Seabrook Station
License Renewal Application

NEXTera ENERGY SEABROOK

VOLUME I

LICENSE RENEWAL APPLICATION

NEXTERA ENERGY SEABROOK, LLC, ET AL.*

DOCKET NO. 50-443

SEABROOK STATION, UNIT NO. 1

FACILITY OPERATING LICENSE No. NPF-86

* NextEra Energy Seabrook, LLC, is authorized to act as agent for the: Hudson Light & Power Department, Massachusetts Municipal Wholesale Electric Company, and Taunton Municipal Lighting Plant and has exclusive responsibility and control over the physical construction, operation and maintenance of the facility.

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ADMINISTRATIVE INFORMATION

1.0 ADMINISTRATIVE INFORMATION

Pursuant to Title 10, Part 54, of the *Code of Federal Regulations* (10 CFR 54), *"Requirement for Renewal for Operating Licenses for Nuclear Power Plants"*, this application seeks renewal for an additional 20-year term of the NextEra Energy Seabrook, LLC facility operating license for Seabrook Station Unit 1.

Operating license (NPF-86) currently expires at midnight, March 15, 2030. This application includes renewal of the source, special nuclear and byproduct materials licenses that are combined in the facility operating license. The application is based on the guidance provided by the U. S. Nuclear Regulatory Commission (NRC) in NUREG-1800, *"Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants"* and Regulatory Guide 1.188, *"Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses"* which endorses the guidance provided by NEI 95-10, *"Industry Guideline for Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule"*.

The license renewal application (LRA) is intended to provide sufficient information for the NRC to complete its technical and environmental reviews pursuant to 10 CFR Part 54 *"Requirement for Renewal for Operating Licenses for Nuclear Power Plants"* and 10 CFR Part 51, *"Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions"*. The LRA is provided to meet the standards required by 10 CFR 54.29 in support of the issuance of a renewed operating license for Seabrook Station Unit 1.

1.1 GENERAL INFORMATION

The following is general information required by 10 CFR 54.17 and 10 CFR 54.19.

1.1.1 NAME OF APPLICANT

NextEra Energy Seabrook, LLC (NextEra Energy Seabrook)

NextEra Energy Seabrook owns 88.2% of Seabrook Station. The remaining portion is owned by the following municipal utilities in Massachusetts: Massachusetts Municipal Wholesale Electric Company, Taunton Municipal Lighting Plant, and Hudson Light & Power Department. NextEra Energy Seabrook, LLC is a subsidiary of FPL Group, Inc. based in Juno Beach, Florida. NextEra Energy Seabrook is the licensed operator of Seabrook Station Unit 1.

1.1.2 ADDRESSES OF APPLICANTS

Owner's Address

NextEra Energy Seabrook, LLC
700 Universe Boulevard
Juno Beach, FL 33408-0420

Other Owners and Addresses

Massachusetts Municipal Wholesale Electric Company
Moody Street, P.O. Box 426
Ludlow, MA 01056

Taunton Municipal Lighting Plant
55 Weir Street
Taunton, MA 02780

Hudson Light & Power Department
49 Forest Avenue
Hudson, MA 01749

Address of the Site

Seabrook Station
NextEra Energy Seabrook, LLC
626 Layfayette Road
Seabrook, NH 03874

1.1.3 DESCRIPTION OF BUSINESS OF APPLICANT

NextEra Energy Seabrook is engaged principally in the business of generating electricity for sale on the wholesale market.

1.1.4 LEGAL STATUS AND ORGANIZATION

NextEra Energy Seabrook, a Delaware limited liability company, is a direct, wholly owned subsidiary of ESI Energy, LLC, which is a direct, wholly-owned subsidiary of NextEra Energy Resources, LLC. NextEra Energy Resources, LLC is in turn, a direct-wholly owned subsidiary of FPL Group Capital, Inc, which is a direct wholly-owned subsidiary of FPL Group. FPL Group is a public utility holding company incorporated in 1984 under the laws of the state of Florida. NextEra Energy Seabrook is not owned, controlled, or dominated by any alien, foreign corporation, or foreign government. NextEra Energy Seabrook makes this application on their own behalf and on behalf of the other co-owners and is not acting as an agent or representative of any other person. All persons listed are United States citizens. NextEra Energy Seabrook does not have a Board of Directors.

NextEra Energy Seabrook is authorized to act as agent for Massachusetts Municipal Wholesale Electric Company, Taunton Municipal Lighting Plant and Hudson Light & Power Department and has exclusive responsibility and control over the physical construction, operation and maintenance of the facility.

NextEra Energy Seabrook – Principal Officers

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Assistant Secretary
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Assistant Treasurer
700 Universe Boulevard
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Massachusetts Municipal Wholesale Electric Company - Officers

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President and General Manager
c/o Nancy A. Brown
Moody Street, P.O. Box 426
Ludlow, MA 01056

Ronald C. DeCurzio
Chief Executive Officer,
Chief Financial Officer and Secretary
Moody Street, P.O. Box 426
Ludlow, MA 01056

James B. Kline
Treasurer
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Ludlow, MA 01056

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Nancy A. Brown
Assistant Secretary
Moody Street, P.O. Box 426
Ludlow, MA 01056

Kelly R. Joyce
Assistant Treasurer
Moody Street, P.O. Box 426
Ludlow, MA 01056

Taunton Municipal Lighting Plant – Commissioners

Peter H. Corr
Chairman
55 Weir Street
Taunton, MA 02780

David Westcoat
Secretary
55 Weir Street
Taunton, MA 02780

Joseph Martin
Commissioner
55 Weir Street
Taunton, MA 02780

Hudson Light & Power Department – Board

Joseph J. Marinelli
Chairman
49 Forest Avenue
Hudson, MA 01749

Paul Huehmer
Clerk
49 Forest Avenue
Hudson, MA 01749

Roland L. Plante
Board Member
49 Forest Avenue
Hudson, MA 01749

1.1.5 CLASS AND PERIOD OF LICENSE SOUGHT

NextEra Energy Seabrook requests renewal of the Class 103 operating license for Seabrook Station (Facility Operating License NPF-86) for a period of 20 years beyond the expiration of the current license. This would extend the operating license from midnight, March 15, 2030, to midnight, March 15, 2050. This application includes a request for renewal of those NRC source material, special nuclear material, and by-product material licenses included within the current operating license and issued pursuant to 10 CFR 30, *"Rules of General Applicability to Domestic Licensing of Byproduct Material"*, 10 CFR 40, *"Domestic Licensing of Source Material" and 10 CFR 70, "Domestic Licensing of Special Nuclear Material"*.

1.1.6 ALTERATION SCHEDULE

NextEra Energy Seabrook does not propose to construct or alter any production or utilization facility in connection with this renewal application. The current licensing basis (CLB) will be continued and maintained throughout the period of extended operation (PEO).

1.1.7 REGULATORY AGENCIES WITH JURISDICTION

New Hampshire Nuclear Decommissioning Finance Committee
21 South Fruit Street, Suite 10
Concord, NH 03301-2429

1.1.8 LOCAL NEWS PUBLICATIONS

News publications which circulate in the area surrounding NextEra Energy Seabrook and are considered appropriate to give reasonable notice of this renewal application to those municipalities, private utilities, public bodies and cooperatives that might have a potential interest in the facility, include the following:

Exeter News-Letter
111 New Hampshire Avenue
Portsmouth, NH 03801

Hampton Union
111 New Hampshire Avenue
Portsmouth, NH 03801

Portsmouth Herald
111 New Hampshire Avenue
Portsmouth, NH 03801

Manchester Union Leader
Loeb Drive
PO Box 9555
Manchester, NH 03108-9555

Foster's Daily Democrat
150 Venture Drive
Dover, NH 03820

The Daily News
23 Liberty Street
Newburyport, MA 01950

Boston Globe
135 Morrissey Boulevard
P.O. Box 55819
Boston, MA 02125

Boston Herald
One Herald Square
Boston, MA 02118

1.1.9 CONFORMING CHANGES TO STANDARD INDEMNITY AGREEMENT

The requirements of 10 CFR 54.19(b) state that license renewal applications 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-106 for Seabrook Station states that the agreement shall terminate at the time of expiration of the license.

The indemnity agreement lists NPF-86 as the applicable license number. Should the license number be changed upon issuance of the renewed license, NextEra Energy Seabrook requests that conforming changes be made to the indemnity agreement to include the extended period.

1.1.10 RESTRICTED DATA AGREEMENT

This application does not contain restricted data or other national defense information, nor is it expected that subsequent amendments to the license application will contain such information. However, pursuant to 10 CFR 54.17(g) and 10 CFR 50.37, NextEra Energy Seabrook, as a part of the application for a renewed operating license, hereby agrees that it 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 25, *"Access Authorization"* and/or 10 CFR 95, *"Facility Security Clearance and Safeguarding of National Security Information and Restricted Data"*.

1.2 PLANT DESCRIPTION

Seabrook Station is located in the Town of Seabrook, Rockingham County, New Hampshire, on the western shore of Hampton Harbor, two miles west of the Atlantic Ocean. The Station is approximately two miles north of the Massachusetts state line and approximately 15 miles south of the Maine state line. The site consists of 889 acres divided into two lots. Lot 1, which is owned by the Seabrook Station joint owners, is approximately 109 acres and holds most of the operating facility. Lot 2, which is owned by NextEra Energy Seabrook, is approximately 780 acres and consists mainly of natural areas.

Seabrook Station is a single unit 1,245 net megawatts electric Westinghouse 4-loop pressurized water reactor with a turbine generator built by General Electric. A zero power license was granted to the facility in October 1986 and a full power operating license was subsequently granted on March 15, 1990. Seabrook Station previously sought and received a modification to the expiration of the facility operating license to recapture the time licensed at zero percent power. Commercial operation began in August 1990 with a design rated power of 3411 megawatts thermal (MWt). Two power uprates have been implemented since initial commercial operation. In cycle 11, the rated thermal power was increased to 3587 MWt and in cycle 12, the rated thermal power was increased to 3648 MWt.

Seabrook Station's reactor is housed in a steel lined reinforced concrete containment structure which is enclosed by a reinforced concrete containment enclosure structure. Two three-mile-long tunnels bring water to and from the Atlantic Ocean for cooling and other plant systems. Other site structures include the Primary Auxiliary Building, Fuel Storage Building, Waste Processing Building, Control and Turbine Building, Diesel Generator Building, Administration and Service Building, Ocean Intake Structure, Ocean Discharge Structure, Circulating Water Pump House and the Service Water Pump House.

Originally two identical units were to be built on the site, but construction of Unit 2 was effectively terminated in 1984 when it was approximately 25 percent complete and the construction permit subsequently expired in October 1988.

1.3 TECHNICAL INFORMATION REQUIRED FOR AN APPLICATION

In accordance with 10 CFR 54.21, each application for a renewed operating license must contain the following information. These are an integrated plant assessment (IPA) (Chapters 2.0, 3.0 and Appendix B), CLB changes during NRC review (Section 1.4), an evaluation of time-limited aging analyses (TLAA) (Chapter 4.0), and a supplement to the Seabrook Station Updated Final Safety Analysis Report (UFSAR) that contains a summary description of the programs and activities for managing the effects of aging and the evaluation of the TLAA (Appendix A).

In addition to the technical information, 10 CFR 54.22 requires applicants to submit any Technical Specification changes or additions necessary to manage the effects of aging during the period of extended operation (Appendix D). There were no Technical Specification Changes identified necessary to manage the effects of aging during the period of extended operation. Also, 10 CFR 54.23 requires the application to include a supplement to the Environmental Report (Appendix E). Appendix C is optional and is not used by Seabrook Station.

The integrated plant assessment, as defined by 10 CFR 54.3, is a licensee assessment that demonstrates that a nuclear power plant facility's structures and components requiring aging management review in accordance with 10 CFR 54.21(a) for license renewal have been identified. The integrated plant assessment also demonstrates that the effects of aging on the functionality of such structures and components will be managed to maintain the CLB during the period of extended operation (PEO). The Seabrook Station integrated plant assessment includes:

- identification of the structures and components within the scope of license renewal that are subject to an aging management review;
- identification of the aging effects applicable to these structures and components;
- identification of programs and activities that will manage these identified aging effects; and
- a demonstration that these programs and activities will be effective in managing the effects of aging during the period of extended operation.

The Seabrook Station integrated plant assessment for license renewal, along with other information necessary to document compliance with 10 CFR 54, is maintained in an auditable and retrievable form in accordance with 10 CFR 54.37(a). The Seabrook Station integrated plant assessment is documented with site-specific reports and calculations that were generated in accordance with the FPL and Seabrook Station Quality Assurance Programs.

Time Limited Aging Analyses (TLAA) are analyses that are explicitly based on the current operating term of the facility. 10 CFR 54 requires exemptions based on TLAAs that are identified and analyzed to justify continuation of these exceptions into the PEO.

For each TLAA, it has been demonstrated that the TLAA remains valid for the PEO, or the analysis has been projected to the end of PEO, or that the effects of aging will be adequately managed for the PEO.

An UFSAR supplement has been developed containing a summary description of the programs and activities for managing the effects of aging and an evaluation of the TLAAs for the PEO.

1.4 CURRENT LICENSING BASIS CHANGES DURING NRC REVIEW

Each year, following the submittal of the NextEra Energy Seabrook LRA and at least three months before the scheduled completion of the NRC review, NextEra Energy Seabrook will submit an amendment to the application pursuant to 10 CFR 54.21(b). This submittal will identify any changes to the CLB that materially affect the contents of the LRA, including the UFSAR supplement and any other aspects of the application.

1.5 CONTACT INFORMATION

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

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Washington DC 20004

1.6 GENERAL REFERENCES

- 10 CFR 50, *Domestic Licensing of Production and Utilization Facilities*
- 10 CFR 51, *Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions*
- 10 CFR 54, *Requirements for Renewal of Operating Licenses for Nuclear Power Plants*
- NUREG-1800, *Standard Review Plan (SRP) for Review for License Renewal Applications for Nuclear Power Plants*, Revision 1, September 2005
- NUREG-1801, *Generic Aging Lessons Learned (GALL) Report*, Volumes 1 and 2, Revision 1, September 2005
- Regulatory Guide 1.188, *Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses*, Revision 1, September 2005
- NEI 95-10, *Industry Guidelines for Implementing the Requirements of 10 CFR 54 – The License Renewal Rule*, Revision 6, June 2005

1.7 ACRONYMS

AC	Alternating Current
ACI	American Concrete Institute
AMP	Aging Management Program
AMR	Aging Management Review
ANSI	American National Standards Institute
ART	Adjusted Reference Temperature
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATWS	Anticipated Transient Without Scram
CAP	Corrective Action Program
CASS	Cast Austenitic Stainless Steel
CCCW	Closed Cycle Cooling Water
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CLB	Current Licensing Basis
CMAA	Crane Manufacturers Association of America
CPVC	Chlorinated Poly-Vinyl Chloride
CRD	Control Rod Drive
CRUD	Chalk River Unidentified Deposits
CUF	Cumulative Usage Factor
DBD	Design Basis Document
DC	Direct Current
EAF	Environmentally Assisted Fatigue

ECCS	Emergency Core Cooling System
EDB	Equipment Database
EFPY	Effective Full Power Years
EOL	End of Life
EPDM	Ethylene Propylene Dienyl Monomer
EPRI	Electric Power Research Institute
EPRI-MRP	Electric Power Research Institute Materials Reliability Program
EQ	Environmental Qualification or Environmentally Qualified
ET	Eddy Current Testing
FAC	Flow-Accelerated Corrosion
F_{en}	Environmental Factor
FP	Fire Protection
FSAR	Final Safety Analysis Report
GALL	Generic Aging Lessons Learned
GL	Generic Letter
GSI	Generic Safety Issue
GSU	Generator Step up Transformer
HELB	High Energy Line Break
HEPA	High Efficiency Particulate Absorber
HVAC	Heating, Ventilation, and Air Conditioning
I&C	Instrumentation and Controls
IASCC	Irradiation Assisted Stress Corrosion Cracking
IGSCC	Intergranular Stress Corrosion Cracking
INPO	Institute of Nuclear Power Operations

IPA	Integrated Plant Assessment
IR	Insulation Resistance
ISG	Interim Staff Guidance
ISI	Inservice Inspection
kV	Kilovolts
kW	Kilowatts
LBB	Leak Before Break
LLC	Limited Liability Company
LOCA	Loss of Coolant Accident
LRA	License Renewal Application
LTOP	Low Temperature Overpressure
LWR	Light Water Reactor
MEB	Metal Enclosed Bus
MEQ	Mechanical Equipment Qualification
MeV	Million Electron Volts
MIC	Microbiologically-Influenced Corrosion
MRULE	Maintenance Rule
MWe	Megawatts Electric
MWt	Megawatts Thermal
NDE	Nondestructive Examination
NEI	Nuclear Energy Institute
NFPA	National Fire Protection Association
NPS	Nominal Pipe Size
NRC	Nuclear Regulatory Commission

NSAC	Nuclear Safety Analysis Center
NSAS	Non-Safety Affecting Safety
NSSS	Nuclear Steam Supply System
NUMARC	Nuclear Utility Management and Resources Council
ODSCC	Outer Diameter Stress Corrosion Cracking
OE	Operating Experience
OBE	Operating Base Earthquake
P&ID	Piping and Instrument Diagram
P-T	Pressure – Temperature
PEO	Period of Extended Operation
PORV	Power Operated Relief Valve
PTS	Pressurized Thermal Shock
PVC	Poly-vinyl Chloride
PVDF	Polyvinylidene Fluoride
PWR	Pressurized Water Reactor
PWSCC	Primary Water Stress Corrosion Cracking
RAT	Reserve Auxiliary Transformer
RCPB	Reactor Coolant Pressure Boundary
RCP	Reactor Coolant Pump
RG	Regulatory Guide
RMUWST	Reactor Makeup Water Storage Tank
RPV	Reactor Pressure Vessel
RT_{NDT}	Reference Temperature – NIL Ductility Transition
RT_{PTS}	Reference Temperature – Pressurized Thermal Shock

RV	Reactor Vessel
RWST	Refueling Water Storage Tank
SBO	Station Black out
SCC	Stress Corrosion Cracking
SER	Safety Evaluation Report
SF_6	Sulfur Hexafluoride
SO_2	Sulfur Dioxide
SR	Safety-Related
SRP	Standard Review Plan
SS	Stainless Steel
SSC	Systems, Structures, and Components
SSE	Safe Shutdown Earthquake
SWG	Switchgear
TLAA	Time Limited Aging Analysis
UAT	Unit Auxiliary Transformer
UT	Ultrasonic Testing
UFSAR	Updated Final Safety Analysis Report
USE	Upper Shelf Energy
WCAP	Westinghouse Commercial Atomic Power
w.g.	Water Gauge

CHAPTER 2

SCOPING AND SCREENING METHODOLOGY FOR IDENTIFYING SYSTEMS, STRUCTURES AND COMPONENTS SUBJECT TO AGING MANAGEMENT REVIEW, AND INPLEMENTATION RESULTS

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

This chapter describes the process required by 10 CFR Part 54 for the identification of structures and components subject to an aging management review in the Seabrook Station integrated plant assessment (IPA). For those systems, structures, and components within the scope of license renewal, §54.21(a)(1) requires a license renewal applicant to identify and list the structures and components subject to an aging management review. Furthermore, §54.21(a)(2) requires that methods used to identify and list these structures and components be described and justified. The technical information in this chapter serves to satisfy these requirements.

Seabrook Station's plant assessment methodology follows the approach recommended in Nuclear Energy Institute (NEI) 95-10. The methodology consists of scoping, screening, and aging management reviews. The methodology is implemented in accordance with FPL/NextEra Energy Quality Assurance Program.

The scoping and screening methodology is described in License Renewal Application (LRA) Section 2.1. The results of the plant level scoping to identify the systems and structures within the scope of license renewal are contained in LRA Section 2.2. The results of the scoping and screening of the mechanical, structural and electrical components subject to an aging management review are contained in LRA Section 2.3 for mechanical systems, LRA Section 2.4 for structures, and LRA Section 2.5 for electrical and instrumentation and control systems.

The operating license application and original FSAR for Seabrook Station contemplated two identical units on a single site. Construction on Seabrook Station Unit 2 was terminated in 1984 and its construction permit was allowed to expire in October 1988. The updated FSAR eliminates all references to Unit 2 except for a few cases where it was necessary to maintain a Unit 2 reference to provide an accurate description of a plant feature.

2.1 SCOPING AND SCREENING METHODOLOGY

This section describes the scoping and screening process used at Seabrook Station to identify systems, structures and components (SSCs) subject to aging management review. The following sections provide details of how the "Scoping" and "Screening" process was implemented.

"Scoping" was performed to identify the plant systems and structures which perform intended functions as defined in 10 CFR 54.4(a)(1), (a)(2) or (a)(3). Initially, all Seabrook Station SSCs were examined. If any portion of a system or structure met the scoping criteria of 10 CFR 54.4, the system and/or structure was included in-scope for License Renewal. For systems and structures determined to be in scope, the intended functions were identified. A simplified flowchart of the Seabrook Station scoping process is depicted in Figure 2.1-1. All electrical and Instrumentation and Control systems and components are considered in scope.

"Screening" was performed to identify the components associated with the in-scope systems and structures that are subject to aging management review as defined in 10 CFR 54.21. The screening process examined in-scope components and structures to determine those that are passive and long-lived. These components and structures were subject to aging management review. A simplified flowchart of the Seabrook Station screening process is depicted in Figure 2.1-2.

Scoping and screening has been performed consistent with the requirements of 10 CFR 54, the Statements of Consideration related to the license renewal rule, and the guidance provided in NEI 95-10, "Industry Guidelines for Implementing the Requirements of 10 CFR Part 54 – The License Renewal Rule, Revision 6".

Seabrook Station license renewal project procedures provide detailed instructions for these processes. The procedures incorporate the guidance provided in NEI 95-10. In addition, Seabrook Station developed technical reports to provide guidance on specific topics associated with the criteria of 10 CFR Part 54.

Section 2.1.1	provides the regulatory requirements from 10 CFR 54 applicable to the scoping and screening process.
Section 2.1.2	discusses the Seabrook Station scoping methodology.
Section 2.1.3	discusses the Seabrook Station screening methodology.
Section 2.1.4	discusses consideration of the NRC staff's license renewal interim staff guidance (ISG) documents in the Seabrook Station application.

Section 2.1.5 discusses the evaluation of Generic Safety Issues (GSIs).

Section 2.1.6 provides conclusions for Section 2.1.

2.1.1 REGULATORY REQUIREMENTS

Scoping

Criteria for determining which SSCs should be reviewed and evaluated for inclusion in the scope of license renewal (LR) is provided in 10 CFR 54.4(a)(1)-(3). Specifically, 10 CFR 54.4 states:

(a) Plant SSCs within the scope of this part are--

(1) Safety-related SSCs which are those relied upon to remain functional during and following design basis events (as defined in §50.49(b)(1)) to ensure the following functions

(i) The integrity of the reactor coolant pressure boundary;

(ii) The capability to shut down the reactor and maintain it in a safe shutdown condition; or

(iii) The capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures comparable to the guidelines in §50.34(a)(1), §50.67(b)(2), or §100.11 of this chapter, as applicable.

(2) All non-safety-related SSCs whose failure could prevent satisfactory accomplishment of any of the functions identified in paragraphs (a)(1)(i), (ii), or (iii) above.

(3) All SSCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the NRC's regulations for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49), pressurized thermal shock (10 CFR 50.61), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

(b) The intended functions that these SSCs must be shown to fulfill in §54.21 are those functions that are the bases for including them within the scope of license renewal as specified in paragraphs (a)(1) - (3) of this section.

Screening:

Criteria used in the screening process at Seabrook Station is defined in 10 CFR 54.21 (a)(1) and (2). Screening determines the systems, structures and components in the scope of license renewal that are subject to aging management review.

Specifically, 10 CFR 54.21 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.

(2) Describe and justify the methods used in paragraph (a)(1) of this section.

(3) For each structure and component identified in paragraph (a)(1) of this section, demonstrate that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation.

2.1.2 SCOPING METHODOLOGY

General Scoping Process

Scoping is the systematic process that identifies the Seabrook Station SSCs within the scope of the License Renewal rule. Systems, structures and components within the scope of License Renewal are then screened to determine if they require an Aging Management Review (AMR).

The scoping methodology utilized by Seabrook Station is consistent with the guidance provided by NEI 95-10, Revision 6. Existing plant documentation was used for this review including the Updated Final Safety Analysis Report (UFSAR), Technical Specifications and licensing correspondence that collectively form the Seabrook Station Current Licensing Basis (CLB). Additional information sources included Design Basis Documents (DBD's), controlled drawings, Equipment Database and the Maintenance Rule Database.

All Seabrook Station plant systems and structures were reviewed and evaluated against the scoping criteria to determine which met the requirements for inclusion in the scope of license renewal.

Scoping was initially performed at the system or structure level in accordance with the criteria identified in 10 CFR 54.4(a). System level and structure intended functions were then identified from a review of CLB documentation. Starting at the system level intended functions, scoping boundaries for each system were determined. The results of this effort form the basis for identification of the in-scope components.

Component information was initially transferred from the Seabrook Station Equipment Database (EDB) to the License Renewal Database. The EDB is used to maintain configuration control of component level information at Seabrook Station. As such, quality assurance applied to the EDB software ensures compliance with requirements and/or commitments that are necessary to support both safety related and non-nuclear safety component level information.

Use of commodity groups occurred when component evaluations were best performed by component type, rather than by system or structure. NEI 95-10 served as guidance for commodity groupings. Components constructed from similar materials, exposed to similar environments, and which perform similar intended functions form the commodity groups.

Commodity group components were not associated with a specific system or structure during the component's evaluation, but with their assigned commodity group. Evaluation of each commodity group took place as if it were a separate, individual system.

Equipment that is stored on site for use in response to design basis events is considered to be within the scope of License Renewal. At Seabrook Station, Station Blackout and Appendix R fire scenarios utilize stored equipment to facilitate contingency actions following the event. The stored equipment is confirmed available and in good operating condition by periodic inspection. Tools and supplies used to place the stored equipment in service are not in the scope of License Renewal.

Mechanical Scoping

Mechanical scoping utilized existing Maintenance Rule (MRule) system functions during the License Renewal scoping. These functions were transferred into the License Renewal Database from the MRule database.

In addition to the MRule functions, functions were created in the License Renewal Database to capture the non-safety affecting safety (Criterion 2) and the five regulated events (Criterion 3). The MRule system functions that were transferred to the License Renewal Database were validated for accuracy using the UFSAR, Technical Specifications, DBD (including source documents), and other controlled documentation.

Civil/Structural Scoping

Civil controlled drawings and the EDB were used to identify buildings, structures and foundations. The buildings were input into the License Renewal Database as individual or grouped license renewal structures.

Other information sources, such as CLB documentation, were electronically searched using several keywords (e.g., structure, new structure, building modification) to ensure all plant structures were evaluated for license renewal intended functions regardless of their coverage in the plant equipment database.

Electrical Scoping

All electrical and I&C systems were considered in-scope. Electrical and I&C components were organized into commodity groups. The information provided by NEI 95-10 Appendix B and NUREG-1800 Table 2.1-5, was used as a basis for categorizing electrical and I&C components into commodity groups such as insulated cables and connections, circuit breakers, and switches. Individual components were not identified. The electrical commodity groups identified resulted from a review of plant documents;

controlled drawings, the EDB, and interface with the parallel mechanical screening efforts.

Scoping Boundaries

Application of all three 10CRF54.4 criteria generated a listing of SSCs that were determined to be in-scope for license renewal. Not every component of a system supports the system intended functions. Therefore, some components within an in-scope system are not in-scope for license renewal.

For the mechanical scoping effort, summary level boundary descriptions were developed and included in Section 2.3. License Renewal drawings/diagrams were also created from plant controlled PID's (e.g. PID-1-FW-20686) to illustrate in-scope mechanical systems, structures and components subject to an aging management review (AMR). These AMR boundaries are depicted on color coded license renewal drawings (e.g. PID-1-FW-LR20686) and contain system boundary flags. The "RED" colored portions of the drawings indicate system components in scope for criteria (a)(1) and (a)(3) that are subject to an AMR. The "GREEN" colored portions indicate system components in scope for criterion (a)(2) that are subject to an AMR. The "BLACK" lines define those components that are not in scope or screen out and thus, are not subject to an AMR.

Mechanical Component Types are listed in sections 2.3.1, 2.3.2, 2.3.3, and 2.3.4 and in the 3.X.2 Tables of Sections 3.1, 3.2, 3.3 and 3.4 of the LRA. License Renewal Drawing "PID-LRNOTES1" was prepared to help the reviewer in correlation of component types mentioned in the LRA with component numbers identified on the License Renewal Drawings. For example, the term "Piping Element" is used in Table 2.3.2-1. License Renewal Drawing PID-LRNOTES1 provides the tag number correlation for components labeled as Piping Elements (e.g., tag numbers containing "-FE-", "-FG-", "-FI-", "-MM-") and states that this designation refers only to the glass portion of these instrumentation components. Similarly, the term "Instrumentation Element" used in Table 2.3.2-1 can be correlated using "PID-LRNOTES1" to refer to these same instrumentation components, but would include the portions of the instrumentation component other than the glass portion.

For the structural scoping effort, summary level boundary descriptions were developed and included in Section 2.4. Individual License Renewal drawings were not created for structures. A single plot plan drawing was, however, created to depict the in-scope boundaries. The "RED" colored portions of the drawing indicate structures that are in scope for criteria (a)(1). The "BLUE" colored portions indicate structures that are in scope for criterion (a)(2). The "GREEN" colored portions indicate structures that are in scope for criterion (a)(3). "BLACK" colored structures are out of scope.

For the electrical scoping effort, boundary drawings were not necessary since commodity grouping was used in the scoping process. The SBO Offsite Recovery Path License Renewal Drawing, Figure 2.5-1, was created to depict the in-scope portion of the off-site power system for Station Blackout (SBO). Seabrook Station has chosen two paths for the recovery of off-site power in the event of a Station Blackout (SBO). Path 1 is colored green. Path 2 is colored red.

Documentation Sources

A number of CLB and design basis information sources were used in the scoping and screening process. The CLB for Seabrook Station is consistent with the definition provided in 10 CFR 54.3.

Plant documentation sources may contain system names that vary slightly. For example, the Waste Gas system (WG) may be referred to as the Radioactive Gaseous Waste system in the UFSAR. Similarly, Resin Sluicing system (RS) may be referred to as the Spent Resin Sluicing system in the UFSAR. System designators (e.g., WG, RS) remain consistent throughout the Seabrook Station documentation despite this minor variation in descriptors. The system names utilized in the License Renewal Application are consistent with the ones currently used in the plant and consistent with the names listed in the Seabrook Station Engineering data base. However, for clarification purposes, a cross reference is provided if the UFSAR system name is different than the current plant system name. This would appear, for example, as "Spent Resin Sluicing system [Resin Sluicing system (RS)] or Radioactive Gaseous Waste system [Waste Gas system (WG)]".

The significant sources of information used in this evaluation are discussed below.

<u>Updated Final Safety Analysis Report</u>

The Updated Final Safety Analysis Report (UFSAR) provides the information required by Revision 3 to the "*Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants*," Regulatory Guide 1.70, dated November, 1978. The Updated FSAR is divided into 17 chapters, using substantially the same format as NUREG-75/094. In 2002, the UFSAR was converted to a computer based living document, periodically updated throughout the reporting cycle. The Seabrook Station UFSAR has been updated regularly in accordance with requirements of 10 CFR 50.71(e).

<u>Harsh Environment Equipment List</u>

The Harsh Environment Equipment List identifies all Class 1E equipment, and other equipment important to safety, located in a potentially harsh environment and associates equipment within the scope of 10 CFR 50.49 to its applicable environmental qualification (EQ) file. This information is maintained in the Equipment Database (EDB) which includes an EQ data field.

Maintenance Rule Database

The Maintenance Rule database documents the results of the Maintenance Rule scoping for Seabrook Station systems and structures. The Maintenance Rule Database provides an additional source of information that aids in developing system and structure functions.

Design Basis Documents

System design basis documents (DBDs) are available for selected systems at Seabrook Station. These documents contain the basis for design at the system level and at the component level. They also include applicable licensing documents, codes and standards, along with calculation summaries and references. DBDs are intended to complement other upper tier documents such as the UFSAR and Technical Specification Bases.

Piping & Instrumentation Diagrams (P&IDs)

P&IDs are diagrams that have been created for piping system and ventilation systems. P&IDs provide valve, damper, piping, ductwork, instrumentation, and other component information. Instrument valves and fittings downstream of instrument root valves are not typically shown on P&IDs and are considered beyond the level of detail for these drawings. Safety Classification boundaries are indicated on the P&IDs.

Electrical Schematics

Electrical schematics were used to identify electrical systems and their safety functions.

Station Blackout Evaluation of NUMARC, Initiative No. 5

The analysis is an assessment of the ability to cope with a station blackout at Seabrook Station. This assessment is in compliance with NUMARC 87-00, "*Guidelines and Technical Basis for NURMAC Initiatives Addressing Station Blackout at Light Water Reactors*," dated November 1987, and Regulatory Guide 1.155, "*Station Blackout*".

Component Database

Seabrook Station maintains an Equipment Database (EDB) that contains component level design information. Data from the EDB was utilized to populate the Seabrook License Renewal (LR) database which served as an information repository for evaluations performed in support of License Renewal. The EDB contains plant components at the level of detail for which discrete maintenance or modification activities are performed. The database provides a comprehensive listing of plant components including component type, unique component identification number, safety and seismic classification, and other design data.

License Renewal Technical Reports

License Renewal Technical Reports (LRTR) were developed to assist in the identification of systems and structures that are in the scope of License Renewal. License Renewal Technical Reports were also issued to document the basis of approach taken on selected specialty topics that are addressed in the License Renewal Application (LRA).

2.1.2.1 10 CFR 54.4(a)(1) – Safety Related SSCs

Systems, structures and components that perform safety functions as defined in 10 CFR 54.4(a)(1) are within the scope of license renewal. Safety-related SSCs are uniquely identified at Seabrook Station. The definition of Safety Related is consistent with the definition in 10 CFR 54.4, as follows:

SSCs and related activities relied upon to remain functional during and following design basis events to ensure:

- The integrity of the reactor coolant boundary,
- The capability to shut down the reactor and maintain it in a safe shutdown condition,
- The capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures comparable to §50.34(a)(1), §50.67, or §100.11 of 10 CFR 50, as applicable. Seabrook Station has implemented Alternate Source Term (AST) with NRC approval. Therefore, §50.67 guidelines are applicable to Seabrook Station. (AST was not adopted for the EQ, however, the existing conditions are bounding.)

Components are classified as Safety Class 1, Safety Class 2, Safety Class 3, and non-nuclear safety (NNS) in accordance with their importance to nuclear safety. This importance, as established by the assigned safety class, is applied in the design, materials, manufacture or fabrication, assembly, erection, construction, and operation. A single system may have components in more than one safety class. The definitions of safety classes listed apply to fluid pressure boundary components and the reactor containment. Supports that have a nuclear safety function are of the same safety class as the components that they support. All Class 1E safety-related electrical, instrumentation and controls systems are Safety Class 3.

The Equipment Database (EDB) was initially used to identify the safety classification of systems, structures and components for license renewal per 10 CFR 54.4(a)(1).

Seabrook Station P&IDs, Electrical One Line diagrams, Civil/Architectural drawings and the UFSAR were used to identify components required to support in-scope system-level and structure-level functions. As described in UFSAR section 3.2.2.2, safety class designation boundaries of safety-related systems are shown on the P&IDs and described in the respective sections of the UFSAR. Fluid system component safety class designations are listed in UFSAR Table 3.2-2. The Heating, Ventilation and Air Conditioning (HVAC) system component safety class designations are listed in UFSAR Table 3.2-4.

Seabrook Station structures, systems and components important to safety, as well as their foundations and supports, have been designed to withstand the effects of an Operating Basis Earthquake (OBE) and a Safe Shutdown Earthquake (SSE), and are thus designated as seismic Category I.

The structures, systems and components classified as seismic Category I are listed in UFSAR Table 3.2-1 and Table 3.2-2.

2.1.2.2 10 CFR 54.4(a)(2) – Non-Safety Related Affecting Safety-Related SSCs

10 CFR 54.4(a)(2) requires that all non-safety related systems, structures and components whose failure could prevent satisfactory accomplishment of any of the functions identified in §54.4(a)(1) be included within the scope of license renewal. These SSCs are classified non-nuclear safety (NNS) in the Seabrook Station UFSAR and is used interchangeably with the Non-safety related term.

The process used at Seabrook Station for identification of Non-Safety Affecting Safety (NSAS) related SSCs is consistent with the NEI 95-10 "Industry Guideline for Implementing the Requirements of 10CFR54 - The License Renewal Rule", Rev. 6, June 2005.

SSCs required by §54.4(a)(2) for Seabrook Station are included in one of the following four categories:

- Current Licensing Basis (CLB) Topics. The Seabrook Station CLB includes a number of topics that identify non-safety related SSCs credited for preventive or mitigative functions in support of safe shutdown for special events (e.g., external floods) or whose failure could prevent satisfactory accomplishment of a safety related function (e.g., seismic interactions). The CLB Topics are discussed in sub-section 2.1.2.2.1.

- Non-safety related SSCs directly connected to safety related SSCs are discussed in sub-section 2.1.2.2.2.
- Non-safety related SSCs that are not directly connected to safety related SSCs but whose failure could prevent the satisfactory accomplishment of a safety related function due to spatial proximity. Non-Safety Related SSCs in spatial proximity of Safety Related SSCs are discussed in sub-section 2.1.2.2.3.
- A non-safety related SSC could provide functional support for a safety related intended function. The non-safety related SSC is required to function so that a safety related SSC performs its intended function (e.g., A non-safety related system provides cooling to a safety related pump). Non-Safety Related SSCs providing functional support for safety related SSCs are discussed in sub-section 2.1.2.2.4.

SSCs required by §54.4(a)(2) were identified by review of the Seabrook Station UFSAR and other CLB documentation. Plant drawings, DBDs, piping analyses, and the plant equipment database were also used. Plant walk downs were performed, as necessary, to confirm the spatial interaction boundaries.

2.1.2.2.1 Current Licensing Basis (CLB) Topics

The Seabrook Station CLB includes a number of topics that identify non-safety related SSCs credited for preventive or mitigative functions in support of safe shutdown for special events. Those topics are:

High Energy Line Break (HELB)

At Seabrook Station, the high energy piping systems were identified using the criteria if the service temperature is greater than 200°F or the design pressure is greater than 275 psig. A HELB could affect EQ Equipment in the area of the break by increasing the local temperature and humidity.

High energy line breaks inside and outside of the buildings are described in UFSAR section 3. The locations of postulated pipe ruptures were chosen for their potential adverse environmental impact of pressure, temperature and/or humidity on Safety Related Class 1E electrical equipment.

All high-energy lines identified in UFSAR section 3, Appendix 3I are included as in-scope for license renewal. High energy lines of one-inch diameter or smaller pipe size were excluded from the HELB analysis but still remain as a potential source of spray and/or leakage. All of the HELB Analysis pipe segments are located in buildings with Safety Related equipment and are therefore in the scope of License Renewal.

Protection from a high energy line break inside of buildings is provided primarily by separation and redundancy. High energy lines are routed to provide maximum protection by using plant structural elements, such as walls, columns, doors, and pipe whip restraints to prevent uncontrolled whipping of the high energy piping. Outside of buildings, protection from a high energy line break (postulated breaks in, or whip loads) is provided by seismic Category I reinforced concrete walls. These components are in-scope for license renewal.

Internal and External Flooding Events

Flooding from various internal sources (e.g., pipe breaks) and external sources were evaluated during the design of the plant.

Protection against possible internal flooding from liquid carrying systems, due to pipe rupture or fire protection activities are discussed in the following UFSAR Sections:

- Section 3.6 — Protection against Dynamic Effects Associated with the Postulated Rupture of Piping
- Section 9.3.3 — Equipment and Floor Drainage System
- Section 9.5.1 — Fire Protection System
- Section 10.4.5.3 — Circulating Water System

Internal Flooding features are associated with the Equipment and Floor Drainage System, including sumps, sump pumps, tanks, drains, and piping to remove water from potential internal flooding events, and fire protection activities for areas containing safety-related equipment. These design features are in-scope for license renewal.

Protection against possible internal flooding is discussed in UFSAR Section 3.4 “Water Level (Flood) Design”. Internal flood protection components are reinforced concrete walls, and concrete and steel curbs. These components are in-scope for license renewal.

Protection against possible external flooding is discussed in UFSAR Sections 2.4.5.5 "Protective Structures", and Section 2.5.5 "Stability of Slopes". External flood protection components are stone revetment, sheet pile retaining wall, and vertical seawall. These components are in-scope for license renewal.

