. The 480 Volt North Yard Outdoor 1E1 Unit Substation at Oyster Creek Nuclear Generating Station receives power from either line R144, which is the preferred line, or line J69361, the alternate source. The remaining system components are supplied through Line J69361 that provides power to the North Yard Loads.
The 480V unit substation 1E1 in turn supplies power to seven motor control centers which then provide 480V and by additional transformers the 208V and 120V loads of the system. Additionally, 480V loads directly off the unit substation supply the Torus Water Storage Tank Heaters, the North Guard House, and the New Radwaste Service Water Pumps.
The South Yard components including the Site Emergency Building are supplied thru J69360 and J67401.
Seven motor control centers are powered from the substation. The motor control centers auxiliaries are as follows:

a. Motor Control Centers 1E11 and 1E12 for Radwaste Building loads.
b. Motor Control Centers 1E13 and 1E14 for Offgas Building loads.
c. Motor Control Centers 1E15 for Boiler House loads.
d. Motor Control Centers 1E16 for New Sample Pumphouse loads.
e. Motor Control Centers 1E17 for Redundant Fire Pump House.

Each motor control center is isolable from the other motor control centers off the substation by 3 pole circuit breakers. Control power for the circuit breakers is 120V AC and is from the 3000A Bus feeder. The motor control centers then feed 480, 208 & 120V loads. Line breakers and thermal overload devices for motors and fuses isolate individual loads from the MCCs. Direct feeds off the substation are isolated by breakers and fuses with disconnect switches at the loads.

This system is in scope to support the redundant fire pump which is powered from MCC 1E17.

For additional detail, see UFSAR Section 8.2.1.2.

Reason for Scope Determination

The 480/208/120V Utility (JCP&L) Non-Vital Power System is not in scope under 10 CFR 54.4(a)(1) because no portions of the system are safety related or relied on to remain functional during and following design basis events. It is not in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system will not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The 4480/208/120V Utility (JCP&L) Non-Vital Power System meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48). The 4480/208/120V Utility (JCP&L) Non-Vital Power System is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for ATWS (10 CFR 50.62), environmental qualification (10 CFR 50.49), or SBO (10 CFR 50.63).

System Intended Functions

1. Relied upon 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). JCP&L Non-Vital Power is credited to support the redundant fire pump for safe shutdown due to fire. 10 CFR 54.4(a)(3)

UFSAR References

8.2.1.2

License Renewal Boundary Drawings

LR-BR-3000

2.5.1.7 480V AC System

System Purpose

The 480V AC System is an electrical distribution system designed to provide continuous electrical power necessary for plant operation, startup and shutdown.

The purpose of the 480V AC System is to distribute electrical power to the station auxiliaries, including safety related loads. The system accomplishes this electrical distribution function utilizing metal clad switchgear, step-down transformers, control and protective relays, current transformers, potential transformers, molded case circuit breakers, fuses, cable and cable connections.

Unit substations are provided to step down the 4.16 kV system voltage to 480 volts to supply the 480 Volt Distribution System. All the unit substations are fed from the 4.16 kV essential switchgear Bus Sections 1C and 1D through step-down transformers, and in turn supply power to the motor control centers, distribution panels and motors throughout the station.

There are six unit substations. The unit substations are located in pairs, and provide power to station auxiliaries as follows:
a. Unit Substations 1A1 and 1B1, in the Turbine Building basement.
b. Unit Substations 1A2 and 1B2, in the 480 Volt Switchgear Room.
c. Unit Substations 1A3 and 1B3, at the Intake Structure.

Each substation comprising a pair is physically separated from the other substation in the pair either by distance or by one hour rated fire walls.

Unit Substations 1A2 and 1B2 supply power to the vital loads. The step-down transformers in the Unit Substations are three phase, liquid filled transformers. The switchgear for each substation is in self supporting metal enclosed sections with continuous main buses having drawout units, which are replaceable under live bus conditions. Control power for the circuit breakers is 125 V dc and is from the station batteries of the same division as the safety related equipment being supplied with power.

Two vital motor control centers are provided for supplying power to vital instrumentation, reactor protection panels, critical isolation valves, vital lighting circuits, and the 125 V DC main battery chargers. These vital motor control centers are identified as Vital MCC 1A2 and Vital MCC 1B2, one each for Division A and Division B safety related loads. They are located in the 480 V Switchgear Room.

For additional detail, see UFSAR section 8.3.1.

Reason for Scope Determination

The 480V AC System is in scope under 10 CFR 54.4(a)(1) because it is a safety related system that is relied on to remain functional during and following design basis events. The 480V AC system is not required under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system would not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and 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) and station blackout (10 CFR 50.63). The 480V AC system is not required to demonstrate compliance with the Commission's regulations for ATWS (10 CFR 50.62).

System Intended Functions

1. Provide motive power to safety related components. 10 CFR 54.4(a)(1)
2. Relied upon 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). 10 CFR 54.4(a)(3)
3. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Station Blackout (10 CFR 50.63). 10 CFR 54.4(a)(3)
4. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Environmental Qualification (10 CFR 50.49). 10 CFR 54.4(a)(3)

UFSAR References

8.3.1

License Renewal Boundary Drawings

LR-BR-3000

2.5.1.8 Alternate Rod Injection System (ARI)

System Purpose

The Alternate Rod Injection (ARI) System is an electrical system which provides a method diverse from the Reactor Protection System (RPS) for depressurizing the Instrument (Control) Air System scram air header in the unlikely event the RPS does not cause a reactor scram in response to an operational transient.

The ARI System is comprised of two normally-de-energized solenoid blocking valves, in series, in the supply line to the scram air header, three normally de-energized solenoid vent valves at different locations in the scram air header piping, and associated power supplies, logic and controls.

ARI is initiated automatically if either of the following conditions occur:
1. Redundant high reactor pressure signals are received from the Nuclear Boiler Instrumentation System (NBIS)
2. Redundant low reactor water level signals are received from the NBIS

During normal reactor operation, the de-energized ARI block valves do not restrict the normal makeup air flow to the Instrument (Control) Air System scram air header. During a scram initiated by the RPS, the ARI valves are not in the vent flowpath for the scram air header.

When ARI is initiated, either manually or automatically, the two solenoid blocking valves close and the three solenoid vent valves open. This depressurizes the scram air header, causing the Control Rod Drive System scram valves to open and subsequent control rod insertion.

For additional information, see UFSAR Section 3.9.4.

Reason for Scope Determination

The Alternate Rod Injection (ARI) System is in scope of license renewal under 10 CFR 54.4(a)(3) because it is relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for ATWS (10 CFR 50.62).