Internal and External Missile Hazards

Missiles that could be generated from internal sources or external sources such as rotating equipment and tornados were considered in the design of the plant. Both preventive (e.g., over speed controls, seismic restraints) and mitigative (e.g., missile barriers) features were installed to ensure safe shutdown as required by the CLB for postulated missile hazards. These design features are in-scope for license renewal .

Missiles that could be generated from internal or external sources as described in UFSAR Section 3.5 for various building and structures are summarized in UFSAR Table 3.5-1. The missile protection feature (missile barriers) are typically included as part of the building structure (reinforced concrete wall, floor or ceiling). All structures and their missile shields and barriers listed on UFSAR table 3.5-12 are designed to resist internal and external missiles in accordance with the CLB, and are in-scope for license renewal.

Overhead Handling Systems

Overhead handling systems, including those associated with heavy loads as described in NUREG-0612 are considered to meet the criteria of 10 CFR 54.4(a)(2) and are in-scope for license renewal. Additionally, the refueling platform and fuel handling machine are considered to meet the criteria of 10 CFR 54.4(a)(2) and are in-scope for license renewal .

Coatings in Containment

Coatings in containment that are credited to remain in place during design bases events have been qualified for forty years. These coatings are considered a Time Limited Aging Analysis (TLAA) and addressed in section 4.7.7 for the period of extended operation. No credit is taken for protective coatings inside containment to prevent aging effects.

2.1.2.2.2 Non-Safety Related SSCs Directly Connected to Safety Related SSCs

For NNS SSCs directly connected to safety related SSCs, the in-scope boundary for license renewal extends into the NNS portion of the piping and supports up to and including the first seismic anchor or an equivalent anchor beyond the safety/non-safety interface. An equivalent seismic anchor is a combination of pipe restraints as described in UFSAR Section 3.7 (B) and Figure 3.7 (B) – 37.

An alternative used to specifically identify a seismic anchor or an equivalent anchor is to:

- Include the NNS piping run to the next large piece of plant equipment (e.g., pump, heat exchanger, tank, etc). The large piece of equipment must also be included in-scope and is subject to aging management for the intended function of being an anchor point for the piping run.
- Include the NNS piping run to a flexible connection – a flexible connection is considered a pipe stress analysis model end point when the flexible connection effectively decouples the piping system (i.e. does not support loads or transfer loads across it to connecting piping).
- For NNS piping runs such as vent or drain piping that end at open floor drains, include the entire piping in the scope of LR.
- For NNS piping runs that are connected to Safety Related (SR) piping at both ends, include the entire run of NNS piping between the SR piping.
- Include the buried portion of the piping in the scope of LR up to the point where the buried pipe exits the ground.

NNS structures attached to or next to Scoping Criteria 1 structures are in-scope for license renewal if their failure could prevent a Scoping Criteria 1 SSC from performing its intended function.

2.1.2.2.3 Non-Safety Related SSCs In Spatial Proximity Of Safety Related SSCs

For non-safety related NNS SSCs that are *not* directly connected to safety related SSCs, or are connected downstream of the first equivalent anchor, the non-safety SSCs may be in-scope if their failure could prevent the performance of the system safety function for which the safety related SSC is required.

Two approaches were used to determine if a non-safety related SSC in proximity to a safety related SSC is in scope for license renewal: the mitigative and preventive approach. Where it could be demonstrated that safety related SSCs are separated from non-safety related SSCs by physical barriers, the mitigative option was used (e.g., Tank Farm rooms TF101 and TF102). The preventive option was used in evaluating the vast majority of structures or systems at Seabrook for potential adverse structural or spatial interactions with Scoping Criterion 1 SSCs.

If a safety related component was determined to exist within that building, then all the NNS components within that building were included in the scope of LR. In other words, if a building contained a safety related component, then the entire building, not just the room, was included in the scope for NSAS.

There is one exception to the application of above methodology. NEI-95-10 section 3.1.1 recognizes that ... *"a system, structure or component may not meet the requirements of §54.4(a) (1) although it is designated as safety related for plant specific reasons. However, the systems, structures and components would still need to be evaluated for inclusion into the scope of the Rule using the criteria in §54.4(a) (2) and §54.4(a) (3)."*

The Turbine Building contains components associated with the reactor protection and engineered safety features actuation system which have been classified as safety related in the plant equipment database. There are no other safety related SSCs in the Turbine Building. These components do not perform a safety function, as defined in 10 CFR 54.4(a) (1), and are not credited in the Seabrook Station accident analysis. The CLB does not credit operation of these components during or after a seismic event and thus seismic design or qualification is not required. Therefore, there are no components in the Turbine Building that are considered to be in scope for license renewal as defined in 10 CFR 54.4(a) (2).

The Turbine Building is a non-seismic Category I structure (UFSAR 1.2.2.9). The entire Turbine Building is designed against failure due to Tornado Wind and SSE Loads that could affect any seismic Category I structures in the proximity and therefore considered to be in-scope for license renewal as defined in 10 CFR 54.4(a) (2) (UFSAR Tables 3.3-4 and 3.7(B)-22).

<u>*Air/Gas Systems (For NNS SSCs that are not directly connected to SR SSCs)*</u>

Leakage of NNS air-gas systems (non-liquid) are not a hazard to other plant equipment because they do not contain sufficient energy to cause pipe whip or jet impingement. A site specific review was made of operating experience in regards to air/gas systems which verified that air/gas systems have not negatively affected other plant equipment. All supports in buildings with 10 CFR 54.4(a)(1) components are in-scope for license renewal. Per NEI 95-10, Appendix F, the air/gas NNS piping and piping components for NNS SSCs that are not directly connected to safety-related SSCs are not in-scope.

NNS Conduits, Trays, Junction Boxes, and Lighting Fixtures

NNS conduits, cable trays, junction boxes, lighting fixtures may contain or be routed near Scoping Criterion 1 cables or other components. To determine which of these commodities to consider in-scope for license renewal, a conservative simplified approach is used. All NNS conduits, trays, junction boxes and lighting fixtures and their supports located within structures housing safety related equipment are in-scope for license renewal.

NNS HVAC Ducts and Supports

At Seabrook Station, the non-nuclear safety (NNS) HVAC ducting was evaluated similar to air/gas piping systems utilizing the guidance provided in NEI 95-10 Appendix F. All HVAC duct supports located within structures housing Scoping Criterion 1 components are in-scope for license renewal similar to Air/Gas Systems.

2.1.2.2.4 Non-Safety SSCs Providing Functional Support for Safety Related SSCs

The review of the CLB identified a diesel driven pump as a component that supports a safety related intended function. The portable Cooling Tower makeup pump is maintained on the site. It is capable of providing makeup water to the Service Water System (section 2.3.3.37) Cooling Tower basin from the nearby Browns River or Hampton Harbor with several locations accessible by road. This pump is stored in a Seismic Category 1 building, and is used to ensure a 30 day supply of water in the cooling tower basin in the event of design bases event and subsequent seismic event, the Safe Shutdown Earthquake. This diesel driven pump (1-SW-P-329) has been included in the scope of license renewal.

2.1.2.3 10 CFR 54.4(a)(3) – Regulated Events

The third scoping category in 10 CFR 54.4 involves SSCs relied upon by licensees to address five regulated events. Specifically, §54.4(a)(3) defines SSCs as in-scope for license renewal, if relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with one or more of the regulated events:

- Fire Protection (10 CFR 50.48)
- Environmental Qualification (10 CFR 50.49)
- Anticipated Transient Without Scram (10 CFR 50.62)
- Station Blackout (10 CFR 50.63)

- Pressurized Thermal Shock (10 CFR 50.61)

Any SSC that is required to function in order to meet compliance requirements of one or more of these regulations was identified as required by §54.4(a)(3). All SSCs required by §54.4(a)(3) are in-scope for license renewal.

Conduits, trays, junction boxes and lighting fixtures and their supports required for regulated events that are located in structures not housing Scoping Criterion 1 equipment are in-scope for license renewal.

A review of the CLB and plant documentation was performed to determine SSCs that support these regulated events and, therefore, in-scope for license renewal. The results of this review were documented in technical reports and incorporated into the license renewal database. The following discussion describes the methodology used in this review.

Fire Protection Scoping

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 compliance with 10 CFR 50.48 are described in UFSAR Appendix A and Appendix R. They include:

- Systems and structures required to demonstrate safe shutdown capabilities.
- Systems and structures required for fire detection and suppression needed to support safe shutdown.
- Systems and structures required to meet commitments made to Appendix A of Branch Technical Position APCSB 9.5-1 with respect to the protection of systems important to safety and prevention of radioactive releases to the environment.

The License Renewal fire protection technical report documents the results of a detailed review of Seabrook's fire protection program documents that demonstrate compliance with the requirements of 10 CFR 50.48. This document provides a list of systems and structures credited in the plant's fire protection and safe shutdown evaluations. The identified systems and structures are in the scope of License Renewal under 10 CFR 54.4(a)(3) scoping criteria.

Safe shutdown in the event of a fire is achieved at Seabrook Station utilizing fire protection features (detection, suppression and containment) and by having a minimum of one train required for safe shutdown free of fire damage.

The Seabrook Station design basis for 10 CFR 50.48 fire assumes that a fire occurs in a given Fire Area (FA) rendering all safe shutdown systems (cable and components) in the Fire Area inoperable. 10 CFR 50.48 also assumes that only fire induced failures occur (no random single failure) and that no severe natural phenomena (e.g. design bases earthquake) or accident occur concurrent with the fire, with the result that safe shutdown can be achieved.

Environmental Qualification Scoping

The CLB for Seabrook Station's EQ Program is Title 10, Part 50, Section 49 of the Code of Federal Regulations (10 CFR 50.49). This is achieved via conformance to the requirements of NUREG-0588, "*Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment*" Category I criteria. Category I criteria incorporates and supplements IEEE 323-1974, "*IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations*".

Pursuant to the requirements of 10 CFR 50.49, Seabrook Station established a program for qualifying the electrical equipment defined in §50.49(b).

The EQ portion of the license renewal scoping was performed utilizing the Harsh Environment Equipment list. Systems and structures containing equipment within the scope of the EQ Program were identified. The buildings serve to provide shelter, support and protection of EQ equipment.

Components in the EQ program are evaluated in the EQ TLAA, Section 4.4.

Anticipated Transients Without Scram Scoping

10 CFR 54.4(a)(3) requires that all systems, components and structures 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 (ATWS) (10 CFR 50.62) be included in the scope of License Renewal.

For Seabrook Station, a Westinghouse PWR, the following requirements from 10 CFR 50.62 a (1) apply, "Each pressurized water reactor (PWR) must have equipment from sensor output to final actuation device, that is diverse from the reactor trip system, to automatically initiate the auxiliary (or emergency) feedwater system and initiate a turbine trip under conditions indicative of an ATWS. This equipment must be designed to perform its function in a reliable manner and be independent (from sensor output to the final actuation device) from the existing reactor trip system."

An ATWS Mitigation System (AMS) is installed at Seabrook Station which provides an alternative means for automatically tripping the turbine and actuating Emergency Feedwater (EFW) flow that is independent of the protection system actuations.

Seabrook Station SSCs used to mitigate an ATWS event have been included in the scope of License Renewal.

Station Blackout Scoping

10 CFR 54.4(a)(3) requires that all systems, structures and components relied upon in safety analyses or plant evaluations to perform a function that is credited in demonstrating compliance with the Commission's regulations for Station Blackout (10 CFR 50.63) be included in the scope of License Renewal.

Station Blackout (SBO) is an event resulting from the complete loss of alternating current (AC) electric power to the essential and nonessential switchgear buses in a nuclear power plant (i.e., loss of offsite power concurrent with a generator trip and loss both diesel backed safety related electric buses). SBO does not include loss of AC power to buses powered by battery backed buses. The SBO event does not postulate concurrent single failure or other design bases event in addition to the SBO.

Seabrook Station complies with the requirements of 10 CFR 50.63 as a coping plant. This means that safe shutdown can be maintained using battery backed electrical buses for the four hour coping period. Offsite power and or onsite power will be restored at or before the end of the four hour coping period.

The SBO Offsite Recovery Path License Renewal Drawing, Figure 2.5-1, was created to depict the in-scope portion of the off-site power system for Station Blackout (SBO). Seabrook Station has chosen two paths for the recovery of off-site power in the event of a Station Blackout (SBO). Path 1 is colored green. Path 2 is colored red.

Pressurized Thermal Shock

Criterion 10 CFR 54.4(a)(3) requires that all SSCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the commission's regulations for PTS be included in the scope of License Renewal

Pressurized Thermal Shock (PTS) is a condition that could challenge the integrity of the reactor pressure vessel (RPV). Pressurized Thermal Shock (PTS) may occur during a severe transient such as a Loss of Coolant Accident (LOCA) or a steam line break. Such transients can challenge the RPV integrity under the following conditions:

- Severe overcooling of the inner surface of the RPV followed by high repressurization
- Radiation embrittlement of RPV materials causing a shift in the nil-ductility reference temperature and a decrease in the fracture toughness
- Presence of a flaw/defect of a critical size in the vessel wall

The steel reactor vessel beltline shell, including plates, forgings, and welds, were determined to meet the scoping criteria of 10 CFR 54.4 with respect to pressurized thermal shock.

2.1.3 SCREENING METHODOLOGY

General Screening Process

Structures and components (or component commodity groups) 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 process was used to identify the passive, long-lived structures and components in the scope of License Renewal and subject to aging management review. The Seabrook Station screening process determines the structures and components subject to aging management review by:

- Listing the in-scope structures and components by component type,
- Screening component types by using the passive and long lived criteria, and
- Identifying the intended functions performed by these structures and components by component type.

NUREG-1800, "*Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants*" and NEI 95-10, Appendix B 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 (e.g., solenoid valves that are periodically replaced).

Intended functions used to define passive structures and components are identified in LRA Table 2.1-1. Structures and components may have multiple intended functions (e.g., heat exchanger with heat transfer and pressure boundary intended functions). Seabrook Station has considered multiple intended functions where applicable, consistent with the staff guidance provided in Tables 2.1-4(a) and (b) of NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants". If a component did not have at least one component-level intended function, the component was not subject to an aging management review.

Detailed scoping and screening reports have been prepared which identify all structures and components subject to an aging management review. These reports have been prepared for all systems, structures, or commodity groups (except electrical commodities) in-scope for License Renewal.

Passive, long lived electrical commodities subject to an aging management review were identified using guidance in NEI 95-10.

The Seabrook Station structures and components subject to aging management review have been identified in accordance with the requirements of 10 CFR 54.21(a)(1). The process implemented to meet these requirements is described as follows:

Mechanical Screening

Mechanical components have been screened with the system in which they were scoped. Plant components such as heat exchangers and coolers that have License Renewal intended functions that are unique have been identified at the subcomponent level to ensure all the intended functions and material / environment combinations are considered in the evaluation (e.g., channel head, shell, tubes, and tube sheet).

Civil/Structural Screening

The screening process was applied to in-scope buildings and civil structures to identify the structural elements to be evaluated in the aging management reviews. Screening evaluation boundaries were established based on the scoping boundary results. In some cases, individual structures were grouped together for screening due to similarity in construction or other common features to simplify the screening process and presentation of the aging management review results.

The Seabrook Station scoping and screening process used a "spaces" approach in establishing the evaluation boundaries. With few exceptions, the scoping and screening boundary for a building or structure is an entire building or buildings, including the doors, supports, base slabs, foundations, walls, beams, slabs, roofs, penetration seals and structural steel. The various types of structural elements, and materials that make up the buildings were identified and listed. The listing of structural elements is facilitated by grouping them into component groups. Structural components/commodities often do not have unique identifiers such as those given to mechanical components. Therefore, identifying structural components as commodities based on materials of construction, their environment and functional applications provided an identification system for aging management reviews.

A list of structural commodities (example; carbon steel with indoor air includes, but is not limited to: carbon steel decking, embedments, fasteners, grating, other miscellaneous steel such as fire walls made from carbon steel siding, doors, plates, platforms, rails for hoists, and shapes) was developed for each civil/structural evaluation boundary. Most structural elements have no moving parts and do not change configuration or properties. Since structures are inherently passive, and long-lived, the screening of structural commodities was based primarily on whether or not they performed an intended function under 10 CFR 54.4(a). Structural commodities that perform an intended function without moving parts and without a change in configuration or properties, and that are not subject to replacement based on a qualified life or specified time period, are subject to aging management review.

Electrical Screening

Screening of electrical and I&C components used a bounding approach as described in NEI 95-10. All Electrical and I&C systems were considered in-scope. Electrical and I&C components were assigned to a commodity grouping. The commodity groups subject to an aging management review were identified by applying the criteria of 10 CFR 54.21(a)(1). This method provided the most efficient means for determining the electrical commodity groups subject to an aging management review since many of the electrical components are active.

The sequence of steps used by Seabrook Station for identification of electrical commodity groups that require an aging management review was as follows:

(1) The criteria of 10 CFR 54.21(a)(1)(i) was applied to identify commodity groups that perform their intended functions without moving parts or without a change in configuration or properties (referred to as "passive" components). These electrical commodity groups were identified utilizing the guidance of NEI 95-10.

(2) Portions of electrical commodity groups that perform no License Renewal intended functions do not require aging management review and were not considered further (e.g., ground conductors, switchyard components outside of SBO boundary).

(3) The screening criterion found in 10 CFR 54.21(a)(1)(ii) excludes those 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 commodity groups that were not previously eliminated by the application of the 10 CFR 54.21(a)(1)(i) screening criterion or previously eliminated because they do not perform a License Renewal intended function. Electrical components included in the plant environmental qualification (EQ) program are replaced on a specified interval based on a qualified life. These components are managed as time-limited aging analyses (TLAAs) and addressed in Section 4.4. 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) A review was performed on the remaining commodity groups, considering industry and Seabrook Station operating experience.

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

(6) The electrical commodities that require an aging management review are passive electrical commodities. 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 Seabrook Station, the electrical commodity groups that require an aging management review are identified in Section 2.5.1.

(7) Components which function as an electrical commodity and a mechanical pressure boundary (e.g., solenoid valves, motor operated valves, heaters, elements, Resistance Temperature Detectors (RTD's), sensors, thermocouples or transducers) are evaluated in separate sections. The mechanical function is evaluated in Section 2.3. The electrical function is evaluated in Section 2.5.

Insulation

At Seabrook Station, thermal insulation was treated as a passive, long lived component during the scoping and screening process. There is no aging effect for thermal insulation in an "air-indoor uncontrolled" environment, however, aluminum insulation jacketing in "air with borated water leakage environment" would have an aging effect of loss of material due to boric acid corrosion. This aging effect will be age managed by the Boric Acid Corrosion Program. The intended function for "Insulation" per Table 2.1-1 is "Provide temperature control."

For license renewal purposes, thermal insulation jacketing is being addressed as a commodity group in the civil / structural section of the license renewal application. Therefore, insulation is not included as a separate component type in each mechanical in scope system. The thermal insulation jacketing is shown in Table 3.5.2-6.

Consumables

The evaluation process used 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 American National Standards Institute (ANSI) B31.1 and the American Society of Mechanical Engineers (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: Structural sealants are required to have an aging management review. 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. 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 (NFPA 10 Code for Portable Extinguishers, NFPA 1962 Code for Inspection, care, use of Fire Hose, Couplings, and Nozzles and NFPA 1981 Respiratory Protective Equipment for Fire Fighters). These standards require replacement of equipment based on their condition or performance during testing and inspection. The periodic inspections are implemented by controlled Seabrook 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.

2.1.4 INTERIM STAFF GUIDANCE (ISG)

The NRC staff has developed guidance documents to capture new insights or address emerging issues as they evolve from application reviews. This guidance is contained in "Interim Staff Guidance" (ISG) documents. The purpose of an ISG is to provide guidance on emerging issues during the development of the License Renewal applications until such time these issues can be incorporated into the license renewal guidance documents.

LR-ISG-19B *Cracking of Nickel-Alloy Components in the Reactor Coolant Pressure Boundary*

Issuance of this interim staff guidance has been "deferred". The NRC staff has prepared a draft aging management program, XI.M11B, "Cracking of Nickel-Alloy Components in the Reactor Coolant Pressure Boundary". This program will be included in the update of NUREG-1801, "Generic Aging Lessons Learned (GALL) Report" and will not become an LR-ISG.

Seabrook Station has addressed nickel-alloy aging mechanisms in Section B.2.1.5, "Nickel-Alloy Penetration Nozzles Welded to the Upper RV Closure Heads of PWRs" and Section B.2.2.3 "Nickel-Alloy Nozzles and Penetrations" and is consistent with NUREG-1801 programs XI.M11A and XI.M11 respectively.

LR-ISG-23 *Replacement Parts Necessary to Meet 10 CFR 50.48 (Fire Protection)*

This interim staff guidance has been withdrawn. The NRC staff determined that additional guidance on this topic is not necessary, as documented by letter dated December 20, 2006.

LR-ISG-2006-01 *Plant-Specific Aging Management Program for Inaccessible Areas of Boiling Water Reactor Mark I Steel Containment Drywell Shell*

The interim staff guidance was issued as "final" and is not applicable to Seabrook Station. This ISG is only applicable to boiling water reactors with Mark I steel containments drywell shells and is not applicable to pressurized water reactor designs.

LR-ISG-2006-02 *Staff Guidance on Acceptance Review for Environmental Reports for License Renewal* Applications

A notice of "withdrawal" of the Proposed LR-ISG-2006-02 was published in the *Federal Register* on July 16, 2009. Seabrook Station has prepared the License Renewal Environmental Report in accordance with NUREG-1437 *Generic Environmental Impact Statement for License Renewal of Nuclear Power Plants, May 1996.*

LR-ISG-2006-03 *Staff Guidance For Preparing Severe Accident Mitigation Alternatives Analyses*

This interim staff guidance has been issued as "final" and is applicable to Seabrook Station. The Seabrook Station severe accident mitigation alternatives analysis is provided in Appendix E to this application. This analysis is consistent with the guidance provided in NEI 05-01, *Severe Accident Mitigation Alternatives.*

LR-ISG-2007-01 *License Renewal Interim Staff Guidance Process, Revision 1*

A notice of availability of the "final" LR-ISG-2007-01 was published in the *Federal Register* on August 17, 2009.

This LR-ISG issues a revised process for guiding the development and implementation of LR-ISGs. The revised process supersedes the previous process entitled, "Process for Interim Staff Guidance," which the NRC staff issued on December 12, 2003.

The LR-ISG does not affect development of the Seabrook Station License Renewal Application.

LR-ISG-2007-02 *Changes to Generic Aging Lessons Learned (GALL) Report Aging Management Program (AMP) XI.E6, "Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements"*

This interim staff guidance has been issued as "final" and is applicable to Seabrook Station. Seabrook Station has addressed LR-ISG-2007-02 in the Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements program, which is described in Section B.2.1.32.

LR-ISG-2008-01 *Staff Guidance Regarding the Station Blackout Rule (10 CFR 50.63) Associated with License Renewal Applications*

A notice of "withdrawal" of the Proposed LR-ISG-2008-01 was published in the Federal Register on July 13, 2009.

LR-ISG-2009-01 *Staff Guidance Regarding Aging Management of Spent Fuel Pool Neutron-Absorbing Materials Other Than Boraflex*

The interim staff guidance has been issued. The guidance states that "an applicant may reference this proposed program in a license renewal application to demonstrate that the programs at the applicant's facility are acceptable until this guidance is implemented into the next update of the Generic Aging Lessons Learned (GALL) Report".

Because NUREG-1801, Section XI does not contain an Aging Management Program for monitoring the aging effects on Boral, the guidance provided in Draft LR-ISG-2009-01 was used to evaluate the Seabrook Station Boral Monitoring Program. Seabrook Station has reviewed the final LR-ISG-2009-01, "*Aging Management of Spent Fuel Pool Neutron-Absorbing Materials Other than Boraflex*", dated May 4, 2010 and determined that the Seabrook Station Boral Monitoring Program Meets the requirements of the final guidance.

2.1.5 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. GSIs involving issues related to License Renewal aging management reviews or TLAAs should be addressed in the License Renewal Application. Based on guidance provided in NEI 95-10, "*Industry Guidelines for Implementing the Requirements of 10 CFR Part 54 – The License Renewal Rule, Revision 6*", NUREG-0933 Supplement 29 dated November 2005, and previous License Renewal applicants, the following GSIs are addressed for Seabrook Station License Renewal:

GSI 163 *Multiple Steam Generator Tube Leakage*

This GSI involves the potential loss of primary system coolant as a result of leakage through multiple steam generator tubes into an un-isolated steam generator. NRC activities to resolve the issue include continuing development of risk-informed guidance to assure compliance with existing regulatory requirements. The NRC stated that compliance with existing regulatory requirements provides reasonable assurance of plant safety.

Steam generator tubes are part of the reactor coolant pressure boundary and are the subject of an aging management review and TLAA evaluation as documented in Section 3.0 and 4.0. The issue of age-related degradation of steam generator tubes is being addressed within the Seabrook Station CLB and will continue to be addressed during the period of extended operation by the Steam Generator Tube Integrity program discussed in Section B.2.1.10.

<u>GSI-191</u> *Assessment of Debris Accumulation on PWR Sump Performance*

This GSI addresses the potential for blockage of containment sump strainers that filter debris from cooling water supplied to the safety injection and containment spray pumps following a postulated LOCA. The issue is based on the identification of new potential sources of debris, including failed containment coatings, which may block the sump strainers. In response to NRC Generic Letter 2004-02, "*Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized Water Reactors*," dated September 1, 2005, Seabrook Station committed to debris screen modifications in accordance with the Generic Letter requirements. Installation of the debris screen modifications has been completed and incorporated into the IPA . Seabrook Station does not credit coatings inside containment to manage aging of SSCs. However, coatings in containment that are credited to remain in place during design bases events have been qualified for forty years. Therefore, these coatings are considered a Time Limited Aging Analysis (TLAA) and addressed in Section 4.7.7 for the period of extended operation.

2.1.6 CONCLUSION

The scoping and screening methodology described above was used for the Seabrook Station 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).

TABLE 2.1-1
PASSIVE STRUCTURE/COMPONENT INTENDED FUNCTIONS

Intended Function	Description
Absorb neutrons	Absorb neutrons
Control Building Habitability	Minimize in-leakage by maintaining/support positive pressure in the Control Building isolation mode
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
Expansion/separation	Provide for thermal expansion and/or seismic separation
Filter	Provide filtration
Fire barrier	Provide rated fire barrier to confine or retard a fire from spreading to and from adjacent areas of the plant
Flood barrier	Provide flood protection barrier (internal and external flooding event)
Heat transfer	Provide heat transfer
HELB Shielding	Provide shielding against high energy line breaks
Insulate (electrical)	Insulate and support an electrical conductor
Insulate	Provide temperature control
Leakage boundary (spatial)	Non-safety related component that maintains mechanical and structural integrity to prevent spatial interactions that could cause failure of safety related SSCs
Missile barrier	Provide missile barrier (internally or externally generated)
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
Shelter, protection	Provide shelter/protection to safety related components
Shielding	Provide shielding against radiation

Intended Function	Description
Spray	Convert fluid to spray
Structural integrity (attached)	Non-safety related component that maintains mechanical and structural integrity to provide structural support to attached safety related piping and components
Structural pressure barrier	Provide pressure boundary or essentially leak tight barrier to protect public health and safety in the event of any postulated design basis events
Structural support	Provide structural and/or functional support to safety related and/or non-safety related components
Support	Support/mitigate regulated events
Throttle	Provide flow restriction

FIGURE 2.1-1

SCOPING FLOWCHART

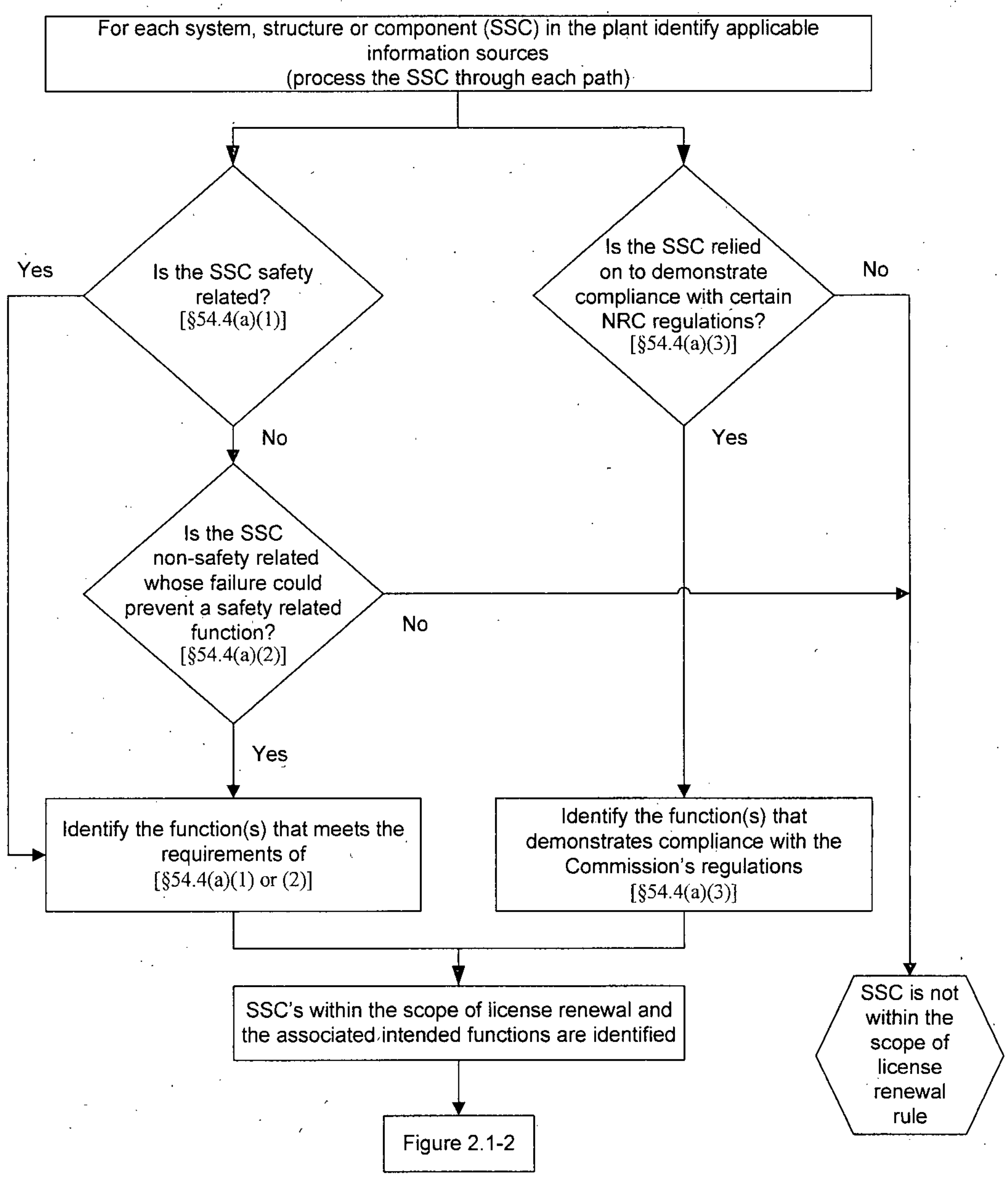
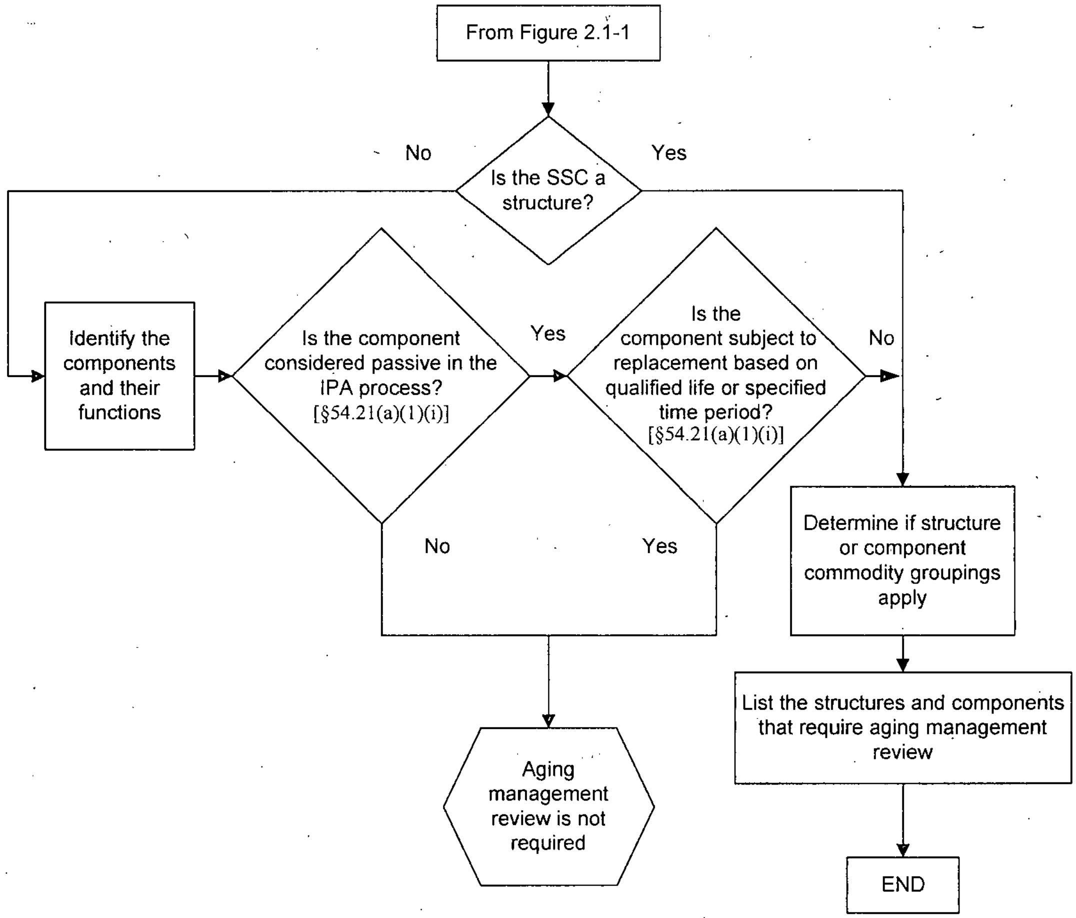


FIGURE 2.1-2

SCREENING FLOWCHART



2.2 PLANT LEVEL SCOPING RESULTS

Table 2.2-1 lists the Seabrook Station systems, structures and a commodity group that were evaluated using the methodology described in Section 2.1 and determined to be within the scope of license renewal. The system or structure identifier is included. For each in-scope system, structure group or commodity group, a reference is provided to the section containing the scoping and screening results.

Table 2.2-2 lists the Seabrook Station systems, structures and commodity groups that were evaluated using the methodology described in Section 2.1 and were determined to not be in the scope of license renewal. A reference to the applicable Seabrook Station Updated Final Safety Analysis Report (UFSAR) section(s), where available, is provided for each Mechanical and Electrical/Instrumentation and Controls (I&C) system determined to not be in scope. Structures listed in Table 2.2-2 are provided with clarifying notes as to why these structures are not in scope.