The ARI System is not in scope under 10 CFR 54.4(a)(1) because no portions of the system are safety related or relied on to remain functional during and following a design basis event. The ARI System is not in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system will not prevent satisfactory accomplishment of functions identified in 10 CFR 54.4(a)(1). The ARI System is not in scope under 10 CFR 54.4(a)(3) because it is not relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commissions regulations for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49 or station blackout (10 CFR 50.63).

System Intended Functions

1. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Anticipated Transients Without Scram (10 CFR 50.62). Depressurize the scram air headers under conditions indicative of an Anticipated

Transient Without Scram. 10 CFR 54.4(a)(3)

UFSAR References

3.9.4.4
7.3
15.8

License Renewal Boundary Drawings

None

2.5.1.9 Grounding and Lightning Protection System

System Purpose

The plant Grounding and Lightning Protection System is an electrical system designed to provide a low impedence path to ground for fault currents and lightning strokes.

The purpose of the system is to ensure that local potential gradients developed during system ground faults are limited to safe and tolerable levels, to provide a zero potential difference between energized electrical equipment and nearby metallic components or structures in order to eliminate the electric shock hazard to personnel working in the area, to provide a ground fault return circuit in the event of an electrical equipment insulation failure, and to provide the least impedence path for the passage of lightning stroke current between the air terminals and ground.

The Grounding and Lightning Protection System is comprised of grounding cable, ground mats/ground bars, grounding rods, air terminals, preventor heads, and associated hardware and connectors. The system provides sufficient metal distribution in the earth to permit the dissipation of direct stroke of lightning without stroke current passing through the nonconducting parts of the building.

Reason for Scope Determination

The Grounding and Lightning Protection System is not in scope under 10 CFR 54.4(a)(1) because no portions of the system are safety related or relied on to remain functional during and following design basis events. The system is not in scope under 10 CFR 54.4(a)(2) because failure of the system will not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The system is in scope under 10 CFR 54.4(a)(3) because it is relied upon 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). The Grounding and Lightning Protection System is not relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for environmental qualification (10 CFR 50.49), ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Relied upon 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). 10 CFR 54.4 (a)(3)

UFSAR References

None

License Renewal Boundary Drawings

None

2.5.1.10 Intermediate Range Monitoring System

System Purpose

The Intermediate Range Monitor (IRM) System is an electrical instrumentation and logic system designed to provide the capability of monitoring the neutron flux and power in the reactor core, and of providing automatic core protection. The purpose of the IRM system is to measure core neutron flux within a range of approximately 0.0003% to 40% reactor power, which provides the operator with power level indication and generates rod block and scram signals. The IRM system accomplishes its purpose by utilizing a set of fission chamber detector instruments to generate current pulse signals which are then processed to indicate core power levels in the vicinity of each detector. The IRM system is in scope for license renewal, however the detector positioning portion of the system is not in scope.

The IRM system is comprised of eight fission chamber detectors, one for each of the eight IRM channels. Each detector is located in a dry tube (evaluated with the Reactor Internals system), and is positioned axially in the core by a detector drive mechanism located below the reactor vessel. The drive mechanism is actuated by a flexible shaft routed through the reactor support structure and powered by an electric motor mounted on the outside of the reactor pedestal structure. During use, the detectors are inserted into the core to an optimum elevation for proper indication of neutron flux. When not in use, the detector is withdrawn to an elevation below the core to maximize detector life. The drives are not required for the IRM system to perform its intended function, and consequently the drive assembly components are not in scope for license renewal.

The signal from each detector is processed through a preamplifier, amplifier and attenuator, inverter, mean square analog unit, and operational amplifier, which conditions the signal sufficiently to drive a recorder, meter, and the trip units. Each IRM channel has two dual channel trip units. These units are tripped by Inoperative, Downscale, Hi, or Hi-Hi conditions. Bypass switches may be positioned to bypass up to two IRM channels simultaneously. It is not possible to simultaneously bypass more than one channel in any core quadrant.

The IRM system generates annunciator alarms, rod blocks, and scram signals relative to nuclear instrumentation degraded operation, downscale, or upscale conditions.

Each IRM instrument is adjusted through 10 ranges during reactor power ascension by using the associated range switch. Use of IRM ranges provides core protection and allows for a reasonable rate of power increase by requiring that each IRM must be on scale (between downscale and high trip points) in order to obtain a control rod withdrawal permissive. If a second high level trip point (Hi-Hi) is reached, a half scram condition results. Simultaneous trips in both RPS channels will result in a full scram of the reactor.

The IRM system utilizes electrical power from the 24/48V Instrument Power DC System for the trip relays and high voltage power supplies for the IRM detectors, the 125V Station DC system for control power to the detector drives, and the 120VAC Vital Power System for power to the detector drives and recorders.

For more detailed information, see UFSAR section 7.5.1.8.

Reason for Scope Determination

The Intermediate Range Monitor System meets 10 CFR 54.4(a)(1) because it is a safety related system that is relied upon to remain functional during and following design basis events. It does not meet 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It does not meet the requirements of 10 CFR 54.4(a)(3) since it is not required to demonstrate compliance with the Commission's regulations for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49), ATWS (10 CFR 50.62), or station blackout (10 CFR 50.63).

The IRM detector drive assemblies, consisting of the drive mechanisms, flexible drive shafts, and motor assemblies function only to position the detectors and are not required for the IRM system to perform its intended function. Consequently the drive assembly components are not in scope for license renewal.

System Intended Functions

1. Sense process conditions and generate signals for reactor trip or engineered safety features actuation. 10 CFR 54.4(a)(1)

UFSAR References

7.5.1.8

License Renewal Boundary Drawings

None

2.5.1.11 Lighting System

System Purpose

The Lighting System is comprised of Normal Lighting & Convenience System (Outdoor Area Lighting, General Plant Lighting, Office Building Lighting), Emergency Lighting and Security Lighting.

The Normal Lighting & Convenience System throughout most of the plant and office areas is supplied by fluorescent lamps operating at 277 volts. Fixtures in most areas are fed partly from the "A" distribution system and partly from the "B" system. Outdoor areas are lighted by various types of fixtures mounted on structures and poles. Certain indoor areas where 277 volt power is not readily available are lighted with fluorescent or incandescent lamps operating at 120 volts. Exit lights are normally powered by 120 volt AC lines with automatic switchover to six volt lights, powered by local six volt rechargeable storage batteries.

In addition to the above, an incandescent lighting system supplied by the 125 volt dc battery system is available for lighting stairwells and halls when ac power fails. One dc lighting panel for Control Room lighting is provided. The panel is fed via an energized ac relay. Failure of relay coil voltage allows the relay to drop out and transfer feed to dc power. Battery operated emergency lanterns with extension cords are installed in corridors and other selected points.

The Emergency lighting in the control room is provided by a combination of in-plant lighting systems (AC lighting, Vital AC lighting and DC lighting) and battery units located outside the control room in adjacent fire area OB-FA-9 with remote lamps inside the control room. For a fire affecting OB-FA-9, the DC system may be rendered inoperable. Under these circumstances, the normal AC lighting system described above, backed with EDG power, is credited for illuminating the control room. Therefore the normal lighting system is within the scope of license renewal.

Emergency 8 hour battery operated lights are provided in vital plant areas (as required by Appendix R). (UFSAR 9.5.3) Outside lamps remotely connected to emergency lighting units inside adjacent buildings provide emergency lighting required for access/egress in yard area. No other outdoors lighting systems (i.e., security lighting) are relied upon for Appendix R.

The Security Lighting System was determined not to be in the scope of licensing renewal. The function of the Security Lighting System is not an intended function.

For additional detail, see USFAR section 9.5.3.

Reason for Scope Determination

The Lighting System is not in scope under 10 CFR 54.4(a)(1) because it is not relied on to remain functional during and following design basis events. The Lighting System is not required under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system would not prevent satisfactory accomplishment of 10 CFR 54(a)(1) functions. The Lighting system is in scope under 10 CFR 54.4(a)(3) because emergency lighting is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for station blackout (10 CFR 50.63). The Lighting system is also in scope under 10 CFR 54.4(a)(3) because emergency lighting and normal lighting are relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48). The Lighting System is not required to demonstrate compliance with the Commission's regulations for ATWS (10 CFR 50.62) or environmental qualification (10 CFR 50.49).

System Intended Functions

1. Relied upon 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). 10 CFR 54.4(a)(3)
2. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Station Blackout (10 CFR 50.63). 10 CFR 54.4(a)(3)

UFSAR References

9.5.3
8.3.1

License Renewal Boundary Drawings

None

2.5.1.12 Local Power Range Monitoring System/Average Power Range Monitoring System

System Purpose

The Local Power Range Monitor (LPRM) and Average Power Range Monitor (APRM) Systems are electrical instrumentation and logic systems designed to provide the capability of monitoring the neutron flux and power in the reactor core, and of providing automatic core protection. The purpose of the LPRM system is to detect local reactor power and generate signals proportional to the local neutron flux in order to drive indicating meters used for manual evaluation of core performance. The LPRM system also generates signals to annunciators which indicate high local flux or low detector reading, and generates rod withdrawal blocks. The LPRM system accomplishes its purpose by utilizing a set of fission chamber detector instruments to generate current pulse signals which are then processed to indicate core power levels in the vicinity of each detector. The purpose of the APRM system is to average the output signals from selected LPRM amplifiers, providing a continuous indication of reactor average power from a few percent to 150% rated power. The APRM system also actuates automatic protective actions when the APRM signals exceed preset values, including high power trip and rod block. The APRM system accomplishes its purpose by collecting and processing the signals from the LPRM detectors.

The LPRM system is comprised of 31 assemblies each containing four fission chamber detectors, arranged so as to form four horizontal planes throughout the core. Each of these moisture-proof, sealed assemblies is referred to as an LPRM “string.” These assemblies are located in enclosing tubes which are inserted into the core in spaces between the fuel bundles. The enclosing tubes extend through thimbles, or in-core housing guide tubes, which penetrate and are welded to the bottom of the reactor vessel. These thimbles extend down into the under-vessel access area where they terminate in flanges which mate to the flange of each incore detector assembly. Each enclosing tube contains the four fission chamber detectors and associated cables, and a calibration tube for the traversing probe (evaluated with the Traversing Incore Probe, or TIP system). The guide tubes and enclosing tubes are not included in the LPRM system boundary and are included with reactor vessel internals (evaluated with the Reactor Internals system). The LPRM system also includes the Flux Amplifier which consists of two identical dc amplifiers and two identical trip units. The trip units are tripped on signals corresponding to LPRM Upscale, or LPRM Downscale or Inoperative.

The power supply and monitor for the LPRM system supplies three regulated voltages to operate the flux amplifiers and their associated detectors. The monitoring circuit on the power supply provides the capability to monitor either the power supply or the flux amplifier outputs on the associated meter.

LPRM outputs are indicated on four control room meters associated with the detectors at a given radial core location. A light associated with each meter illuminates if the associated channel is upscale, downscale, or manually bypassed. Alarm annunciators are associated with the LPRM High, Downscale, or Inop conditions. A rod withdrawal block is generated when one of the LPRMs feeding an APRM channel indicates a downscale condition.

The APRM system is comprised of electronic equipment which averages the output signals from selected LPRM amplifiers, trip units which actuate automatic protective actions when

APRM signals exceed preset values, and signal readout equipment. This system provides continuous indication of average reactor power within the range of a few percent to 150% rated power. There are eight APRM channels – two per core quadrant. Each core quadrant is monitored by two different APRM channels, each of which is associated with a different channel of the Reactor Protection System (evaluated separately with the RPS). Each APRM channel normally averages the inputs of eight LPRM channels.

APRM high power scram and rod block set points are flow biased; that is, they vary with recirculation flow. To accomplish this, the APRM system receives recirculation flow signals to compare with APRM power level signals. Flow converters develop the flow signal outputs for use by individual APRM channels. Each flow converter module contains independent trip circuits which trip under Upscale, Inoperative, or Comparator Mismatch conditions. These conditions each generate alarms and rod withdrawal block signals provided as input to the Reactor Protection System and Reactor Manual Control System (evaluated separately with the RMCS). The Inoperative condition also generates a reactor half scram signal. Both flow converters must be tripped to produce a full scram.

Each channel of the APRM system incorporates input bypass switches, an input counting circuit, an averaging amplifier, a flow control reference card, trip units, and channel bypass switches. For various conditions of core power and flow outside predetermined limits, rod blocks, alarms, and scram signals are produced by the APRM system logic. Rod blocks are generated for IRM High with APRM Downscale in STARTUP and REFUEL modes, APRM Downscale in RUN mode, and APRM High or Inop in all modes. Reactor trip signals are generated for IRM High-High or Inop with APRM Downscale in RUN mode, and APRM High-High or Inop in all modes of operation.

Electrical power for the LPRM and APRM power supply and monitoring units is supplied from the RPS. Loss of power results in inability to monitor reactor power. The 120VAC vital power system provides power to the APRM recorder units.

For more detailed information, see UFSAR Section 7.5.1.8.

Reason for Scope Determination

The Local Power Range Monitor and Average Power Range Monitor Systems meet 10 CFR 54.4(a)(1) because they are safety related systems that are relied upon to remain functional during and following design basis events. They do not meet 10 CFR 54.4(a)(2) because failure of non-safety related portions of the systems could not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). They do not meet the requirements of 10 CFR 54.4(a)(3) since they are not required to demonstrate compliance with the Commission’s regulations for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49), ATWS (10 CFR 50.62), or station blackout (10 CFR 50.63).