Table 2.2-1 Systems and Structures Within the Scope of License Renewal

System – Structure	System - Structure ID	Section 2 Scoping Results
Mechanical Systems		
Reactor Vessel, Internals, and Reactor Coolant System		
Reactor Coolant	RC	2.3.1.1
Reactor Vessel	RV	2.3.1.2
Reactor Vessel Internals	RVI	2.3.1.3
Steam Generator	SG	2.3.1.4
Engineered Safety Systems		
Combustible Gas Control	CGC	2.3.2.1
Containment Building Spray	CBS	2.3.2.2
Residual Heat Removal	RH	2.3.2.3
Safety Injection	SI	2.3.2.4
Auxiliary Systems		
Auxiliary Boiler	AB	2.3.3.1
Boron Recovery System	BRS	2.3.3.2
Chemical and Volume Control System	CS	2.3.3.3
Chlorination	CL	2.3.3.4
Containment Air Handling	CAH	2.3.3.5
Containment Air Purge	CAP	2.3.3.6
Containment Enclosure Air Handling	EAH	2.3.3.7
Containment Online Purge	COP	2.3.3.8
Control Building Air Handling	CBA	2.3.3.9
Demineralized Water	DM	2.3.3.10
Dewatering	DW	2.3.3.11
Diesel Generator	DG	2.3.3.12
Diesel Generator Air Handling	DAH	2.3.3.13

System – Structure	System - Structure ID	Section 2 Scoping Results
Mechanical Systems		
Emergency Feedwater Pumphouse Air Handling	EPA	2.3.3.14
Fire Protection	FP	2.3.3.15
Fuel Handling	FH	2.3.3.16
Fuel Oil	FO	2.3.3.17
Fuel Storage Building Air Handling	FAH	2.3.3.18
Hot Water Heating	HW	2.3.3.19
Instrument Air	IA	2.3.3.20
Leak Detection	LD	2.3.3.21
Mechanical Seal Supply System	MSS	2.3.3.22
Miscellaneous Equipment	MM	2.3.3.23
Nitrogen Gas	NG	2.3.3.24
Oil Collection for Reactor Coolant Pumps	OC	2.3.3.25
Plant Floor Drain	DF	2.3.3.26
Potable Water	PW	2.3.3.27
Primary Auxiliary Building Air Handling	PAH	2.3.3.28
Primary Component Cooling Water	CC	2.3.3.29
Radiation Monitoring	RM	2.3.3.30
Reactor Makeup Water	RMW	2.3.3.31
Release Recovery	RR	2.3.3.32
Resin Sluicing	RS	2.3.3.33
Roof Drains	DR	2.3.3.34
Sample System	SS	2.3.3.35
Screen Wash	SCW	2.3.3.36
Service Water	SW	2.3.3.37
Service Water Pumphouse Air Handling	SWA	2.3.3.38
Spent Fuel Pool Cooling	SF	2.3.3.39
Switchyard	SY	2.3.3.40, 2.5
Valve Stem Leak Off	VSL	2.3.3.41

System – Structure	System - Structure ID	Section 2 Scoping Results
Mechanical Systems		
Vent Gas	VG	2.3.3.42
Waste Gas	WG	2.3.3.43
Waste Processing Liquid	WL	2.3.3.44
Waste Processing Liquid Drains	WLD	2.3.3.45
Steam and Power Conversion Systems		
Auxiliary Steam	AS	2.3.4.1
Auxiliary Steam Condensate	ASC	2.3.4.2
Auxiliary Steam Heating	ASH	2.3.4.3
Circulating Water	CW	2.3.4.4
Condensate	CO	2.3.4.5.
Feedwater	FW	2.3.4.6
Main Steam	MS	2.3.4.7
Steam Generator Blowdown	SB	2.3.4.8
Structures and Component Supports		
Buildings Affecting Safety		2.4.1
Discharge Transition Structure	10	2.4.1
Fire Pumphouse, Tank Foundation and Donkey Boiler House	30, 31, 82 & 84	2.4.1
Intake Transition Structure	9	2.4.1
Nonessential Switchgear Building	13	2.4.1
Revetment	37, 38 & 39	2.4.1
Steam Generator Blowdown Recovery Building	46	2.4.1
Containment Structures		2.4.2
Containment Structure	1	2.4.2
Containment Enclosure Building	2	2.4.2
Containment Enclosure Ventilation Area	3	2.4.2
Fuel Handling & Overhead Cranes		2.4.3
Miscellaneous Yard Structures		2.4.4

System – Structure	System - Structure ID	Section 2 Scoping Results
Structures		
Condensate Storage Tank Enclosure	80	2.4.4
Control Room Makeup Air Intake Structures	27	2.4.4
Nonsafety Related Electrical Duct Banks/Manholes	n/a	2.4.4
Safety Related Electrical Duct Banks/Manholes	n/a	2.4.4
Service Water Access Vault	17	2.4.4
Station Blackout Structures	28 & 29	2.4.4
Primary Structures		2.4.5
Containment Equipment Hatch Missile Shield	83	2.4.5
Control and Diesel Generator Building	11 & 12	2.4.5
Emergency Feedwater Pump Building, including Electrical Cable Tunnels and Penetration Area	18	2.4.5
Fuel Storage Building	16	2.4.5
Main Steam and Feedwater Pipe Chases East & West	19 & 20	2.4.5
Personnel Hatch Area	22	2.4.5
Primary Auxiliary Building including Residual Heat Removal Vault	15	2.4.5
Tank Farm	23	2.4.5
Waste Processing Building	24	2.4.5
Supports	n/a	2.4.6
Turbine Building	4	2.4.7
Water Control Structures		2.4.8
Service Water Cooling Tower	25	2.4.8
Service Water Pumphouse	7	2.4.8
Circulating Water Pumphouse	6	2.4.8
Electrical and I&C Systems		
Electrical Distribution	ED	2.5

System – Structure	System - Structure ID	Section 2 Scoping Results
Electrical and I&C		
Electrical Distribution - Emergency	EDE	2.5
Grounding	GD	2.5
Heat Tracing	HT	2.5
Incore Instrumentation	IC	2.5
Lighting	LTG	2.5
Meteorological System	MET	2.5
Nuclear Instrumentation	NI	2.5
Public Address Communication	PAC	2.5
Radiation Monitoring	RM	2.5
Rod Control and Position	CP	2.5
Security & Fire Detection System	SFD	2.5
Seismic Monitoring	SM	2.5
STA Info & Alarm Comp	SC	2.5
Turbine Electro-Hydraulic System	EHC	2.5
Turbine Supervisory Instrumentation	TSI	2.5
Vibration Monitoring	VB	2.5

Table 2.2-2 Systems and Structures Not In the Scope of License Renewal

System - Structure	System - Structure ID	UFSAR Reference and Notes
Mechanical Systems		
Admin Bldg Air Handling	AAH	9.4.12
Acetylene	ACT	
Argon Methane	AM	
Argon	AN	
Condenser Air Evacuation	AR	10.4.2.1, 10.4.2.5
Boiling Water Guardhouse	BW	
Carbon Dioxide	CD	10.2.2.2
Chemical Laboratory Vacuum	CLV	
Chemical Analysis System	CAS	9.3.2, 10.3.5.1 & .3
Chemical Treatment & Secondary Chemistry	CT	
Chilled Water	CHW	
Chlorination Air Handling	CLA	
Condensate Polishing Air Handling	CPH	
Condensate Polishing System	CPS	10.4.6.1 & .2
Contaminated Waste	DCW	
CW Pumphouse Air Handling	CWA	
Decontamination Area Waste	DC	9.3.3.2.b.6
Decontamination Waste Vent	DCV	
Dry Fuel Storage	DFS	1.2.2.22
Electrical Tunnel Air Handling	ETA	
Equipment Handling	EH	
Extraction Steam	EX	10.2.2.3
Fire Pumphouse Air Handling	FPA	
Generator Stator Coolant	GSC	
Guardhouse Air Handling	GAH	
Heater Drains	HD	

System - Structure	System - Structure ID	UFSAR Reference and Notes
Mechanical Systems		
Helium	HE	
Hydraulic Fluid	HF	10.2.2.4
Hydrogen Gas	HG	10.2.2.2, 11.3.2
Hydrogen Gas to Generator	HGG	10.2.2.2
Isobutane - Helium	IH	
Lubricating Oil	LO	
Mapp Gas	MAP	Appendix A
Meteorological Tower	MET	
Miscellaneous Vents and Drains	MVD	
Moisture Separator & Reheater Drains	MD	
Nitrous Oxide	NX	
Non-Essential Switchgear Air	SGA	
Oxygen	OG	
Propane	PP	Appendix A
RCA Check Point Air Handling	CPA	
Sanitary Piping	SAN	9.2.4.1
Sanitary Lagoon Area	SLA	9.2.4.1
Seal Oil Generator	SO	
Secondary Component Cooling	SCC	
SGFP Turbine Drive A Equipment	TDA	10.4.7.2.b
SGFP Turbine Drive B Equipment	TDB	10.4.7.2.b
Storm Drains	SD	2.4.2.3, 2.4.5.3
Supplementary Emergency Power	SEPS	8.3.1.1.b.9.c
Turbine Building Air Handling	TAH	9.4.15
Turning Gear	TG	
Turbine Generator	TH	10.2.1
Turbine Steam Seal	SSS	

System - Structure	System - Structure ID	UFSAR Reference and Notes
Waste Processing Air Handling	WAH	9.4.4.
Waste Processing Solid	WS	11.4.2
Water Treatment	WT	9.2.3.2, 9.2.3.3
Structures		
Abandoned Old Barn	91	Note 1
Abandoned Sewage Treatment Building	34	Note 1
Administration and Service Building	5	Note 2
Alternative Radiation Protection Check Point	78	Note 2
Asphalt Building	71	Note 2
Chlorination Building	45	Note 2
Condensate Polisher Facility	76	Note 2
Control Building for Meteorological Tower	105	Note 1
Demineralized Water Storage Tank	26	Note 2
Dry (Spent) Fuel Storage Facility	79	Note 1
Electrical Shack	95	Note 1
Employee Allegation Resolution Office	57	Note 1
Equipment Maintenance Facility	59	Note 1
Fabrication Facility	62	Note 1
Fire Protection Facility	61	Note 1
Fitness Center	41	Note 1
Fuel Oil Storage Tank	32	Note 1
Fuel Storage Tanks	87	Note 1
Gas Bottle Storage Facilities	75	Note 2
General Office Building	44	Note 1

System - Structure	System - Structure ID	UFSAR Reference and Notes
Structures		
Guard House	33	Note 2
High Rise Building	63	Note 1
Hydrogen Storage Area	50	Note 1
Intake and Discharge Tunnels	106	Note 4
Lincoln Park Substation	100	Note 3
Lube Oil Storage Building	72	Note 2
Lumber Mill Facility	58	Note 1
Maintenance Facility	73	Note 2
Metal Shack	103	Note 2
Meteorological Tower	36	Note 1
Miscellaneous Construction Trailers	96	Notes 1 & 2
Miscellaneous Cranes	-	Note 5
Miscellaneous Non-operational Bldgs	35	Note 1
North Gate House	89	Note 1
Office Equipment Storage Building	69	Note 1
Oil/Water Separator Vault No 1	51	Note 2
Oil/Water Separator Vault No 2	52	Note 2
Oil/Water Separator Vault No 3	53	Note 1
Operational Support Building	68	Note 1
OPS Training Center	47	Note 1
Permanent Security Fence	42	Note 2
Planning/Projects Trailer	98	Note 1
Production Warehouse	70	Note 1
Radioactive Waste Metal Storage Shack	101	Note 2
Radiation Calibration Facility	48	Note 2

System - Structure	System - Structure ID	UFSAR Reference and Notes
Structures		
Radioactive Controlled Area Storage Facility	74	Note 2
Science and Nature Center	40	Note 1
Sewer Lift Station	104	Note 1
SF_6 Refurbishment & Test Facility	65	Note 1
Shack (Fire Fighting Training)	94	Note 1
Siren Maintenance Facility	60	Note 1
Snow Plow Storage	86	Note 1
South Gate House	90	Note 1
Staging Storage Facility	43	Note 1
Storage Building	93	Note 1
Storage Shack	102	Note 2
Storage Tent	97	Note 1
Sundial Substation	100	Note 3,
Supplemental Emergency Power System Enclosure	77	Note 2
Technical Training Center	64	Note 1
Transformers T45, T46, T47 & Electrical Building for T45, T46, T47	92	Note 1
Unit 1 Abandoned Control Building Make-up Air Intake Structure	99	Note 1
Unit 2 Structure	85	Note 1
Unit 2 Storage Buildings	67	Note 1
Warehouse No 1 M&TE Calibration/Conference Center	54	Note 1
Warehouse No 2	55	Note 1
Warehouse No 3	56	Note 1
Weld Training Center	66	Note 1
West Rye Substation	100	Note 3

System - Structure	System - Structure ID	UFSAR Reference and Notes
Wood Storage Shed	88	Note 1
345kV Termination Center	49	Note 1
Electrical and I&C System		
Campus Power	na	Note 3

Notes:

1. Structure is located outside of the Protected Area and is not safety related. It is not in close proximity to safety related SSCs and is not in scope for 10 CFR 54.4(a)(2). The structure does not house/protect any SSCs that are credited in the CLB for Fire Protection, Environmental Qualification, Pressurized Thermal Shock, Anticipated Transients Without Scram or Station Blackout.

2. Structure is located inside the Protected Area and is not safety related. It is not in close proximity to safety related SSCs and is not in scope for 10 CFR 54.4(a)(2). The structure does not house/protect any SSCs that are credited in the CLB for Fire Protection, Environmental Qualification, Pressurized Thermal Shock, Anticipated Transients Without Scram or Station Blackout.

3. Campus Power distribution network is not safety related and failure of its structures or equipment cannot fail any 10CFR 54.4(a)(1) SSCs. Campus Power does not provide/support any function credited in the CLB for Fire Protection, Environmental Qualification, Pressurized Thermal Shock, Anticipated Transients Without Scram or Station Blackout.

4. The Intake and Discharge Tunnels are not in scope due to the following:
   - The Intake and Discharge Tunnels are not safety related and therefore do not meet the scoping criteria of License Renewal 10 CFR 54.4 (a)(1).
   - Credible, age-related failure of the tunnel would not prevent the satisfactory accomplishment of any License Renewal 10 CFR 54.4 (a)(1) function and therefore does not meet the scoping criteria of License Renewal 10 CFR 54.4 (a)(2).
   - The tunnels do not have a credible Appendix R function and therefore do not meet the scoping criteria of License Renewal 10 CFR 54.4 (a)(3).

5. The active components of the miscellaneous in scope cranes and hoists will be screened out as being active. The passive components are included with the structures where they are located.

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:

- Reactor Coolant System (2.3.1.1)
- Reactor Vessel (2.3.1.2)
- Reactor Vessel Internals (2.3.1.3)
- Steam Generator (2.3.1.4)

2.3.1.1 Reactor Coolant System

System Description

The Reactor Coolant System consists of four similar heat transfer loops connected in parallel to the reactor pressure vessel. Each loop contains a Reactor Coolant pump, steam generator, and associated piping and valves. In addition, the system includes a pressurizer, pressurizer relief tank, pressurizer relief and safety valves, interconnecting piping, and instrumentation necessary for operational control. All the above components are located in the Containment Building.

During operation, the Reactor Coolant System transfers the heat generated in the core to the steam generators, where steam is produced to drive the turbine generator. Borated demineralized water is circulated in the Reactor Coolant System at a flow rate and temperature consistent with achieving the reactor core thermal-hydraulic performance. The water also acts as a neutron moderator and reflector, and as a solvent for the neutron absorber used in chemical shim control.

The Reactor Coolant System pressure boundary provides a barrier against the release of radioactivity generated within the reactor, and is designed to ensure a high degree of integrity throughout the life of the plant.

Reactor Coolant System pressure is controlled by the use of the pressurizer, where water and steam are maintained in equilibrium by electrical heaters and water sprays. Steam can be formed (by the heaters) or condensed (by the pressurizer spray) to minimize pressure variations due to contraction and expansion of the reactor coolant. Spring-loaded safety valves and power-operated relief valves from the pressurizer provide for steam discharge to the pressurizer relief tank, where the steam is condensed and cooled by mixing with water.

<u>*Reactor Coolant System Components*</u>

1. *Reactor Vessel (Evaluated Separately)*

   The Reactor Vessel is cylindrical, with a welded hemispherical bottom head and a removable, flanged and gasketed, hemispherical upper head. The vessel contains the core, core supporting structures, control rods, and other parts directly associated with the core. The vessel has inlet and outlet nozzles located in a horizontal plane just below the Reactor Vessel flange but above the top of the core. Coolant enters the vessel through the inlet nozzles and flows down the core barrel-vessel wall annulus, turns at the bottom and flows up through the core to the outlet nozzles.

2. *Steam Generators (Evaluated Separately)*

   The Steam Generators are vertical shell and U-tube evaporators with integral moisture separating equipment. The Reactor Coolant flows through the inverted U-tubes entering and leaving through the nozzles located in the hemispherical bottom head of the Steam Generator. Steam is generated on the shell side and flows upward through the moisture separators to the outlet nozzle at the top of the vessel.

3. *Reactor Coolant Pumps*

   The Reactor Coolant pumps are identical single speed centrifugal units driven by water/air cooled, three phase induction motors. The internal parts of the motor are cooled by air which is routed through external water/air heat exchangers. The shaft is vertical, with the motor mounted above the pump. A flywheel on the shaft above the motor provides additional inertia to extend pump coast down. The inlet is at the bottom of the pump and the discharge on the side.

4. *Piping*

   The Reactor Coolant loop piping is specified in sizes consistent with system requirements. The hot leg inside diameter is 29 inches and the inside diameter of the cold leg return line to the Reactor Vessel is 27½ inches. The piping between the Steam Generator and the pump suction is increased to 31 inches in inside diameter to reduce pressure drop and improve flow conditions to the pump suction.

5. *Pressurizer*

   The pressurizer is a vertical, cylindrical vessel with hemispherical top and bottom heads. Electrical heaters are installed through the bottom head of the vessel while the spray nozzle, relief and safety valve connections are located in the top head of the vessel.

6. *Safety and Relief Valves*

   The pressurizer safety valves are of the totally enclosed pop-type. The valves are spring loaded, self-activated, with back pressure compensation. The power-operated relief valves limit system pressure in the event of a large power mismatch. They are operated automatically or by remote manual control. Remotely operated valves are provided to isolate the inlet to the power-operated valves if excessive leakage occurs. Steam from the pressurizer safety and relief valves is discharged into the Pressurizer Relief Tank, where it is condensed and cooled by mixing with water near ambient temperature.

7. *Pressurizer Relief Tank*

   The tank is a horizontal, cylindrical vessel with elliptical dished heads. The vessel is constructed of austenitic stainless steel and is overpressure protected in accordance with ASME Boiler and Pressure Vessel Code, Section VIII, Division 1, by means of two safety heads with stainless steel rupture discs. A flanged nozzle is provided on the tank for the pressurizer discharge line connection to the sparger pipe. The tank is also equipped with an internal spray connected to a cold water inlet and a bottom drain, which are used to cool the tank following a discharge.

8. *Pressurizer Relief Tank Pump*

   The Pressurizer Relief Tank pump is an end suction centrifugal pump with totally enclosed, fan cooled motor. The pump is used to circulate water through the Pressurizer Relief Tank heat exchanger to cool the Pressurizer Relief Tank following a discharge by the pressurizer safety relief valves or power operated relief valves. The pump is also used to transfer the cooled fluid to the Waste Processing Liquid System.

9. *Pressurizer Relief Tank Heat Exchanger*

   This heat exchanger is a horizontal shell and tube type. It is cooled by primary component cooling water to remove heat from the liquid following a discharge by the safety relief valves or power operated relief valves.

In-Scope Boundary Description

The Reactor Coolant System boundary includes the pressurizer, Reactor Coolant pumps and their oil lift system, hot leg and cold leg piping, Pressurizer Relief Tank, pressurizer heaters, pressurizer surge line, and pressurizer spray line, including the auxiliary spray piping back to its first isolation valve.

The Reactor Coolant System scoping boundary begins at the Reactor Vessel outlet nozzle safe end-to-pipe welds, continues through the hot leg piping to the Steam Generator inlet nozzle safe end-to-pipe welds. The Steam Generators are evaluated as a separate license renewal system. The Reactor Coolant System boundary continues from the Steam Generator outlet safe end-to-pipe welds through the cold leg piping to the suction of the Reactor Coolant pump. The Reactor Coolant System boundary continues from the Reactor Coolant pump discharge through the cold leg piping to the Reactor Vessel inlet nozzle pipe-to-safe end welds. The Reactor Vessel is evaluated as a separate license renewal system. The pressurizer surge line that is connected from the hot leg to the pressurizer lower head is included in the

Reactor Coolant System boundary, as well as the pressurizer spray lines that are connected from the cold leg piping to the spray nozzle, internal to the pressurizer.

PID-1-RC-LR20845:

The Reactor Coolant System scoping boundary includes the Reactor Vessel head vent piping from the vessel head nozzle to the Pressurizer Relief Tank.

The scoping boundary includes the Reactor Vessel Level Instrumentation System (RVLIS) line beginning at the restricting orifice located at the upper head penetration and on to the reference leg instrument, to capillary tubing through a containment penetration, and termination at a level transmitter. The sensing line for RVLIS begins at the lower head instrumentation nozzle-to-guide tube weld, passes through the seal table, and terminates at the level devices. The boundary continues from the level device via capillary lines to the containment penetration, and terminates at both level and pressure transmitters. Also included in the boundary are the incore instrument guide tubes.

The drain lines from the inner and outer head flange O-ring seals begin at the vessel nozzles welds, and terminate at the Reactor Coolant drain tank.

PID-1-RC-LR20846:

The Reactor Coolant System scoping boundary includes the pressurizer attached piping, and code safety valves and power-operated relief valves with discharge lines.

The pressurizer steam and liquid space sample lines each pass through flex hose, capillary tubing, and various valves to the inside containment isolation valve where the two lines join. The single line exits containment through the outside containment isolation solenoid valve where the boundary terminates at the inlet to the pressurizer liquid and steam sample heat exchanger.

The pressurizer instrument lines and heaters are in scope. The pressurizer relief lines to the safety valves and pressure control valves are in the scope of the Reactor Coolant System. Discharge from these lines vents to the Pressurizer Relief Tank. The Pressurizer Relief Tank, pump, heat exchanger, instrumentation and connected pipes and valves are in scope.

Pressurizer spray lines from the Reactor Coolant cold legs each include a pressure control valve and a bypass line/throttle valve around the pressure control valve, then join to a single spray line and terminates at the pressurizer spray nozzle.

PID-1-RC-LR20841:

The boundary consists of safety related components that provide the Loop 1 flow path from the Reactor Vessel to the Steam Generator, then to Reactor Coolant pump, and back to the Reactor Vessel, the branch lines that provide a pressure boundary for the Reactor Coolant piping and the piping to the pressurizer. The non-safety related boundary consists of the components that interface with the seal connections on the Reactor Coolant pumps and the drain line components downstream of the safety related boundary.

PID-1-RC-LR20842:

The boundary consist of safety related components that provide the Loop 2 flow path from the Reactor Vessel to the Steam Generator, then to Reactor Coolant pump, and back to the Reactor Vessel and the branch lines that provide a pressure boundary for the Reactor Coolant piping. The non-safety related boundary consists of the components that interface with the seal connections on the Reactor Coolant pumps and the drain line components downstream of the safety related boundary.

PID-1-RC-LR20843:

The boundary consists of safety related components that provide the Loop 3 flow path from the Reactor Vessel to the Steam Generator, then to Reactor Coolant pump, and back to the Reactor Vessel, and the branch lines that provide a pressure boundary for the Reactor Coolant piping and the piping to the pressurizer. The non-safety related boundary consists of the components that interface with the seal connections on the Reactor Coolant pumps and the drain line components downstream of the safety related boundary.

PID-1-RC-LR20844:

The boundary consists of safety related components that provide the Loop 4 flow path from the Reactor Vessel to the Steam Generator, then to Reactor Coolant pump, and back to the Reactor Vessel and the branch lines that provide a pressure boundary for the Reactor Coolant piping. The non-safety related boundary consists of the components that interface with the seal connections on the Reactor Coolant pumps and the drain line components downstream of the safety related boundary.

PID-1-CS-LR20722:

The boundary consists of safety related piping that interfaces with the regenerative heat exchanger in the Chemical and Volume Control System.

PID-1-RH-LR20662:

The boundary consists of safety related components that provide a flow path to the Residual Heat Removal Pump "A" and branch lines to instruments. The non-safety related boundary consists of the drain line components downstream of the safety related boundary.

PID-1-RH-LR20663:

The boundary consists of safety related components that provide a flow path to the Residual Heat Removal Pump "B" and branch lines to instruments. The non-safety related boundary consists of the drain line components downstream of the safety related boundary.

PID-1-SI-LR20448:

The boundary consists of safety related components which are the same components that are shown on PID-1-RH-LR20662 and PID-1-RH-LR20663. These components provide a flow path to the Residual Heat Removal Pumps "A" and "B" and the branch lines to instruments. The non-safety related boundary consists of the components that are shown on PID-1-RH-LR20662 and PID-1-RH-LR20663, which are the drain line components downstream of the safety related boundary.

PID-1-SI-LR20450:

The boundary consists of non-safety related drain piping that interfaces with the Safety Injection System.

PID-1-SS-LR20518:

The boundary consists of safety related pressure boundary components for penetrations X-35 and X-40. The non-safety related boundary consists of the drain and vent components downstream of the safety related components, and the components in process lines that interface with the Sample System.

PID-1-SS-LR20520:

The boundary consists of non-safety related drain piping that interfaces with the Sample System.

PID-1-VSL-LR20777:

The boundary consists of non-safety related drain piping that interfaces with the Valve Stem Leak-off System and Waste Processing Liquid Drains System.

PID-1-WLD-LR20218:

The boundary consists of the safety related pressure boundary that interfaces with the Waste Processing Liquid Drain System. The non-safety related components which are the drain piping components that interface with the Waste Processing Liquid Drains System.

PID-1-WLD-LR20219:

The boundary consists of non-safety related drain piping that interfaces with the Waste Processing Liquid Drains System.

PID-1-WLD-LR20221:

The boundary consists of non-safety related drain piping that interfaces with the Waste Processing Liquid Drains System.

The Reactor Coolant System scoping boundary also includes the pressure retaining portions of Reactor Coolant System instrumentation and its associated piping, tubing, and instrumentation root valves.

Interfacing Systems

Not included in the Reactor Coolant System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Chemical and Volume Control System
- Nitrogen Gas System
- Residual Heat Removal System
- Reactor Makeup Water System
- Reactor Vessel
- Reactor Vessel Internals
- Safety Injection System
- Sample System
- Steam Generators
- Valve Stem Leak-off System
- Vent Gas System
- Waste Processing Liquid Drains System

System Intended Functions

Provide a pressure boundary capable of accommodating temperatures and pressures associated with operational transients.	10 CFR 54.4(a)(1)
Provide adequate flow to the Steam Generator to transfer the heat from the core to the steam and power conversion systems.	10 CFR 54.4(a)(1)
Transfer residual heat from the reactor core to the residual heat removal system during cool down and subsequent shutdown.	10 CFR 54.4(a)(1)
Provide the water used as the neutron moderator and reflector, and as a solvent for chemical shim (boric acid) control.	10 CFR 54.4(a)(1)
Establish and maintain Reactor Coolant System pressure.	10 CFR 54.4(a)(1)
Provide overpressure protection for the Reactor Coolant System.	10 CFR 54.4(a)(1)
Reactor Coolant pressure boundary accommodates volume changes in Reactor Coolant during transient conditions.	10 CFR 54.4(a)(1)
Provide alarms, interlocks, display, control, and protection functions to enable safe operation and shut down of the Reactor Coolant System and other subsystems. This function includes Post Accident Monitoring instrumentation / indications.	10 CFR 54.4(a)(1)
Provide Containment Isolation function.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Anticipated Transients Without Scram (ATWS).	10 CFR 54.4(a)(3)

This system contains components which perform functions credited for Environmental Qualification (EQ).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Station Blackout (SBO).	10 CFR 54.4(a)(3)

UFSAR References

- Section 1.2.3.2
- Section 5.1
- Section 5.2
- Table 6.2-83
- Section 7.2
- Table 7.5-1
- Table 7.5-2

License Renewal Drawings

- PID-1-CS-LR20722
- PID-1-RC-LR20841
- PID-1-RC-LR20842
- PID-1-RC-LR20843
- PID-1-RC-LR20844
- PID-1-RC-LR20845
- PID-1-RC-LR20846
- PID-1-RH-LR20662
- PID-1-RH-LR20663

- PID-1-SI-LR20448
- PID-1-SI-LR20450
- PID-1-SS-LR20518
- PID-1-SS-LR20520
- PID-1-VSL-LR20777
- PID-1-WLD-LR20218
- PID-1-WLD-LR20219
- PID-1-WLD-LR20221

Table 2.3.1-1 Reactor Coolant System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Bolting (Class 1)	Pressure Boundary
Flexible Hose	Leakage Boundary (Spatial) Pressure Boundary
Heat Exchanger Components	Heat Transfer Leakage Boundary (Spatial) Pressure Boundary
Incore Instrument Guide Tube	Pressure Boundary
Orifice (Class 1)	Pressure Boundary Throttle
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary
Piping and Fittings (Class 1)	Pressure Boundary
Piping and Fittings (Class 1 < 4 inches)	Pressure Boundary
Pressurizer Components	Pressure Boundary
Pressurizer Diaphragm Plate	Pressure Boundary
Pressurizer Heater Sleeves	Pressure Boundary
Pressurizer Integral Support	Pressure Boundary
Pressurizer Manway Cover	Pressure Boundary
Pressurizer Nozzle	Pressure Boundary
Pressurizer Nozzle Safe End	Pressure Boundary
Pressurizer Spray Head	Spray
Pump Casing	Leakage Boundary (Spatial)
Pump Casing (Class 1)	Pressure Boundary
Reactor Coolant System Piping and Fittings	Pressure Boundary
Rupture Disk	Leakage Boundary (Spatial)
Tank	Leakage Boundary (Spatial)
Thermowell	Leakage Boundary (Spatial)

Component Type	Intended Function
	Pressure Boundary
Thermowell (Class 1)	Pressure Boundary
Valve Body	Leakage Boundary (Spatial) Pressure Boundary
Valve Body (Class 1)	Pressure Boundary

The aging management review results for these components are provided in Table 3.1.2-1, Summary of Aging Management Evaluation - Reactor Coolant System.

2.3.1.2 Reactor Vessel

System Description

The Reactor Vessel is a cylinder with a welded hemispherical bottom head and a removable, flanged hemispherical upper head. The vessel contains the core, core supporting structures, control rods, and other parts directly associated with the core.

The vessel has four inlet and four outlet nozzles located in a horizontal plane just below the Reactor Vessel flange but above the top of the core. Coolant enters the vessel through the inlet nozzles and flows down the core barrel-vessel wall annulus, turns at the bottom and flows up through the core to the outlet nozzles.

Two O-ring seals are installed between the mating surfaces of the closure head flange and the Reactor Vessel flange. The O-ring seals prevent leakage of the primary coolant between the vessel and the closure head. Two head seal monitoring connections are used to detect seal leakage. One detects leakage between the inner and outer seals, while the other detects leakage outside the outer seal. Piping and various valves are used to direct any leakage to the Reactor Coolant Drain Tank.

Both the upper and lower Reactor Vessel heads contain penetrations which are used for instrumentation or control devices. The lower Reactor Vessel head has penetrations for 58 incore nuclear instrumentation thimbles, while the vessel upper head contains 79 control rod drive mechanism (CRDM) penetrations. A threaded, 316 stainless steel adapter is welded to the upper end of each tube. CRDM housings are attached to 57 of these adapters. The housings are threaded onto the adapters and seal welded. The remaining penetrations in the upper head were originally designed to be used for incore thermocouple access points and part-length CRDMs. Due to design changes, neither are utilized at Seabrook Station. Therefore, the penetrations are capped and seal welded. One of the capped penetrations, however, is used by the Reactor Vessel Level Instrumentation System (RVLIS). A 1-inch pipe is connected to the cap, and spool pieces allow for removal when the upper head is removed from the vessel.

There is also a 1-inch penetration in the upper head which is used as a vent path for the vessel. An Inconel tube passes through the penetration and is welded to the interior of the head.

The Reactor Vessel is supported by steel pads on four of the coolant nozzles. The pads rest on steel base plates atop a support structure that is attached to the concrete foundation wall. There are also three lifting lugs evenly spaced around the upper head, which are used to move it.

The six core support lugs provide rotational support/stability for the Reactor Vessel Internals.

In-Scope Boundary Description

PID-1-RC-LR20845:

The Reactor Vessel boundary begins at the Reactor Vessel inlet nozzle safe ends and includes the Reactor Vessel shell, core support lugs, lower head, upper head and head flange, and terminates at the outlet nozzle safe ends. There are a series of plates and baffles assisting in flow distribution through the core. These plates and baffles are separately evaluated with the Reactor Vessel Internals.

The license renewal scoping boundary of the Reactor Vessel encompasses the Reactor Vessel, including the Reactor Vessel shell, flange, Reactor Vessel lower head, upper head assembly, primary nozzles and nozzle supports, the control rod drive mechanisms and housings, closure studs, flange metal o-rings, and the flange leak-off nozzles. The control rod drive system drive shafts are in the scope of the Reactor Vessel Internals and are not evaluated here. The upper head RVLIS instrument nozzle, up to but not including the restricting orifice, is in the scope of Reactor Vessel. The remaining portion of the reactor vessel level instrumentation system is evaluated separately with the Reactor Coolant System.

The head vent nozzle, up to but not including the pipe weld, is in the scope of the Reactor Vessel.

The scoping boundary also includes the Reactor Vessel shell, flange, primary nozzles, primary nozzle safe ends, and nozzle supports.

Also included in the Reactor Vessel scoping boundary are the Reactor Vessel lower head and the incore monitoring tubing assemblies from inside of the vessel, through the vessel penetration tubes, and terminating at the vessel weld joint to the thimble guide tubes.

The Reactor Vessel nozzles include the four (4) inlet nozzles, four (4) outlet nozzles, and control rod drive mechanism nozzles. The boundary includes control rod drive mechanism housings as well as the lower head tubing assemblies for incore thimbles and instrumentation.

Interfacing Systems

Not included in the Reactor Vessel license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Reactor Vessel Internals
- Reactor Coolant System

System Intended Functions

Provide Reactor Coolant pressure boundary. The Reactor Vessel is an integral part of the Reactor Coolant system pressure boundary and is capable of accommodating the temperatures and pressures associated with the operational transients.	10 CFR 54.4(a)(1)
The Reactor Vessel functions to support the reactor core and control rod drive mechanisms.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Pressurized Thermal Shock (PTS).	10 CFR 54.4(a)(3)

UFSAR References

- Section 5.1
- Section 5.2

License Renewal Drawing:

- PID-1-RC-LR20845

Table 2.3.1-2 Reactor Vessel
Components Subject to Aging Management Review

Component Type	Intended Function
Canopy Seal Pressure Housing	Pressure Boundary
Closure Head Components	Pressure Boundary
Control Rod Drive Pressure Housing	Pressure Boundary
External Vessel Attachments	Structural
Reactor Vessel Bottom Instrument Tube	Pressure Boundary
Reactor Vessel Closure Head	Pressure Boundary
Reactor Vessel Closure Head Bolting	Pressure Boundary
Reactor Vessel Control Rod Drive Flange Bolting	Pressure Boundary
Reactor Vessel Control Rod Drive Penetration Nozzle and Welds	Pressure Boundary
Reactor Vessel Core Sup Pads/ Guide Lugs	Structural
Reactor Vessel Flange	Pressure Boundary
Reactor Vessel Head Vent Pipe	Pressure Boundary
Reactor Vessel Nozzle Safe Ends and Welds	Pressure Boundary
Reactor Vessel Primary Inlet and Outlet Nozzles	Pressure Boundary
Reactor Vessel Primary Inlet and Outlet Nozzle Welds	Pressure Boundary
Reactor Vessel Shell	Pressure Boundary

The aging management review results for these components are provided in Table 3 1.2-2, Summary of Aging Management Evaluation - Reactor Vessel.

2.3.1.3 Reactor Vessel Internals

System Description

The components of the Reactor Vessel Internals are divided into three parts consisting of the lower core support structure (including the entire core barrel and neutron shield pad assembly), the upper core support structure and the incore instrumentation support structure. The Reactor Vessel Internals support the core, maintain fuel alignment, limit fuel assembly movement, maintain alignment between fuel assemblies and control rod drive mechanisms, direct coolant flow past the fuel elements, direct coolant flow to the pressure vessel head, provide gamma and neutron shielding, and provide guides for the incore instrumentation. The coolant flows from the vessel inlet nozzles down the annulus between the core barrel and the vessel wall and then into a plenum at the bottom of the vessel. It then reverses and flows up through the core support and through the lower core plate. The lower core plate is sized to provide the desired inlet flow distribution to the core. After passing through the core, the coolant enters the region of the upper support structure and then flows radially to the core barrel outlet nozzles and directly through the vessel outlet nozzles. A small portion of the coolant flows between the baffle plates and the core barrel to provide additional cooling of the barrel. Similarly, a small amount of the entering flow is directed into the vessel head plenum and exits through the vessel outlet nozzles.

Lower Core Support Structures

The major containment and support member of the Reactor Vessel Internals is the lower core support structure. This support structure assembly consists of the core barrel, the core baffle, the lower core plate and support columns, the neutron shield pads, the core support which is welded to the core barrel, reactor fuel, and rod cluster control assemblies. All the major material for this structure is Type 304 stainless steel. The lower core support structure is supported at its upper flange from a ledge in the reactor vessel head flange, and its lower end is restrained in its transverse movement by a radial support system attached to the vessel wall. Within the core barrel are an axial baffle and a lower core plate, both of which are attached to the core barrel wall and form the enclosure periphery of the assembled core. The lower core support structure and the core barrel serve to provide passageways and control for the coolant flow. The lower core plate is positioned at the bottom level of the core below the baffle plates and provides support and orientation for the fuel assemblies.

The lower core plate is a member through which the necessary flow distribution holes for each fuel assembly are machined. Fuel assembly locating pins (two for each assembly) are also inserted into this plate. Columns are placed between this plate and the core support of the core barrel to provide stiffness and to transmit the core load to the core support. Adequate coolant distribution is obtained through the use of the lower core plate and core support.

The neutron shield pad assembly consists of four pads that are bolted and pinned to the outside of the core barrel. These pads are constructed of Type 304 stainless steel, and are approximately 48 inches wide by 148 inches long by 2.8 inches thick. The pads are located azimuthally to provide the required degree of vessel protection. Specimen guides in which material surveillance samples can be inserted and irradiated during reactor operation are attached to the pads. The samples are held in the guides by a preloaded spring device at the top and bottom to prevent sample movement.

The main radial support system of the lower end of the core barrel is accomplished by "key" and "keyway" joints to the reactor vessel wall. At equally spaced points around the circumference, an Inconel clevis block is welded to the vessel inner diameter. Another Inconel insert block is bolted to each of these blocks and has a "keyway" geometry. Opposite each of these is a "key" which is attached to the internals. At assembly, as the internals are lowered into the vessel, the keys engage the keyways in the axial direction. With this design, the internals are provided with a support at the furthest extremity, and may be viewed as a beam supported at the top and bottom.

Upper Core Support Assembly

The upper core support assembly, consists of the top support plate assembly and the upper core plate, between which are contained support columns and guide tube assemblies. The support columns establish the spacing between the top support plate assembly and the upper core plate, and are fastened at top and bottom to these plates. The support columns transmit the mechanical loadings between the two plates and serve the supplementary function of supporting thermocouple guide tubes. The guide tube assemblies sheath and guide the control rod drive shafts and control rods. They are fastened to the top support plate, and are restrained by pins in the upper core plate for proper orientation and support. Additional guidance for the control rod drive shafts is provided by the upper guide tube which is attached to the upper support plate and guide tube.

The upper core support assembly is positioned in its proper orientation with respect to the lower support structure by flat-sided pins pressed into the core barrel which, in turn, engage in slots in the upper core plate. At an elevation in the core barrel where the upper core plate is positioned, the flat-sided pins are located at angular positions of 90 degrees from each other. Four slots are milled into the core plate at the same positions. As the upper support structure is lowered into the main internals, the slots in the plate engage the flat-sided pins in the axial direction. The upper core support assembly is restrained from any axial movements by a large circumferential spring which rests between the upper barrel flange and the upper core support assembly and is compressed by the reactor vessel head flange.

Incore Instrumentation Support Structures

The incore instrumentation support structure consists of a guide tubing system to convey and support flux thimbles penetrating the vessel through the bottom. Each flux thimble assembly includes five fixed neutron flux detectors, a thimble tube for a movable neutron flux detector, and a thermocouple. The thimble guide tubes extend from the seal table down through the concrete shield area and terminate in socket welds at the reactor vessel bottom head penetrations. The guide tube bend radius is 12 feet. The Inconel flux thimble assemblies extend through the guide tubing and vessel penetrations, through hollow passages in the lower internals, and finally through instrumentation support tubes in the fuel assemblies. The thimbles remain in place during operation but are pulled back approximately 13 feet at the seal table during refueling to avoid interference within the core. The thimbles are closed at the leading ends and sealed against the guide tubes at the seal table. Mechanical seals between the retractable thimbles and conduits are provided at the seal line. During normal operation, the retractable thimbles are stationary and move only during refueling or for maintenance, at which time a space of approximately 15 feet above the seal line is cleared for the retraction operation.

In-Scope Boundary Description

The components of the Reactor Vessel Internals are divided into three parts consisting of the lower core support structure (including the entire core barrel and neutron shield pad assembly), the upper core support structure, and the incore instrumentation support structure.

The lower internals assembly (lower core support structure) consists of the core barrel, core baffle and former plates, lower core plate and support column assembly, neutron shield pads (panels) with attached specimen holders, and the lower core support forging. The fuel assemblies and the rod cluster control assemblies, control rod drive shafts, spider assemblies and control rodlets are included in the scope of Reactor Vessel Internals.

The upper core support assembly consists of the top support plate assembly and the upper core plate, between which are contained support columns and guide tube assemblies. The guide tube assemblies are fastened to the top support plate, and are restrained by pins in the upper core plate for proper orientation and support. Fuel assembly locating pins protrude from the bottom of the upper core plate and engage the fuel assemblies as the upper assembly is lowered into place. The upper core support assembly is restrained from any axial movements by a large circumferential spring which rests between the upper barrel flange and the upper core support.

The incore instrumentation support structure consists of a guide tubing system to convey and support flux thimbles penetrating the vessel through the bottom.

Interfacing Systems

Not included in the Reactor Vessel Internals license renewal scoping boundaries is the following interfacing system, which is separately evaluated as a license renewal system:

- Reactor Vessel

System Intended Functions

The Reactor Vessel Internals support the core, maintain fuel alignment between fuel assemblies and control rods, direct coolant flow to the vessel head, provide gamma and neutron shielding and guide the incore instruments.	10 CFR 54.4(a)(1)

UFSAR References

- Section 3.9(N).5.1

License Renewal Drawings

There are no License renewal Boundary drawings for the Reactor Vessel Internals. The internals are described in associated vendor manuals and industry reports.

Table 2.3.1-3 Reactor Vessel Internals
Components Subject to Aging Management Review

Component Type	Intended Function
Baffle and Former Plates	Direct flow Structural Support
Baffle and Former Bolts	Structural Support
Bottom Support Forging	Direct Flow Structural Support
Clevis Inserts	Structural Support
Clevis Insert Bolts	Structural Support
Core Barrel and Core Barrel Flange	Direct Flow Structural Support
Core Barrel Outlet Nozzles	Direct Flow Structural Support
Flux Thimble Guide Tubes	Structural Support
Flux Thimble Tubes	Pressure Boundary
Hold Down Spring	Structural Support
Lower Core Plate	Direct Flow Structural support
Lower Core Support Columns	Structural Support
Lower Fuel Alignment Pins	Structural Support
Lower Radial Support Keys	Structural Support
Lower Support Column Bolts	Structural Support
Rod Control Cluster Bolts	Structural Support
Rod Control Cluster Pins	Structural Support

Component Type	Intended Function
Rod Control Cluster Tubes	Structural Support
Thermal Shield	Structural Support
Upper Core Plate	Direct Flow Structural Support
Upper Core Plate Pins	Structural Support
Upper Fuel Alignment Pins	Structural Support
Upper Support Column	Structural Support
Upper Support Column Bolts	Structural Support
Upper Support Plate	Structural Support

The aging management review results for these components are provided in Table 3.1.2-3, Summary of Aging Management Evaluation - Reactor Vessel Internals.

2.3.1.4 Steam Generator

System Description

When the Reactor Coolant System is operating, the Reactor Coolant pumps move the pressurized water (coolant) through the vessel and the loops. The water, which cools the core and moderates the nuclear reaction, picks up the heat of fission (thermal energy) as it passes through the core. The thermal energy in the water is carried to the Steam Generators, where it is transferred across the U-tubes to the secondary side. The coolant is then returned to the core inlet by the Reactor Coolant pumps to continue the energy removal process.

Each Steam Generator includes a primary section called the tube side (major components include hemispherical channel head with a divider plate, tube sheet, and U-tubes). The channel head makes up the bottom of the Steam Generator. The head resembles an inverted bowl divided into inlet and outlet sections by a plate. Flow from the core enters the primary side of the Steam Generator through the inlet nozzle of the channel head. From the inlet chamber, reactor coolant flows upward through the tube sheet and into the U-tubes. The heat from fission carried by the primary coolant is transferred through the U-tubes to the fluid on the secondary side. Primary flow continues upward toward the U-bend, back down the other side, through the tube sheet and into the outlet chamber of the channel head. The primary water exits the channel head through the outlet nozzle on its way to the suction of the Reactor Coolant pump. The Reactor Coolant pump returns the flow to the reactor vessel.

The lower shell of the Steam Generator is a vertical cylinder. The tube sheet is welded to the bottom of the cylinder. Above the top of the U-tubes, the shell bevels out via a transition cone to the larger diameter of the upper shell. The upper shell houses the moisture separation equipment.