System Intended Functions

1. Sense process conditions and generate signals for reactor trip or engineered safety features actuation. 10 CFR 54.4(a)(1)

UFSAR References

7.5.1.8
15.4

License Renewal Boundary Drawings

None

2.5.1.13 Offsite Power System

System Purpose

Offsite Power is an electrical distribution system designed to provide connections to OCNGS from the offsite electrical transmission system. The purpose of the Offsite Power System is to connect to the output of the OCNGS generator and to provide redundant sources of power to the power plant when the main generator is off line. It accomplishes this by employing a 230 kV substation and a connected 34.5 kV substation in a switchyard adjacent to the plant. To match voltages, transformers are utilized to connect the two substations to the Oyster Creek electrical systems.

The system is comprised of the two substations, switchyard equipment and the transformers, lines and associated equipment to connect Oyster Creek with the offsite electrical distribution system. Two 230 kV lines deliver power to and from Oyster Creek 230 kV substation and a third line normally delivers backup power to Atlantic Electric but can be utilized to deliver power to OCNGS for normal plant shutdown. The 230 kV substation is connected to the Oyster Creek generator output through the two Oyster Creek main transformers. The main generator is also connected to the plant electrical system through the auxiliary transformer that supplies the station electrical power during plant operation. The 230 kV substation is also connected to the Forked River combustion turbines. These turbines also provide Blackout Power to the station directly to the 4160V bus 1B through a separate Station Blackout (SBO) transformer (evaluated with the Station Blackout and Support System). Each of the 230 kV buses also feed the 34.5 kV substation.

The 34.5 kV substation has connections to six offsite power lines, three per bus and also the feeds from the 230 kV bus. It connects to the plants electrical power system through the start-up transformers and supplies the 480/208/120V Utility (JCP&L) Non-Vital Site Power System. The two buses of the 34.5 kV substation feed the start-up transformers, which connect to 4160V AC buses 1A & 1B. In the event both 34.5 kV buses are unavailable, the startup transformers can receive power directly from the Whitings Q121 offsite power line.

The system begins at the connections of the offsite electric transmission lines to the 230 kV and 34.5 kV Oyster Creek substations. The 230 kV substation is connected to the Oyster Creek generator output through the Oyster Creek main transformers and accepts power from the Forked River combustion turbines. The generator also connects to the plant 4160V AC System through the auxiliary transformer. Each of the 230 kV buses connects with a bus of the 34.5kV substation that supplies the 480/208/120V Utility (JCP&L) Non-Vital Site Power System. The system ends at the 34.5 kV Oyster Creek substation connection from the startup transformers to the plant 4160V AC System at switchgear breakers S1A, S1B and at the dilution plant bus switchgear and at the auxiliary transformer connection to the same 4160V AC System at breakers 1A and 1B. Not included in the scoping boundary of the Offsite Power System are the S1A, S1B, 1A and 1B switchgear breakers, which are evaluated with the 4160V AC System for license renewal scoping.

Not included in the Offsite Power System are the offsite electrical distribution system and the OCNGS 4160V AC, the Station Blackout and Support and the JCP&L Non-Vital Site Power systems. These OCNGS plant systems are separately evaluated as license renewal systems.

The portion of the Offsite Power System in scope for License Renewal starts at the disconnect switches (bus side) of the switchyard circuit breakers (banks 5 and 6) connecting the 34.5 kV Oyster Creek substation to OCNGS and continues through the startup transformers to the connection to switchgear breakers S1A and S1B of the plant 4160V AC buses. Additionally, the in scope portion for License Renewal consists of the disconnect switches (bus side) of the switchyard circuit breakers for J69361 Bus and R144 Bus connecting the 34.5 kV Oyster Creek substation to the disconnect switches of transformers 732-15 and 16 that feed the 480/208/120V Utility (JCP&L) Non-Vital Site Power System. It includes circuit breakers, disconnect switches, transformers, battery power supply (substation breakers and switches), protection devices, connectors and components.

For additional detail, see UFSAR Section 8.2.

System Operation

N/A

System Boundary

N/A

Reason for Scope Determination

The Offsite Power System is not in scope under 10 CFR 54.4(a)(1) because no portions of the system are safety related or relied on to remain functional during and following design basis events. It is not in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system will not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The Offsite Power System meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for fire protection (10 CFR 50.48) and SBO (10 CFR 50.63). The Offsite Power System is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for ATWS (10 CFR 50.62) or environmental qualification (10 CFR 50.49).

System Intended Functions

1. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Station Blackout 10 CFR 50.63. (Offsite power is credited for restoration of normal AC power following the SBO coping period. During the coping period Oyster Creek is supplied power by the Alternate AC source, the Forked River combustion turbines.) 10 CFR 54.4(a)(3)
2. Relied upon 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. (Offsite power is credited to support safe shutdown due to fire) 10 CFR 54.4(a)(3)

UFSAR References

8.2

License Renewal Boundary Drawings

LR-BR-3000

2.5.1.14 Post-Accident Monitoring System

System Purpose

Post Accident Monitoring is an electrical monitoring system whose purpose is to display and record plant parameters of Drywell radiation and pressure levels, Torus level and temperature and Safety/Relief Valve flow detection during and following a Loss Of Coolant Accident. The associated pressure retaining components are included in and evaluated by other License Renewal systems.

The system accomplishes its purpose by monitoring the drywell and suppression pool parameters and the safety relief valves position status during post accident plant conditions. This information is provided to the Control Room for indication and select parameters are recorded.

The Post Accident Monitoring System is comprised of Containment High Range Radiation Monitors, Safety Valve and Relief Valve Accident Monitoring Instrumentation, Suppression Pool Temperature and Water Level Monitoring, and Containment Pressure Indication. Redundancy is provided for all monitored parameters.

Containment High Range Radiation Monitors

Two high range radiation monitors are installed within the drywell, with readouts in the Control Room. These monitors provide the capability to monitor radiation levels in the drywell, and the signal from these monitors isolate the drywell ventilation on a high radiation reading.

Safety Valve and Relief Valve Accident Monitoring Instrumentation

The purpose of the safety/relief valve accident monitoring instrumentation is to alert the operator to a stuck open safety or relief valve. The primary detectors are acoustic monitors with thermocouples providing backup capability. Additional plant parameters including reactor pressure and suppression pool temperature provide the safety grade information to the operators so action in response to these symptoms can be taken.

Suppression Pool Temperature Monitoring

Two redundant suppression pool temperature monitoring channels are provided, each consisting of six dual element RTD temperature sensors located within thermowells. The thermowells extend in through the Torus shell (evaluated with Primary Containment). These signal loops compute bulk water temperature for display and alarm on a Main Control Room Panel.

Torus Water Level

Two wide range redundant Torus water level measuring loops are provided, each consisting of

a differential pressure transmitter, digital indicator and recorder. The transmitter sensing lines are connected to the Torus (evaluated with Containment Vacuum Breakers). The digital recorders and indicators are located in the Control Room. This instrumentation performs no automatic protective functions, but provides safety related indication for LOCA and post LOCA conditions.
Two narrow range torus water level measuring loops are provided, each consisting of a differential pressure transmitter, power supply and indicator. Additionally, a recorder in provided for one loop. The transmitters are located in the Reactor Building and the indicators and recorder are located in the Control Room.

Containment Pressure

Two redundant containment pressure measuring loops are provided, each consisting of a pressure transmitter and recorder. The transmitters are located in the Reactor Building and indication and recorders are located in the Control Room. This instrumentation performs no automatic protective functions, but provides safety related indication for LOCA and post LOCA conditions.

The Post Accident Monitoring System begins at the electrical radiation detectors, level transmitters, pressure transmitters, temperature elements and acoustic monitors and continue through the associated circuitry that provide indication of, alarms to and records accident and post accident plant parameters in the Control Room. Not included in the scoping boundary of the Post Accident Monitoring System is the pressure retaining components for monitoring Torus temperature which are evaluated with the Primary Containment structure and Torus water level which are evaluated with Containment Vacuum Breakers system for license renewal.

The Post Accident Monitoring System components for the Containment High Range Radiation Monitors, Suppression Pool Temperature and Water Level Monitoring, and Containment Pressure Indication support system intended functions and are included within the scope of license renewal. The Safety Valve and Relief Valve Accident Monitoring Instrumentation and the narrow range Torus Water Level components associated with the Post Accident Monitoring System are not required to support intended functions. This portion of the Post Accident Monitoring System is not included within the scope of license renewal.

For more detailed information, see UFSAR Section(s) 5.2.2.4.2.2, 7.6.1.4, 11.5.2.13 and 12.3.4.1.5.

Reason for Scope Determination

The Post-Accident Monitoring System is in scope under 10 CFR 54.4(a)(1) because portions of the system are safety related and relied on to remain functional during and following design basis events. The Post-Accident Monitoring System is not in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system will not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The system meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for Equipment Qualification (10 CFR 50.49) and for Fire Protection (10 CFR 50.48). The Post-Accident Monitoring System is not relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for ATWS (10 CFR 50.62) or Station Blackout (10 CFR 50.63).

System Intended Functions

1. Sense process conditions and generate signals for reactor trip or engineered safety features actuation. (Drywell ventilation is isolated on high radiation level. Safety grade indication of Drywell radiation and pressure, Torus level and temperature are provided.) 10 CFR 54.4(a)(1)
2. Relied upon 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). (Torus level and temperature indication are provided for Fire Safe Shutdown.) 10 CFR 54.4(a)(3)
3. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Environmental Qualification (10 CFR 50.49). (Drywell radiation and pressure, Torus level and temperature and Safety Relief Valves Acoustic Monitoring are environmentally qualified.) 10 CFR 54.4(a)(3)

UFSAR References

1.9
5.2.2.4.2.2
7.6.1.4
11.5.2.13
12.3.4.1.5

License Renewal Boundary Drawings

None

2.5.1.15 Radio Communications System

System Purpose

The Radio Communications System is an electrical system designed to provide two-way voice communication between operations personnel operating safe shutdown equipment during a fire emergency and Station Blackout. The Radio Communications System accomplishes this by providing the operators with two-way portable radio units supported by repeaters and antennas.

The Radio Communication System is comprised of primary and installed spare base station transmitter-repeaters located in the upper cable spreading room, portable radio units with batteries and chargers stored in the control room, and antennas with associated cabling located at selected locations in the reactor building and turbine building. The individual portable radios also have a direct mode (talk-around) feature that provides direct communication between radios without utilizing repeaters. Electrical power for the primary base station transmitter and repeater is supplied from the 120VAC Vital Power System.

Reason for Scope Determination

The Radio Communications System meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for fire protection (10 CFR 50.48) and Station Blackout (10 CFR 50.63).

The system does not meet 10 CFR 54.4(a)(1) because it is not safety related or relied on to remain functional during and following design basis events. The system does not meet 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system would not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The system is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for Environmental Qualification (10 CFR 50.49) or ATWS (10 CFR 50.62).

System Intended Functions

1. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commissions regulations for Fire Protection (10 CFR 50.48) (10 CFR 54.4(a)(3)).
2. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commissions regulations for Station Blackout (10 CFR 50.63) (10 CFR 54.4(a)(3)).

UFSAR References

None

License Renewal Boundary Drawings

None

2.5.1.16 Reactor Overfill Protection System (ROPS)

System Purpose

The Reactor Overfill Protection System (ROPS) is an electrical instrumentation and logic system designed to minimize the potential for overfilling the reactor to the elevation of the main steam lines. If the water level in the reactor vessel were to exceed the height of the main steam lines, the resulting condition could result in main steam line break due to water-filled dead weight and potential seismic loads, excessive piping loads from water hammer due to rapid steam void collapse, or potential malfunction of MSIVs, safety valves, turbine stop valves, or turbine bypass valves from the effects of water or two-phase flow. The purpose of the ROPS is to provide backup automatic reactor vessel overfill protection to mitigate main feedwater overfeed events. The ROPS accomplishes this purpose by utilizing existing reactor vessel level sensors used by the Reactor Protection System (RPS evaluated with the Reactor Protection System) in a one-out-of-two-twice logic to trip all three feedwater pumps on reactor high level, provided the total feedwater flow is not below a prescribed rate and the system is not manually bypassed for testing.

The ROPS is comprised of signals from four level sensors currently used in the RPS, a signal from a total feedwater flow instrument, and electrical components and controls necessary for its operation. A normal/bypass switch is located on the control room panel, and is placed in bypass for periodic testing of the feedwater pump trip logic. The low feedwater flow interlock automatically bypasses the ROPS when its operation is unnecessary due to feedwater flow being reduced to below a prescribed rate by automatic or operator action. The one-out-of-two-twice reactor vessel level logic assures that a common mode failure of the level sensors associated with a sensing line malfunction will not spuriously initiate the ROPS. Alarms are provided in the control room for signaling ROPS A level sensors actuation, ROPS B level sensors actuation, or ROPS bypassed.

The ROPS is a regulatory-required backup protection system to the Reactor Level and Feedwater Control System (evaluated with the Feedwater System), and is totally independent from the Feedwater Control System as required by the implementing USNRC Generic Letter 89-19.

For more detailed information, see UFSAR section 7.7.1.6.