The secondary section of the Steam Generator is referred to as the shell side and consists of the following major components: shell, feedwater connection and ring, tube bundle and wrapper, moisture separators, steam outlet connection, and blowdown and drain connections. feedwater enters the secondary side of the Steam Generator through a normally submerged feed ring located just above the transition cone. The feed ring is a doughnut-shaped pipe perforated around its circumference on the top side. Inverted J-tubes extend from the perforations to direct feedwater flow downward. The feedwater flow passes along the inside of the shell (downcomer annulus) to the tube sheet. Cold feedwater is initially kept from contact with the U-tubes by the tube bundle wrapper. The tube bundle wrapper acts as a second shell inside the first. It does not, however, extend all the way down to the tube sheet. feedwater enters the tube bundle region in the space between the tube bundle wrapper and the tube sheet. In the tube bundle, the Feedwater is heated to a saturated liquid and is then transformed to a mixture of steam and water that rises upward to the moisture separation equipment. The two moisture separator stages remove the saturated liquid from the wet mixture. The moisture is then directed to the recirculating water plenum, where it joins the feedwater and is preheated prior to entering the downcomer. The steam (saturated vapor) rises out the top of the Steam Generator, leaving through the outlet connection to the main steam system.

Level instrumentation provides information to the plant operators and provides input signals to the solid state protection system to trip the reactor, trip the turbine, isolate main feedwater and start the emergency Feedwater System. One level instrument in each Steam Generator provides an input signal to the ATWS Mitigating System.

In-Scope Boundary Description

The Steam Generator scoping boundary includes those portions of the four (4) Steam Generators associated with maintaining the reactor coolant pressure boundary, and the secondary side pressure boundary. The primary side boundary begins at the inlet primary nozzle safe end, to the safe end to nozzle weld, on to the primary nozzle and into the primary channel head. The channel head has a partition plate which separates the channel head into two volumes, an intake and a discharge section. Upon entering the partitioned channel head, primary water flows through the tube sheet, through the U-tubes, enters the channel head discharge region, and exits the channel head via the outlet primary nozzle safe end.

The secondary side boundary begins at the feedwater nozzle. Feedwater flows through the nozzle and thermal sleeve into the feedwater inlet ring and out through the J-tubes. The supports for the inlet ring are in scope for the Steam Generator. Feedwater flows into the region above the lower deck plate. From there Feedwater flows into the downcomer, down to the tube sheet, through the flow distribution baffle into the heating and up along the U-tubes. After exiting the U-tube region, the steam-water mixture flows up and exits the Steam Generator steam outlet nozzle containing the flow limiting device into the Main Steam System.

Instrument nozzles for level measurement are in the scope of the Steam Generator. Level instruments, associated piping and valves are addressed in Feedwater System evaluation.

The blowdown and secondary shell drain taps are in scope for the Steam Generator. The piping connected to these taps are in the scope of the Steam Generator Blowdown System. The primary channel head drain nozzle is in scope for the Steam Generator but the attached pipe is in the scope of the Reactor Coolant System.

Primary manways, secondary manways and secondary hand holes are in scope for the Steam Generator.

Interfacing Systems

Not included in the Steam Generator license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Feedwater System
- Main Steam System
- Reactor Coolant System
- Steam Generator Blowdown System

System Intended Functions

Transfer the heat produced during power operation from the Reactor Coolant to the steam and power conversion systems.	10 CFR 54.4(a)(1)
Provide a pressure boundary capable of accommodating temperatures and pressures associated with operational transients.	10 CFR 54.4(a)(1)
Limit steam flow from the Steam Generator in the event of a Main Steam line break.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Anticipated Transients Without Scram (ATWS).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Station Blackout (SBO).	10 CFR 54.4(a)(3)

UFSAR References

- Section 5.1
- Section 5.4.2
- Section 10.3.2.2
- Section 10.4.7
- Figure 5.4.4

License Renewal Drawings

- PID-1-FW-LR20686
- PID-1-MS-LR20580
- PID-1-MS-LR20581
- PID-1-RC-LR20841
- PID-1-RC-LR20842
- PID-1-RC-LR20843
- PID-1-RC-LR20844

Table 2.3.1-4 Steam Generator
Components Subject to Aging Management Review

Component Type	Intended Function
Orifice	Pressure Boundary Throttle
Steam Generator Anti-Vibration Bars	Structural Support
Steam Generator Channel Head Drain Pipe	Pressure Boundary
Steam Generator Channel Head Drain Pipe Coupling	Pressure Boundary
Steam Generator Divider Plate	Pressure Boundary
Steam Generator Feedwater Inlet Ring	Pressure Boundary
Steam Generator Feedwater Inlet Ring Support	Structural Support
Steam Generator Feedwater Nozzle	Pressure Boundary
Steam Generator Lower Heads	Pressure Boundary
Steam Generator Lower Shell	Pressure Boundary
Steam Generator Primary Closure Bolting	Pressure Boundary
Steam Generator Primary Manways	Pressure Boundary
Steam Generator Primary Nozzle	Pressure Boundary
Steam Generator Primary Nozzle Safe End	Pressure Boundary
Steam Generator Primary Nozzle Weld	Pressure Boundary
Steam Generator Secondary Closure Bolting	Pressure Boundary
Steam Generator Secondary Hand Holes	Pressure Boundary
Steam Generator Secondary Manways	Pressure Boundary
Steam Generator Shell Penetrations	Pressure Boundary

Component Type	Intended Function
Steam Generator Steam Nozzle	Pressure Boundary
Steam Generator Top Head	Pressure Boundary
Steam Generator Transition Cone	Pressure Boundary
Steam Generator Tube Bundle Wrapper	Direct Flow
Steam Generator Tube Plugs	Pressure Boundary
Steam Generator Tube Support Plates	Structural Support
Steam Generator Tubes	Heat Transfer Pressure Boundary
Steam Generator Tubesheet	Pressure Boundary
Steam Generator Upper Shell	Pressure Boundary

The aging management review results for these components are provided in Table 3.1.2-4, Summary of Aging Management Evaluation - Steam Generator.

2.3.2 ENGINEERED SAFETY FEATURES

NUREG-1801 *"Generic Aging Lessons Learned (GALL) Report"*, Volume 2, Chapter V, Engineered Safety Features, lists the Containment Spray System, Containment Isolation Components, and Emergency Core Cooling System as the Engineered Safety Features (ESF) systems for a pressurized water reactor (PWR).

Seabrook Station UFSAR Section 6 defines the Engineered Safety Features systems as follows:

- Containment Systems (Containment Structure, Containment Heat Removal System known as Containment Building Spray, Secondary Containment, Containment Isolation System, and Combustible Gas Control System)
- Emergency Core Cooling System
- Habitability Systems (Control Building Air Handling System)
- Fission Product Removal and Control Systems (Containment Enclosure Air Handling System, Containment Building Spray, Fuel Storage Building Air Handling, and Control Building Air Handling System)
- Emergency Feedwater System

In order to maintain alignment with the NUREG-1801 format, this application describes the following ESF Systems in this section:

- Combustible Gas Control System (2.3.2.1)
- Containment Building Spray System (2.3.2.2)
- Residual Heat Removal System (2.3.2.3)
- Safety Injection System (2.3.2.4)

The remaining ESF systems listed in UFSAR Section 6 are described in the following sections of the application:

- Chemical and Volume Control System (2.3.3.3)
- Containment Enclosure Air Handling System (2.3.3.7)
- Containment Structures (2.4.2)

- Control Building Air Handling System (2.3.3.9)
- Emergency Feedwater System (included in Feedwater System, 2.3.4.6)
- Fuel Storage Building Air Handling System (2.3.3.18)

Following is a discussion of the Seabrook Emergency Core Cooling System and the Containment Isolation System.

Emergency Core Cooling System (ECCS)

The Emergency Core Cooling System is comprised by four systems (Chemical and Volume Control System, Safety Injection System, Residual Heat Removal System, and Containment Building Spray System) that provide the following functions:

- High Head Injection is supplied by the Chemical and Volume Control System
- Intermediate Head Injection is supplied by the Safety Injection System
- Accumulator Injection is supplied by the Safety Injection System
- Low Head Injection is supplied by the Residual Heat Removal System
- Borated Water Supply is provided by the Containment Building Spray System

The System Description, In-Scope Boundary Description, Interfacing Systems, System Intended Functions, UFSAR References, License Renewal Drawings, and the Table for Components Subject to Aging Management Review are provided separately for each system; Chemical and Volume Control System (2.3.3.3), Safety Injection System (2.3.2.4), Residual Heat Removal System (2.3.2.3), and Containment Building Spray System (2.3.2.2).

The high head injection portion of the Chemical and Volume Control System, the Safety Injection System (which provides intermediate head injection), and the Residual Heat Removal System (which provides low head injection) together form the ECCS discussed in section 6.3.1 of the UFSAR.

The primary function of the ECCS following an accident is to remove the stored and fission product decay heat from the reactor core so that fuel rod damage, to the extent that it would impair effective cooling of the core, is prevented.

The ECCS consists of the Chemical and Volume Control System centrifugal charging pumps, Safety Injection System pumps, Safety Injection System accumulators, Residual Heat Removal System pumps, Residual Heat Removal System heat exchangers, and a Containment Building Spray System refueling water storage tank (RWST), and the associated piping and valves.

The RWST supplies the borated water used for the injection phase of the ECCS. When the RWST level drops to the low-low level alarm point, the injection phase is discontinued and recirculation is initiated.

During the injection phase, the two centrifugal charging pumps operate to inject RWST water into the cold legs of all four loops (high head injection). Once the Reactor Coolant System pressure is below the shutoff head of the two Safety Injection pumps, they begin to take borated water from the RWST and deliver it to the cold legs of the four loops (intermediate head injection). The Safety Injection accumulators will discharge their contents into the four Reactor Coolant System cold legs when Reactor Coolant System pressure decreases below accumulator shutoff pressure. The two Residual Heat Removal pumps take water from the RWST and inject it into the cold legs of all four Reactor Coolant System loops via the accumulator discharge lines once the Reactor Coolant System pressure drops below the shutoff head of the Residual Heat Removal pumps (low head injection).

In the recirculation phase, the containment sump valves are opened to provide suction directly to the Residual Heat Removal pumps which in turn supplies suction water to the centrifugal charging pumps and Safety Injection pumps.

The System Description, In-Scope Boundary Description, Interfacing Systems, System Intended Functions, UFSAR References, License Renewal Drawings, and the Table for Components Subject to Aging Management Review are provided separately for the Residual Heat Removal System and the Safety Injection System. Additionally, for license renewal purposes, the Chemical and Volume Control System, including the ECCS high head injection portion, is included in the Chemical and Volume Control System (2.3.3.3). Furthermore, the RWST is part of the Containment Building Spray System and therefore, included in the Containment Building Spray System (2.3.2.2).

Containment Isolation System

The Containment Isolation System as described in the USFAR is comprised of the valves, piping and actuators required to isolate the containment following a Loss of Coolant Accident (LOCA) or steam line rupture. The systems establish and/or maintain isolation of the containment from the outside environment to prevent the release of fission products, and to ensure that the public is protected in accordance with 10 CFR 100 guidelines.

The Containment Isolation System as described in the USFAR is not treated as a system for the purposes of license renewal. Each piping system which penetrates the containment is provided with containment isolation features, which serve to minimize the release of fission products following a Design Basis Accident (DBA). These features are scoped and evaluated in their respective mechanical process systems, rather than the Containment Isolation System as discussed in section 6.2.4 of the UFSAR.

The civil/structural scoping and screening of the Containment Building (2.4.2) evaluates the containment isolation features associated with the structure. The conductor portions (e.g. cables, connections) of electrical penetrations are included in the electrical and I&C scoping and screening described in Section 2.5 of the application.

2.3.2.1 Combustible Gas Control System

System Description

The Combustible Gas Control System consists of subsystems which monitor the combustible gas concentrations in the containment, and which possess the capability for maintaining a mixed containment atmosphere to ensure that hydrogen concentrations remain below flammable levels following a Loss of Coolant Accident (LOCA). This is achieved by monitoring containment hydrogen levels, mixing the containment atmosphere, recombining free hydrogen with oxygen, and/or purging the containment atmosphere.

Hydrogen Monitoring Subsystem

The containment atmosphere is monitored by two completely independent hydrogen sampling and analysis systems which are started after an accident. The suction intakes are located at opposite sides of the containment dome, terminating in 90° elbows pointing downward to minimize entry of spray into the sample lines. To prevent condensation of moisture in the suction lines to the analyzers, the lines from the containment to the monitors are heat traced. This ensures that the gas sample is maintained above the steam saturation temperatures postulated to occur during design basis accidents. The discharge from the monitors is vented back to the containment.

The analyzers are located outside the containment in the Main Steam and Feed Water Pipe Chase Building, and take suction through a heavy-walled tube with lengths varying from 150 feet to 300 feet inside the containment. The hydrogen monitors are normally in a standby mode to preclude a long warm-up time.

Containment Atmosphere Mixing

Mixing of the containment atmosphere to prevent localized buildup of hydrogen concentrations is provided by the Containment Building Spray System (2.3.2.2). The fission products are uniformly distributed in the sump water, being mixed by turbulence caused by injection, break flows and sprays. Virtually all of the hydrogen generated by radiolysis caused by fission products outside the core is released by the water while it is being sprayed.

In addition, atmospheric mixing is achieved by the Containment Air Handling System (2.3.3.5). Following a LOCA, the two fans are started by an engineered safety feature actuation signal. The fans take suction from the apex of the dome and discharge below the operating floor.

Hydrogen Recombiners

One means of combustible gas control in the containment is through the use of electric hydrogen recombiners. Seabrook Station has a pair of recombiners, located at the perimeter of the operating floor inside the containment. The recombiner consists of an inlet preheater section, a heater-recombiner section, and a discharge mixing chamber. The inlet preheater section is a thermally insulated vertical metal duct positioned around a central heater section to take advantage of heat losses from the heater section. The heater section consists of four vertically stacked assemblies of electric heaters, each assembly containing individual heating elements.

Air is first drawn into the preheater section by natural convection, where it is warmed. It then passes through an orifice plate, and enters the electric heater section where it is heated to approximately 1150 to 1400°F, thus causing recombination between the oxygen and hydrogen. An outer enclosure provides protection against containment spray water. The recombiners are manually started after a LOCA.

Backup Purge System

The capability for purging of the containment at a controlled rate is also provided.

Purging is accomplished by venting the containment gas and replacing it with clean compressed air from the plant air system. Compressed air is fed into the containment. The vent flow path consists of piping taking suction high up in the containment, a flow meter, a throttle valve, and associated piping, terminating adjacent to the inlet screens of the containment enclosure exhaust filters located within the containment enclosure. From the filters, there is a direct path to the unit plant vent. All piping inside the containment and the containment penetration connections associated with the purge system are duplicated to provide independent and redundant capability and to prevent a single failure from stopping the containment purge/flow vent. A line supplying service air from the plant air system is provided to the containment for post-accident combustible gas control. However, this line would only be used should both safety-related hydrogen recombiners fail. Containment isolation valves and the associated piping are Safety Class 2, Seismic Category I.

In-Scope Boundary Description

PID-1-CGC-LR20612:

Backup Purge System:

The boundary for the Combustible Gas Control System begins at the service air supply and continues forward through valves and a flow orifice into the containment annulus, through a containment penetration and check valve to the containment atmosphere. The two returning boundary (venting) lines begin at the containment atmosphere, continue through a manual valve, containment isolation valve and exit the containment and annulus and form a common line. The boundary line continues through a flow orifice and on to the containment enclosure, and terminates at the inlet of the containment enclosure exhaust filters.

Hydrogen Recombiner:

Two hydrogen recombiners that are located in containment.

Hydrogen Monitoring:

Two in-boundary hydrogen analyzers located outside the containment draw samples through dedicated sample lines in containment and discharge the sampled gas back to the containment. The sample boundary includes connections to a nearby manual sample panel.

Interfacing Systems

Not included in the Combustible Gas Control System license renewal scoping boundaries is the following interfacing system, which is separately evaluated as a license renewal system:

- Service Air System (included with Instrument Air System)

System Intended Functions

Monitor the concentration of hydrogen gas within the containment building.	10 CFR 54.4(a)(1)
Reduce the combustible gas concentrations within the containment by recombining the free hydrogen with the oxygen in the containment building.	10 CFR 54.4(a)(1)
Provide Containment Isolation function.	10 CFR 54.4(a)(1)
Provide Safe Shutdown Control and indication (PAM)	10 CFR 54.4(a)(1))

This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Environmental Qualification (EQ).	10 CFR 54.4(a)(3)

UFSAR References

- Section 6.2.5.1.a
- Section 6.2.5.2
- Table 6.2-83
- Table 7.5-1

License Renewal Drawings

- PID-1-CGC-LR20612

Table 2.3.2-1 Combustible Gas Control System Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Heat Exchanger Components	Heat Transfer Pressure Boundary
Hydrogen Recombiner	Pressure Boundary
Instrumentation Element	Pressure Boundary Structural Integrity (Attached)
Orifice	Pressure Boundary Throttle
Piping and Fittings	Pressure Boundary Structural Integrity (Attached)
Piping Element	Pressure Boundary
Pump Casing	Pressure Boundary
Tank	Pressure Boundary
Valve Body	Pressure Boundary Structural Integrity (Attached)

The aging management review results for these components are provided in Table 3.2.2-1, Summary of Aging Management Evaluation - Combustible Gas Control System.

2.3.2.2 Containment Building Spray System

System Description

The Containment Building Spray System is designed to remove the energy discharged to the containment following a Loss of Coolant Accident (LOCA) or Main Steam Line Break (MSLB), to prevent the containment pressure from exceeding design pressure and to reduce and maintain containment temperature and pressure within acceptable limits. The Containment Building Spray System provides for iodine removal by mixing sodium hydroxide (NaOH) with borated water from the Refueling Water Storage Tank (RWST) to limit the consequences of a LOCA to within the limits of 10 CFR 100 by providing a rapid reduction in containment elemental iodine concentration. The limits on NaOH volume and concentration ensure a pH value of between 8.5 and 11.0 for the solution recirculated within containment after a LOCA. This pH band minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion on mechanical systems and components.

The Containment Building Spray System is composed of two 100% capacity standby system trains. For each train, suction is initially taken from the RWST and pumped through the Containment Building Spray System heat exchanger to the containment building spray headers. NaOH is injected via its hydrostatic head into the mixing chamber of the RWST. As the level in the RWST decreases to its low-low level set point, suction is automatically transferred from the RWST to the containment building recirculation sumps and the system operates in the recirculation mode. There are two penetrations from the containment sump to the Primary Auxiliary Building, with each pipe encased in a sleeve. In each line, immediately inside the Primary Auxiliary Building, is a motor-operated gate valve. After passing through the isolation valve, the flow in each line divides to supply one Containment Building Spray and one Residual Heat Removal pump. Each isolation valve is enclosed within a housing designed to withstand containment design pressure to prevent any leakage to the Primary Auxiliary Building atmosphere. In this mode heat from the hot fluid in the containment building sumps is removed from the Containment Building Spray System and transferred to the Primary Component Cooling Water System. The Primary Component Cooling Water System also provides cooling to the Containment Building Spray pumps.

In-Scope Boundary Description

PID-1-CBS-LR20233, PID-1-RH-LR20662, PID-1-RH-LR20663, PID-1-SI-LR20446, PID-1-SI-LR20447, PID-1-SI-LR20448:

The Containment Building Spray (CBS) System has two independent flow paths from the RWST during the injection phases of operation. Each flow path provides suction flow to the Containment Building Spray pumps, the Safety Injection pumps and the Residual Heat Removal pumps. The Containment Building Spray boundary extends from the RWST to the suction side of the Residual Heat Removal pumps and the Safety Injection pumps. The Containment Building Spray boundary continues though the Containment Building Spray pumps, through the Containment Building Spray heat exchangers, and then through the Containment Building Spray headers, including and ending at the spray header spray nozzles.

The Spray Additive Tank (SAT) provides NaOH via a common line to mix with the borated water in the RWST prior to injection. Both tanks are in hydraulic equilibrium. There is a recirculation pump to provide adequate mixing in the Spray Additive Tank. The Containment Building Spray boundary includes the Spray Additive Tank, its discharge valves and the discharge line to the RWST, recirculation pump, and associated piping and valves. This tank, recirculation pump, discharge isolation valves, and associated piping are within the Containment Building Spray boundary.

Water sprayed in the containment collects in the containment recirculation sumps. When the liquid level in the RWST reaches its low-low level set point, the recirculation sump isolation valves open, providing a suction flow path to the Containment Building Spray pumps and the Residual Heat Removal pumps. The recirculation sump strainers, sump level instrumentation, sump suction isolation valves, and connected piping are in the Containment Building Spray boundary, but recirculation sumps are evaluated with containment structures.

The Containment Building Spray has a line from the Containment Building Spray heat exchanger outlet lines back to the RWST, which is used to test the Containment Building Spray pumps. The Containment Building Spray test line from the pump discharge to the RWST is in the Containment Building Spray boundary.

Piping and valves associated with instrumentation measuring level and temperature at the RWST and Spray Additive Tank are in the Containment Building Spray boundary. The Containment Building Spray is automatically initiated by containment pressure sensors. These sensors and associated pipes and valves are within the boundary of the Safety Injection System.

PID-1-CS-LR20725:

Two suction lines that supply borated water during the injection phase of operation to the suction side of the charging pumps are in the Containment Building Spray boundary.

PID-1-SF-LR20482:

The RWST supplies makeup to the Spent Fuel Pool Cooling (SF) System and this line from RWST isolation valve to the Spent Fuel Pool Cooling isolation valve is in the Containment Building Spray boundary.

PID-1-WLD-LR20219, PID-1-WLD-LR20221:

Relief valves in the tube side of the Containment Building Spray System heat exchangers discharge to the Waste Processing Liquid Drains System in the Residual Heat Removal equipment vaults. These relief valves are in the Containment Building Spray boundary. The drain lines from these relief valves are within the Containment Building Spray boundary. Drain lines from the Containment Building Spray piping inside of containment (drains spray header) to the containment trench are within the Containment Building Spray boundary.

PID-1-AS-LR20571, PID-1-ASC-LR20907:

The steam heaters for the Refueling Water Storage Tank and Spray Additive Tank are within the Containment Building Spray boundary.

Interfacing Systems

Not included in the Containment Building Spray System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Auxiliary Steam System
- Auxiliary Steam Condensate System
- Chemical and Volume Control System
- Primary Component Cooling Water System
- Residual Heat Removal System
- Safety Injection System

System Intended Functions

Provides long term decay heat removal following a Loss Of Coolant Accident (LOCA) or Main Steam Line Break (MSLB) by providing a flow path from containment to the Residual Heat Removal pumps.	10C FR 54.4(a)(1)
Limit containment peak pressure and temperature below design basis limits following a Loss Of Coolant Accident (LOCA) or Main Steam Line Break (MSLB).	10 CFR 54.4(a)(1)
Reduce containment atmospheric Iodine concentration following a Loss Of Coolant Accident (LOCA).	10 CFR 54.4(a)(1)
Containment Building Spray sump isolation valve encapsulation vessels provide backup containment integrity for penetrations without inside reactor containment isolation.	10 CFR 54.4(a)(1)
Mixes the containment atmosphere to prevent localized buildup of hydrogen concentration.	10 CFR 54.4(a)(1)
Provide design basis Engineered Safety Features Actuation Signals (ESFAS).	10 CFR 54.4(a)(1)
Provide safe shutdown control and indication (Post Accident Monitoring).	10 CFR 54.4(a)(1)
Provide Containment Isolation function.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Environmental Qualification (EQ).	10 CFR 54.4(a)(3)

UFSAR References

- Section 6.2
- Section 6.3
- Section 6.5
- Table 6.2-83
- Table 7.5-1

License Renewal Drawings

- PID-1-AS-LR20571
- PID-1-ASC-LR20907
- PID-1-CBS-LR20233
- PID-1-CS-LR20725
- PID-1-RH-LR20662
- PID-1-RH-LR20663
- PID-1-SF-LR20482
- PID-1-SI-LR20446
- PID-1-SI-LR20447
- PID-1-SI-LR20448
- PID-1-WLD-LR20219
- PID-1-WLD-LR20221

Table 2.3.2-2 Containment Building Spray System Components Subject to Aging Management Review

Component Type	Intended Functions
Bolting	Pressure Boundary
Expansion Joint	Pressure Boundary
Filter Housing	Leakage Boundary (Spatial)
Flexible Hose	Leakage Boundary (Spatial)
Heat Exchanger Components	Heat Transfer Pressure Boundary
Heater Housing	Leakage Boundary (Spatial)
Instrumentation Element	Leakage Boundary (Spatial)
Nozzle	Spray
Orifice	Pressure Boundary Throttle
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary
Pump Casing	Pressure Boundary Leakage Boundary (Spatial)
Screen	Filter
Tank	Pressure Boundary Leakage Boundary (Spatial)
Thermowell	Pressure Boundary
Valve Body	Leakage Boundary (Spatial) Pressure Boundary

The aging management review results for these components are provided in Table 3.2.2-2, Summary of Aging Management Evaluation - Containment Building Spray System.

2.3.2.3 Residual Heat Removal System

System Description

The Residual Heat Removal System transfers heat from the Reactor Coolant System to the Primary Component Cooling Water System to reduce the temperature of the Reactor Coolant System to the cold shutdown temperature, at a controlled rate, during the second part of the normal plant cool down, and maintain this temperature until the plant is started up again.

The Residual Heat Removal System is provided with two Residual Heat Removal pumps and two Residual Heat Removal heat exchangers arranged in two separate and independent flow paths.

The Residual Heat Removal System also makes up the low-head injection portion of the Emergency Core Cooling System (ECCS) by injecting borated water from the Refueling Water Storage Tank (RWST) into the Reactor Coolant System cold legs during the injection phase following a Loss of Coolant Accident (LOCA). In its capacity as the low head portion of the ECCS, the Residual Heat Removal System provides long-term recirculation capability for core cooling following the injection phase of a LOCA. The changeover from the injection mode to the recirculation mode is initiated automatically upon low-low level in the RWST. This function is accomplished by aligning the Residual Heat Removal System to take fluid from the containment sump, cool it in the Residual Heat Removal heat exchangers, and supply it to the core directly as well as via the high-head Chemical and Volume Control System centrifugal charging pumps and intermediate-head Safety Injection System pumps.

The Residual Heat Removal System also is used to transfer refueling water between the refueling cavity and the RWST at the beginning and end of the refueling operations.

In-Scope Boundary Description

PID-1-CBS-LR20233, PID-1-CS-LR20722, PID-1-CS-LR20725, PID-1-RC-LR20841, PID-1-RC-LR20844, PID-1-RH-LR20662, PID-1-RH-LR20663, PID-1-SI-LR20446, PID-1-SI-LR20447, PID-1-SI-LR20448, PID-1-SI-LR20449, PID-1-SI-LR20450:

The Residual Heat Removal (RH) System license renewal boundary begins at the pump suction of the Residual Heat Removal pumps, proceeds through a flow element and on to a piping tee where flow can be bypassed around the Residual Heat Removal heat exchanger via a flow control valve, and on to terminate at the Safety Injection accumulator injection paths. The flow that passes through the heat exchanger can merge with the bypass flow and on to the Reactor Coolant System cold legs. There are three additional lines connected to the heat exchanger outlet. One line recirculates Residual Heat Removal pump flow to accommodate low flow situations; the second line provides suction flow to the Safety Injection pumps via the Containment Building Spray System when the ECCS is in the recirculation mode; and the third line from each heat exchanger joins to a common line with an air operated valve before terminating at the inlet to the letdown heat exchanger in the Chemical and Volume Control System. All the above mentioned pumps, piping, valves, flow elements, and heat exchangers involved in developing Residual Heat Removal System flow to the Safety Injection accumulator injection lines are within the Residual Heat Removal System boundary. In the recirculation phase, cross connects between the two trains enable the Residual Heat Removal System to inject into the hot legs. The cross-connect piping, valves, flow elements, and piping leading to the Reactor Coolant System are within the Residual Heat Removal System boundary. The valve and piping connecting the cross connect line to the RWST are within the Residual Heat Removal System boundary.

Piping down stream of the test isolation valves forming a class break, all capped drain and test line drains, and drains from relief valves are within the Residual Heat Removal System boundary. The Residual Heat Removal pump seal water vent sight glasses and lines from the Residual Heat Removal pumps down stream of the class break isolation valves are also within the Residual Heat Removal System boundary.

PID-1-VSL-LR20776, PID-1-WLD-LR20221:

The Residual Heat Removal pump seal water vent sight glasses lines and the valve stem leak off lines for Residual Heat Removal valves drain to the Waste Processing Liquid Drains System and are within the Residual Heat Removal System boundary.

Interfacing Systems

Not included in the Residual Heat Removal System scoping boundary are the following interfacing systems, which are separately evaluated as license renewal systems:

- Chemical and Volume Control System
- Containment Building Spray System
- Reactor Coolant System
- Safety Injection System
- Sample System

- Valve Stem Leak-Off System
- Waste Processing Liquid Drains System

System Intended Functions

Provide Reactor Coolant System cold leg injection from the Refueling Water Storage Tank (RWST) when the Reactor Coolant System pressure has decreased below shutoff head for low head ECCS injection.	10 CFR54.4 (a)(1)
Transfer and cool water from the containment sumps and inject water back into the Reactor Coolant System cold legs or hot legs during long term recirculation.	10 CFR 54.4(a)(1)
Provide Reactor Coolant System decay heat removal during emergency plant cool down.	10 CFR 54.4(a)(1)
Provide Reactor Coolant System reduced inventory cooling.	10 CFR 54.4(a)(1)
Provide overpressure protection and isolation from the Reactor Coolant System.	10 CFR 54.4(a)(1)
Provide safe shutdown control and indication (Post Accident Monitoring).	10 CFR 54.4(a)(1)
Provide Containment Isolation function.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Environmental Qualification (EQ).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)

UFSAR References

- Section 5.4.7

- Section 6.3
- Table 6.2-83
- Table 7.5-1

License Renewal Drawings

- PID-1-CBS-LR20233
- PID-1-CS-LR20722
- PID-1-CS-LR20725
- PID-1-RC-LR20841
- PID-1-RC-LR20844
- PID-1-RH-LR20662
- PID-1-RH-LR20663
- PID-1-SI-LR20446
- PID-1-SI-LR20447
- PID-1-SI-LR20448
- PID-1-SI-LR20449
- PID-1-SI-LR20450
- PID-1-VSL-LR20776
- PID-1-WLD-LR20221

Table 2.3.2-3 Residual Heat Removal System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Bolting (Class 1)	Pressure Boundary
Flexible Hose	Leakage Boundary (Spatial)
Heat Exchanger Components	Heat Transfer Pressure Boundary
Instrumentation Element	Leakage Boundary (Spatial) Pressure Boundary
Orifice	Pressure Boundary Throttle
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary
Piping and Fittings (Class 1)	Pressure Boundary
Piping and Fittings (Class 1 <4 Inches)	Pressure Boundary Throttle
Piping Element	Leakage Boundary (Spatial) Pressure Boundary
Pump Casing	Pressure Boundary
Thermowell	Pressure Boundary
Valve Body	Leakage Boundary (Spatial) Pressure Boundary
Valve Body (Class 1)	Pressure Boundary

The aging management review results for these components are provided in Table 3.2.2-3, Summary of Aging Management Evaluation - Residual Heat Removal System.

2.3.2.4 Safety Injection System

System Description

The Safety Injection System makes up the intermediate head injection portion of the Emergency Core Cooling System (ECCS). The intermediate head injection function is performed by two redundant Safety Injection pumps. The Safety Injection pumps take suction from the Refueling Water Storage Tank (RWST) and inject to the Reactor Coolant System cold legs when Reactor Coolant System pressure is reduced below the Safety Injection pump shutoff head. A minimum flow bypass line is provided on each pump discharge to recirculate flow to the RWST in the event that the pumps are started with Reactor Coolant System pressure above the pump shutoff head. A series of valves in this line provide isolation. These valves are manually closed from the control room as a part of the ECCS realignment from injection to the recirculation mode. The Safety Injection accumulators inject borated water into the Reactor Coolant System cold legs when reactor pressure drops below the pressure in the Safety Injection accumulator tanks. Swing disc check valves in the injection path open to allow flow from the accumulators to the core via the cold leg.

When the RWST level reaches the low-low level, the suction valves from the containment sumps to the Containment Building Spray and Residual Heat Removal System lines open and the Containment Building Spray System and Residual Heat Removal System continue to operate in the recirculation mode. In the containment sump recirculation mode, the Safety Injection pumps and the Chemical and Volume Control System centrifugal charging pumps are manually realigned and take suction from the Residual Heat Removal pumps.

The accumulator tanks are used to inject a sufficient volume of water into the Reactor Coolant System cold legs to refill the reactor-vessel/core-barrel annulus and the lower reactor vessel plenum (up to the bottom of the core) following a major Loss of Coolant Accident (LOCA). This permits the other ECCS subsystems to quickly supply cooling water to the reactor core.

The accumulator tanks are partially filled with primary grade, borated water and are pressurized with nitrogen gas. One accumulator tank is connected to each Reactor Coolant System cold leg. The accumulators are located inside containment.

If the accumulators require makeup water, it is supplied from the RWST via the Safety Injection pumps. The accumulators are pressurized from the Nitrogen Gas System. The Nitrogen Gas System is discussed in Section 2.3.3.24.

When Reactor Coolant System pressure drops below the accumulator gas pressure, the accumulator contents are injected into the Reactor Coolant System. During normal operations, check valves prevent normal Reactor Coolant System pressure from leaking back into the accumulator. To minimize the number of penetrations into the Reactor Coolant System, the Safety Injection pump discharge lines connect to the discharge lines of the Residual Heat Removal pumps, which then joins the accumulator injection line. Once the accumulator contents have been injected into the Reactor Coolant System, the accumulators serve no further purpose.

In-Scope Boundary Description

High Head Injection
PID-1-SI-LR20447:

The ECCS high head injection flow is provided by the centrifugal charging pumps which discharge through the high head injection valves which are in parallel and continue on to the Reactor Coolant System cold legs. The centrifugal charging pumps are evaluated with the Chemical and Volume and Control system (discussed in section 2.3.3.3)

Intermediate Head Injection
PID-1-SI-LR20446, PID-1-SI-LR20447, PID-1-SI-LR20449, PID-1-CBS-LR20233, PID-1-RC-LR20841, PID-1-RC-LR20842, PID-1-RC-LR20843, PID-1-RC-LR20844, PID-1-RH-LR20662, PID-1-RH-LR20663:

The ECCS intermediate head injection begins at the suction of the Safety Injection pumps and discharges to either the common cross-connect piping between Safety Injection pumps and on to the accumulators discharge piping to the Reactor Coolant System cold legs or directly to the Reactor Coolant System hot legs. Each Safety Injection line to the Reactor Coolant System has two series check valves to prevent over pressurization of the upstream piping. These components are within the Safety Injection boundary. There is a minimum flow recirculation line with an isolation valve from each Safety Injection pump discharge. These two lines join to a common return line to the RWST. The common line contains an isolation valve forming the class break. These two separate lines with isolation valves and the common return with isolation valve are in scope. The piping, valves and flow element down stream of the common line isolation valve are in scope. Capped drain lines and drain lines from the Safety Injection relief valves are in scope. Test lines from the hot leg injection lines are in the Safety Injection boundary. In the containment sump recirculation mode, Safety Injection pumps take suction from the discharge of the Residual Heat Removal heat exchangers. The in scope boundary in the recirculation mode is the same as is in the injection mode.

Accumulator Injection
PID-1-SI-LR20450, PID-1-WLD-LR20218:

The Safety Injection accumulator injection starts with flow discharged from the accumulator tank through a check valve, through a normally open motor operated valve and discharges to the Reactor Coolant System cold leg piping. The accumulators, discharge lines, valves in the discharge lines, accumulator instrument piping, fill line between the accumulator and fail-closed class break isolation, and the test line between the accumulator and fail-closed class break isolation valve are within the Safety Injection System boundary. The nitrogen vent lines and valves are within the Safety Injection System boundary. The containment isolation valves and piping are within the Safety Injection System boundary.

All lines connected between the inboard containment isolation valve and fail-closed class break valves in the test lines, and the fill and drain lines, are within the Safety Injection System boundary. Valves, piping and flow elements down stream of the outboard containment isolation valve are within the Safety Injection System boundary. The accumulator drain lines are in scope up to the isolation valve.

The piping down stream of the drain line isolation valves is within the Safety Injection System boundary. The capped drains and relief valve discharge lines are within the Safety Injection boundary. The Nitrogen Gas line to each accumulator is isolated during normal operations, and these lines are evaluated with the Nitrogen Gas System (discussed in Section 2.3.3.24).

PID-1-WLD-LR20219, PID-1-WLD-LR20221:

The Waste Processing Liquid Drain System drawings show the in scope system interface for drains in the Safety Injection System.

PID-1-BRS-LR20854:

The Boron Recovery System drawing shows the in scope system interface with the test header for the Safety Injection System.

Interfacing Systems

Not included in the Safety Injection System scoping boundary are the following interfacing systems, which are separately evaluated as license renewal systems:

- Chemical and Volume Control System
- Containment Building Spray System
- Nitrogen Gas System
- Reactor Coolant System

- Residual Heat Removal System
- Sample System
- Valve Stem Leak-Off System
- Waste Processing Liquid Drains System

System Intended Functions

Injects borated water into the Reactor Coolant System when Reactor Coolant System pressure has decreased below shutoff head for intermediate head ECCS injection.	10 CFR 54.4(a)(1)
Provide a sufficient volume of water for injection into the Reactor Coolant System cold legs to refill the reactor vessel/core barrel annulus and vessel plenum following a loss of coolant accident.	10 CFR 54.4(a)(1)
Provide emergency core cooling during ECCS recirculation for either Reactor Coolant System cold leg or hot leg recirculation.	10 CFR 54.4(a)(1)
Provide safe shutdown control and indication (Post Accident Monitoring).	10 CFR 54.4(a)(1)
Isolate the accumulators from the Reactor Coolant System.	10 CFR 54.4(a)(1)
Provide design basis Engineered Safety Features Actuation Signals (ESFAS).	10 CFR 54.4(a)(1)
Provide Containment Isolation function.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited in the current licensing basis for Environmental Qualification (EQ).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited in the current licensing basis for Fire Protection (FP).	10 CFR 54.4(a)(3)

UFSAR References

- Tech Spec 3.5.1.1
- Section 6.3
- Table 6.2-83
- Table 7.3-1
- Table 7.5-1

License Renewal Drawings

- PID-1-BRS-LR20854
- PID-1-CBS-LR20233
- PID-1-RC-LR20841
- PID-1-RC-LR20842
- PID-1-RC-LR20843
- PID-1-RC-LR20844
- PID-1-RH-LR20662
- PID-1-RH-LR20663
- PID-1-SI-LR20446
- PID-1-SI-LR20447
- PID-1-SI-LR20449
- PID-1-SI-LR20450
- PID-1-WLD-LR20218
- PID-1-WLD-LR20219
- PID-1-WLD-LR20221

Table 2.3.2-4 Safety Injection System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Bolting (Class 1)	Pressure Boundary
Filter Element	Filter
Filter Housing	Pressure Boundary
Heat Exchanger Components	Heat Transfer Pressure Boundary
Instrumentation Element	Pressure Boundary
Orifice	Leakage Boundary (Spatial) Pressure Boundary Throttle
Orifice (Class 1)	Pressure Boundary Throttle
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary
Piping and Fittings (Class 1)	Pressure Boundary
Piping and Fittings (Class 1 <4 Inches)	Pressure Boundary Throttle
Piping Element	Pressure Boundary
Pump Casing	Pressure Boundary
Tank	Pressure Boundary
Thermowell	Leakage Boundary (Spatial) Pressure Boundary
Valve Body	Leakage Boundary (Spatial) Pressure Boundary
Valve Body (Class 1)	Pressure Boundary

The aging management review results for these components are provided in Table 3.2.2-4, Summary of Aging Management Evaluation - Safety Injection System.