Reason for Scope Determination

The Reactor Overfill Protection System meets 10 CFR 54.4(a)(1) because it is a safety-related system that is relied upon to remain functional during and following design basis events. It does not meet 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system could not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). It does not meet the requirements of 10 CFR 54.4(a)(3) since it is not required to demonstrate compliance with the Commission’s regulations for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49), ATWS (10 CFR 50.62), or station blackout (10 CFR 50.63).

System Intended Functions

1. Provide motive power to safety related components. The ROPS utilizes input from RPS and

therefore has a direct interface with safety-related RPS instruments for determination of reactor level. ROPS is in scope for license renewal in that failure of ROPS components could adversely affect the safety related RPS system. 10 CFR 54.4(a)(1)

UFSAR References

7.7.1.6

License Renewal Boundary Drawings

None

2.5.1.17 Reactor Protection System

System Purpose

The Reactor Protection System is an electrical logic system designed to furnish signals to trip the reactor and to initiate certain Engineered Safety Feature (ESF) Systems. The purpose of Reactor Protection System action is to prevent fuel damage, limits steam pressure, and prevent or restrict the release of radioactive materials. The system accomplishes this purpose by sensing plant parameters and generating reactor trip, isolation and ESF actuation signals when sensed parameters exceed pre-established limits.

The RPS system protection and initiation actions include but are not limited to the following:

Reactor Trip
Rod Withdrawal Block
Core Spray Cooling Initiation
Reactor Vessel Isolation
Primary Containment Isolation
Standby Gas Treatment System Initiation
Secondary Containment Isolation
Isolation Condenser Initiation
Turbine Trip
Recirculation Pump Trip
Offgas System Isolation

The Reactor Protection System (RPS) is comprised of dual logic channels. Each channel has an independent source of ac power, fail safe design and high reliability in initiating protective actions and preventing spurious trips. Each independent logic channel has two subchannels of tripping devices, thus the system has a total of four independent subchannels. There are some exceptions to this logic scheme, such as the logic associated with the main condenser low vacuum scram. Other exceptions are described in UFSAR Section 7.2.1.1.2.

The RPS power is supplied through two independent vital buses from Protection System Panels No. 1 and 2. The normal power supply to Protection System Panel No. 1 is from 4160 volt bus 1A to 4160 volt emergency bus 1C, then through a transformer to 480 volt substation 1A2 to M-G set 1-1 which supplies 120 volt single phase power to the Protection System Panel. The normal power supply to Protection System Panel No. 2 is from 4160 volt bus 1B to 4160 volt emergency bus 1D, then through a transformer to 480 volt substation 1B2 to M-G set 1-2 which supplies 120 volt single phase power to the Protection System Panel. The motor generator set is equipped with a flywheel to provide inertial smoothing of switching transients upstream of the motor.

An alternate source of power is available to either channel of the RPS when a motor generator set is out of service. This source takes power from either vital motor control center 1A2 or 1B2 at 480 volts ac, steps the voltage down to 115 volts, and supplies power to either Protection System Panel 1 or 2 by means of selector switches in the Control Room. If normal ac power to the RPS M-G set is lost, emergency power is supplied from the Emergency Diesel Generators, which feed motor control centers 1A2 and 1B2.

The 120V AC power sources to the RPS Protection System Panels 1 and 2 are from the 120V AC Vital Power System. The 120V AC Vital Power System also includes the M-G sets. The 120V AC Vital Power System is evaluated as its own license renewal system, and the associated components are not included in the evaluation boundary of the RPS system scoping.

The 125V DC power sources to the Reactor Protection System are provided by 125V DC Battery B through 125V DC Power Panel D, and by 125V DC Battery C through 125V DC Power Panel F. The 125V Station DC System is evaluated as its own license renewal system, and the associated components are not included in the evaluation boundary of the RPS system scoping.

For additional details, see UFSAR Sections 7.2 and 7.3.

Reason for Scope Determination

The Reactor Protection system is in scope under 10 CFR 54.4(a)(1) because it is a safety related system that is relied on to remain functional during and following design basis events. The Reactor Protection system is not required under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system would not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for fire protection (10 CFR 50.48). The Reactor Protection system is not required to demonstrate compliance with the Commission's regulations for ATWS (10 CFR 50.62), environmental qualification (10 CFR 50.49) or station blackout (10 CFR 50.63).

System Intended Functions

1. Sense process conditions and generate signals for reactor trip or engineered safety features actuation. 10 CFR 54.4(a)(1)
2. Relied upon in safety analyses or plant evaluations to perform to a function that demonstrates compliance with the Commission’s regulations for Fire Protection. 10 CFR 54.4(a)(3).

UFSAR References

7.2
7.3

License Renewal Boundary Drawings

None

2.5.1.18 Remote Shutdown System

System Purpose

The Remote Shutdown System is provided to enable the operators to achieve and maintain hot and cold shutdown if it becomes necessary to evacuate the control room. The Remote Shutdown System is comprised of a remote shutdown panel and several local shutdown panels located outside the control room.

The remote shutdown panel includes controls and indication to assure safe shutdown and cooldown of the reactor in the event of fire causing evacuation of the Control Room or loss of Control Room function due to damage in the cable spreading rooms. Isolation Condenser "B" is utilized for decay heat removal and reactor cooldown to establish a safe shutdown condition. The remote shutdown panel includes instrumentation for monitoring reactor pressure and level, and also indicating lights for monitoring the status of the local shutdown panels. The remote shutdown panel is activated through transfer switches which are keylocked and alarmed in the Control Room to prevent inadvertent actuation.

Local shutdown panels are provided for local control of other safety related equipment important for achieving and maintaining safe shutdown. There are six local shutdown panels that provide local control capability for various pumps, breakers, valves, ventilation systems, and an emergency diesel generator.

For additional details see UFSAR Section 9.5.1 and 3.1.15.

Reason for Scope Determination

The Remote Shutdown System is in scope under 10 CFR 54.4(a)(1) because it is a safety related system that is relied on to remain functional during and following design basis events. The Remote Shutdown System is not required under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system would not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54(a)(1). It also meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and 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) and Station Blackout (10 CFR 50.63). The Remote Shutdown System is not required to demonstrate compliance with the Commission's regulations for ATWS (10 CFR 50.62).

System Intended Functions

1. Sense process conditions and generate signals for reactor trip or engineered safety features actuation. The Remote Shutdown System allows operators to monitor critical plant parameters and achieve and maintain safe shutdown from outside the control room. 10 CFR 54.4(a)(1)
2. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commissions regulations for Fire Protection (10 CFR 50.48). The Remote Shutdown System allows for safe shutdown from outside the control room by transferring control to local shutdown panels and monitoring local shutdown panel status. 10 CFR 54.4(a)(3)
3. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Environmental Qualification (10 CFR 50.49)

10 CFR 54.4(a)(3)

4. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for Station Blackout (10 CFR 50.63) 10 CFR 54.4(a)(3)

UFSAR References

9.5.1
3.1.15

License Renewal Boundary Drawings

None

2.5.1.19 Station Blackout System

System Purpose

The Station Blackout (SBO) System at Oyster Creek is an electrical supply system that provides Alternate AC (AAC) power to Oyster Creek Nuclear Generating Station (OCNGS) for the regulated event of loss of all AC power (10 CFR 50.63 - Station Blackout). The source of electrical power to the SBO system is the Forked River Combustion Turbines power plant, an electrical power plant that is owned, operated and maintained by FirstEnergy and designed for peak loading to the grid. The Forked River Combustion Turbines (FRCTs) are made available by FirstEnergy to provide power during a station blackout event, in accordance with an Interconnection Agreement and supplemental Station Blackout Agreement with AmerGen. The Oyster Creek commitments for compliance with the station blackout rule, including the FRCT Alternate AC power source, was reviewed and approved by the NRC in their Safety Evaluation enclosed with NRC letter dated August 13, 1991, and Supplemental Safety Evaluation enclosed with NRC letter dated February 12, 1992.

The purpose of the Station Blackout System is to independently provide sufficient power to energize all equipment required to achieve and maintain the plant in a safe shutdown condition following a station blackout event. The FRCTs, which are located adjacent to the Oyster Creek switchyard, are designed to be available within one hour of the onset of a station blackout event, and provide adequate Alternate AC power for the duration of the event. Recovery from the station blackout event is complete upon restoration of normal offsite AC power from the Offsite Power System.

System Operation

The SBO System is comprised of the Forked River Combustion Turbines power plant and associated electrical connection to OCNGS. The connection between OCNGS and the FRCTs utilizes an independent connection diverse from the normal connection to the regional transmission grid. The routing is through a dedicated underground ductbank to the load break switches and SBO transformer located on site, and then through a cable trench to the switchgear breaker connection to the 4160V AC Bus 1B. In the event of a Station Blackout at OCNGS, one of the combustion turbines is disconnected from the regional transmission system, connected to the OCNGS SBO transformer by closure of appropriate load break switches and breakers, started and operated to provide AC power to OCNGS to cope with the station blackout. The SBO transformer, control panel, load break switches and the switchgear circuit breakers are dependant upon the 125V Station DC System.

System Boundary

The Station Blackout System boundary begins at the Forked River Combustion Turbines power plant, and continues through the output breakers, through the underground duct bank to the load break switches, the SBO transformer, and ends at the switchgear circuit breaker that connects to the OCNGS 4160V AC System. It includes the Forked River Combustion Turbines power plant, circuit breakers, load break switches, transformers, relays, control switches, cables, conduits, connectors and miscellaneous components.

Not included within the scope of the Station Blackout System are the 4160V AC, 125V Station DC and Offsite Power Systems, which are separately evaluated as license renewal systems. Portions of the Offsite Power System are used to recover from a station blackout event and restore normal power, as further described in the Offsite Power System scoping discussion in LRA Section 2.5.1.13. Also not included in the scoping boundary are the underground duct bank, cable trench, conduits and manholes for the cables and the foundations for the switchgears, transformer and load break switches which are evaluated with structures in Section 2.4.

For additional detail, see UFSAR Section 8.3.4 and 15.9.

Reason for Scope Determination

The Station Blackout System is not in scope under 10 CFR 54.4(a)(1) because no portions of the system are safety related or relied on to remain functional during and following design basis events. It is not in scope under 10 CFR 54.4(a)(2) because failure of non-safety related portions of the system will not prevent satisfactory accomplishment of function(s) identified for 10 CFR 54.4(a)(1). The Station Blackout System meets 10 CFR 54.4(a)(3) because it is relied upon in the safety analyses and plant evaluations to perform a function that demonstrates compliance with the Commission’s regulations for SBO (10 CFR 50.63). The Station Blackout System is not relied upon in any safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulation for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49). or ATWS (10 CFR 50.62).

System Intended Functions

1. Relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission’s regulations for Station Blackout (10 CFR 50.63). (Provides AAC power for SBO coping period.) 10 CFR 54.4(a)(3)

UFSAR References

8.3.4
15.9

License Renewal Boundary Drawings

LR-BR-3000

Table 2.5.1.19 Station Blackout System
Components Subject to Aging Management Review

Component Type	Intended Functions
Combustion Turbine Power Plant	See Section 2.5.1.19

The aging management review results for these components are provided in
Table 3.6.2.1.2 Station Blackout System
-Summary of Aging Management Evaluation

2.5.2 ELECTRICAL COMMODITY GROUPS

2.5.2.1 Identification of Electrical Commodity Groups

The first step of the screening process for electrical components involved using plant documentation to identify the electrical component types within the electrical, mechanical and civil/structural systems based on plant design documentation, drawings, the CRL, and by interfacing with the parallel mechanical and civil screening efforts. These component types were grouped into a smaller set of electrical commodity groups identified from a review of NEI 95-10 Appendix B, NUREG-1801 and information from previous License Renewal applications. The electrical commodity groups identified at Oyster Creek are listed in the table below. This list includes all electrical commodity groups listed in NEI 95-10 Appendix B in addition to commodity groups added per NUREG-1801 or unique to Oyster Creek.

ELECTRICAL COMMODITY GROUPS FOR SYSTEMS AND STRUCTURES

Alarm Units	High Voltage Insulators	Regulators	Transmission Conductors & Connections
Analyzers	Indicators	Relays	Uninsulated Ground Conductors
Annunciators	Insulated Cables & Connections	Detectors (RTDs, etc.)	Wooden Utility Poles
Batteries	Inverters	Sensors	Cable Connections (metallic parts)
Chargers	Isolators	Solenoid Operators	
Circuit Breakers	Light Bulbs	Signal Conditioners	
Converters	Load Centers	Solid State Devices	
Communication Equipment	Loop Controllers	Splices	

Electrical Controls and Panel Internal Component Assemblies	Meters	Surge Arresters	
Electrical Penetrations	Motor Control Centers	Switches	
Elements	Motors	Switchgear	
Fuses	Phase Bus	Switchyard Bus	
Fuse Holders (NUREG 1801)	Power Distribution Panels	Terminal Blocks	
Generators	Power Supplies	Thermocouples	
Heat Tracing	Radiation Monitors	Transducers	
Heaters	Recorders	Transmitters	

2.5.2.2 Application of Screening Criterion 10 CFR 54.21(a)(1)(i) to the Electrical Commodity Groups

Following the identification of the electrical commodity groups, the criteria of 10 CFR 54.21(a)(1)(i) were applied to identify commodity groups that perform their intended functions without moving parts or without a change in configuration or properties. The following electrical component commodity groups were determined to meet the screening criteria of 10 CFR 54.21(a)(1)(i).