2.3.3 AUXILIARY SYSTEMS

The following systems are addressed in this section:

- Auxiliary Boiler (2.3.3.1)
- Boron Recovery System (2.3.3.2)
- Chemical and Volume Control System (2.3.3.3)
- Chlorination System (2.3.3.4)
- Containment Air Handling System (2.3.3.5)
- Containment Air Purge System (2.3.3.6)
- Containment Enclosure Air Handling System (2.3.3.7)
- Containment Online Purge System (2.3.3.8)
- Control Building Air Handling System (2.3.3.9)
- Demineralized Water System (2.3.3.10)
- Dewatering System (2.3.3.11)
- Diesel Generator (2.3.3.12)
- Diesel Generator Air Handling System (2.3.3.13)
- Emergency Feed Water Pump House Air Handling System (2.3.3.14)
- Fire Protection System (2.3.3.15)
- Fuel Handling System (2.3.3.16)
- Fuel Oil System (2.3.3.17)
- Fuel Storage Building Air Handling System (2.3.3.18)
- Hot Water Heating System (2.3.3.19)
- Instrument Air System (2.3.3.20)
- Leak Detection System (2.3.3.21)

- Mechanical Seal Supply System (2.3.3.22)
- Miscellaneous Equipment (2.3.3.23)
- Nitrogen Gas System (2.3.3.24)
- Oil Collection for Reactor Coolant Pumps System (2.3.3.25)
- Plant Floor Drain System (2.3.3.26)
- Potable Water System (2.3.3.27)
- Primary Auxiliary Building Air Handling System (2.3.3.28)
- Primary Component Cooling Water System (2.3.3.29)
- Radiation Monitoring System (2.3.3.30)
- Reactor Makeup Water System (2.3.3.31)
- Release Recovery System (2.3.3.32)
- Resin Sluicing System (2.3.3.33)
- Roof Drains System (2.3.3.34)
- Sample System (2.3.3.35)
- Screen Wash System (2.3.3.36)
- Service Water System (2.3.3.37)
- Service Water Pump House Air Handling System (2.3.3.38)
- Spent Fuel Pool Cooling System (2.3.3.39)
- Switchyard (2.3.3.40)
- Valve Stem Leak-off System (2.3.3.41)
- Vent Gas System (2.3.3.42)
- Waste Gas System (2.3.3.43)
- Waste Processing Liquid System (2.3.3.44)
- Waste Processing Liquid Drains System (2.3.3.45)

2.3.3.1 Auxiliary Boiler System

System Description

This is a subsystem of the Auxiliary Steam System. The Auxiliary Boiler System provides steam to the Auxiliary Steam System, which in turn provides process steam for various plant heating loads.

There are two main purposes of the Auxiliary Boiler System. The first is to provide steam to the Auxiliary Steam System. The second is to provide fuel oil to the Fire Pump House Boiler. The Fire Pump House Boiler provides steam to heat the Fire Water Storage Tank and provides steam to the Fire Pump House unit heaters.

The Auxiliary Boiler System consists of two package boilers, which include a de-aerating heater with storage tank, boiler feed pumps, fuel oil pumps, and a blowdown tank. Also included are the fuel oil storage tank and the associated piping. The portion of the Auxiliary Boiler System that supplies oil to the Fire Pump House Boiler consists of piping from the fuel oil storage tank to the Fire Pump House Boiler and the Fire Pump House Boiler oil pumps.

In-Scope Boundary Description

The license renewal boundary of the Auxiliary Boiler (AB) System required for Fire Protection is the fuel oil system pressure boundary path for supplying fuel oil to boiler 1-ASH-E-218.

Auxiliary Boiler Fuel Tank
PID-1-AB-LR20016:

The Auxiliary Boiler System boundary begins with the Auxiliary Boiler fuel oil storage tank and includes the fuel oil truck fill connection. From the dike containing the fuel tank, underground lines lead to and from the fuel oil pumps in the auxiliary boiler room of the administration building, and the fire pump house boiler building.

Auxiliary Boiler Fuel Supply
PID-1-AB-LR20014:

The boundary piping to the auxiliary boiler fuel pump set includes a suction strainer, the three fuel oil pumps, a pressure controlled recirculation valve and the supply lines to and from each boiler control set for the atomizing stations. The boundary includes the lines up to the pressure control valve and the fuel oil storage tank return line. The boundary ends at the fuel oil shut off valve for the main and auxiliary atomizers.

Fire Pump House
PID-1-ASC-LR20912

The boundary piping for the fire pump house boiler includes a suction strainer, pressure control valve, burner driven fuel oil pump and fuel flow control valves and piping. The boundary also includes the blower air damper and return line to the fuel oil storage tank.

Interfacing Systems

Not included in the Auxiliary Boiler System license renewal scoping boundaries are the following interfacing system, which is separately evaluated as a license renewal system.

- Auxiliary Steam Heating System

System Intended Functions

This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)

UFSAR References

- Section 10.4.11

License Renewal Drawings

- PID-1-AB-LR20014
- PID-1-AB-LR20016
- PID-1-ASC-LR20912

Table 2.3.3-1 Auxiliary Boiler System
Component Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Damper Housing	Pressure Boundary
Fan Housing	Pressure Boundary
Filter Housing	Pressure Boundary
Flame Arrestor	Pressure Boundary
Instrumentation Element	Pressure Boundary
Piping and Fittings	Pressure Boundary
Pump Casing	Pressure Boundary
Tank	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, Summary of Aging Management Evaluation - Auxiliary Boiler.

2.3.3.2 Boron Recovery System

System Description

The Boron Recovery System stores and processes reactor coolant effluent and reactor coolant grade drainage for reuse in the plant or for disposal offsite. The system maximizes recycling of effluent back to the plant and minimizes the release of radioactive material to the environment by proper cleanup and volume reduction methods. The system process is a combination of degasification, demineralization, filtration and evaporation. The Boron Recovery System is designed as non-nuclear safety class and non-seismic Category I.

The Boron Recovery System is designed to:

- Process the reactor coolant letdown liquid generated by normal operations under either base loaded or load-following conditions.
- Permit startup from a cold shutdown condition. For conservatism, the plant is assumed to be in end-of-core-life conditions (50 ppm boron concentration), and evaporator availability is considered to be 75 percent of the time.
- Produce distillate from the boron evaporator with a maximum of 5 ppm boron, and provide by means of the boron demineralizers (mixed bed ion exchange units) the capability for reducing the boron concentration further, if so desired.
- Provide radioactivity decontamination and chemical purification such that: (1) for reuse within the station, the system effluent meets the chemical purity requirements for recycled reactor makeup water, and (2) for discharge from the station, the effluent meets required radioactivity release limitations.
- Accept and process any hydrogenated liquid drains collected in the primary drain tank.

Other sources of liquid which can be transferred into the Recovery Test Tanks (1-BRS-TK-58-A and B) include effluent from a skid-mounted waste liquid processing system should additional storage capacity be required prior to discharge.

In-Scope Boundary Description

PID-1-BRS-LR20861, PID-1-ASC-LR20902:

The license renewal boundary begins when the Boron Recovery System Recovery Test Tank inlet lines leave the Waste Process Building and enter the

Tank Farm building. The Boron Recovery System Recovery Test Tanks, tank panel heaters, and connected instruments are included. Tank outlet lines, drain valves, and isolation valves are included until the line ends or leaves the Tank Farm and enters the Waste Process Building.

PID-1-CS-LR20724, PID-1-VSL-LR20775:

Included in the license renewal boundary is the Primary Drain Tank Transfer Pumps to Letdown Degasifier line and isolation valve as it enters the Primary Auxiliary Building from the Waste Process Building. Also included in this boundary is the valve stem leak-off for the isolation valve.

Interfacing Systems

Not included in the Boron Recovery System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Auxiliary Steam System
- Auxiliary Steam Condensate System
- Chemical and Volume Control System
- Reactor Makeup Water System

System Intended Functions

This system contains components which perform functions credited for Non Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)

UFSAR References

- Section 9.3.5

License Renewal Drawings

- PID-1-ASC-LR20902
- PID-1-BRS-LR20861
- PID-1-CS-LR20724
- PID-1-VSL-LR20775

Table 2.3.3-2 Boron Recovery System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage Boundary (Spatial)
Flexible Hose	Leakage Boundary (Spatial)
Heater Housing	Leakage Boundary (Spatial)
Piping and Fittings	Leakage Boundary (Spatial)
Tank	Leakage Boundary (Spatial)
Thermowell	Leakage Boundary (Spatial)
Valve Body	Leakage Boundary (Spatial)

The age management review results for these components are provided in Table 3.3.2-2, Summary of Age Management Evaluations - Boron Recovery System.

2.3.3.3 Chemical and Volume Control System

System Description

The Chemical and Volume Control System is designed to:

- Provide emergency core cooling. A portion of the Chemical and Volume Control System is used to supply high-head injection as part of the Emergency Core Cooling System (ECCS).
- Regulate the concentration of chemical neutron absorber (boron) in the reactor coolant to control reactivity changes resulting from the change in reactor coolant temperature between cold shutdown and hot full power operation, burn up of fuel and burnable poisons, buildup of fission products in the fuel, and xenon transients.
- Maintain the coolant inventory in the Reactor Coolant System within the allowable pressurizer level range for all normal modes of operation including startup from cold shutdown, full power operation and plant cooldown.
- Remove fission and activation products, in ionic form, in gaseous form or as particulates, from the reactor coolant during operation and to reduce activity releases due to leaks.
- Add chemicals to the Reactor Coolant System to control the pH of the coolant during initial startup and subsequent operation, scavenge oxygen from the coolant during startup, and counteract the production of oxygen in the reactor coolant due to radiolysis of water in the core region.
- Supply filtered water to each reactor coolant pump seal, as required by the reactor coolant pump design.
- Supply water at the maximum test pressure specified for hydrostatic testing of the Reactor Coolant System.

The Chemical and Volume Control System consists of several subsystems:

- High-head injection part of the emergency core cooling
- The Charging, Letdown and Seal Water System
- The Reactor Coolant Purification and Chemistry Control System
- The Reactor Makeup Control System

- The Boron Thermal Regeneration System

High Head Injection System:

The high-head injection part of the Emergency Core Cooling System consists of the Chemical and Volume Control System centrifugal charging pumps, Reactor Coolant System injection header isolation valves, and injection lines to the four Reactor Coolant System cold legs. This system is used to inject borated makeup water from the Refueling Water Storage Tank (RWST) into the Reactor Coolant System cold legs.

The high head injection system is capable of injecting cool, primary grade, borated water into the Reactor Coolant System at or above normal Reactor Coolant System pressure, as would be necessary in the event of a small break loss of coolant accident.

During normal plant operation, the high head injection flow path is isolated from both the RWST and Reactor Coolant System. During a safety injection, however, the injection header from the Chemical and Volume Control System to the Reactor Coolant System is un-isolated and the Centrifugal Charging Pumps pump water from the RWST into the four Reactor Coolant System cold legs. The flow path for the high-head injection system is the same for all phases of emergency core cooling. When the RWST level reaches the low-low level, the suction valves from the containment sumps to the Containment Building Spray and Residual Heat Removal System lines open and the Containment Building Spray System and Residual Heat Removal System continue to operate in the recirculation mode. In the containment sump recirculation mode, the Safety Injection pumps and the Chemical and Volume Control System Centrifugal Charging Pumps are manually realigned and take suction from the Residual Heat Removal pumps.

The Charging, Letdown and Seal Water System:

The charging and letdown functions of the Chemical and Volume Control System are employed to maintain a programmed water level in the Reactor Coolant System pressurizer, thus maintaining proper reactor coolant inventory during all phases of plant operation. This is achieved by means of a continuous feed and bleed process during which the feed rate is automatically controlled based on pressurizer water level.

Two high-pressure letdown valves are provided in parallel, either of which can be utilized to adjust letdown flow from 0 to 80 gpm. Reactor coolant is discharged to the Chemical and Volume Control System from a reactor coolant loop cold leg; it then flows through the shell side of the regenerative heat exchanger where its temperature is reduced by heat transfer to the charging flow passing through the tubes. The coolant then experiences a large pressure reduction as it passes through the high pressure letdown control valve.

Three charging pumps (one positive displacement and two centrifugal) are provided to take suction from the volume control tank and return the purified reactor coolant to the Reactor Coolant System. Normal charging flow is handled by one of the three charging pumps. This charging flow splits into two paths. The bulk of the charging flow is pumped back to the Reactor Coolant System cold leg through the tube side of the regenerative heat exchanger. The letdown flow in the shell side of the regenerative heat exchanger raises the charging flow to a temperature approaching the reactor coolant temperature. Two redundant charging paths are provided from a point downstream of the regenerative heat exchanger. The centrifugal charging pumps also serve as high-head safety injection pumps in the Emergency Core Cooling System.

A portion of the charging flow is directed to the Reactor Coolant pumps (nominally 8 gpm per pump) through a seal water injection filter. The flow is directed to a point above the pump shaft bearing. Here the flow splits and a portion (nominally 5 gpm per pump) enters the Reactor Coolant System through the labyrinth seals and thermal barrier.

The excess letdown path is provided as an alternate letdown path from the Reactor Coolant System in the event that the normal letdown path is inoperable. Reactor coolant can be discharged from a cold leg to flow through the tube side of the excess letdown heat exchanger, where it is cooled by primary component cooling water.

<u>The Reactor Coolant Purification and Chemistry Control System:</u>

The reactor coolant Purification and Chemistry Control System maintains reactor coolant chemistry within EPRI specified guidelines.

pH Control:

The pH control chemical employed is lithium hydroxide. The concentration of lithium-7 in the Reactor Coolant System is maintained in the range specified for pH control per approved station procedures and EPRI PWR Primary Water Chemistry Guidelines. If the concentration exceeds this range, the cation bed demineralizer is employed in the letdown line in series operation with one or both of the mixed bed demineralizers. Since the amount of lithium to be removed is small, and its buildup can be readily calculated, the flow through the cation bed demineralizer is not required to be full letdown flow. If the concentration of lithium-7 is below the specified limits, lithium hydroxide can be introduced into the Reactor Coolant System via the charging flow. The solution is prepared and poured into the chemical mixing tank. Reactor makeup water is then used to flush the solution to the suction manifold of the charging pumps.

Oxygen Control:

During reactor startup from the cold condition, hydrazine is employed as an oxygen scavenging agent. The hydrazine solution is introduced into the Reactor Coolant System in the same manner as described above for the pH control agent. Hydrazine is not employed at any time other than startup from the cold shutdown state. Dissolved hydrogen is employed to control and scavenge oxygen produced due to radiolysis of water in the core region. A sufficient partial pressure of hydrogen is maintained in the volume control tank so that the specified equilibrium concentration of hydrogen is maintained in the reactor coolant. A pressure control valve maintains a minimum pressure in the vapor space of the volume control tank. This valve can be adjusted to provide the correct equilibrium hydrogen concentration. Hydrogen is supplied from the hydrogen manifold in the Gaseous Waste Processing System. When the letdown flow is degasified, hydrogen is injected into the degasified coolant before it is discharged into the volume control tank.

Reactor Coolant Purification:

Mixed bed demineralizers and a degasifier package are provided in the letdown line to provide cleanup of the letdown flow. The demineralizers remove ionic corrosion products and certain fission products. One demineralizer is in continuous service, with the second mixed bed demineralizer serving as a standby unit for use if the operating demineralizer becomes exhausted during operation or both demineralizers are in service operating in parallel. A further cleanup feature is provided for use during cold shutdown and residual heat removal. A remote-operated valve admits a bypass flow from the Residual Heat Removal System (RH) into the letdown line upstream of the letdown heat exchanger. The flow passes through the heat exchanger, though the demineralizer pre-filter, through a mixed bed demineralizer and the reactor coolant filter to either the volume control tank and to the Reactor Coolant System via the normal charging route, or directly to the operating Residual Heat Removal pump suction line. Filters are provided at various locations to ensure filtration of particulate and resin fines, and to protect the seals on the reactor coolant pumps. Fission gases are normally removed from the reactor coolant by the letdown degasifier, or they may be removed by continuous purging of the volume control tank to the Gaseous Waste Processing System.

The Reactor Makeup Control System:

The soluble neutron absorber (boric acid) concentration is controlled by the Reactor Makeup Control System. It can also be controlled by the Boron Thermal Regeneration System. The Reactor Makeup Control System is also used to maintain proper reactor coolant inventory. In addition, for emergency boration and makeup, the capability exists to provide refueling water or 4-weight percent boric acid directly to the suction of the charging pump.

The Reactor Makeup Control System provides a manually pre-selected makeup composition to the charging pump suction header or to the volume control tank. The makeup control functions are those of maintaining desired operating fluid inventory in the volume control tank and adjusting reactor coolant boron concentration for reactivity control. Reactor makeup water and boric acid solution are blended together at the reactor coolant boron concentration for use as makeup to maintain volume control tank inventory, or they can be used separately to change the reactor coolant boron concentration.

The boric acid is stored in two boric acid tanks. Two boric acid transfer pumps are provided, with one pump normally aligned to provide boric acid to the suction header of the charging pumps, and the second pump in reserve. On a demand signal by the reactor makeup controller, the pump starts and delivers boric acid to the suction header of the charging pumps. The pump is also used to recirculate the boric acid tank fluid.

All portions of the Chemical and Volume Control System which normally contain concentrated boric acid solution are required to be located within a heated area in order to maintain solution temperature at ≥ 65°F. If a portion of the system which normally contains concentrated boric acid solution is not located in a heated area, it is provided with some other means (e.g., heat tracing) to maintain solution temperature at ≥ 65°F.

The reactor makeup water pumps, taking suction from the reactor makeup water storage tank, are employed for various makeup and flushing operations throughout the systems. One of these pumps starts on demand from the reactor makeup controller and provides flow to the suction header of the charging pumps or the volume control tank through the letdown line and spray nozzle.

The Boron Thermal Regeneration System:

Downstream of the mixed bed demineralizers, if load following operation were desired, the letdown flow can be diverted to the Boron Thermal Regeneration System where part or all of the letdown flow can be treated for boron concentration changes. After processing, the flow is returned to a point upstream of the reactor coolant filter.

Storage and release of boron if load follow operation is conducted, would be determined by the temperature of fluid entering the thermal regeneration demineralizers. A chiller unit and a group of heat exchangers would be employed to provide the desired fluid temperatures at the demineralizer inlets for either storage or release operation of the system

The flow path through the Boron Thermal Regeneration System is different for the boron storage and the boron release operations. During boron storage, the letdown stream enters the moderating heat exchanger and from there it passes through the letdown chiller heat exchanger. These two heat exchangers cool the letdown stream prior to its entering the demineralizers. The letdown reheat heat exchanger is valved out on the tube side and performs no function during boron storage operations. The temperature of the letdown stream at the point of entry to the demineralizers is controlled automatically by the temperature control valve which controls the shell side flow to the letdown chiller heat exchanger. After passing through the demineralizers, the letdown enters the moderating heat exchanger shell side, where it is heated by the incoming letdown stream before going to the volume control tank.

Therefore, for boron storage, a decrease in the boric acid concentration in the reactor coolant is accomplished by sending the letdown flow at relatively low temperatures to the thermal regeneration demineralizers. The resin, which was depleted of boron at high temperature during a prior boron release operation, is now capable of storing boron from the low temperature letdown stream. Reactor coolant with a decreased concentration of boric acid leaves the demineralizers and is directed to the Reactor Coolant System via the charging system.

During the boron release operation, the letdown stream enters the moderating heat exchanger tube side, bypasses the letdown chiller heat exchanger, and passes through the shell side of the letdown reheat heat exchanger. The moderating and letdown reheat heat exchangers heat the letdown stream prior to its entering the resin beds. The temperature of the letdown at the point of entry to the demineralizers is controlled automatically by the temperature control valve which controls the flow rate on the tube side of the letdown reheat heat exchanger. After passing through the demineralizers, the letdown stream enters the shell side of the moderating heat exchanger, passes through the tube side of the letdown chiller heat exchanger and then goes to the volume control tank. The temperature of the letdown stream entering the volume control tank is controlled automatically by adjusting the shell side flow rate on the letdown chiller heat exchanger. Thus, for boron release, an increase in the boric acid concentration in the reactor coolant is accomplished by sending the letdown flow at relatively high temperatures to the thermal regeneration demineralizers. The water flowing through the demineralizers now results in boron being released which was stored by the resin at low temperature during a previous boron storage operation. The boron-enriched reactor coolant is returned to the Reactor Coolant System via the charging system. For either of the above operating modes, the flow through the demineralizers can be adjusted from zero flow to the total letdown flow. Reduced flow through the demineralizers is achieved by adjusting the three-way valve located upstream of the demineralizers to split the flow so that a portion of the flow bypasses the demineralizers.

Although the Boron Thermal Regeneration System was initially primarily designed to compensate for xenon transients occurring during load follow, it can also be used to handle boron changes during other modes of plant operation. During startup dilution, for example, the resin beds would be first saturated, then washed off to the primary drain tank, then again saturated and washed off. This operation would continue until the desired dilution in the Reactor Coolant System was obtained. This method of startup serves to reduce the effluents diverted to the primary drain tank.

A thermal regeneration demineralizer can be used as a de-borating demineralizer without the use of the chiller portion of the system. This can be used to dilute the Reactor Coolant System down to very low boron concentrations towards the end of a core cycle. To make such a bed effective, the effluent concentration from the bed must be kept very low, close to zero ppm boron. This low effluent concentration can be achieved by using fresh resin. Use of fresh resin can be coupled with the normal replacement cycle of the resin; one resin bed being replaced during each core cycle. This operation serves to reduce the effluents diverted to the primary drain tank.

To prevent Reactor Coolant System boron dilutions during shutdown operations, the thermal regeneration demineralizers are isolated in accordance with the Technical Specifications.

In-Scope Boundary Description

The Chemical and Volume Control (CS) System license renewal boundary is discussed in the following section and is divided into the functional groupings of high-head injection, letdown, excess letdown, charging, seal water, thermal regeneration and boron/dilution.

High-Head Injection Portion of the Emergency Core Cooling System (ECCS) PID-1-CBS-LR20233, PID-1-SI-LR20446, PID-1-SI-LR20447, PID-1-SI-LR20449, PID-1-RH-LR20663, PID-1-RH-LR20662, PID-1-CS-LR20722, PID-1-CS-LR20726, PID-1-CS-LR20725:

The High Head Injection pumps are supplied with two suction flow paths for the Emergency Core Cooling System, one for Cold Leg Injection Phase, the second from the Cold Leg Recirculation Phase.

Injection Phase:

The boundary for the Chemical and Volume Control System starts at the suction of the centrifugal charging pumps at the CS/Containment Building Spray System interface where the pumps take suction from the Refueling Water Storage tank. The water continues through the pumps and 1-CS-FE-917 and 1-CS-FE-7448 and the boundary ends at the Safety Injection System interface. The charging pumps also supply the Reactor Coolant Pump seals, the flow path continues through the seal injection filters to the reactor coolant pump seals, the boundary ends at the containment penetration isolation 1-CS-V-168.

Cold Leg Recirculation Phase:

The boundary for the Chemical and Volume Control System starts at the suction of the centrifugal charging pumps at the CS/Residual Heat Removal System interface where the pumps take suction from the Residual Heat Removal Pumps which are supplied from the Containment Recirculation Sumps. The water continues through the pumps and 1-CS-FE-917 and 1-CS-FE-7448 and the boundary ends at the CS/SI interface. The charging pumps also supply the Reactor Coolant Pump seals, the flow path continues through the Seal injection filters to the reactor Coolant Pump seals, the boundary ends at the containment penetration isolation 1-CS-V-168.

Also included in both boundaries are the mini-flow recirculation flow paths through the seal water heat exchangers back to the suction of the centrifugal charging pumps.

Letdown Portion of the Chemical and Volume Control System Boundary PID-1-CS-LR20722, PID-1-CS-LR20723, PID-1-CS-LR20724, PID-1-CS-LR20725, PID-1-RH-LR20662, PID-1-RH-LR20663, PID-1-RC-LR20843, PID-1-RS-LR20252, PID-1-SI-LR20448, PID-1-SS-LR20519, PID-1-BRS-LR20854:

The boundary for the letdown portion (heat exchange, purification and degasification) of the Chemical and Volume Control System begins inside the reactor containment at the inlet to the regenerative heat exchanger. The boundary continues with the regenerative heat exchanger and continues with the connected piping and valves passing through the containment wall, mechanical penetration area and into the primary auxiliary building. Flow exits the letdown heat exchanger discharge line, passes through a pressure control valve/bypass, passes by relief valve line and a sample line before entering a temperature control valve. The outlet of the temperature control valve can be directed to the outlet of the demineralizer beds and/or to the demineralizer pre-filter before entering the inlet of the demineralizer beds. The boundary then divides and continues through three demineralizer vessels joining at their exit with the demineralizer bypass line and continuing to the reactor coolant filter. The boundary also includes the piping boundary of the Resin Sluicing System. The outlet of the reactor coolant filter includes a shutdown slipstream purification path to Residual Heat Removal pump suction. It then continues to the degasifier diversion valve where the boundary continues both to the bypass line (and a divert valve to the primary drain tank), a flow orifice and to the degasifier regenerative heat exchanger, degasifier pre-heater and the degasifier. The boundary continues with the degasifier outlet piping dividing into two degasifier recirculation pump suction lines, pumps and discharge lines. The pump discharges combine in a single line continuing through the regenerative heat exchanger, degasifier trim cooler and a startup bypass line. The boundary continues to the boron thermal regeneration diversion line and the hydrogen static mixer. From the mixer, the boundary joins with the diversion line and continues to the Chemical Volume Control Tank.

Excess Letdown Portion of the Chemical and Volume Control System Boundary
PID-1-CS-LR20726, PID-1-CS-LR20722:

The boundary for excess letdown begins with the reactor coolant connection at the Chemical and Volume Control System cold leg connection at loop three reactor coolant pump discharge. The boundary continues to and includes the excess letdown heat exchanger. At the outlet of the heat exchanger the boundary divides via a diversion valve to either a line connecting to the reactor coolant drain tank or, to the reactor coolant pumps seal water return header.

Charging portion of the Chemical and Volume Control System Boundary
PID-1-CS-LR20725, PID-1-CS-LR20722, PID-1-RC-LR20846, PID-1-SI-LR20446, PID-1-SI-LR20447, PID-1-SS-LR20518, PID-1-BRS-LR20854:

The charging portion of the Chemical and Volume Control System boundary continues with the volume control tank and outlet piping. The pipe divides to become the suction line for the positive displacement charging pump, the common suction for the two centrifugal charging and the residual heat removal common cross connect to safety injection/ charging pumps. The positive displacement charging pump includes the suction stabilizer, pump, stuffing box reservoir and oil cooler. The boundary continues with the discharge piping, pulsation damper and minflow line. Each centrifugal pump includes the pump, lube oil pump, cooler, filter and oil reservoir. The centrifugal pumps boundary continues with one recirculation line with a flow orifice per pump, a supply to the seal water portion of the Chemical and

Volume Control System boundary and a line to the high head safety injection (part of the Safety Injection System). The discharge piping includes a flow control valve and then joins with the Positive Displacement Pump discharge boundary piping and continues through the seal flow control valve, enters the mechanical penetration area, passes through two containment isolation valves and then enters the containment and proceeds through the tube side of the regenerative heat exchanger. At the outlet of the regenerative heat exchanger the boundary divides into three paths. The first boundary line leads to the pressurizer spray and the remaining two lines to Reactor Coolant loops one and four cold legs.

Seal Water Portion of the Chemical and Volume Control System Boundary PID-1-CS-LR20725, PID-1-CS-LR20726, PID-1-CS-LR20722, PID-1-WLD-LR20218, PID-1-RC-LR20841, PID-1-RC-LR20842, PID-1-RC-LR20843, PID-1-RC-LR20844:

The reactor coolant pump seal water boundary of the Chemical and Volume Control System begins at a connection upstream of the seal flow control valve and at the two centrifugal charging pump discharge lines (seal flow bypass lines). The boundary divides at the inlet to the two seal injection filters and recombines on the downstream side. The boundary piping enters the mechanical penetration area and divides into four sections, one for each reactor coolant pump. Each of the four lines is similar and includes a flow control needle valve and isolation valve. Each line then passes through a containment penetration and to, but not including, the respective reactor coolant pump seal. The four number one seal leakoff lines combine along with excess letdown and pass through a seal return isolation valve, flow orifice and combines in a single line with a containment isolation valve. The line exits the containment, enters the mechanical penetration area and passes through a containment isolation valve. The line then enters the Primary Auxiliary Building, continuing to the seal return filter and filter bypass line. The outlet piping of the seal injection return filter joins with the centrifugal charging pump recirculation lines and continues to the two series connected seal water heat exchangers and bypass line. The outlet boundary piping of the seal water heat exchangers divides and connects to the charging portion of the boundary at the top of the volume control tank and at the volume control tank outlet line downstream of the two series isolation valves.

At the reactor coolant pump seal outlet the four reactor coolant pump number two seal leakoff lines continue to and end at the reactor coolant drain tank inlet header.

Boron Thermal Regeneration Portion of the Chemical and Volume Control System Boundary
PID-1-CS-LR20723, PID-1-CS-LR20727, PID-1-CS-LR20722, PID-1-CS-LR20728, PID-1-RC-LR20843, PID-1-WLD-LR20219:

The boron thermal regeneration boundary of the Chemical and Volume Control System begins at the outlet of the three purification Chemical and Volume Control System demineralizers (discussed in the letdown portion of the Chemical and Volume Control System). The boundary piping continues to the tube side of the moderating heat exchanger, the tube side of the letdown chiller heat exchanger and its bypass line. The outlet of the letdown chiller includes a branch returning to the reactor coolant filter. The boundary then continues to the shell side of the letdown reheat heat exchanger and to the inlet piping of the thermal regeneration demineralizers. A borate/dilute valve and piping is included that accommodates the directional flows necessary to provide boration and dilution. The boundary also includes the piping boundary of the Resin Sluicing System. The piping recombines to a single line continuing to the shell side of the moderating heat exchanger. The outlet piping divides and either returns to the inlet of the reactor coolant filter (discussed in the letdown portion of the Chemical and Volume Control System) or joins with the boundary from the tube side of the moderating heat exchanger. A boundary line from the outlet piping of the regenerative heat exchanger in the Primary Auxiliary Building (discussed in the letdown portion of the Chemical and Volume Control System) continues to the tube side of the letdown reheat heat exchanger. The outlet returns to Chemical and Volume Control System letdown portion boundary piping just downstream of the reheat temperature control valve. The boron thermal regeneration chiller 1-CS-E-18, chiller surge tank, chiller pumps, piping and components are in dry layup and not in scope of License Renewal as the components have no intended function.

Boric Acid Makeup Portion of the Chemical and Volume Control System Boundary
PID-1-CS-LR20729, PID-1-CBS-LR20233:

The Boric Acid portion of the Chemical and Volume Control System boundary begins with the boric acid batching tank. The batch tank outlet boundary pipe leads to a valved line connected to both boric acid storage tanks outlet lines and a gravity boration line continuing to the charging pumps suction. Each boric acid storage tank is connected to the suction of a dedicated boric acid pump. The discharge of the boric acid pump divides into a recirculation line (with a Boron Recovery System fill line), a cleanup line and a line to the boric acid filter. The two boric acid pump discharge lines join to form a common line to the boric acid filter. A recirculation line is provided from the filter outlet to boric acid tank. The filter outlet line divides into emergency boration boundary piping to the charging pumps suction and the boric acid flow to the boric acid blender. The line to the blender has a flow control valve and a branch line providing an alternate emergency boration path to the charging pump suction. From the boric acid blender the path includes a flow straightener, a flow orifice and divides to supply five locations: the cesium removal demineralizer, spent fuel pool makeup, refueling water storage tank, the top of the volume control tank and the outlet of the volume control tank.

Boron Thermal Regeneration System Chiller
PID-1-CC-LR20212:

The boundary on this drawing includes the component cooling water to the non-nuclear safety chiller 1-CS-E-18-E and the vent valve. Also included in the boundary is the Safety Related Seal Water Heat Exchanger 1-CS-E-5-B.

Interfacing Drainage Drawings
PID-1-VSL-LR20775, PID-1-VSL-LR20776, PID-1-VSL-LR20777, PID-1-WLD-LR20222, PID-1-WLD-LR20223:

The boundary on these drawings are valve leakoff lines and drain lines from Chemical and Volume Control components shown on the CS boundary drawings.

Interfacing Systems

Not included in the Chemical and Volume Control System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Boron Recovery System
- Containment Building Spray System
- Demineralized Water System
- Nitrogen Gas System
- Primary Component Cooling Water System
- Radiation Monitoring System
- Reactor Coolant System
- Reactor Makeup Water System
- Release Recovery System
- Resin Sluicing System
- Residual Heat Removal System
- Safety Injection System

- Sample System
- Spent Fuel Pool Cooling System
- Valve Stem Leakoff System
- Vent Gas System
- Waste Processing Liquid Drains System

System Intended Functions

Provide high head safety injection for emergency core cooling.	10 CFR 54.4(a)(1)
Maintain programmed pressurizer water level (e.g. maintain required Reactor Coolant System inventory)	10 CFR 54.4(a)(1)
Maintain seal water injection flow to the reactor coolant pumps.	10 CFR 54.4(a)(1)
Control Reactor Coolant System chemistry, activity level, boron concentration, and makeup.	10 CFR 54.4(a)(1)
Provide backup high head injection capability.	10 CFR 54.4(a)(1)
Provide safe shutdown control and indication (Post Accident Monitoring).	10 CFR 54.4(a)(1)
Provide containment isolation function.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Anticipated Transient Without a Scram (ATWS).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Environmental Qualification (EQ).	10 CFR 54.4(a)(3)

This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Station Blackout (SBO).	10 CFR 54.4(a)(3)

UFSAR References

- Section 9.3.4
- Section 6.2
- Table 6.2-83
- Table 7.4-1
- Table 7.5-1

License Renewal Drawings

- PID-1-BRS-LR20854
- PID-1-CBS-LR20233
- PID-1-CC-LR20212
- PID-1-CS-LR20722
- PID-1-CS-LR20723
- PID-1-CS-LR20724
- PID-1-CS-LR20725
- PID-1-CS-LR20726
- PID-1-CS-LR20727
- PID-1-CS-LR20728
- PID-1-CS-LR20729
- PID-1-RC-LR20841

- PID-1-RC-LR20842
- PID-1-RC-LR20843
- PID-1-RC-LR20844
- PID-1-RC-LR20846
- PID-1-RH-LR20662
- PID-1-RH-LR20663
- PID-1-RS-LR20252
- PID-1-SF-LR20483
- PID-1-SI-LR20448
- PID-1-SI-LR20449
- PID-1-SI-LR20447
- PID-1-SI-LR20446
- PID-1-SS-LR20518
- PID-1-SS-LR20519
- PID-1-VSL-LR20775
- PID-1-VSL-LR20776
- PID-1-VSL-LR20777
- PID-1-WLD-LR20218
- PID-1-WLD-LR20219
- PID-1-WLD-LR20222
- PID-1-WLD-LR20223

Table 2.3.3-3 Chemical and Volume Control System Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Bolting (Class 1)	Pressure Boundary
Filter Housing	Pressure Boundary
Flexible Hose	Leakage Boundary (Spatial) Pressure Boundary
Heat Exchanger Components	Heat Transfer Leakage Boundary (Spatial) Pressure Boundary
Instrumentation Element	Leakage Boundary (Spatial) Pressure Boundary
Orifice	Leakage Boundary (Spatial) Pressure Boundary Throttle
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary Structural Integrity (attached)
Piping and Fittings (Class 1 <4 Inches)	Pressure Boundary Throttle
Piping Element	Leakage Boundary (Spatial)
Pump Casing	Leakage Boundary (Spatial) Pressure Boundary
Pump Casing (High Head Centrifugal Charging Pump)	Pressure Boundary
Regenerative Heat Exchanger	Heat Transfer Pressure Boundary
Tank	Leakage Boundary (Spatial) Pressure Boundary
Thermowell	Leakage Boundary (Spatial) Pressure Boundary
Valve Body	Leakage Boundary (Spatial) Pressure Boundary
Valve Body (Class 1)	Pressure Boundary

The aging management review results for these components are provided in Table 3.3.2-3, Summary of Aging Management Evaluation - Chemical and Volume Control System.

2.3.3.4 Chlorination System

System Description

The Chlorination System provides sodium hypochlorite solution for injection into the Circulating Water System. Provisions for continuous low-level chlorination and heat treatment of the tunnels are included for control of fouling by marine organisms.

Sodium hypochlorite is injected into a common header that receives flow from the Screen Wash System pumps. The flow from this common header flow to:

- Intake Tunnel
- Intake Transition Structure
- Discharge Transition Structure.
- Circulating Water pump bays
- Service Water pump bays

The Chlorination System is non-safety related.

In-Scope Boundary Description

PID-1-CL-LR20682, PID-1-CW-LR20673:
In the Discharge Transition Structure drywell area, the scoping boundary includes warm water supply pump, its suction line, recirculation line and the discharge line and pressure control valve. Also in the Discharge Transition Structure drywell area is a distribution header for unit one and two. Portions of the unit two header is not in boundary as it is dry and drained. In the Intake Transition Structure drywell area is an in-boundary distribution header that supplies spray to the incoming ocean water for unit one. The unit two spray is drained and out of scope. Also in the Intake Transition Structure drywell area is the normal Intake Tunnel chlorination supply and strainer.

In the Service Water Pump House is a portion of the chlorination supply header along with the distribution header serving unit one and two. A portion of the unit two header is drained and is not in-scope.

Interfacing Systems

Not included in the Chlorination System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Screen Wash System
- Circulating Water System

System Intended Functions

This system has components that perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)

UFSAR References

- Section 9.2.1
- Section 10.4.5

License Renewal Drawings

- PID-1-CL-LR20682
- PID-1-CW-LR20673

Table 2.3.3-4 Chlorination System
Components Subject to Aging Management review

Component Type	Intended Function
Bolting	Leakage Boundary (Spatial)
Filter Housing	Leakage Boundary (Spatial)
Instrumentation Element	Leakage Boundary (Spatial)
Piping and Fittings	Leakage Boundary (Spatial)
Pump Casing	Leakage Boundary (Spatial)
Valve Body	Leakage Boundary (Spatial)

The age management review results for these components are provided in Table 3.3.2-4, Summary of Age Management Evaluations - Chlorination System.

2.3.3.5 Containment Air Handling System

System Description

The Containment Air Handling System composed of three subsystems:

- Containment structure cooling system
- Containment recirculation/filter system
- Control rod drive mechanism cooling system

Containment Structure Cooling Subsystem:

The containment structure cooling subsystem is designed to maintain the normal ambient air temperature in the containment structure at or below 120°F.

The containment structure cooling subsystem also functions to prevent the concrete temperature in the area of the reactor supports from exceeding 150 deg F, and the neutron detector cavity from exceeding 135°F during normal operation.

The containment structure cooling subsystem cooling units are designed against overturning and structural failure during a Safe Shutdown Earthquake.

Containment Structure Recirculating Filter Subsystem:

This subsystem is normally used to filter contaminated air within containment prior to personnel entry, and whenever it is desired to reduce airborne particulate contamination and radioactive iodine. The filter subsystem, when operated in conjunction with the pre entry purge subsystem, reduces the airborne iodine to an acceptable level, permitting access to containment within 24 hours after the reactor is shutdown. The fans, ductwork and dampers associated with the containment recirculation subsystem are redundant and as such, a single failure will not render the system inoperative. Failure of the filter unit of the containment recirculation subsystem will not affect safe operation or shutdown of the plant since the air cleaning unit has no safety design bases.

In a recirculating mode, the filter section is bypassed and the redundant fans, dampers and ductwork provide containment atmospheric mixing to prevent excessive hydrogen stratification.

The fans, dampers and ductwork for the subsystem are ANS Safety Class 3, seismic Category I. The filter unit has no safety related function and is not seismic Category I.

<u>*Control Rod Drive Mechanism Cooling Subsystem:*</u>

The control rod drive mechanism cooling subsystem is designed to induce supply air into the control rod drive mechanism shroud at or below 120°F.

The Containment Air Handling System also has two containment penetrations that are associated with a radiation monitor (1-RM-RM-6526).

In Scope Boundary Discussion

Containment Air Handling System
PID-1-CC-LR20207, PID-1-CC-LR20208, PID-1-CC-LR20214, PID-1-CC-LR20215, PID-1-MAH-LR20504, PID-1-MAH-LR20505, PID-1-MAH-LR20506 and PID-1-WLD-LR20219:

The boundary for the Containment Air Handling System sampling begins at the containment atmosphere and continues through a containment isolation solenoid, containment penetration, containment isolation solenoid up to the line designation "RM" (Radiation Monitoring). The sample return begins at the radiation monitor return line to containment designated "CAH" (Containment Air Handling) through one containment isolation solenoid, containment penetration, check valve, and to the containment. The boundary for the containment air cleaning portion of Containment Air Handling System begins at the containment atmosphere through two train related ducts, control dampers and fans then back to containment atmosphere. Alternately, the fans can draw containment air through a common in-scope filter unit using two train related control dampers. The containment structure cooling portion of the boundary consists of six cooling units including inlet filters, cooling coils, and piping up to the Primary Component Cooling Water System interface and tray drain lines. The boundary includes the individual fans and outlet dampers. The cooling units discharge into a common distribution duct which, through a network of balancing dampers, provides airflow and cooling to all areas of the containment.