- Cable Connections (Metallic Parts)
- Electrical Penetrations
- Fuse Holders
- High Voltage Insulators
- Phase Bus
- Insulated Cables and Connections
- Splices
- Switchyard Bus
- Terminal Blocks
- Transmission Conductors and Connections
- Uninsulated Ground Conductors
- Wooden Utility Poles

2.5.2.3 Elimination of Commodity Groups With No License Renewal Intended Functions

The following electrical commodity groups were eliminated for the reasons stated:

- Phase Bus exists only in the Main Generator and Auxiliaries System. That system has no electrical intended functions and is in scope for 10 CFR 54.4(a)(2) systems interaction only. Because the phase bus contains no fluid, it has no license renewal intended functions.
- Switchyard Bus was eliminated because none perform a license renewal intended function. Rather, transmission conductors, high voltage insulators and insulated cables and connectors perform the functions of providing offsite power to cope with and recover from regulated events.

2.5.2.4 Application of Screening Criterion 10 CFR 54.21(a)(1)(ii) to Electrical Commodity Groups

The 10 CFR 54.21(a)(1)(ii) screening criterion was applied to the specific component commodity groups that remained following application of the 10 CFR 54.21(a)(1)(i) criterion. 10 CFR 54.21(a)(1)(ii) allows the exclusion of those component commodity groups that are subject to replacement based on a qualified life or specified time period. The only electrical components identified for exclusion by the criteria of §54.21(a)(1)(ii) are electrical components included in the Oyster Creek Environmental Qualification (EQ) Program. This is because electrical components included in the EQ Program have defined qualified lives and are replaced prior to the expiration of their qualified lives. No electrical components within the Oyster Creek EQ Program are subject to aging management review (AMR) in accordance with the screening criteria of §54.21(a)(1)(ii). Therefore, the electrical components in the EQ Program were screened out. See Section 4.4 for the TLAA evaluation of the Oyster Creek EQ Program.

The remaining commodity groups, all or part of which are not in the EQ Program, require an AMR. These commodity groups are discussed below.

2.5.2.5 Electrical Commodity Groups Subject to Aging Management Review

The electrical commodity groups subject to aging management review are identified in Table 2.5.2, along with the associated intended functions. These electrical commodity groups are further described below.

2.5.2.5.1 Insulated Cables and Connections

The insulated cables and connections commodity group was broken down for aging management review of insulation into subcategories based on their treatment in NUREG 1801:

- Insulated Cables and Connections
- Insulated Cables and Connections Used In Instrumentation Circuits
- Insulated Inaccessible Medium Voltage Cables

The types of connection insulation included in this review include splices, connectors and terminal blocks. Fuse holders were reviewed separately.

Numerous insulated cables and connections are included in the EQ Program and, therefore, are not subject to an aging management review in accordance with the screening criteria of 10 CFR 54.21(a)(1)(ii). Insulated cables and connections not included in the EQ Program meet the criterion of 10 CFR 54.21(a)(1)(ii) and are subject to an aging management review.

Insulated cables and connections inside the enclosure of an active device (e.g., motor leads and connections, and cables and connections internal to relays, chargers, switchgear, transformers, power supplies, etc.) are maintained along with the other subcomponents and piece-parts inside the enclosure and are not subject to aging management review.

2.5.2.5.2 Electrical Penetrations

The electrical portions of many Oyster Creek electrical penetration assemblies are included in the EQ Program and, therefore, do not meet the criterion of 10 CFR 54.21(a)(1)(ii) and are not subject to an aging management review. The electrical portions of those electrical penetrations which are not included in the EQ Program meet the screening criterion of 10 CFR 54.21(a)(1)(ii) and are subject to an aging management review. The electrical insulation within the penetration assembly was reviewed as well as the epoxy potting compound that provides the sealing function. Insulated cable pigtails are considered part of the Insulated Cables and Connectors commodity group. Metallic portions of the electrical penetrations are considered part of the Primary Containment structure.

2.5.2.5.3 High Voltage Insulators

High voltage insulators are provided on the circuits used to supply power from the switchyard to plant buses during recovery from a station blackout or fire protection event and are not included in the EQ program. Therefore, high voltage insulators meet the screening criterion of 10 CFR 54.21(a)(1)(ii) and are subject to an aging management review.

2.5.2.5.4 Transmission Conductors and Connections

Transmission conductors provide a portion of the circuits used to supply power from the switchyard to plant buses during recovery from a station blackout or fire protection event and are not included in the EQ program. Therefore, transmission conductors meet the screening criterion of 10 CFR 54.21(a)(1)(ii) and are subject to an aging management review.

2.5.2.5.5 Fuse Holders

Fuse holders not included in the EQ Program comprise this commodity group. Both the metallic and non-metallic portions of fuse holders not included in the EQ Program meet the screening criterion of 10 CFR 54.21(a)(1)(ii) and are subject to an aging management review.

2.5.2.5.6 Wooden Utility Poles

Wooden utility poles did not fit within an existing electrical commodity group, so separate commodity group was created. Utility poles provide structural support for transmission conductors, high voltage insulators and other active electrical components that supply power from the switchyard to plant buses during recovery from a station blackout or fire protection event and are not included in the EQ Program. Therefore, wooden utility poles meet the screening criterion of 10 CFR 54.21(a)(1)(ii) and are subject to an aging management review.

2.5.2.5.7 Cable Connections (Metallic Parts)

The Cable Connections commodity group includes the metallic portions of cable connections that are not included in the EQ Program. The metallic connections evaluated include splices, threaded connectors, compression-type termination lugs and terminal blocks.

2.5.2.5.8 Uninsulated Ground Conductors

The uninsulated ground conductors commodity group is comprised of grounding cable and associated connectors.

Table 2.5.2 Electrical Commodity Groups
Components Subject to Aging Management Review

Component Type	Intended Functions
Cable Connections (Metallic Parts)	Electrical Continuity
Electrical penetrations	Electrical Continuity (pigtails)
	Pressure Boundary
Fuse Holders	Electrical Continuity
	Insulation - Electrical
High Voltage Insulators	Insulation - Electrical
Insulated cables and connections	Electrical Continuity
Insulated cables and connections in instrumentation circuits	Electrical Continuity
Insulated inaccessible medium-voltage cables	Electrical Continuity
Transmission conductors and connections	Electrical Continuity
Uninsulated Ground Conductors	Electrical Continuity
Wooden Utility Poles	Structural Support

The aging management review results for these components are provided in
Table 3.6.2.1.1 Electrical Commodity Groups
-Summary of Aging Management Evaluation

Continue To Next Page