Interfacing Systems

Not included in the Containment Air Handling System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Primary Component Cooling Water System
- Waste Processing Liquid Drains System

System Intended Function

The containment structure recirculating filter subsystem, when in the recirculation mode, bypasses the filter section and provides containment atmospheric mixing to prevent excessive hydrogen stratification	10 CFR 54.4(a)(1)
Provides safe shutdown control and indication (Post Accident Monitoring).	10 CFR 54.4(a)(1)
Provide containment isolation function.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS)	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Environmental Qualification (EQ).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)

UFSAR References

- Section 9.4.5.
- Table 6.2-83
- Table 7.5-1

License Renewal Drawings

- PID-1-CC-LR20207
- PID-1-CC-LR20208
- PID-1-CC-LR20214
- PID-1-CC-LR20215
- PID-1-MAH-LR20504
- PID-1-MAH-LR20505
- PID-1-MAH-LR20506
- PID-1-WLD-LR20219

Table 2.3.3-5 Containment Air Handling System Components Subject to Aging Management Review

Component Type	Intended Function
Air Conditioner Housing	Pressure Boundary
Damper Housing	Fire Barrier Pressure Boundary
Drip Pan	Pressure Boundary
Ducting	Pressure Boundary
Ducting Closure Bolting	Pressure Boundary
Fan Housing	Pressure Boundary
Filter Housing	Pressure Boundary
Flexible Connector	Pressure Boundary
Heat Exchanger Components	Heat Transfer Pressure Boundary
Instrumentation Element	Pressure Boundary
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary Structural Integrity (Attached)
Thermowell	Pressure Boundary
Valve Body	Pressure Boundary

The aging management review results for these components are provided in Table 3.3.2-5, Summary of Age Management Evaluations - Containment Air Handling System.

2.3.3.6 Containment Air Purge System

System Description

The Containment Air Purge System provides supply air to the containment air distribution ducts, removes air from the containment exhaust ducts and vents to the unit plant vent. The supply and exhaust ductworks each have two containment isolation valves, one inside the containment and one outside the containment enclosure. The supply and exhaust ductwork are isolated on the outboard side of each containment penetration during plant Modes 1, 2, 3, and 4 by a blind flange using a resilient double o-ring seal design. Each penetration is isolable during Modes 5 and 6 by an in-board and/or outboard pneumatically activated butterfly valve. The containment isolation valves and associated ductwork (pipe) of the Containment Air Purge System are Safety Class 2, seismic Category I. The Containment Air Purge System provides the following functions:

Containment Structure Air Purge and Heating Subsystem:

The containment air purge and heating subsystem employs two supply fans and two exhaust fans with the common supply and exhaust ductwork. Each set consists of a supply air fan and exhaust air fan, each with pneumatically operated dampers. A common ductwork system, which includes the refueling purge supply and heating subsystem and the pre-entry purge subsystem.

Pre-Entry Purge Subsystem:

During pre-entry purge, a single fan supplies pre-entry purge air to the containment area using common supply ductwork. A single exhaust fan pulls air from containment through common exhaust ductwork and discharges directly to the unit plant vent after first passing through the filter unit and the containment air purge air cleaning unit.

Refueling Purge Subsystem:

A single fan supplies refueling purge and heating (when required) air to the containment area during the refueling operation using, as described above, the same ductwork as the pre-entry purge system. Dampers are used to isolate the non-operating system, in this case, the pre-entry purge. The 40,000 cfm exhaust air flow of the refueling purge subsystem first passes through a filter unit before discharging to the plant vent.

During refueling purge subsystem operation, Radiologically Controlled Area tunnel exhaust is maintained by operating the pre-entry purge subsystem in the same configuration as during Modes 1, 2, 3 and 4. Isolation dampers prevent recirculating air through the ductwork of the refueling purge exhaust subsystem.

Radiologically Controlled Area Tunnel Exhaust System:

An exhaust register located approximately at elevation 36'-0" in the Radiologically Controlled Area walkway exhausts the air supplied to the Radiologically Controlled Area tunnel. A ductwork system is routed from the register to the containment air purge cleaning unit.

In-Scope Boundary Description

PID-1-MAH-LR20504:

The boundary for the Containment Air Purge (CAP) System begins in the containment at a flexible connection in the ductwork from the reactor cavity fuel pool area, continues through a containment isolation valve, containment penetration ending at a testable blind flange in the containment annulus. The boundary continues starting at an adjacent blind flange, continues through an isolation valve ending at a flexible connection in the containment enclosure area. The boundary starts again at a flange downstream of filter 1-CAP-F-310 and ends with the fire damper at the Primary Auxiliary Building / Containment Enclosure Ventilation Area wall. The supply portion of the boundary starts with the fire damper at the Primary Auxiliary Building / Containment Enclosure Ventilation Area wall and continues through an isolation valve ending at a flange in the containment annulus. The boundary continues from a testable flange in the containment annulus through a containment penetration, a containment isolation valve and ending at a noted anchor point. In addition a segment of duct from the radioactive control area tunnel to filter 1-CAP-F-40 is in boundary from the Radiologically Controlled Area to Primary Auxiliary Building wall fire damper including a tornado damper and ending at an anchor point downstream of the tornado damper.

Interfacing Systems

The Containment Air Purge System does not interface with any license renewal systems.

System Intended Function

Provide safe shutdown control and indication (Post Accident Monitoring).	10CFR 54.4(a)(1)
Provide pressure relief protection in the event of a tornado (Tornado Dampers).	10 CFR 54.4(a)(1)
Provide containment isolation function.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Anticipated Transient Without a Scram (ATWS).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Environmental Qualification (EQ)	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Station Blackout (SBO).	10 CFR 54.4(a)(3)

UFSAR References

- Section 9.4.5.
- Table 6.2-83
- Table 7.5-1

License Renewal Drawings

- PID-1-MAH-LR20504

Table 2.3.3-6 Containment Air Purge System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Damper Housing	Fire Barrier Pressure Boundary
Ducting	Pressure Boundary Structural Integrity (Attached)
Ducting Closure Bolting	Pressure Boundary
Flexible Connector	Pressure Boundary Structural Integrity (Attached)
Piping and Fittings	Pressure Boundary Structural Integrity (Attached)
Valve Body	Pressure Boundary

The aging management review results for these components are provided in Table 3.3.2-6, Summary of Age Management Evaluation - Containment Air Purge System.

2.3.3.7 Containment Enclosure Air Handling System

System Description

The Containment Enclosure Air Handling System removes heat from areas associated with the containment enclosure, creates a negative pressure in the Containment Enclosure structure to capture post accident leakage from the containment and contiguous areas, and filters the effluent prior to release from the plant vent.

The containment enclosure and adjoining areas cooling systems are designed to remove equipment heat from the following areas during normal and emergency operation:

- Charging pump areas
- Safety injection pump areas
- Residual heat removal equipment areas
- Containment spray pump and heat exchanger equipment areas
- Mechanical penetration area
- Containment enclosure ventilation equipment area
- H2 analyzer room and electrical room areas
- RHR vault stairway area
- Electrical tunnel personnel walkway (electrical) area.

Containment Enclosure Cooling Systems:

The containment enclosure cooling units maintain the first six areas above at or below the safety-related equipment's maximum design operating temperatures during normal operation and following a loss of coolant accident, loss of offsite power, high and moderate pipe breaks, SSE and tornados.

Redundant containment enclosure cooling units are provided, each with an independent supply of primary component cooling water and emergency power, so that a single active failure will not cause a loss of cooling capacity. For normal operation, the containment enclosure cooling and ventilation system will maintain the areas served at or below 104°F for an outside temperature of 88°F or lower. Under emergency plant operation, the cooling units will limit the temperatures in the equipment areas to maximum design conditions, based on the transient peak temperature of the Primary Component Cooling Water system which serves as the cooling medium for the cooling units.

The containment enclosure area ventilation system functions so that the ventilation air is controlled to flow from areas of low potential radioactivity toward areas of higher potential radioactivity, and then exhausts to the unit plant vent for atmospheric dispersion. Radioactivity releases are maintained within the limits of the Technical Specifications by the emergency exhaust cleanup system.

H2 Analyzer/Electrical Rooms Ventilation System:

The H2 analyzer and electrical room supply fans maintain area 7 at or below the safety-related equipment's maximum design operating temperatures during normal operation and following a LOCA, loss of offsite power, high and moderate pipe breaks, and an SSE.

A redundant supply fan is provided with an emergency power source so that an active failure of one fan will not cause a loss of cooling capacity in the H2 analyzer and electric room areas. For normal operation, the H2 analyzer electrical room ventilation system will maintain the areas served at or below 104°F for an outside temperature of 88°F or lower.

The heating system consists of electric unit heaters each individually controlled by its own room thermostat.

RHR Equipment Vault Stairway Cooling System:

The RHR vault stairway chilled water cooling units maintain area 8 at or below safety-related equipment's maximum design operating temperature during normal operation. This temperature is 104°F coincident with an outside temperature of 88°F. The system provides auxiliary cooling to maintain area temperatures below 104ºF. The cooling system is non-safety related and is operated as required to maintain the desired area temperature.

Electrical Tunnel Personnel Walkway Cooling System:

The electrical tunnel personnel walkway chilled water cooling units maintain area 9 at or below safety-related equipment's maximum design operating temperature during normal operation. This temperature is 104°F coincident with an outside temperature of 88°F. The system provides auxiliary cooling to maintain area temperatures below 104ºF. The cooling system is non-safety related and is operated as required to maintain the desired area temperature.

Containment Enclosure Emergency Air Cleaning System:

The filter system consists of redundant filter trains, fans, dampers and controls and a common ductwork system. The air flow required to maintain a negative pressure in the Containment Enclosure Building is passed through demisters, which also function as prefilters, and through high efficiency particulate absorber filters located both upstream and downstream of the carbon filter prior to exhausting through the plant vent.

A ductwork cross-connection is provided between the two filter trains at a point between the downstream high efficiency particulate absorber filter and the fan inlet. Should the operating fan fail, this cross-connection will insure a continued air flow by manual startup of the redundant fan.

Each redundant filter train is complete, separate and independent from both electrical and control standpoints. Each filter train fan is supplied power from an independent engineered safety features power train source, which will furnish power to its fan during abnormal and post-accident conditions. The operation of mechanical equipment is controlled and monitored in the plant unit control room.

The containment enclosure cooling system and return fans and hydrogen analyzer and electrical room fans are designed to remain functional and will support continuous operation of safety class equipment during and after an SSE while assuming a loss of offsite power and a single active failure.

The containment enclosure cooling units, return fans, return dampers and ductwork and hydrogen analyzer and electrical room ventilation system fans, dampers and ductwork are classified as Safety Class 3 and seismic Category I.

In-Scope Boundary Description

PID-1-MAH-LR20495, PID-1-CC-LR-20205, PID-1-CC-LR-20211 and PID-1-WLD-LR20223:

The Containment Enclosure Air Handling (EAH) System boundary begins in the Containment Enclosure Ventilation Area at the inlet to two train related containment enclosure cooling units. Each cooling unit contains an inlet filter set, Primary Component Cooling Water cooling coils (with Waste Processing Liquid Drains), one fan and a discharge damper. The outlet boundary ducts of the two units join in a common duct with six branches supplying air flow via fire and balancing dampers to diffusers in the:

- Containment Enclosure Ventilation Area
- Mechanical penetration area

- Residual Heat Removal equipment vaults
- Charging pump CS-P-2A room
- Charging pump CS-P-2B room
- Charging pump CS-P-128 room

PID-1-MAH-LR20496 and PID-1-MAH-LR20495:

The return boundary for the mechanical penetration area begins from each Residual Heat Removal heat exchanger area through fire damper(s) combining in a common duct in the Primary Auxiliary Building. Passing from the Primary Auxiliary Building to the Containment Enclosure Ventilation Area through a fire damper and dividing to become the suctions of two return air fans with inlet dampers and ending as the fans discharge into the Containment Enclosure Ventilation Area. The return boundary for the three charging pump rooms begin in the individual rooms and continue individually through fire dampers to the Containment Enclosure Ventilation Area where the ducts join in a common duct that branches to two charging pump area return air fans and a duct connecting to the Primary Auxiliary Building Air Handling return duct.

PID-1-MAH-LR20495:

The Containment Enclosure Ventilation Area also contains the two emergency exhaust filter units. The boundary for the each cleanup unit begins at the inlet to the media filter, continuing to a high efficiency particulate absorber filter, charcoal filter, outlet high efficiency particulate absorber filter, charcoal bed cooling bypass line, damper, and associated filter fan. The outlet of each fan passes through a damper, combines and passes through a tornado damper. The boundary terminates at a ductwork support equivalent support leading to the plant vent.

PID-1-MAH-LR20503:

The Containment Enclosure Air Handling System boundary includes the hydrogen analyzer and electrical room cooling supply fans and return ducts. This boundary begins with a common outside air intake duct that divides to the back draft damper for each supply fan discharging to a damper. The duct then joins to form a single duct that passes through a filter and into the two rooms. Ducts in the rooms join to a common duct and damper and return the heated air to atmosphere.

PID-1-MAH-LR20508 and PID-1-WLD-LR20221:

The Containment Enclosure Air Handling System also bounds the air conditioner units for the vault glycol cooling loop. The boundary begins as the cooled glycol enters the building from outside. The piping divides to supply the six cooling unit heat exchangers. From the six cooling unit heat exchangers the boundary piping joins to form a common line and divides to the suctions of the two glycol pumps. The pumps discharge piping joins to form a single line. The boundary ends as the line exits the building. The system includes the drain line to waste liquid drains.

Interfacing Systems

Not included in the Containment Enclosure Air Handling system license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Primary Auxiliary Building Air Handling System
- Primary Component Cooling Water System
- Radiation Monitoring System
- Sample System

System Intended Functions

Maintain design temperature in Emergency Core Cooling System (ECCS) equipment areas during normal plant operation and during accident conditions.	10 CFR 54.4(a)(1)
Provide cooling with filtered outside air and heating with electric heaters to maintain design temperature in the hydrogen analyzer and electrical rooms during normal plant operation and during accident conditions.	10 CFR 54.4(a)(1)
Maintain a negative pressure within the containment enclosure ventilation area pressure boundary following an accident. Remove and retain airborne particulates and radioactive iodine. Exhaust filtered air to the plant vent stack.	10 CFR 54.4(a)(1)
Provide safe shutdown control and indication (Post Accident Monitoring).	10 CFR 54.4(a)(1)
Provide pressure relief protection in the event of a tornado (Tornado Dampers).	10 CFR 54.4(a)(1)

This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Environmental Qualification (EQ).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Station Blackout (SBO).	10 CFR 54.4(a)(3)

UFSAR References

- Section 9.4.6
- Section 6.5
- Table 7.4-1
- Table 7.5-1

License Renewal Drawings

- PID-1-CC-LR20205
- PID-1-CC-LR20211
- PID-1-MAH-LR20495
- PID-1-MAH-LR20496
- PID-1-MAH-LR20503
- PID-1-MAH-LR20508
- PID-1-WLD-LR20221
- PID-1-WLD-LR20223

Table 2.3.3-7 Containment Enclosure Air Handling System Components Subject to Age Management Review

Component Type	Intended Function
Air Conditioner Housing	Leakage Boundary (Spatial) Pressure Boundary
Bolting	Pressure Boundary
Damper Housing	Fire Barrier Pressure Boundary
Drip Pan	Pressure Boundary
Ducting	Pressure Boundary Structural Integrity (Attached)
Ducting Closure Bolting	Pressure Boundary
Fan Housing	Pressure Boundary
Filter Housing	Leakage Boundary (Spatial) Pressure Boundary
Flexible Connector	Pressure Boundary Structural Integrity (Attached)
Heat Exchanger Components	Heat Transfer Pressure Boundary
Instrumentation Element	Pressure Boundary
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary
Pump Casing	Leakage Boundary (Spatial)
Valve Body	Leakage Boundary (Spatial) Pressure Boundary

The age management review results for these components are provided in Table 3.3.2-7, Summary of Age Management Evaluations - Containment Enclosure Air Handling System.

2.3.3.8 Containment Online Purge System

System Description

The Containment Online Purge System provides supply air to the containment during normal operation and exhaust air from the containment to the plant vent filter. Valves in the exhaust line can be adjusted to establish containment pressure.

<u>*Online Purge Supply Air Equipment:*</u>

The containment online purge subsystem supply air fan draws filtered, preheated air from the Primary Auxiliary Building mechanical room at elevation 53'-0" and distributes it through an eight-inch supply air duct into the containment. Two inline butterfly valves are installed in the supply air line; one in the containment enclosure area and the other inside containment. Each valve is pneumatically activated, and is controlled by a separate redundant source so that a single failure will not prevent the closure of a given valve. The isolation valves are Safety Class 2, seismic Category I.

<u>*Online Purge Exhaust Air Equipment:*</u>

The online purge subsystem exhaust equipment collects air from the containment and exhausts it to the normal exhaust filter unit located in the Primary Auxiliary Building. This filtered air is then discharged to the plant vent.

The purge exhaust valves are non-nuclear safety related, and are in accordance with ANSI B16.5.

Two inline, isolation valves are installed in the exhaust air line. One valve is installed on each side of the containment. These valves are Safety Class 2, seismic Category I.

In-Scope Boundary Description

PID-1-MAH-LR20504, PID-1-MAH-LR20494:

The license renewal boundary for the Containment Online Purge System includes the supply and return ductwork that is attached to the safety related ductwork and valves that are providing containment isolation. The boundary for the Containment Online Purge System begins in the Primary Auxiliary Building at the discharge of the purge supply fan and flows through a back draft damper and two containment isolation valves and then into the containment atmosphere. The discharge flow path starts at the containment atmosphere and flows through two containment isolation valves and then normally to the plant vent through a filter. The alternate flow path bypasses the filter and is discharged directly to the plant vent.

Interfacing Systems

Not included in Containment Online Purge System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Primary Auxiliary Building Air Handling System
- Radiation Monitoring System

System Intended Functions

Provide safe shutdown control and indication (Post Accident Monitoring).	10CFR 54.4(a)(1)
Provide containment Isolation function.	10CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10CFR 54.4(a)(2)
This system contains components which perform functions credited for Anticipated Transients Without Scram (ATWS).	10CFR 54.4(a)(3)
This system contains components which perform functions credited for Environmental Qualification (EQ).	10CFR 54.4(a)(3)
This system contains components which perform functions credited for Station Blackout (SBO).	10CFR 54.4(a)(3)

UFSAR References

- Section 9.4.5
- Table 6.2-83
- Table 7.5-1

License Renewal Drawings

- PID-1-MAH-LR20494
- PID-1-MAH-LR20504

Table 2.3.3-8 Containment Online Purge System Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Damper Housing	Structural Integrity (Attached)
Ducting	Structural Integrity (Attached)
Ducting Closure Bolting	Structural Integrity (Attached)
Flexible Connector	Structural Integrity (Attached)
Piping and Fittings	Pressure Boundary Structural Integrity (Attached)
Valve Body	Pressure Boundary Structural Integrity (Attached)

The aging management review results for these components are provided in Table 3.3.2-8, Summary of Age Management Evaluation - Containment Online Purge System.

2.3.3.9 Control Building Air Handling System

System Description

Seabrook Station's control room complex occupies the entire 75'-0" elevation of the Control Building. The HVAC systems that service the control room complex are described below and in UFSAR Section 6.4, Habitability Systems. In addition, the redundant filter systems integral to the emergency makeup air and filtration subsystem are detailed in UFSAR. The control room complex HVAC system consists of the following subsystems:

- Control room safety-related air conditioning subsystem
- Control room nonsafety-related chilled water system
- Computer room air conditioning subsystem
- Control room normal makeup air subsystem
- Control room emergency air makeup and filtration subsystem
- Control room exhaust and static pressure control subsystem
- Control room air conditioning subsystem

The control room air conditioning subsystem includes both safety-related and non-safety related cooling subsystems. The safety-related and non-safety related cooling subsystems share a common recirculating air system located on elevation 75'-0" within the control room complex.

Control Room safety-related air conditioning subsystem:

The safety-related control room air conditioning subsystem consists of two full-sized identical air cooling trains that are independently electrically powered. One train is supplied from emergency Bus A, and the other from emergency Bus B. Each train consists of:

- A 100% capacity electric motor-driven water chiller
- Two (2) 100% capacity chilled water circulating pumps
- One (1) 100% capacity chiller condenser exhaust fan
- A back draft damper

- A 100% capacity air handling unit located in the recirculated control room air cooling stream
- Interconnecting piping, expansion tank and instrumentation and controls

Each electric motor-driven chiller is a factory fabricated package unit consisting of two (2) equal capacity refrigerant circuits with each circuit consisting of two (2) scroll type refrigeration compressors, a shell and tube evaporator and an air cooled condenser. The water chillers are located in the Diesel Generator Building mechanical equipment room on elevation 51'-6".

The chilled water recirculating pumps are electric motor driven, and are of the centrifugal type. These pumps circulate a glycol/water mixture through an air-cooled liquid chiller. The pumps are located in the Diesel Generator Building mechanical equipment room on elevation 51'-6".

The chiller condenser exhaust fans capture the heat rejected from the chillers into the mechanical equipment room and exhaust it to the outside via exhaust ductwork. They are located in the Diesel Generator Building mechanical equipment room on elevation 51'-6".

Each air handling unit consists of a medium efficiency flat filter, a cooling coil section and a fan section. The cooling coil section houses the safety-related chilled water cooling coil as well as the non-safety related cooling coil. One of the two (2) air handling units is always in operation irrespective of whether the non-safety related chilled water system or the safety-related chilled water system is in operation.

The air handling unit with its associated safety-related refrigeration equipment is designed to produce 58.7 tons of refrigeration, and is sized to meet the design emergency conditions requiring 53.1 tons of refrigeration, during normal plant conditions, the control room air conditioning subsystem can provide cooling to supplement the computer room if the computer room air conditioning unit is unavailable.

Control Room non-safety related chilled water system:

The non-safety related subsystem includes two chilled water pumps located in the Administration and Services Building mechanical room 1B. Each pump circulates a glycol/water mixture through an air-cooled liquid chiller located on the Administration and Services Building roof. The chilled water is then delivered to a chilled water cooling coil mounted within each of the safety related Control Building Air Handling System (CBA) evaporator fan units located in the Control Building, elevation 75 ft. mechanical room.

Safety-related evaporator fan units 1-CBA-FN-14A or -14B distribute and circulate the cooled air throughout the control room complex.

The non-safety related control room air conditioning subsystem will normally operate. In the event of a malfunction in the non-safety related subsystem, or during a loss of offsite power, one of two 100% capacity safety-related trains of control room air conditioning will be placed in service manually. The control room is supplied with conditioned air through a sheet metal duct system that is seismic Category I supported. Air is distributed through diffusers, as necessary, to maintain design room temperature. Return air is drawn from the control room through return air registers into the plenum above the ceiling. The return air is then drawn through the plenum and passes through the return air openings in the wall between the plenum and the mechanical equipment room. The return air, together with the makeup ventilation air, is drawn through the air conditioning unit for conditioning and recirculation.

Computer Room Air Conditioning Subsystem:

The computer room air conditioning subsystem has a recirculating air system which consists of a vertical unit located in the computer room. Conditioned air is discharged from the unit into a raised floor and then into the room through grills in the raised floor. Air is then returned through the face grills on the unit. The temperature and humidity controllers are factory installed and wired within the unit.

A glycol supply and return water system is used to remove the room heat load, using pumps and a dry cooler located on the Diesel Generator Building roof.

The control room air conditioning system ductwork contains manually controlled air dampers which in the open position permit utilization of the control room air conditioning capacity should the computer room air conditioning system be unavailable. The computer room ductwork is seismically supported, nonsafety-related.

Control Room Normal Makeup Air Subsystem:

During normal plant operation, the control room normal makeup air subsystem is aligned to deliver approximately 1000 cfm of outside air from both remote intakes (500 cfm per intake). With one normal makeup air fan operating and its associated discharge damper open, the intake isolation valves are positioned to allow equal amounts of air to be drawn from the east and west intakes. The normal makeup air flows through the prefilter and heater for each emergency filter unit and discharges via an orifice plate into the HVAC equipment room. The heater for each unit operates continuously to maintain the humidity at or below 70 percent relative humidity. The prefilters are periodically replaced when the differential pressure across the filters increases to a predetermined value, as a result of particulate buildup.

The continuous supply of makeup air to the control room HVAC equipment room maintains the complex at a positive pressure with respect to the outside and adjacent areas. This positive pressure precludes the infiltration of hazardous contaminants. The control room is maintained at a slightly greater positive pressure than the HVAC equipment room. The supply air also provides adequate air change out to preclude the buildup of stale air and noxious odors.

In the event normal makeup air fails or is isolated for reasons other than those delineated in UFSAR and below, appropriate operator action will be taken to re-establish makeup air. If makeup air is lost because of fan failure, the redundant normal makeup air fan and its discharge damper will be manually actuated. If makeup air is lost because of a vital bus outage or failure, or a loss of instrument air supply to the dampers, the emergency makeup air filtration subsystem will be manually actuated.

The remote air intakes are monitored for radiation and smoke. Each intake is designed with two fully redundant radiation monitoring systems. Following an accident when high radiation is detected in either remote air intake or when the emergency makeup air and filtration subsystem fans are actuated, the normal makeup air fans automatically trip off and their associated discharge dampers automatically close. The control systems for these fans and dampers are "cross-trained." That is, the discharge damper associated with the Train "A" fan is controlled by the Train "B" control loop and vice versa. This configuration ensures isolation of the normal makeup air subsystem by fan trip and/or damper closure regardless of any single active failure.

Each intake is provided with smoke detection capability to automatically alarm and permit operator-initiated isolation of control room normal makeup air subsystem. This isolation procedure would include manually starting the emergency cleanup filtration subsystem from the Main Control Board, which automatically isolates the normal makeup air subsystem. The HEPA filters associated with this filtration subsystem will remove smoke from incoming air. The effected intake can then be manually isolated.

All of the active components of the normal makeup air subsystem are redundant, and all are independently powered and controlled from independent emergency buses so that no single failure will impose operational limitations.

Control Room Emergency Makeup Air and Filtration Subsystem:

Following an accident, when high radiation is detected at either remote intake, or upon generation of an 'S' signal, both redundant emergency makeup air fans and their associated discharge damper are automatically actuated. Although the redundant filter system fans are designed to operate coincidently and stably in their parallel configuration, Operations may, at their discretion, shut down one of the systems during the course of the accident. Each filter system may also be initiated manually upon detection of smoke in either remote intake. Each emergency makeup air and filtration subsystem has a nominal capacity of 1100 cfm. This capacity is comprised of 600 cfm makeup air and 500 cfm recirculation air. These system flow rates have been calculated assuming both remote intake isolation valves are open to a throttle position allowing for 300 cfm makeup air from each intake. Following an accident, a contaminated remote intake does not have to be manually isolated. Design base analyses indicate that the makeup air dilution factor (i.e., 50 percent makeup air from "clean" intake, 50 percent air from contaminated intake) and the radioactive particulate and iodine removal capacity of the filters together are adequate to maintain control room doses below allowable limits for the 30-day accident mitigation period.

Control Room Exhaust and Static Pressure Control Subsystem:

During normal plant operation, the control room exhaust fan is operating and its discharge control damper modulates to maintain the control room complex at a pressure of at least + 1/8 " w.g. with respect to adjacent areas. The redundant exhaust isolation damper remains fully open.

The pneumatically-operated modulating damper in the exhaust ductwork controls the amount of air being exhausted and, thereby, maintains a positive pressure within the control room complex. The damper is under the control of three static pressure sensing devices. The first pressure sensing point for the complex is in the HVAC equipment room, which is at a slightly lower positive pressure than the remainder of the control room envelope. The mechanical equipment room, the second pressure sensing point, is kept at least 1/8" w.g. above the outside atmospheric pressure and at least 1/8" w.g. above the cable spreading room at all times, which is the third pressure sensing point.

Detection of high radiation in either remote makeup air intake or operation of either emergency makeup air and filtration subsystem fan will automatically isolate the exhaust and static pressure control subsystem. Under emergency conditions the exhaust subsystem remains isolated at all times.

During normal operation, 1000 cfm of makeup air will be delivered to the control room complex. Approximately 145 cfm will be exfiltrated and the remaining 855 cfm will be exhausted. Under emergency conditions, approximately 600 cfm of makeup air will be delivered to the control room complex all of which will be exfiltrated.

Battery Rooms and Switchgear Rooms:

The 4-kV switchgear areas, battery rooms and electrical tunnels are ventilated in the summer with filtered outside air, supplied from the Diesel Generator Building outside air intake. Each redundant switchgear train area has a supply fan, a return fan and supply and return ductwork. The battery rooms and electrical tunnels ventilation air is provided by the 4-kV switchgear area supply fans. The battery rooms have redundant exhaust fans and redundant supply and exhaust ductwork. The electrical tunnels have a single return fan and return ductwork. The supply air and exhaust air systems for the battery rooms are balanced to maintain the battery rooms under a negative pressure of approximately 0.1 inch H_2O, thereby preventing any hydrogen generated by the batteries from infiltrating the emergency switchgear areas.

In the winter the 4-kV switchgear areas, cable spreading area (see Subsection 9.4.9) and the electrical tunnel area air is recirculated and mixed with preheated outside air, as necessary, for makeup and to maintain the inside design temperature. The 4-kV switchgear areas and battery rooms have two ventilation equipment rooms, one for each train. The equipment rooms serve as a return air/makeup air mixing plenum. The heat required to offset building heat loss from the switchgear areas, battery rooms and electrical tunnels is supplied by hot water unit heaters located in the equipment rooms. Water line breaks or hot water system failures will not affect the operation of the switchgear areas or battery rooms.

Cable Spreading Room Ventilation:

This standby ventilation system consists of a single supply fan, a single return fan, and supply air and return air duct work. The system is only placed into service using administrative controls. When the system is in operation, the cable spreading room is ventilated in the summer with filtered outside air. In the winter, the cable spreading room ventilation system air is re-circulated and is mixed with preheated outside air, as necessary, for makeup and to maintain the inside design temperature. In addition, the supply air is reheated, when required, by a hot water heating coil in the supply ductwork to offset building heat losses. The cable spreading room ventilating system obtains makeup air and hot water for heating from the 4-kV switchgear area and battery rooms heating and ventilating system.

In-Scope Boundary Description

Control Building Air Handling Non-Safety Chilled Water
PID-1-CBA-LR20309:

The Control Building Air Handling non-nuclear safety control room air conditioning chilled water boundary begins as the piping enters the Control Building. It continues to a bypass control valve. The main piping divides and continues to both of the train associated fan coil units. The boundary includes four coils and coil drains. The coil outlet side boundaries combine into a single pipe and then join the temperature control bypass line and end at their exit from the control building.

Control Building Air Handling Safety Chilled Water
PID-1-CBA-LR20307, PID-1-CBA-LR20308, PID-1-CBA-LR20303:

The Control Building Air Handling safety related chilled water train "A" and "B" train boundaries are similar and begin at the outlets of the associated control room air conditioning cooling coils. The piping combines to form a common pipe that joins with the line from the temperature control bypass and head tank/head tank piping. The line then divides to form the inlets to the two chilled water pumps. The pumps and discharge pipe boundary join to form a common line to the chiller unit evaporator. The safety related chiller evaporator boundary includes the compressor, condenser, control panel and evaporator. The chill water outlet of the evaporator leads to a temperature control valve and divides to the two cooling coils of the associated control room air conditioner. Included to support the chillers heat rejection are two exhaust hoods, fans, back draft dampers and duct work to collect the heated air and exhaust it outside. Condensate pans and drain lines from both non-safety and safety related cooling coils are included ending at a local hub drain.

Computer Room Chilled Water
PID-1-CBA-LR20306:

The control room computer room air conditioning boundary begins as the chilled water enters the control room and continues to the floor mounted air conditioning unit. From the air conditioning unit the chilled water joins the included head tank, fill line and connecting pipe. The boundary ends as the piping exits the control building. Also included is the condensate drain and discharge piping ending as it exits the control building.

Control Room Air Handling
PID-1-CBA-LR20303, PID-1-CBA-LR20304, PID-1-CBA- LR20305:

The control room air conditioning air distribution boundary begins in the control building mechanical room on the 75' elevation. Room air enters the filters of two train related air conditioner units and passes over chilled water coils of the non-safety and safety related chilled water units and enters the fan. The outlet duct of the "A" unit passes through a control damper and joins with a non-functional duct from the "A" emergency cleanup filter unit (a blank is installed in the duct). The duct continues through a fire damper and joins the duct for the "B" air conditioner unit. Room air enters the "B" unit and passes over chilled water coils of the non-safety and safety related chilled water units and enters the fan. The outlet duct of the "B" unit passes through a control damper and joins a duct leading through a fire damper to a bypass damper. The "A" and "B" combined duct continues through the in-boundary distribution ducting, flow adjusting dampers, fire dampers and diffusers to the main control room, offices, storage and the kitchen. Branch lines to alternate computer room cooling and data room cooling terminate at listed hanger supports. Return air flow from all areas flows through the included fire damper 1-CBA-DP-131.

The control room normal exhaust boundary begins at the discharge of the exhaust fan and includes the control room pressure control damper. The boundary continues with the back draft damper, isolation damper, tornado damper and ends upon exit from the building to atmosphere.

The control room fresh air and emergency cleanup boundary begins at yard located intakes (East and West) including the screens. The piping for both intakes then continues underground to the unit 1 diesel building where each line is provided with a drain and potable water filled trap that combine and terminate at cast iron storm drain hub. The intake line boundaries each continue through an isolation valve and combine in a common line and test plate. The line then divides to the suctions of two control room air supply fans and to two bypass dampers. The fans each discharge to an isolation damper and then join with the two outlet lines from the bypass dampers to form a single line which continues to the inlet plenum of the train "A" emergency clean-up filter in the control building mechanical room 75' elevation. The line then continues to the inlet of the "B" filter through a back draft and control damper. Each of the included emergency clean-up filters units contains a pre-filter, heater, HEPA filter, charcoal filter and HEPA post filter. Each boundary also includes a filter fan, back draft damper and control damper. The boundary for "A" ends at the discharge duct to the mechanical room and duct to a blank off plate. The boundary for "B" ends at the discharge duct to the mechanical room.

Switchgear and Battery Room Air Handling
PID-1-CBA-LR20302, PID-1-CBA-LR20303:

The switchgear area boundary begins with two train related fan housings in the 50' elevation of the mechanical room. Each boundary continues through duct work and a fire damper continuing to the associated 21' 6" elevation essential switchgear room. In each switchgear room the duct divides with one duct leading to a non-safety section terminated at a listed seismic support. The ducts for each room end in area diffusers and one branch to the essential battery rooms. The "B" train supply supports two diffusers in the "A" train via a fire damper protected penetration. Outside air is supplied through a pair of fire dampers connecting the Diesel Generator mechanical room and the switchgear mechanical room.

The return air boundaries for both trains begin with return ducts ("B" train includes a duct extending into the "A" train via a fire damper). Both room return loop ducts join in ducts that extend to the 50' mechanical room. The train related return boundaries include a fire damper, return air fan, back draft damper, a duct to a winter bypass damper, a control damper, tornado damper and fire damper ending outside the building in a missile proof enclosure.

Each train battery room supply includes a back draft damper, heater and two balancing dampers. A section of duct connects the two train related battery room supplies between the back draft damper and the heater via a fire damper in order to provide a cross train supply. Each train related battery return air boundary begins at return diffusers and continue through in-room fire dampers to join in a common duct leading to a wall fire damper and cross train suction duct with fire damper to provide cross train return. The return duct boundary continues to the associated control damper, exhaust fan and outlet damper. The "B" battery exhaust boundary continues through a fire damper and enters the "A" train mechanical room and joins "B" train battery room return forming a single duct exiting the building through a fire damper and tornado damper.

The cable spreading room and electrical tunnel return air boundary begins at the outlet of the associated fan continuing through the fan outlet damper to join the respective switchgear return duct downstream of the associated switchgear return fan outlet damper.

PID-1-DAH-LR20624:

The license renewal boundary consists of criterion (a)(3) Fire Protection components, which are the Control Building Air Handling System fire dampers.

Interfacing Systems

Not included in the Control Building Air Handling System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Potable Water System
- Radiation Monitoring System

System Intended Functions

The 4.16 KV switchgear area, battery rooms, and electrical tunnels heating and ventilation subsystems maintain room design temperature, and prevent the buildup of generated hydrogen gas in the battery rooms.	10 CFR 54.4(a)(1)
Provide Control Room Emergency Makeup Air and Filtration.	10 CFR 54.4(a)(1)
Provide Control Room Air Conditioning.	10 CFR 54.4(a)(1)
The control room exhaust and static pressure control subsystem is designed to maintain the control room complex at a positive pressure relative to adjacent areas, during normal plant operations.	10 CFR 54.4(a)(1)
Provide Control Room normal makeup air.	10 CFR 54.4(a)(1)
Provide safe shutdown control and indication.	10 CFR 54.4(a)(1)
Provide pressure relief protection in the event of a tornado (Tornado Dampers)	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Station Blackout (SBO).	10 CFR 54.4(a)(3)

UFSAR References

- Section 6.4
- Section 9.4.1
- Section 9.4.10
- Section 9.4.9
- Table 7.4-1
- Table 7.5-1

License Renewal Drawings

- PID-1-CBA-LR20302
- PID-1-CBA-LR20303
- PID-1-CBA-LR20304
- PID-1-CBA-LR20305
- PID-1-CBA-LR20306
- PID-1-CBA-LR20307
- PID-1-CBA-LR20308
- PID-1-CBA-LR20309
- PID-1-DAH-LR20624

Table 2.3.3-9 Control Building Air Handling System Components Subject to Age Management Review

Component Type	**Intended Function**
Air Conditioner Housing	Leakage Boundary (Spatial) Pressure Boundary
Bolting	Pressure Boundary
Compressor Housing	Pressure Boundary
Damper Housing	Fire Barrier Pressure Boundary Structural Integrity (Attached)
Drip Pan	Leakage Boundary (Spatial) Pressure Boundary
Dryer Housing	Pressure Boundary
Ducting	Pressure Boundary Structural Integrity (Attached)
Ducting Closure Bolting	Pressure Boundary
Fan Housing	Pressure Boundary
Filter Element	Filter
Filter Housing	Pressure Boundary
Flexible Connector	Pressure Boundary Structural Integrity (Attached)
Flexible Hose	Pressure Boundary
Heat Exchanger Components	Heat Transfer Leakage Boundary (Spatial) Pressure Boundary
Heater Housing	Pressure Boundary
Instrumentation Element	Pressure Boundary
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary
Piping Element	Pressure Boundary

Component Type	**Intended Function**
Pump Casing	Pressure Boundary
Tank	Leakage Boundary (Spatial) Pressure Boundary
Thermowell	Leakage Boundary (Spatial) Pressure Boundary
Valve Body	Leakage Boundary (Spatial) Pressure Boundary Structural Integrity (Attached)

The aging management review results for these components are provided in Table 3.3.2-9, Summary of Aging Management Evaluation - Control Building Air Handling System.

2.3.3.10 Demineralized Water System

System Description

The Demineralized Water System serves no safety-related functions. It is designed as a non-nuclear safety, non-seismic Category I system, except for the containment penetration piping, and containment isolation valves, which are designed in accordance with Safety Class 2, seismic Category I requirements. Also, the makeup water piping connections to the Primary Component Cooling Water head tanks are designed in accordance with Safety Class 3, seismic Category I requirements. In addition, the interface piping with the Condensate Storage Tank and the Thermal Barrier Loop head pipe is safety Class 3.

The system is designed to provide a sufficient supply of demineralized water at a quality required for operation, makeup, and maintenance of the plant.

Water from the Water Treatment subsystem is directed to either a 500,000-gallon or 200,000-gallon Demineralized Water storage tank. From here, the water can be transferred to the condensate storage tank or distributed throughout the unit by means of the Demineralized Water System. If the demineralized water storage tanks are full or not available, it is possible to bypass these tanks and go directly from the water treatment plant to the condensate storage tank. The demineralized water transfer subsystem supplies initial fill and makeup to the various services within the Turbine, Administration, Containment, Primary Auxiliary, Fuel Storage, and Waste Processing Buildings, and the Condensate Polishing Facility. These services include reactor makeup, primary and secondary component cooling water, auxiliary boiler deaerator makeup, condensate polishing regeneration, emergency showers and eye wash stations, generator stator cooling, and maintenance flushing of systems and components located within the plant.

In-Scope Boundary Description

Primary Auxiliary Building
PID-1-DM-LR20350, PID-1-DM-LR20351, PID-1-DM-LR20352, PID-1-CC-LR20205, PID-1-CC-LR20211, PID-1-RMW-LR20360, PID-1-SB-LR20626, PID-1-RR-LR20061:

The Demineralized Water boundary begins as the header enters the Main Steam and Feedwater Pipe Chase. The boundary includes hose connections, instruments, instrument rack supplies, eyewash stations, drain lines, radiation monitor flush lines, sump flush lines and chemistry sample panels in the areas detailed below.

The Primary Auxiliary Building Demineralized Water boundary includes supplies to the Steam Generator Blowdown flash tank 1-SB-TK-40, Primary Component Cooling Water System head tanks 1-CC-TK-19A and 19B, alternate charging pump cooling, Reactor Makeup Water storage tank, Boron Thermal Regeneration System chiller surge tank, a flush line to the Primary Auxiliary Building sump, the letdown degasifier and Release Recovery tank 1-RR-TK-258.

The Primary Auxiliary Building boundary continues to the Containment Enclosure Ventilation Area and includes a supply to the plant vent loop seal fill line. The Primary Auxiliary Building header then continues to the containment penetration area, Residual Heat Removal Equipment Vault 1 and 2 and through penetration X-36 to the Reactor Containment.

Containment
PID-1-DM-LR20352:

The Primary Auxiliary Building header comes into containment that includes the piping and valves that provide a pressure boundary for penetration X-36, a supply to the Thermal Barrier Loop Head Tank, the fuel transfer console and two relief valves.

Fuel Storage Building
PID-1-DM-LR20352:

The Primary Auxiliary Building header then continues to the Fuel Storage Building and supplies the cleanup filter trap priming lines, the cask loading pool spray header and the fuel transfer control panel.

Tank Farm
PID-1-DM-LR20356, PID-1-RMW-LR20360:

The Waste Process Building header enters the Tank Farm area which includes the fill lines for the Reactor Makeup Water tank vent and overflow seal cups.

PID-1-DM-LR20355, PID-1-DG-LR20461, PID-1-DG-LR20466:

Demineralized water supply piping and valves located in the Diesel Generator Building that supplies Diesel Generator expansion tank 1-DG-TK-46A and 1-DG-TK-46B.

PID-1-DM-LR20349, PID-1-CO-LR20426:

The Condensate Storage Tank Demineralized Water makeup line from a pipe anchor through series check valves DM-V-611/612 up to the Condensate Storage Tank. The Condensate to Demineralized Water cross connect valve 1-DM V 530 and Demineralized water to the condensate storage tank.

PID-1-WLD-LR20223:

Demineralized Water line to the Primary Auxiliary Building sump A.

PID-1-SS-LR20518:

Demineralized Water supply to the reactor coolant Sample System line from Loops one and three.

PID-1-SS-LR20519:

Demineralized Water supply to the Primary System Sample sink 1-SS-MM-13B.

PID-1-SS-LR20520:

Demineralized Water supply to the Post Accident Sample Panel 1-SS-CP-419.

PID-1-SS -LR20521:

Demineralized Water supply to the Steam Generator Sample System Sample Panel 1-SS-SP-166B.

PID-1-SF-LR20483:

Demineralized Water relief valve 1-DM-V-693 discharge to floor drain 184 in the Primary Auxiliary Building.

PID-1-FW-LR20690:

Demineralized Water to the Sample System cooler 1-SS-E-184, and Sample System sink 1-SS-SS-2.

PID-1-DF-LR20200:

Demineralized Water from a safety shower discharge to the Main Steam and Feedwater Pipe Chase west sump.

PID-1-SF-LR20482:

Demineralized Water to Sample System sink 1-SS-SS-003.

PID-1-WLD-LR20220:

Demineralized Water line to the Fuel Storage Building sump A.

PID-1-WLD-LR20221:

Demineralized Water line to the Residual Heat Removal Equipment Vault 1 sump A.

PID-1-CC-LR20209:

Demineralized Water line to the Thermal Barrier Loop Head Pipe.

Interfacing Systems

Not included in the Demineralized Water system license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Chemical and Volume Control System
- Condensate System
- Diesel Generator System
- Fuel Handling System
- Mechanical Seal Supply System
- Primary Component Cooling Water System
- Radiation Monitoring System
- Reactor Coolant System
- Release Recovery System
- Sample System
- Spent Fuel Pool Cooling System
- Steam Generator Blowdown System
- Waste Processing Liquid Drains System

System Intended Functions

Provide Condensate Storage Tank integrity.	10 CFR 54.4(a)(1)
Provide containment isolation function.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)

UFSAR References

- Section 9.2.3
- Table 6.2-83

License Renewal Drawings

- PID-1-CC-LR20205
- PID-1-CC-LR20209
- PID-1-CC-LR20211
- PID-1-CO-LR20426
- PID-1-DF-LR20200
- PID-1-DG-LR20461
- PID-1-DG-LR20466
- PID-1-DM-LR20349
- PID-1-DM-LR20350
- PID-1-DM-LR20351
- PID-1-DM-LR20352
- PID-1-DM-LR20355
- PID-1-DM-LR20356
- PID-1-FW-LR20690
- PID-1-RMW-LR20360
- PID-1-RR-LR20061
- PID-1-SB-LR20626
- PID-1-SF-LR20482
- PID-1-SF-LR20483
- PID-1-SS-LR20518
- PID-1-SS-LR20519
- PID-1-SS-LR20520
- PID-1-SS-LR20521
- PID-1-WLD-LR20220
- PID-1-WLD-LR20221
- PID-1-WLD-LR20223

Table 2.3.3-10 Demineralized Water System
Components Subject to Age Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Drip Pan	Leakage Boundary (Spatial)
Filter Housing	Leakage Boundary (Spatial)
Instrumentation Element	Leakage Boundary (Spatial)
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary
Piping and Fittings (Containment Isolation)	Pressure Boundary
Valve Body	Leakage Boundary (Spatial) Pressure Boundary
Valve Body (Containment Isolation)	Pressure Boundary

The aging management review results for these components are provided in Table 3.3.2-10, Summary of Aging Management Evaluation - Demineralized Water System.

2.3.3.11 Dewatering System

System Description

Seabrook Station was not originally designed with a Dewatering System, because it was believed that the in leakage prevention methods described in UFSAR Section 3.4.1.1 (Flood Protection Measures for Seismic Category I Structures) would be adequate to prevent water ingress. Over the years, it has become evident that the mitigation methods were not completely effective at preventing in leakage.

A plant Dewatering System has been installed which can further mitigate in leakage of groundwater in the lower elevations of the plant. The purpose is to routinely pump water from beneath the plant structures, to reduce the static hydraulic head outside the building concrete and reduce the in leakage. This allows the original mitigative measures to function properly. A pump is installed in the existing well at (+) 7' elevation of the Primary Auxiliary Building. This pump discharges the water to the Roof Drains System, which then flows to the Storm Drain System and out to Circulating Water for discharge.

Existing pipe penetrations located in the (-) 26 elevation of the Emergency Feedwater Pump House have been utilized as a groundwater low point. These penetrations have been directed to a nearby sump. This sump discharges to the existing plant Storm Drain System.

A pump is installed in the Residual Heat Removal Vault "B" stairwell at (-) 61' elevation of the Equipment Vault. This pump discharges the water to the Roof Drains System, which then flows to the Storm Drain System and out to Circulating Water for discharge. Routine monitoring of this flow path is performed per station operating procedures.

A pump is installed in the containment annulus at (–) 32' elevation. This pump discharges the ground water in the containment annulus to the roof drain system. The connection to the drain system is installed at 240 degrees azimuth of the containment annulus. Routine monitoring of this flow path is performed per station operating procedures.

A ground water collection tank and pump are installed in the "B" Electrical Tunnel, west stairwell at (-) 20'-0" elevation. The pump discharges the water to the turbine building Roof Drains System, which then flows to the Storm Drain System and out to Circulating Water for discharge via the outfall. Routine monitoring of this flow path is performed per station operating procedure.

In-Scope Boundary Description

PID-1-DW-LR20600:

The Dewatering (DW) System boundary for the Primary Auxiliary Building begins at the 7' elevation with pump 1-DW-P-436 through an orifice, the discharge check valve to a flex hose. From the flex hose the boundary continues including an isolation valve, drain line, strainer, flow indicator, isolation valve and check valve up to the connection at the roof drain piping. A branch connection goes to the Fuel Storage Building to the sample sink.

The boundary for the West Electrical Tunnel portion of the Dewatering System begins at the two connections at (-)26' elevation of the "B" Electrical Tunnel, through isolation valves joining in a common line to a local sample and isolation valve ending at the Electrical Tunnel sump.

The Residual Heat Removal Equipment Vault Dewatering System boundary begins at (-)61' elevation piping through an isolation valve and to a pressure gage, to the skid mounted components for 1-DW-SKD-153. From the skid mounted pump the boundary continues through isolation valves, flow totalizer, sample reservoir, and sample connection continuing on to the Roof Drain System. The boundary also includes the chemical addition tank, valves, flex hose and suction line through a chemical addition pump, instruments and valves; joining the Dewatering System piping just downstream of the first ground water tap isolations.

The Containment Annulus Dewatering System boundary begins at (-)30' elevation at azimuth ~240° and continues to the sump for 1-DW-P-441. The boundary continues with pump 1-DW-P-441 through discharge flex hose & piping, valves, a flow totalizer, a reservoir, ending at the connection to the Roof Drains connection. The boundary also begins at the chemical addition fill connection in the Primary Auxiliary Building, through the flex hose and piping in the West Main Steam and Feedwater Pipe Chase stairwell and through flex hose, piping and valve to the chemical addition tank, 1-DW-TK-306 located into the Containment Enclosure Ventilation Area. The boundary continues from the tank through discharge piping, valves, and flex hose to the suction of the chemical addition pump. The boundary includes pump discharge piping, valves (including the pressure control valve) and pump relief to the Dewatering System line just downstream of the first isolation valve.

PID-1-DW-LR20601:

The boundary for the East Electrical Tunnel Dewatering System begins at two ground water isolation taps at elevation (-)20' through isolation valves joining in a common line with isolation valve to and including a collection tank. From the collection tank the boundary continues through a dewatering pump suction line and isolation valve through the pump and discharge piping and check valve, through a flow totalizer, isolation valve and ending where the line leaves the electrical tunnel and enters the turbine building. The boundary also includes the chemical addition suction line upon entry into the electrical tunnel and continues through the two chemical addition pumps, instruments, and valves, joining the Dewatering System piping just downstream of the first ground water tap isolations.

PID-1-DF-LR20200:

The boundary consists of non-safety related components which are the drain lines from the Dewatering System.

PID-1-DR-LR20633:

The boundary consists of non-safety related components which are the drain lines from the Dewatering System

PID-1-SF-LR20483:

The boundary consists of non-safety related components which is the sample line going to Sample System sink 1-SS-SS-7.

Interfacing Systems

Not included in the Dewatering System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Plant Floor Drain System
- Roof Drains System
- Sample System

System Intended Functions

This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)

UFSAR References

- Section 3.4.1.2

License Renewal Drawings

- PID-1-DF-LR20200
- PID-1-DR-LR20633

- PID-1-DW-LR20600
- PID-1-DW-LR20601
- PID-1-SF-LR20483

Table 2.3.3-11 Dewatering System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage Boundary (Spatial)
Filter Housing	Leakage Boundary (Spatial)
Flexible Hose	Leakage Boundary (Spatial)
Instrumentation Element	Leakage Boundary (Spatial)
Orifice	Leakage Boundary (Spatial)
Piping and Fittings	Leakage Boundary (Spatial)
Piping Element	Leakage Boundary (Spatial)
Pump Casing	Leakage Boundary (Spatial)
Tank	Leakage Boundary (Spatial)
Valve Body	Leakage Boundary (Spatial)

The aging management review results for these components are provided in Table 3.3.2-11, Summary of Aging Management Evaluation - Dewatering System.

2.3.3.12 Diesel Generator

System Description

The standby power supply is provided by two redundant diesel engine generators of identical design and characteristics which supply onsite power of sufficient capacity and capability to reliably shut down the reactor. The Diesel Generator System includes the skid mounted Diesel Generators and their auxiliaries.

Diesel Generator:

The Emergency Diesel Generators have a continuous rating of 6,083 kW. The capacity of each Diesel Generator is adequate to support operation of engineered safety feature loads.

Each Diesel Generator is connected to a 4160-volt emergency bus as shown in UFSAR Figure 8.3-1 and UFSAR Figure 8.3-10. The capacity of each Diesel Generator is sufficient to meet the safety features demand caused by a loss of offsite power with or without a coincident loss-of-coolant accident.

Diesel Generator Auxiliaries:

Each Diesel Generator includes the auxiliaries necessary for operation, connection to the 4160-volt emergency bus, and connections to the required services. No auxiliaries are shared between the Diesel Generator systems. External power sources, other than DC control power from the unit's station batteries, are not required for starting or subsequent operation. The Diesel Generator auxiliaries include the lube oil system; the fuel oil system, the air start system; the cooling water system; and the air intake, exhaust and crankcase vacuum system.

Each Diesel Generator unit and its auxiliaries are located in a separate and independent enclosure within a seismic Category I building. The reinforced concrete enclosure wall between Diesel Generators has a three-hour fire rating and is designed to withstand explosions and stop postulated missiles from the adjoining Diesel Generator and its auxiliaries. The Diesel Generator and its auxiliaries, which are essential for the operation are designed in accordance with Category I seismic requirements.

Separate and independent heating and ventilating equipment is provided for each Diesel Generator system to supply adequate air for control of the ambient temperature. The heating and ventilation system for the Diesel Generator system is described in Section 2.3.3.13.

Diesel Generator Lube Oil System Description:

Each Diesel Generator has an independent lubrication system. Lube oil is taken from the sump, filtered, cooled and pumped to engine components and returned to the sump. There are two lube oil circuits, one for the main engine lubrication and the other for the rocker arms.

Engine lube oil is pumped through the system by the engine driven pump. The discharged oil is pipe to a three way temperature controlled valve. If the temperature of the oil is above the recommended temperature, the valve will divert lube oil to the cooler, then through a strainer before entering the main engine. The oil collects in the crankcase and is available for suction back to the lube oil circuit. A motor driven auxiliary lube oil pump will operate in the event that a low pressure is detected at the discharge of the strainer.

The rocker lube system is separate from engine lube system. Lube oil to the diesel engine rocker arm is provided by the engine driven rocker arm lube pump, is filtered and returns to the oil reservoir tank. A motor driven rocker arm lube pump is available.

When the engine is not operating, the motor driven engine prelube and filter pump operates continuously, drawing oil from the sump through a suction strainer and discharging the oil through an electric heater, a 5 micron filter and into the lubrication system downstream of the three way temperature control valve.

Diesel Generator Fuel Oil System Description:

Each Diesel Generator has a completely independent fuel oil storage and transfer system consisting of a fuel oil storage tank, transfer pump and interconnecting piping for supplying fuel oil to the day tank which, in turn supplies fuel oil to the engine skid.

Fuel oil from the storage tank is transferred to the Diesel Generator day tank by the Diesel Generator fuel oil transfer pump, a motor driven positive displacement pump. The fuel oil level in the day tank controls the operation of the transfer pump.

Fuel oil from the day tank is pumped to the injector pumps by the fuel oil pumps. The injector pumps are cam-operated and feed the injectors, mounted in the heads for combustion. Engine high pressure fuel return is to the day tank, while the low pressure gravity drain is to the dirty fuel oil reservoir.

Diesel Generator Air Start System Description:

Each diesel engine has an independent starting air system capable of starting the engine within ten seconds and an independent control air system. The engine is designed for a 435 psig, air-over piston starting system with separate solenoid valve and starting air distributor for each bank of cylinders. On initiation of a start signal, starting air is applied to both banks of cylinders simultaneously to accelerate the engine to provide rated frequency and voltage in less than 10 seconds. Each portion of the starting system has an independent receiver, supply line, air start valve and distributor, and supplies starting air to half of the engine cylinders (one bank). If either portion of the starting system should fail, the other portion, already activated, will continue to apply starting air to the engine.

Starting air is supplied by the starting air compressor assembly which includes a starting air compressor and two receivers, all mounted on a common skid. The air discharging from the compressor passes through a pulsation dampener, moisture trap, air dryer, dryer prefilter, dryer after filter, and check and stop valves before entering the receivers. Normally, both receivers will be fully loaded to provide a continuous supply of air. Pressure relief and blowdown valves are included on both receivers.

The receivers also provide instrument air at 100 psi and 20 psi to other engine system components through pressure reducing valves. These components include the auxiliary cooling water pump solenoid valves and cooling water temperature control valves.

Each diesel engine has an available backup control air compressor that can be aligned to the receivers in the event that the starting air compressor is not available to provide control air. This unit is comprised of a compressor, cooler, moisture trap, filter, and dryer, and will supply sufficient air to the receivers to support long-term operation of the engine.

Diesel Generator Cooling Water System Description:

Each Diesel Generator has a completely independent closed-circuit cooling water system which circulates treated demineralized water to the diesel engine components requiring cooling. The system consists of heat exchangers, engine driven pumps, motor driven pump, expansion tank and interconnected piping for supplying water to the diesel engine skid.

When the Diesel Generator is operating, removal of heat from the cooling water is accomplished by circulating cooling through the shell side of the main heat exchanger located in the Primary Auxiliary Building, with Service Water circulating through the tubes.

There are two engine driven cooling water pumps, the jacket cooling pump and the air cooler pump and two motor driven pumps, the auxiliary coolant pump and the standby jacket circ pump.

The engine driven jacket coolant pump discharges cooling water to the engine cylinder walls and turbo charger prior to being returned through the main heat exchanger.

The engine driven air cooler pump discharges cooling water to the air cooler, generator bearing and the lube oil cooler.

The motor driven auxiliary auto starts when either or both of engine driven pumps fail. The motor driven jacket circulating is started when the engine is not operating. .

Diesel Generator Air Intake, Exhaust and Crankcase Vacuum System Description:

The Diesel Generator combustion air intake and exhaust system is capable of supplying adequate combustion air and disposing of resultant exhaust products to permit continuous operation of the diesel engine. The Diesel Generator combustion air intake and exhaust system consists of an intake filter, plenum, exhaust silencer, and interconnecting piping.

The intake air is filtered by a dry-type air intake filter, passes through the intake plenum, and is piped to the Diesel Generator turbochargers. The intake filters reduce the airborne particulate matter in the combustion air during engine operation. The combustion air is compressed by the turbochargers and delivered to the cylinder heads by the inlet manifold.

The exhaust gases are manifolded through the turbochargers and exhausted to atmosphere through an exhaust silencer. The point of discharge is physically separated from the intake point to preclude degradation of engine function due to dilution of the intake air by exhaust gases.

Each engine is equipped with a crankcase exhauster to provide positive crankcase ventilation. The exhauster discharge is piped to a discharge point outside of the Diesel Generator Building. The crankcase exhauster is not safety-related and is not required for operation of the engine.

In-Scope Boundary Description

The boundary discussion the follows is for the train "A" Diesel Generator. The discussion also applies to the "B" Diesel Generator.

Lube Oil
PID-1-DG-LR20458, PID-1-DG-LR20463:

The boundary of the lubricating oil system begins at the engine lubricating oil suction strainer and continues through the common suction piping. The boundary divides into two lines: one, to the engine driven lube oil pump with internal relief and two, to the motor driven lube oil pump with external relief. The discharge piping boundary of the engine driven pump includes a supply to rack boost. The discharge boundary of both pumps flows through check valves and join to form a common line that continues to a temperature control valve that directs flow to, or bypasses the lube oil cooler. A 3/8 in. continuous vent is provided as part of the boundary.

The lube oil supply boundary continues to the lube oil strainer and to the main distribution header where the piping boundary includes the supply lines to the main bearings, the barring device, a supplemental bearing, inner and outer thrust bearings, cam shaft drive gears, water pump bearings, governor drive gears, the overspeed trip device and end cam shaft bearings. The piping boundary continues to the left and right bank air start distributors and to the left and right bank intermediate camshaft bearings, push rods, rollers, and injection pump rollers. The piping continues to the left and right bank air start distributors and foggers. Also connected is the supply to the oil reservoir float control valve.

Left and right rocker arm drain boundary piping leads to an oil reservoir tank. A common suction line from the tank supplies the motor driven rocker arm pre-lube and engine driven rocker arm lube oil pump. The outlet boundary of the pumps joins in a common line to the duplex strainers and then to each of the diesel cylinder sets.

A suction line from the lube oil sump to the pre-lube filter pump strainer is included in the boundary. The boundary continues with the strainer and joins the return piping boundary from the oil reservoir warming loop. The piping then continues to the pump and lube oil heater. The outlet of the lube oil heater divides to supply the oil reservoir warming loop and the five micron filter. The boundary piping then joins the main lube oil at the inlet to the strainer to provide pre-lubrication and engine heating.

Fuel Oil
PID-1-DG-LR20459, PID-1-DG-LR20464:

The diesel fuel oil system boundary begins outside the diesel building at a fill connection and enters the diesel building and connects to both "A" and "B" train fuel oil storage tanks. The storage tank boundary includes a flame arrestor vent located outside the building. The boundary continues at the outlet of the fuel oil tank through a set of duplex strainers and a fuel oil transfer pump. The outlet of the pump continues to the day tank. The fuel oil day tank boundary includes a flame arrestor vent located on the diesel building roof. The tank boundary includes a connection to a roof mounted relief valve, drain connection and an overflow returning excess fuel to the storage tank. The diesel fuel supply boundary continues with a tank outlet line through a pair of duplex strainers and dividing to supply both the engine and motor driven fuel oil pumps. The outlets of the pumps join and continue through a duplex strainer to an accumulator tank and the fuel inlet headers for the engine fuel injectors. Fuel not used by the injectors is collected and returned to the fuel oil day tank through the fuel return headers. Fuel that is not collected in the fuel return header is collected in the drain header and flows to the "dirty" oil reservoir and gravity drains to the fuel oil storage tank. The boundary includes normally isolated train cross connect piping for the fuel oil storage tank, fuel oil transfer pump discharge, fuel oil day tank overflow/drain and the "dirty" oil drain.

Starting Air
PID-1-DG-LR20460, PID-1-DG-LR20465:

The diesel starting air boundary begins at the inlet filter for the air compressor and includes auto drains, traps and drain manifold to drains. The boundary continues with the compressor cooling pipe, pulsation damper, pre-filter, dryer and post filter to the receiver inlet header. In parallel, the backup air start skid boundary begins with the compressor, after cooler, trap, pre-filter and dryer to the receiver inlet header. The air supplied to the header divides and includes both starting air receivers. The outlet of each starting air receiver divides to a cylinder bank associated air start solenoid and main air start valve supply. The boundary for the main air start valve includes the barring gear interlock. The main air start supplies also include a connection to the four shuttle valves that control fuel rack boost (full throttle start). The shuttle valves select the air source and allow boost if: there is no engine overspeed, the shutdown solenoid is not energized and engine driven lube oil is satisfied. The outlet of the main air start valve divides to the cylinders and is controlled for engine starting by the air start distributor. The engine associated "A" air receiver outlet includes a connection that divides to service the shutdown air tank and shutdown solenoid valve, and the engine control air and backup pump control valves.

Cooling Water
PID-1-DG-LR20461, PID-1-DG-LR20466, PID-1-WLD-LR20222:

The Diesel Generator cooling water system consists of two interconnected closed loop subsystems. A backup motor driven pump capable of supporting both engine system loops is also provided. Beginning at a common line at the outlet of the Diesel Generator heat exchanger, the boundary piping divides into:

The first portion of the boundary connected to the engine driven air coolant pump suction line with connections to the expansion tank, auxiliary coolant pump suction, and a return line from the generator bearing cooler. The boundary continues with the air coolant pump and discharge piping, return line from the auxiliary coolant pump and a line supplying the generator bearing cooler. The boundary includes a temperature control valve that modulates flow to the turbocharger intercoolers based on combustion air temperature. The boundary includes the piping to and from the intercoolers and the return piping to and including the lube oil heat exchanger and the lube oil heat exchanger outlet to the inlet of the Diesel Generator component water heat exchanger.

The second portion of the boundary connected to the jacket cooling temperature control valve. The temperature control valve modulates to change the bypass flow and thus control jacket water return temperature. The outlet boundary piping from the temperature control valve leading to the suction of the Jacket coolant pump includes connections to the expansion tank, auxiliary coolant pump suction and a return from the governor lube oil cooler. The jacket coolant pump discharge connects with the return from the auxiliary coolant pump and continues to the lower end of the cylinder jackets up and through the cylinder heads. A parallel boundary continues to and from the turbo for bearing cooling. The combined return piping divides to either return to the temperature control valve or to the inlet of the Diesel Generator component water heat exchanger. A small pipe from the return common line to the surge tank provides continuous venting.

The jacket water standby circulation pump and heater boundary begins at the return line at the temperature control valve inlet and continues through the pump, piping and heater, returning to the jacket cooling inlet.

The auxiliary coolant pump is provided for events where either of the engine driven pumps fail. The suction boundary connects to the suctions of both the air coolant pump and the jacket coolant pump through air operated valves. The discharge piping connects similarly to the pump discharges.

Air intake, exhaust and crankcase vacuum
PID-1-DG-LR20462, PID-1-DG-LR20467:

The diesel intake boundary begins on the 51'6" elevation of the Diesel Generator Building with an intake filter and divides into piping connecting to the right and left bank turbochargers.

The diesel exhaust starts at the right and left bank turbochargers, joins the exhaust silencer and continues through the roof to a protective shield.

The crankcase exhauster boundary includes two connections to the engine crankcase, connecting piping and one flow orifice. The two lines join and include the crankcase exhauster ending at the inlet of the discharge flex connection. Failure of the exhauster does not affect the starting capability of the engine.

Interfacing Systems

Not included in the Diesel Generator System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Demineralized Water System
- Waste Processing Liquid Drains System

System Intended Functions

Provide an independent onsite power supply to train-related vital busses if preferred power sources are interrupted.	10 CFR 54.4(a)(1)
Provide and receive process control signals to initiate and satisfy diesel engine starts, load sequencing and load shedding.	10 CFR 54.4(a)(1)
Provide system status via indications and alarms.	10 CFR 54.4(a)(1)
Provide safe shutdown control and indication (Post Accident Monitoring).	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Station Blackout (SBO).	10 CFR 54.4(a)(3)

UFSAR References

- Section 8.3
- Section 9.5
- Table 7.5-1

License Renewal Drawings

- PID-1-DG-LR20458
- PID-1-DG-LR20459
- PID-1-DG-LR20460

- PID-1-DG-LR20461
- PID-1-DG-LR20462
- PID-1-DG-LR20463
- PID-1-DG-LR20464
- PID-1-DG-LR20465
- PID-1-DG-LR20466
- PID-1-DG-LR20467
- PID-1-WLD-LR20222

Table 2.3.3-12 Diesel Generator
Components Subject to Age Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Dryer Housing	Pressure Boundary
Expansion Joint	Pressure Boundary
Fan Housing	Structural Integrity (Attached)
Filter Element	Filter
Filter Housing	Pressure Boundary
Flame Arrestor	Leakage Boundary
Flexible hose	Leakage Boundary (Spatial) Pressure Boundary
Heat Exchanger Components	Heat Transfer Pressure Boundary
Heater Housing	Pressure Boundary
Instrumentation Element	Leakage Boundary (Spatial) Pressure Boundary
Orifice	Pressure Boundary Structural Integrity (Attached) Throttle
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary Structural Integrity (Attached)
Piping Element	Leakage Boundary (Spatial) Pressure Boundary
Pump Casing	Pressure Boundary
Silencer	Pressure Boundary
Strainer	Filter
Tank	Pressure Boundary
Thermowell	Pressure Boundary

Component Type	Intended Function
Trap	Pressure Boundary
Valve Body	Leakage Boundary (Spatial) Pressure Boundary Structural Integrity (attached)

The aging management review results for these components are provided in Table 3.3.2-12, Summary of Aging Management Evaluation - Diesel Generator System.

2.3.3.13 Diesel Generator Air Handling System

System Description

The Diesel Generator Building heating and ventilating system functions to remove heat generated in the building during normal and emergency conditions and also maintains the design winter indoor building temperature. Ventilation is provided by the Diesel Generator Air Handling System. Electric heaters provided in each day tank room are included in the Diesel Generator Air Handling System. The remainder of the Diesel Generator Building heating function is provided by the Hot Water Heating System and is evaluated separately.

Diesel Generator Air Handling System:

A separate ventilation system, consisting of one supply air and one exhaust air fan, an automatic roll filter, and associated dampers, is provided for each of the redundant Diesel Generators, Train A and Train B. Each supply fan is equipped with a mechanical backdraft damper to prevent backward fan rotation due to reverse air flow. Each of the supply and exhaust fans, as well as the roll filter drive, is powered from its respective train to provide 100 percent redundancy. All of the fans and roll filters are located at elevation 51'-6" of the Diesel Generator Building.

The ventilation systems are redundant; therefore, a single active failure of one ventilation system will not prevent the other ventilation system from operating.

Loss of offsite power will not affect the ventilation systems, since the exhaust dampers fail open and each set of Diesel Generator Building supply and exhaust fans is connected to separate trains of the Emergency Electrical Power System.

Electric unit heaters are provided in the day tank rooms of the Diesel Generator Building, so the temperatures in the rooms do not fall below minimum design temperature. The explosion-proof unit heaters are controlled by room thermostats. A low temperature switch in each room will alarm (on the computer panel located in the control room) if the room temperature falls to a predetermined setpoint.

In-Scope Boundary Description

Diesel Generator Air Handling System
PID-1-DAH-LR20624:

The Diesel Generator Air Handling (DAH) System consists of one supply and one exhaust fan and associated dampers provided for each of the redundant Diesel Generators. Heating is provided by four hot water unit heaters located in each Diesel Generator room, and is evaluated as part of the Hot Water Heating System. Electric unit heaters are provided in the day tank rooms so the temperatures there do not fall below minimum design temperature. The supply air passes through louvers and an automatic roll filter.

The boundary of the system begins with the two train associated supply fans taking suction on diesel building air on the 51'6" elevation and each discharging through a discharge damper, fire damper and ductwork into the respective diesel room. The two train associated exhaust fans take suction via a damper and Fire damper on the area atmosphere at the 49' foot elevation of the Diesel Generator rooms. Two in boundary supply and outlet fire dampers facilitate the ventilation of the respective Diesel Fuel Oil Day Tank rooms. Attendant instrumentation is included in the boundary.

Interfacing Systems

The Diesel Generator Air Handling System does not interface with any license renewal systems.

System Intended Functions

Diesel Generator Room HVAC and Flammable Vapor Control. Remove heat rejected by the Diesel Generators and building lighting, during normal operation, maintain Diesel Generator room temperature during worst case operation of the Diesel Generators at their continuous rating, and exhausts sufficient air from the rooms to prevent accumulation of a flammable fuel-vapor mixture.	10 CFR 54.4(a)(1)
Provide safe shutdown control and indication (Post Accident Monitoring).	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Station Blackout (SBO).	10 CFR 54.4(a)(3)

UFSAR References

- Section 9.4.8
- Table 7.4-1
- Table 7.5-1

License Renewal Drawings

- PID-1-DAH-LR20624

Table 2.3.3-13 Diesel Generator Air Handling System Components Subject to Aging Management Review

Component Type	Intended Function
Damper Housing	Fire Barrier Pressure Boundary
Ducting	Pressure Boundary
Ducting Closure Bolting	Pressure Boundary
Flexible Connector	Pressure Boundary
Fan Housing	Pressure Boundary

The aging management review results for these components are provided in Table 3.3.2-13, Summary of Aging Management Evaluation - Diesel Generator Air Handling System.

2.3.3.14 Emergency Feedwater Pump House Air Handling System

System Description

The function of the heating and ventilating systems is to maintain the inside temperature of the emergency feedwater pump-house within design limits for both normal and emergency feedwater system operation during summer and winter.

The ventilation function is provided by the Emergency Feedwater Pump House Air Handling System. The heating function is provided by the Hot Water Heating System and is evaluated separately.

The Emergency Feedwater Pump House is ventilated and cooled with outside air supplied through one of the two redundant supply fans and its tornado gravity intake damper with pneumatic test operator, and exhausted through its tornado exhaust damper with pneumatic operator. Each fan and its exhaust damper are controlled by a separate room thermostat. Setpoints are staggered to avoid simultaneous operation of redundant equipment. The Emergency Feedwater Pump House high temperature is alarmed.

The redundant, seismic Category I, Safety Class 3, pump room supply fans, supply and exhaust dampers and the Class 1E fan motors, each with electrical power from a separate Engineered Safety Features power source, assure continued ventilation should a Safe Shutdown Earthquake, loss of offsite power or a single failure occur. Loss of air or electrical power to the pneumatically operated supply and exhaust dampers will cause them to fail open.

In-Scope Boundary Description

PID-1-MAH-LR20503:

The Emergency Feedwater Pump House Air Handling (EPA) System boundary begins at the intake tornado dampers for the two supply fans and continues through the fans and the exhaust dampers on the outlet of the supply fans. The two exhaust tornado dampers located in the walls of the Emergency Feedwater Pump House are included in the boundary.

Interfacing Systems

The Emergency Feedwater Pump House Air Handling system does not interface with any license renewal systems.

System Intended Functions

Maintain Emergency Feedwater Pump House area design temperatures during normal and emergency operation.	10 CFR 54.4(a)(1)
Provide safe shutdown control and indication (Post Accident Monitoring).	10 CFR 54.4(a)(1)
Provide pressure relief protection in the event of a tornado (Tornado Dampers).	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Environmental Qualification (EQ).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)

UFSAR References

- Section 9.4.11
- Table 7.4-1
- Table 7.5-1

License Renewal Drawings

- PID-1-MAH-LR20503

Table 2.3.3-14 Emergency Feedwater Pump House Air Handling System Components Subject to Aging Management Review

Component Type	Intended Function
Damper Housing	Pressure Boundary
Ducting	Pressure Boundary
Ducting Closure Bolting	Pressure Boundary
Fan Housing	Pressure Boundary
Flexible Connector	Pressure Boundary

The aging management review results for these components are provided in Table 3.3.2-14, Summary of Aging Management Evaluation - Emergency Feedwater Pump House Air Handling System.

2.3.3.15 Fire Protection System

System Description

The plant Fire Protection System is a non-safety related system designed to detect and alarm, control and extinguish fires that may occur. To accomplish this end, the concept of defense in depth is a criterion for design. This concept, applied to fire protection, aims at a balanced program which will:

a) Prevent fires from starting.

b) Detect fires quickly, and quickly suppress those that occur, thus limiting their damage.

c) Design and locate plant equipment such that if a fire occurs and burns for a long time, despite a) and b) that essential plant activities will still be performed.

d) Ensure that neither inadvertent operation nor failure of a system will induce a failure of any safety-related system.

Fire Prevention:

The plant fire protection system utilizes design aspects which employ separation criteria, noncombustible material, fire barrier divisions, fire rated penetrations for conduit, cable, piping and ductwork, as well as fire dampers. Fire barrier floors and walls, including all penetrations, have a design fire rating commensurate with the hazard. Physical separation or fire barriers are provided between redundant systems or equipment. In addition, fire stops are provided in long vertical cable tray runs to further ensure the non-propagational properties of the cables. These fire stops are provided where no other fire barriers exist.

Plant equipment location and separation to limit fire-related damage is discussed in detail in the report "Seabrook Station Fire Protection System Evaluation and Comparison to Branch Technical Position 9.5-1, Appendix A" and "Fire Protection of Safe Shutdown Capability (10 CFR 50, Appendix R)."

Detection Systems:

Fire detection devices are provided in areas which are judged to contain sufficient combustibles to present a fire hazard.

Fire detectors are installed consistent with the type of fire anticipated. A minimum of two detectors of any type are provided in each fire zone or fire area. Failure of one detector will not affect the operability of any other detector. The detectors are positioned within the zone or areas so that the flow of air or pressure differences will not affect proper operation of the detector.

The fire detection system contains supervisory panels to monitor the detector status. Fire detectors alarm at the control console in the control room to provide rapid identification of the location of any fire so that corrective action can be initiated.

Charcoal filter fire detection systems sense carbon monoxide to provide an early warning of a fire within the charcoal filter bed being monitored. Each charcoal filter located outside of containment is monitored by sample probes which are located both upstream and downstream of the charcoal beds. Control modules process signals from the sample probes and initiate alarms to the Fire Detection System upon detection of a high carbon monoxide concentration. Within containment, filter 1-CAH-F-8 is monitored by a self-contained Sample System which draws a sample from the downstream side of the charcoal filter. The Sample System initiates an alarm to the Fire Detection System upon detection of a high carbon monoxide concentration. Alarms are initiated by the Fire Detection System on the fire control panel located in the control room.

Suppression Systems:

Fire suppression capability is provided by installed systems which include water supply, pumps, valves and piping that supply hose stations, wet and preaction sprinklers, and deluge spray systems. Portable fire extinguishers are provided, where appropriate, and installed gas suppression systems are used where water would cause a hazard to equipment or personnel.

Water Supply:

The water supply for the plant fire protection system is obtained from two 500,000-gallon heated water storage tanks, of which 300,000 gallons in each tank is reserved for fire protection. Water for fire protection is supplied to the system by one 1500-gpm motor-driven centrifugal fire pump and one 1500-gpm diesel engine-driven centrifugal pump which provide the system design capacity. A second 1500-gpm diesel engine-driven centrifugal fire pump is provided as a spare. Each pump is capable of taking suction from either tank.

Two 25-gpm motor-driven centrifugal pressure maintenance jockey pumps maintain fire system pressure, and prevent unnecessary starting of the main fire pumps.

The fire pumps and jockey pumps are housed in a pump house adjacent to the fire tanks. The pump house is heated and ventilated to maintain suitable ambient conditions for pump operation. Each fire pump is separated by a three-hour rated fire barrier wall, with each bay containing sprinklers and combination fixed temperature rate-of-rise detectors or ionization detectors which alarm at the Main Control Board.

Electric power for the motor-driven fire pump and jockey pumps is obtained from a 460-volt load center. An alternate feed from a second 460-volt load center is supplied to the main motor-driven fire pump.

Yard Piping:

Fire Protection water is supplied to the plant via a closed loop main. The fire main is a 12-inch cement-lined steel piping system, coated and wrapped on the outside for corrosion protection or, Fibercast, Factory Mutual approved, Class 1614, pipe. The fire pumps are arranged to discharge to either half of the loop, with provisions included to permit both pumps to discharge into either half of the loop, if a portion of the main is out of service.

Each branch line from the fire main is equipped with a normally open post-indicating valve. Additional, normally open post-indicating valves are installed in the main to permit isolation of individual main sections for service or repair without affecting the operation of the balance of the main system.

Yard Protection:

Fire protection is provided to the exterior plant areas by fire hydrants located along the loop at about 250-foot intervals. Hose houses are provided complete with necessary associated accessories at alternate hydrant locations. Hydrants are located to provide coverage for each building.

Deluge Systems:

Hydraulically designed, automatic deluge systems are provided in the following areas containing safety-related systems or equipment:

- Diesel Generator Building fuel oil day tank area
- Control Building cable spreading area.
- Hydraulically designed, automatic deluge systems are provided in the following areas housing non-safety related equipment:
- Generator step-up transformers
- Unit auxiliary transformers
- Reserve auxiliary transformers

- Feed pump turbine lube oil conditioner
- Hydrogen seal oil unit
- Main turbine lube oil conditioner and oil reservoir
- Hydraulic fluid power unit
- Turbine lube oil storage tank.

Each deluge valve system contains an automatic deluge valve, system actuation detectors, supervisory control panel with local flow indication provisions included, and remote annunciation at the control console in the control room. The deluge valves and manual actuators are located in areas remote from the protected areas. The systems are provided with 24-volt DC power for operation, should main power be unavailable.

Wet Pipe Sprinkler Systems:

Wet pipe sprinkler systems are installed in the following non-safety related areas:

- Turbine Building below turbine generator operating floor elevation 75'-0" and below the mezzanine floor elevation 46'-0" and 50'-0"
- Turbine Building heater bay below the roof and below floor elevation 50'-0
- Administration Building Storage Area
- Steam generator feed pump areas
- Lube Oil Storage Building
- Diesel Generator Building sump
- Mechanical Maintenance Storage Facility
- Leased Makeup Water Treatment System room and Administration Building Storeroom
- Administration Building (first floor)
- Chlorination Building
- Condensate Polisher Facility
- Alternate Health Physics Checkpoint

Wet pipe sprinkler systems are provided with heat-actuated, closed head, fusible sprinklers with a local flow-actuated alarm. The flow alarm will cause the annunciation of a fire condition in the control room.

Preaction Sprinkler Systems:

Preaction sprinkler systems are installed in the following safety-related areas:

- Cable tunnels from Control Building to containment
- Cable tunnels from Control Building to Primary Auxiliary Building
- Electrical penetration areas outside containment
- Primary Auxiliary Building at elevation 25'-0" and the electrical chase
- Diesel Generator Building fuel oil storage tank rooms and the fuel oil piping trenches.

Preaction sprinkler systems contain valve actuation provisions from fire detectors to charge the system with water, which will then discharge from any sprinkler head fused-open by a fire. Fire detection is annunciated at the control console in the control room and on a local control panel.

Manually Operated Pre-Action Sprinkler Systems:

Manually operated sprinkler systems are provided for the following areas:

- Turbine generator bearings,
- Lube oil piping from bearings to guard pipe
- Diesel Generator rooms

Manual operated sprinkler systems are provided for the Supplemental Emergency Power System enclosures (each Diesel Generator and switchgear enclosure). Water is supplied to the sprinkler piping from a fire hydrant utilizing fire hose. Fire detectors in the area annunciate a fire condition at the control console in the control room and on a local control panel.

Standpipe Systems:

The Turbine Generator Building, the Mechanical Maintenance Storage Facility, the Administration and Service Building, Containment, Control Building, Primary Auxiliary Building, Fuel Storage Building, Waste Process Building, Residual Heat Removal equipment vault, Diesel Generator Building and Emergency Feedwater pump area are provided with fire hose stations at approximately 100-foot intervals around or within the building or stairwells to provide coverage, using 100 feet of hose. Each hose station consists of 1½ inch hose with Factory Mutual approved accessories.

The Turbine Generator Building hose stations are supplied from two looped building mains fed from two branch lines supplying the building from separate sections of the 12-inch yard fire main.

Two branch lines from separate sections of the yard fire main, backed up by a branch line from the safety-related plant service water system and booster pump, supply water to the standpipe hose stations in the Residual Heat Removal equipment vault, Primary Auxiliary Building, Fuel Storage Building, Diesel Generator Building, Control Building, and Emergency Feedwater pump area. These systems are designed to be operational following an SSE.

To provide increased reliability for cooling safety-related components, a cross-connect from the Fire Protection and Demineralized Water systems to the PCCW System is included in the system design. This cross-connect can be used to provide cooling water to the charging pump lube oil coolers or provide emergency makeup water to safety-related portions of the PCCW System. This cross-connect is backed up by a seismic Category I Service Water System and booster pump makeup source.

Standpipes in safety-related areas are designed and supported as seismic Category I systems to prevent pipe failure and subsequent pipe whip. This feature also applies to deluge water spray and preaction sprinkler systems installed in safety-related areas.

Portable Fire Extinguishers:

Portable fire extinguishers are located throughout the plant as the primary fire-fighting provisions in those areas determined to have negligible fire hazard, and as secondary defense in areas containing fixed fire protection systems. Portable fire extinguishers were selected on the basis of the most suitable type for the hazard present, with the radiological, metallurgical, physical and chemical compatibility of the extinguishing agents with plant components in mind. The types of portable extinguishers provided are pressurized water, Halon 1211, dry chemical and CO_2.

Halon 1301 Fire Extinguishing Systems:

A Halon 1301 fire extinguishing system is installed in the following non-safety related area:

- Main computer room (in Control Building)

Halon 1301 systems contain valve actuation provisions from fire detectors to discharge the gas for total flooding of the area experiencing a fire. Fire detection is annunciated at the control console in the control room and on a local control panel. The detection system also contains provisions to close all doors, and to close dampers in the air supply and ducts to the rooms, thus isolating the affected area from adjacent rooms.

In-Scope Boundary Description

PID-1-FP-LR20266, PID-1-WT-LR20041:

The Fire Protection (FP) System license renewal boundary has two 500,000-gallon water storage tanks with 300,000 gallons in each tank reserved for fire protection. The outlets of both tanks join in a common header that connects to the suctions of the three fire pumps and the two jockey pumps. A connection from the water treatment system provides a makeup capability to the tanks, with the water treatment portion of the piping as the pressure boundary preventing loss of water from the fire protection tanks.

The two engine-driven fire pumps include a cooling loop supplied by the discharge of the respective pump. All three fire pumps have installed relief valves that return flow to the fire tanks and test valves that can be aligned to return to either tank through the same piping as the relief valves. The discharge piping for the electrically driven pump provides the connection to the fire pump house sprinkler system.

Two jockey pumps are provided to makeup for small system leakage and maintain system pressurization. Two circulating pumps and Auxiliary steam heated heat exchangers maintain tank temperature.

The three fire pumps connect to the closed loop yard main.

PID-1-FP-LR20274, PID-1-FP-LR20268, PID-1-FP-LR20269, PID-1-FP-LR20270, PID-1-FP-LR20271, PID-1-SW-LR20795:

The boundary continues with the yard main and connections to the following in scope buildings and listed systems with in the building:

Reactor Containment

- Dry standpipe hose connections

Electrical tunnels - Emergency Feedwater Pump House

- Two zones of pre-action sprinkler systems

Unit 1 turbine building loop (two connections)

- Seventeen deluge spray systems
- Connection to the lube oil storage sprinkler header
- Four connections to the turbine building sprinkler header
- Hose stations

Diesel Generator Building – one feed per train

- Preaction for fuel oil storage tank rooms and the fuel oil piping trenches.
- Deluge for day tank room

Two connections to the Tank Farm include:

- SSE based Fire Protection booster pump and piping
- Hose reels in Waste Process Building, Diesel Generator Building, Emergency Feedwater Pump House (and emergency condensate makeup), Residual Heat Removal Equipment Vaults, Primary Auxiliary Building stairwells North and South, Fuel Storage Building, Main Steam and Feedwater Pipe Chase, and "A" and "B" Centrifugal Charging Pump backup cooling.

Primary Auxiliary Building and Tunnel pre-action valves for:

- Electrical tunnels. Control room to Primary Auxiliary Building / Residual Heat Removal
- Primary Auxiliary Building vertical electrical chase
- General area and below trays
- Waste Processing Building Stairwell Hose Stations

Yard hydrant and hose stations are included in the boundary

The feeds to buildings that are not in scope for license renewal and can be isolated per the abnormal operating procedure for a fire main break are not in scope of license renewal.

PID-1-FP-LR20272, PID-1-FP-LR20273:

The Fire Protection boundary on these prints list the valve details for the in scope deluge, alarm, flooding, and pre-actuation valve for the fire protection system.

Interfacing Systems

Not included in the Fire Protection System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Auxiliary Steam Heating System
- Fuel Oil System
- Instrument Air System
- Primary Component Cooling System
- Service Water System

System Intended Functions

Provide containment isolation function.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)

UFSAR References

- Section 9.5.1
- Table 6.2-83
- Appendix A
- Appendix R

License Renewal Drawings

- PID-1-FP-LR20266

- PID-1-FP-LR20268
- PID-1-FP-LR20269
- PID-1-FP-LR20270
- PID-1-FP-LR20271
- PID-1-FP-LR20272
- PID-1-FP-LR20273
- PID-1-FP-LR20274
- PID-1-SW-LR20795
- PID-1-WT-LR20041

Table 2.3.3-15 Fire Protection System
Components Subject to Age Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Filter Element	Filter
Filter Housing	Pressure Boundary
Flexible Hose	Pressure Boundary
Heat Exchanger Components	Pressure Boundary Heat Transfer
Instrumentation Element	Pressure Boundary Leakage Boundary (Spatial)
Piping and Fittings	Pressure Boundary Leakage Boundary (Spatial)
Piping and Fittings (Containment Isolation)	Pressure Boundary
Piping Element	Pressure Boundary Leakage Boundary (Spatial)
Pump Casing	Pressure Boundary
Sprinkler Head	Pressure Boundary Spray
Tank	Pressure Boundary
Thermowell	Pressure Boundary
Valve Body	Pressure Boundary
Valve Body	Pressure Boundary

Component Type	**Intended Function**
(Containment Isolation)	
Vortex Plate	Direct Flow

The aging management review results for these components are provided in Table 3.3.2-15, Summary of Aging Management Evaluation - Fire Protection System.

2.3.3.16 Fuel Handling System

System Description

The new fuel storage facilities are located within the Fuel Storage Building and are designed to facilitate the safe handling, inspection and storage of new fuel assemblies and control rods. Space is provided for handling and storage of 90 new fuel assemblies, which is equal to a core load plus 25 spare assemblies.

The Fuel Transfer System includes an underwater, electric-motor-driven, transfer car that runs on tracks extending from the Containment refueling canal through the transfer tube and into the Fuel Storage Building refueling canal. A hydraulically actuated lifting arm is on each end of the transfer tube. The fuel container in the refueling canal receives a fuel assembly in the vertical position from the refueling machine. The fuel assembly is then lowered to a horizontal position for passage through the transfer tube. After passing through the tube, the fuel assembly is raised to a vertical position for removal by a tool suspended from the Spent Fuel Pool bridge and hoist in the Fuel Storage Building refueling canal. A system of lifting arms and hydraulic cylinders is used to raise and lower the fuel containers containing the fuel assembly. The cylinders are powered by hydraulic pumping units and controlled by electronic consoles. The pumping units and consoles (one each in the Containment and Fuel Storage Building, designated 1-FH-RE-44 and 1-FH-RE-45, respectively) are located on the operating deck of each building. The Spent Fuel Pool Bridge and hoist then moves to a storage loading position and places the spent fuel assembly in the spent fuel storage racks.

During reactor operation, the transfer car is stored in the Fuel Storage Building refueling canal. The quick closure hatch is engaged closed on the containment refueling canal end of the transfer tube to seal the reactor containment. The terminus of the tube in the Fuel Storage Building is closed by a valve.

In-Scope Boundary Description

The License Renewal boundary for the Fuel Handling (FH) System consist of Criterion (a)(2) components that are associated with the hydraulic systems for the tilt mechanisms located inside and outside of the containment. A system of lifting arms and hydraulic cylinders is used to raise and lower the fuel container which contains the fuel assembly being transferred. The cylinders are powered by hydraulic pumping units (1-FH-RE-44 and 1-FH-RE-45) and are located on the operating deck of the Containment and Fuel Storage Buildings. Portions of the system's hydraulic pumps, tubing, valves and accumulators are exposed to the local area.

PID-1-DM-LR20352:

This consists of the piping between the fuel transfer console and the fuel upending machine inside Containment and the piping between the fuel transfer system control panel and the fuel upending machine inside the Fuel Storage Building.

The Fuel Storage Building penetration sleeves, fuel transfer tube and bellows, spent fuel pool storage racks, spent fuel pool liner, new fuel storage area and racks, spent fuel pool gates and fuel handling cranes are civil/structural components, and for License Renewal, are evaluated with the Fuel Storage Building structure.

Interfacing Systems

Not included in the Fuel Handling System license renewal scoping boundaries are the following interfacing system, which is separately evaluated as license renewal systems:

- Demineralized Water System

System Intended Functions

This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)

UFSAR References

- Section 9.1.1
- Section 9.1.4

License Renewal Drawings

- PID-1-DM-LR20352

Table 2.3.3-16 Fuel Handling System
Components Subject to Age Management Review

Component Type	Intended Function
Bolting	Leakage Boundary (Spatial)
Flexible Hose	Leakage Boundary (Spatial)
Instrumentation Element	Leakage Boundary (Spatial)
Piping and Fittings	Leakage Boundary (Spatial)
Piping Element	Leakage Boundary (Spatial)
Pump Casing	Leakage Boundary (Spatial)
Tank	Leakage Boundary (Spatial)
Valve Body	Leakage Boundary (Spatial)

The aging management review results for these components are provided in Table 3.3.2-16, Summary of Aging Management Evaluation - Fuel Handling System.

2.3.3.17 Fuel Oil System

System Description

The Fuel Oil System provides fuel to the two diesel driven fire pumps, 1-FP-P-20A and -20B. There are two fuel tanks, each dedicated to a diesel driven fire pump.

In-Scope Boundary Description

PID-1-FP-LR20266, PID-1-FO-LR20938:

The Fuel Oil System boundary begins with the two fuel oil day tanks and includes a fill alarm, piping and flash arrestor on each tank. Each tank boundary also includes a fill connection, strainer and associated piping. From each tank a supply line leads to the associated diesel fire pump engine and an excess fuel line from each engine returns to the tank.

Interfacing Systems

Not included in the Fuel Oil System license renewal scoping boundaries are the following interfacing system, which is separately evaluated as license renewal system:

- Fire Protection System

System Intended Functions

This system contains components which perform functions credited for Fire Protection (FP).	10CFR 54.4(a)(3)

UFSAR References

- Section 9.5.1

License Renewal Drawings

- PID-1-FO-LR20938
- PID-1-FP-LR20266

Table 2.3.3-17 Fuel Oil System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Filter Element	Filter
Flame Arrestor	Pressure Boundary
Piping and Fittings	Pressure Boundary
Tank	Pressure Boundary
Valve Body	Pressure Boundary

The aging management review results for these components are provided in Table 3.3.2-17, Summary of Aging Management Evaluation - Fuel Oil System.

2.3.3.18 Fuel Storage Building Air Handling System

System Description

The normal heating and ventilation subsystem is comprised of filters, dual purpose chilled water cooling/hot water heating coils for summer cooling or winter heating, supply air fans, chillers and a ducted distribution system with parallel-path supply dampers which are a part of the Primary Auxiliary Building Ventilation System. A hot water unit heater system, which is supplied with hot water from the Primary Auxiliary Building Hot Water Heating System, is also provided. The system is designed to maintain inside design temperatures suitable for equipment and personnel.

The ventilation function is provided by the Fuel Storage Building Ventilation System. The heating function is provided by the Hot Water Heating System and is evaluated separately.

The normal heating and ventilation subsystem employs two slotted exhaust intake hoods designed to sweep the pool surface in order to capture the dilute vapors emanating from the spent fuel pool. The entrained air and vapor are ducted to a vane axial fan, normal ventilation exhaust air isolation damper and from there to the unit plant vent.

Two basic modes of air handling are available, as discussed below. For all modes, the operation of the mechanical equipment is controlled and monitored from the plant unit control room.

Normal Once-Through Supply Exhaust Ventilation Mode:

During normal operation, filtered outside air is circulated through the Fuel Storage Building by the normal ventilation system, with the exhaust air discharged from the building via the unit plant vent. Filtering of the exhaust air is not normally performed.

Fuel Handling Mode:

The fuel handling mode is used any time irradiated fuel not in a sealed cask is handled. In the fuel handling mode of operation, the normal Building Exhaust System is isolated prior to initiation of fuel handling operations by closing the normal exhaust isolation damper and stopping the normal exhaust fan. The Fuel Storage Building is maintained at a negative pressure of 0.25" w.g. or more (negative). This is achieved by exhausting air from the building at a higher rate than directly supplied from the PAB Supply Air System. Maintaining the building at a negative pressure will minimize, or eliminate, the leakage of radioactive material to the environment in the event of an accident. The exhaust filter trains are redundant, with one unit required to operate in the event of an accident.

The redundant filter units and their respective components are fed from independent power sources so that no single failure would prevent the obtaining and maintaining of the negative pressure. The static pressure control for the parallel supply system dampers are provided with manual override provisions to allow the operator to control the damper position and the building pressure if required.

The Fuel Storage Building Emergency Air Cleaning System is a seismic Category I, Safety Class 3 system.

In-Scope Boundary Description

Fuel Storage Building Air Handling
PID-1-MAH-LR20495, PID-1-MAH- LR20497, PID-1-WLD-LR20220:

Fuel Storage Building Air Handling system boundary begins with ducting in the Primary Auxiliary Building at a support anchor, enters the Containment Enclosure Ventilation Area through a fire damper, and continues through a parallel set of dampers to a fire damper, and to a tornado damper in the Fuel Storage Building. This portion of the boundary ends at a ducting support anchor.

The boundary continues on building elevation 64' at the inlets to two air cleaning units including the moisture separators, heaters, roughing filters, HEPA filter, Charcoal filter, HEPA filter , standby cooling crossover duct, and back draft damper. The 1-FAH-F-41 filter outlet boundary leads to a fan, discharge duct and tornado damper, ending at a duct support. The 1-FAH-F-74 filter unit outlet boundary leads to a fan and discharge duct damper. The boundary joins with the duct from the normal exhaust fan and damper to pass through a tornado damper, and ends at a duct support at building exit. Filter demister drains lead from each filter and end at a local floor drain on the 64' elevation.

Interfacing Systems

Not included in the Fuel Storage Building Air Handling System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Primary Auxiliary Building Air Handling System
- Waste Processing Liquid Drains System

System Intended Functions

Provide a negative pressure within the fuel service building to limit unmonitored radioactive release to the environment.	10 CFR 54.4(a)(1)
Remove and retain airborne particulates and radioactive iodine following a fuel handling accident.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Station Blackout (SBO).	10 CFR 54.4(a)(3)

UFSAR References

- Section 3.3.2.1
- Section 6.5.1
- Section 9.4.2

License Renewal Drawings

- PID-1-MAH-LR20495
- PID-1-MAH-LR20497
- PID-1-WLD-LR20220

Table 2.3.3-18 Fuel Storage Building Air Handling System Components Subject to Aging Management Review

Component Type	Intended Function
Damper Housing	Fire Barrier Pressure Boundary Structural Integrity (Attached)
Ducting	Pressure Boundary Structural Integrity (Attached)
Ducting Closure Bolting	Pressure Boundary
Fan Housing	Pressure Boundary
Filter Housing	Pressure Boundary
Flexible Connector	Pressure Boundary
Piping and Fittings	Pressure Boundary Leakage Boundary (Spatial)
Valve Body	Pressure Boundary Structural Integrity (Attached)

The aging management review results for these components are provided in Table 3.3.2-18, Summary of Aging Management Evaluation - Fuel Storage Building Air Handling System.

2.3.3.19 Hot Water Heating System

System Description

The Hot Water Heating System includes the station designated Hot Water Supply and Hot Water Return Systems. In addition to providing heating to buildings not within the License Renewal boundary, such as the Administration Building, Turbine Building and Waste Process Building, the Hot Water Heating System provides the functions described below.

Fuel Storage Building normal heating is comprised of filters, dual purpose chilled water cooling/hot water heating coils for summer cooling or winter heating, supply air fans, chillers and a ducted distribution system with parallel-path supply dampers which are a part of the Primary Auxiliary Building ventilation system. A hot water unit heater system, which is supplied with hot water from the Primary Auxiliary Building hot water heating system, is also provided. The system is designed to maintain inside design temperatures suitable for equipment and personnel.

Primary Auxiliary Building heating is maintained in the winter by heating the outside air with a bank of dual purpose chilled water cooling and hot water heating coils. The water temperature for the main hot water heating coils is controlled by thermostats mounted in the Primary Auxiliary Building. The heating coils are supplied with hot water/glycol from a closed loop parallel pump circulating system utilizing a common steam/hot water converter. The closed loop circulating system for the main heating coils is comprised of three pumps, one for each bank of heating coils and one reserve pump, each manually controlled locally. Each pump once started runs continuously. Certain rooms contain a pair, or pairs of unit heaters connected to thermostats located in the room which will operate the unit heater fans to maintain the room temperature above minimum design requirements. The unit heaters are supplied with hot water/glycol from a closed loop system using the same steam/hot water converter as the Primary Auxiliary Building main hot water heating coils. One centrifugal pump provides circulating water to all of the unit heaters within each room. The pump is started manually from the main control panel and runs continuously.

Heating for the Diesel Generator Building is provided by hot water unit heaters. Four unit heaters are located in each Diesel Generator area. Each of the two area heating systems is provided with hot water from the hot water/steam converter. Three hot water circulating pumps, one for each area and the third, a standby for both, are energized from the local control panel and will run until the operator manually stops them. Operation of the unit heaters is thermostatically controlled. The hot water heating piping is contained or shielded where they pass over safety-related electrical equipment.

Cable Spreading Room ventilation system supply air is reheated, when required, by a hot water heating coil in the supply ductwork to offset building heat losses. The cable spreading room ventilating system obtains makeup air and hot water for heating from the switchgear area and battery rooms heating and ventilating system.

In the winter the 4-kV switchgear areas, cable spreading area and the electrical tunnel area air is recirculated and mixed with preheated outside air, as necessary, for makeup and to maintain the inside design temperature. The 4-kV switchgear areas and battery rooms have two ventilation equipment rooms, one for each train. The equipment rooms serve as a return air/makeup air mixing plenum. The heat required to offset building heat loss from the switchgear areas, battery rooms and electrical tunnels is supplied by hot water unit heaters located in the equipment rooms. Water line breaks or hot water system failures will not affect the operation of the switchgear areas or battery rooms.

The Emergency Feedwater Water Pump House heating system is designed to maintain the pumphouse at or above 50°F when the outside temperature is 0°F or above. The heating system consists of a shared steam/hot water converter, two 100 percent capacity pumps, a piping system and two 100 percent capacity unit heaters. The heating medium is a mixture of water and glycol in a closed loop circulating system. The glycol acts to prevent freezing should the steam supply, electrical power source or a pump or driver fail. Each unit heater is controlled by its own room thermostat.

The pump room area of the Service Water Pump House is maintained at 50°F or above when the outside temperature is 0°F or above by a hot water heating system using unit heaters. Hot water is pumped through the unit heaters from a steam-to-hot-water heat exchanger located in the adjacent Circulating Water Pump House. The heating system is not required to maintain operation of the service water pumping equipment.

In-Scope Boundary Description

The Primary Auxiliary Building and Fuel Storage Building
PID-1-HW-LR20051, PID-HW-LR20056, PID-1-MAH-LR20507:

The Primary Auxiliary Building and Fuel Storage Building portion of the Hot Water Heating System boundary consists of three conjoined loops.

The Hot Water Heating System boundary for the Primary Auxiliary Building heating portion begins with three pumps in parallel discharging to two headers supplying ten water-to-air heat exchangers for the Primary Auxiliary Building. The pump discharge headers also connect to boundary piping connecting to the Primary Auxiliary Building chilled water system supply ending at 1-PAH-V-

16. Each of the ten heat exchangers has a continuous vent with the piping from the vents combining in a single line returning to the common header. The heat exchanger outlet boundary piping combines in two headers passing through a temperature control bypass valve and to the auxiliary steam heat exchanger and returning to the pump common suction or directly to the common suction. The three pumps share two air separators in a swing pump configuration to complete the loop.

The Primary Auxiliary Building filter room boundary begins with a single pump discharging to four unit heaters supporting the Primary Auxiliary Building filter room. Return flow from the unit heaters joins the returning piping from the Primary Auxiliary Building heat exchangers, passes through the auxiliary steam heat exchanger and returns to the pump suction via an air separator to complete the loop.

The Fuel Storage Building boundary begins with a single pump discharging to nine unit heaters located in the Fuel Storage Building. Return flow from the unit heaters joins the returning piping from the Primary Auxiliary Building heat exchangers, passes through the auxiliary steam heat exchanger and returns to the pump suction via an air separator to complete the loop.

The three loop boundaries above are connected by the air separator vent lines to two expansion tanks operated in parallel with a small service air overpressure. A chemical makeup tank and pump are included in the boundary to provide makeup for system leakage.

Diesel Generator and Control Building
PID-HW-LR20053:

The Diesel Generator and Control Building portion of the Hot Water Heating System boundary consists of two conjoined loops.

The control room and non-essential switchgear room heating system boundary begins with three pumps connected in parallel in a swing pump configuration discharging to four headers. One header connects to three unit heaters in mechanical room "A" and a second header connects to three unit heaters in mechanical room "B". The third header boundary ends on entering the non-essential switchgear room. The last header includes a temperature control valve bypass and cable spreading room unit heater. The four return headers combine and continue to the Turbine Building where the boundary ends. The boundary begins again as the now heated water returns from the Turbine Building to the Control Building and to the pumps via a single air separator and piping (in common with the Diesel Generator Building loops).

The Diesel Generator boundary begins with three pumps connected in parallel in a swing pump configuration discharging to two headers. One header supplies four unit heaters in diesel room "A" and one supplies four unit heaters in diesel room "B". Return flow from the unit heaters joins in the common header and likewise and continues to the turbine building where the boundary ends. The boundary begins again as the now heated water returns from the Turbine Building to the Control Building and to the pumps via a single air separator and piping (in common with the control building loops).

The two boundaries above are connected by the single air separator vent line to an expansion tank operated with a small service air overpressure. A chemical makeup tank and pump are included in the boundary to provide makeup for system leakage

Personnel Hatch Area
PID-1-HW-LR20056:

The personnel hatch area heating system boundary begins with two pumps in parallel combining in a common line supplying heated water one unit heater in the personnel hatch area, two unit heaters in the Emergency Feedwater Pump House and one unit heater in the pipe tunnel. The four return pipes join in a common line to the auxiliary steam heat exchanger and return to the common pump suction via an air separator to complete the loop. An expansion tank is included in the boundary and supplies a small service air overpressure. A chemical makeup tank and pump are included in the boundary to provide makeup for system leakage.

Circulating and Service Water Pump Houses
PID-1-HW-LR20052:

The Circulating and Service water Pump House heating system boundary is limited in scope to the five unit heaters and supply and return lines to the point at which they leave the safety related Service Water Pump House and enter the NNS Circulating Water Pump House.

Interfacing Systems

Not included in the Hot Water Heating System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Auxiliary Steam System
- Auxiliary Steam Heating System
- Instrument Air System
- Primary Auxiliary Building Air Handling System
- Waste Processing Liquid Drains System

System Intended Functions

This system has components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10CFR 54.4(a)(2)

UFSAR References

- Section 9.4

License Renewal Drawings

- PID-1-HW-LR20051
- PID-1-HW-LR20052
- PID-1-HW-LR20053
- PID-1-HW-LR20056
- PID-1-MAH-LR20507

Table 2.3.3-19 Hot Water Heating System Components Subject to Age Management Review

Component Type	**Intended Function**
Bolting	Leakage Boundary (Spatial)
Filter Housing	Leakage Boundary (Spatial)
Heat Exchanger Components	Leakage Boundary (Spatial)
Heater Coil	Leakage Boundary (Spatial)
Instrumentation Element	Leakage Boundary (Spatial)
Piping and Fittings	Leakage Boundary (Spatial)
Piping Element	Leakage Boundary (Spatial)
Pump Casing	Leakage Boundary (Spatial)
Tank	Leakage Boundary (Spatial)
Thermowell	Leakage Boundary (Spatial)
Valve Body	Leakage Boundary (Spatial)

The aging management review results for these components are provided in Table 3.3.2-19, Summary of Aging Management Evaluation - Hot Water Heating System.

2.3.3.20 Instrument Air System

System Description

The plant compressed air function is provided by the Service Air and the Instrument Air Systems. The components from the Service Air System have been incorporated with the Instrument Air System, and the Containment Compressed Air System was evaluated with the Instrument Air System components.

The Compressed Air System consists of two subsystems: Plant Compressed Air System and the Containment Compressed Air System. Each subsystem employs redundant, oil-free compressors with associated filters, after coolers, moisture separators, air dryers, receivers and operating controls. The demands on each subsystem are divided into two separate groups:

- Pneumatic instrument and control demands which require clean dry air
- Station Service Air demands which receive undried air.

Instrument and control air distribution ring headers in the Turbine Building and branch headers to other areas are supplied with dried air from two redundant Instrument Air headers. The supply lines to each Instrument Air ring header are provided with an isolation valve and a check valve. In this manner, failure of a single Instrument Air header will not eliminate the air supply, and should prevent unnecessary plant transients due to accidents or maintenance of the Instrument Air System.

The pneumatic devices of various systems are divided into two categories as follows:

- Critical pneumatic devices which would directly or indirectly cause a turbine trip, reactor trip, containment isolation or equipment damage are individually fed from both Instrument Air loops (A and B) through separate check valves.
- For pneumatic devices in systems where dual paths are available (e.g., backup valves in parallel or alternate paths), one set of devices is fed from loop A, and the other set from loop B.

Pneumatic devices in safety class systems are designed to fail in the safest position upon loss of air. However, in a few instances it is desirable to maintain pneumatic control for modulating valves or time is available for operator action. In these instances, high-pressure gas bottles are provided for backup to the Compressed Air System or the equipment has provisions for manual operation.

The following devices are supplied with backup air:

- Emergency Feedwater Pump Turbine Steam Supply Valves
- Atmospheric Steam Dump Valves
- Primary Component Cooling Water Temperature Control Valves
- Primary Component Cooling Water Temperature Control Bypass Valves

The plant compressed air subsystem consists of three compressors, intake filters, after cooler / moisture separators, four air receivers, two Instrument Air dryers, associated instruments/controls, piping and valves. The above equipment is located in the south end of the Turbine Building.

Two compressors are of the air-cooled, rotary screw oil-free type. Each compressor is furnished with an air filter (dry type) at its intake and an after cooler/moisture separator on its discharge side. The compressors are piped in parallel, discharging into two air receivers. Each receiver outlet branches into two discharge lines. One line from each receiver is connected to a common header supplying Service Air to the entire unit. The other discharge line is connected to its own air drying system, which supplies one of the two redundant Instrument Air headers.

To insure a continuous supply of air for the dryers that supply the instruments and controls, air pressure is monitored. Low pressure isolates each receiver from the other and the Service Air header, thus preventing the Service Air System from bleeding down the Instrument Air supply, and increasing the independence of the two Instrument Air loops. These two rotary screw plant air compressors are connected to the emergency diesel-generator buses, making them available following a loss of offsite power.

The third compressor is also an air cooled, rotary screw oil-free type. It is furnished with an inlet air filter, an integral air-cooled intercooler and after cooler with moisture separators and a self-contained lube oil subsystem. The compressor is aligned to discharge into two auxiliary air receivers and ultimately connects into the air compressor piping downstream of the main air receivers. This air compressor is powered from a non-safety related 480V bus which is not connected to the Emergency Diesel Generators. This compressor is not, therefore, available following a loss of offsite power.

All components such as compressors, receivers, filters and air dryers are piped and valved so they may be serviced or removed from operation without interrupting the normal air supply.

Containment Compressed Air Subsystem

This subsystem is the source of compressed air for all the pneumatic instruments, controls and general service requirements in the Containment Building. The subsystem consists of two packaged compressor units (including intake filter, after cooler/moisture separator, receiver), two Instrument Air dryers, instrument/controls, piping and valves, all located in the Containment Building. Each compressor unit discharges air to an independent air dryer. From the dryer it is piped to air ring headers, which supply dry air to each pneumatic instrument or control. Shut-off and check valves are installed in each supply line to the ring headers for isolation. The branch line from a ring header to each pneumatic device includes a valve for isolation. All components are piped and valved so they may be serviced or removed from operation without interrupting the air supply.

The Containment Compressed Air System is powered from nonsafety-related motor control centers. The containment compressors are connected to the emergency diesel generator buses, making them available following a loss of offsite power.

Cooling water to the containment air compressors is supplied by the Primary Component Cooling Water (CC) System.

In-Scope Boundary Description

Service Air
PID-1-SA-LR20650:

The Service Air portion of the boundary begins with the two Service Air compressors 1-SA-SKD-137A and 1-SA-SKD-137B including the contained air and oil hydraulic piping. The boundary continues with the discharge piping of the two compressors which join the common inlet header for the two service air receiver tanks.

A third air compressor 1-SA-SKD-137C is included in the boundary only to the extent that internal piping is pressurized up to and including the check valve at the inlet to the after-cooler, the after-cooler, the moisture separator, the piping between the two and the drain line piping equipment. This compressor is not in scope per criterion (a)(3) Appendix "R".

The boundary includes each of the four air receiver tanks, instrumentation piping, two relief valves, automatic drain piping with drain trap and connecting piping. The outlet lines of receivers "A" and "D" combine and divide to lines supplying the Service Air system and the loop "A" Instrument Air header. The Service Air supply ends at automatic isolation valve 1-SA-V-92. The remaining two receivers are connected similarly. The outlet lines of receivers "B" and "C" combine and divide to lines supplying the Service Air system and the loop "B" Instrument Air header. The Service Air supply ends at automatic isolation valve 1-SA-V-93.

PID-1-SA-LR20652:

Included in boundary is the Service Air supply to containment. It is bounded in the West Main Steam and Feedwater Pipe Chase at two pipe anchors and continues through a containment isolation valve, the containment penetration and to a pipe anchor downstream of the containment isolation valve.

Instrument Air Dryers and Headers
PID-1-IA-LR20637:

Each of the two Instrument Air loops includes a dual vessel dryer skid including pre-filter, purge control valves, connecting piping, instrumentation and a post filter. The outlets of the air dryers supply air to the Condensate Polishing system with the boundary ending at a procedurally isolable valve. Each Instrument Air dryer outlet continues and divides into three supplies and one normally open cross connect. Supplies to procedurally isolable Turbine Building loops end at the associated isolation valve.

Turbine Building:
PID-1-IA-LR20638:

Turbine building loop "A" includes supplies to the East and West Main Steam and Feedwater Pipe Chases. A supply to the water treatment room ends with a normally closed isolation valve.

PID-1-IA-LR20639:

Turbine building loop "B" includes supplies to the East and West Main Steam and Feedwater Pipe Chases and the Generator Stator Cooling System. A supply to the water treatment room is included, continuing to and ending at a procedurally isolable valve.

PID-1-GSC-LR20108:

The boundary includes the isolation valve for the Generator Stator Cooling tank.

PID-1-FP-LR20272, PID-1-FP-LR20273:

The boundary includes the Instrument Air supply to the Fire Protection preaction valves for the Fire Protection System and the component details.

East Main Steam and Feed Water Pipe Chase
PID-1-IA-LR20644, PID-1-IA-LR20647:

Instrument Air loop "A" boundary piping enters the East Main Steam and Feedwater Pipe Chase and divides into three supplies. The Instrument Air header supplies equipment located in the emergency feedwater pump building and the Main Steam and Feedwater pipe chase. Instrument Air is also supplied to an accumulator for 1-MS-V-395. Piping to the Hydrogen recombiner room includes a normally closed isolation valve.

Instrument Air loop "B" boundary piping enters the East Main Steam and Feedwater Chase and divides into three supplies. Piping to the Circulating Water Pump House ending at a procedurally isolable valve. Piping to the hydrogen recombiner room ends at a normally closed isolation valve. Note that the 1-MS-PV-3003 and 1-MS-PV-3002 / 1-MS-V394 boundaries include the Nitrogen backup sources.

West Main Steam and Feed Water Pipe Chase
PID-1-IA-LR20638, PID-1-IA-LR20639, PID-1-IA-LR20645, PID-1-IA-LR20647:

Instrument Air loop "A" boundary piping enters the West Main Steam and Feedwater Chase and supplies the Control Building, Primary Auxiliary Building, West Pipe Chase, alternate containment supply, Radiologically Controlled Area tunnel, and Residual Heat Removal Equipment Vault 1 continuing to and ending at a procedurally isolable valve.

Instrument Air loop "B" boundary piping enters the West Main Steam and Feedwater Chase and supplies the Control Building, Primary Auxiliary Building, West Pipe Chase, alternate containment supply and Residual Heat Removal vault 2. Note that the 1-MS-PV-3004 and 1-MS-PV-3001 / 1-MS-V393 boundaries include the Nitrogen backup sources.

Control Building
PID-1-IA-LR20645, PID-1-IA-LR20646:

Instrument Air loops "A" and "B" boundary piping enter the Control Building and supply the air header to the Diesel Generator Building continuing to and ending at procedurally isolable valves.

Primary Auxiliary Building, Fuel Storage Building, Cooling Tower, Containment Enclosure Ventilation Area and Waste Processing
PID-1-IA-LR20640, PID-1-IA-LR20641, PID-1-IA-LR20642, PID-1-IA-LR20645, PID-1-IA-LR20647, PID-1-CC-LR20205, PID-1-CC-LR20211:

Instrument Air loops "A" and "B" boundary piping enter the Primary Auxiliary Building and continue to the Fuel Storage Building, Cooling Tower (loop "B" only) and Waste Process Building (loop "A" only). The loop "A" enters the

Waste Process Building continuing to and ending at a procedurally isolable valve. The loop supplies to Containment Enclosure Ventilation Area end at procedurally isolable valves.

Instrument Air loop "A" supplies Primary Component Cooling Water valves 1-CC-TV-2271-1 and -2 which includes nitrogen backup. Instrument air loop "B" supplies primary component cooling water valves 1-CC-TV-2171-1 and -2 which includes nitrogen backup.

Containment Instrument Air
PID-1-IA-LR20643, PID-1-IA-LR20645:

The boundary begins with the two Instrument Air compressor skids including the contained air and drain piping. The boundary continues with the discharge piping of the two compressors which supply their integral air receivers. The outlet of each skid continues to a loop related air dryer and to a loop cross connect and two cross train supply lines.

Each loop lists individual components supplied that include pressure retaining components and piping to the first isolation valve, as applicable. A Containment Instrument Air backup supply is included in the boundary that connects to both in-containment loops "A" and "B".

PID-1-CC-LR20205, PID-1-CC-LR20211:

The boundary consists of components which are the air supply to valves 1-CC-TV-2171-1, 1-CC-TV-2171-2, 1-CC-TV-2272-1, and 1-CC-TV-2271-2.

PID-1-MS-LR-20580, PID-1-MS-LR20581:

The boundary consists of components which are the air supply to valves 1-MS-PV-3001, 1-MS-PV-3002, 1-MS-PV-3003, and 1-MS-PV-3004.

Interfacing Systems

Not included in the Instrument Air System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Fire Protection System
- Generator Stator Coolant System
- Main Steam System
- Primary Component Cooling Water System
- Waste Processing Liquid Drains System

System Intended Functions

Provide nitrogen as backup compressed air for critical modulating valves.	10CFR 54.4(a)(1)
Provide safe shutdown control and indication (Post Accident Monitoring).	10 CFR 54.4(a)(1)
Provide containment isolation function.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Environmental Qualification (EQ).	10CFR 54.4(a)(3)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Station Blackout (SBO).	10CFR 54.4(a)(3)

UFSAR References

- Section 9.3.1
- Table 7.5-1
- Table 6.2-83

License Renewal Drawings

- PID-1-CC-LR20205
- PID-1-CC-LR20211
- PID-1-FP-LR20272
- PID-1-FP-LR20273
- PID-1-GSC-LR20108
- PID-1-IA-LR20637
- PID-1-IA-LR20638

- PID-1-IA-LR20639
- PID-1-IA-LR20640
- PID-1-IA-LR20641
- PID-1-IA-LR20642
- PID-1-IA-LR20643
- PID-1-IA-LR20644
- PID-1-IA-LR20645
- PID-1-IA-LR20646
- PID-1-IA-LR20647
- PID-1-MS-LR20580
- PID-1-MS-LR20581
- PID-1-SA-LR20650
- PID-1-SA-LR20652

Table 2.3.3-20 Instrument Air System
Components Subject to Age Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Dryer Housing	Pressure Boundary
Instrumentation Element	Pressure Boundary
Filter Element	Filter
Filter Housing	Pressure Boundary
Flexible Hose	Leakage Boundary (Spatial) Pressure Boundary
Heat Exchanger Components	Pressure Boundary
Orifice	Pressure Boundary Throttle
Piping and Fittings	Pressure Boundary Structural Integrity (Attached)
Pump Casing	Pressure Boundary
Tank	Pressure Boundary
Thermowell	Pressure Boundary
Trap	Pressure Boundary
Valve Body	Pressure Boundary Structural Integrity (Attached)

The aging management review results for these components are provided in Table 3.3.2-20, Summary of Aging Management Evaluation – Instrument Air System.

2.3.3.21 Leak Detection System

System Description

The Leak Detection System components monitor indications of leakage inside the Containment Building by the use of pressure, temperature, and level instruments. The system has leakage detection piping and valves, and Fuel Transfer Tube blind flange, Personnel Hatch, Emergency Hatch, and Containment pressure instrumentation at penetration X-71 and X-74.

In-Scope Boundary Description

PID-1-LD-20864:

The License Renewal scoping boundary for the Leak Detection (LD) System consists of criterion (a)(1) components which are the pressure boundary path associated with the personnel hatch, equipment hatch, fuel transfer tube, and primary containment boundary for penetrations X-71 and X-74. The criterion (a)(2) boundary consists of the non safety related components directly attached to safety related components.

Interfacing Systems

Leak Detection System does not interfere with any license renewal systems.

System Intended Functions

Provide containment isolation function.	10CFR 54.4(a)(1)
The Leak Detection System has components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)

UFSAR References

- Table 6.2-83

License Renewal Drawings

- PID-1-LD-LR20864

Table 2.3.3-21 Leak Detection System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Piping and Fittings	Structural Integrity (Attached) Pressure Boundary
Valve Body	Structural Integrity (Attached) Pressure Boundary

The aging management review results for these components are provided in Table 3.3.2-21, Summary of Aging Management Evaluation - Leak Detection System.

2.3.3.22 Mechanical Seal Supply System

System Description

The Mechanical Seal Supply System is designed to supply flushing water to the mechanical seals of the non-nuclear safety class pumps of the plant. The mechanical seals are provided on these pumps so that no leakage of the process fluid occurs past the shaft into the environment. For their proper functioning, the seal faces have to be kept flushed and under a minimum pressure of 15 psi higher than the process fluid pressure on the suction side of the pump. This ensures the mating of the seal faces without any particulates entrapped between them and not allowing any process fluid to enter the seal cavity (or the stuffing box).

In-Scope Boundary Description

Mechanical Seal Supply System license renewal boundary applies to both the once through demineralized water design system and the closed loop pumped design.

PID-1-DM-LR20352, PID-1-DM-LR20353, PID-1-WLD-LR20219:
The once through boundary begins at the demineralized water supply for the spent fuel skimmer pump seal flush through a pressure control valve and flow indicator to the double mechanical seal. The returning seal flush water boundary includes a flow indicator, control solenoid valve and piping of the flush water ending at a trench drain.

PID-1-DM-LR20350, PID-1-DM-LR20354, PID-1-WLD-LR20222:
The recirculation design system begins at the demineralized water supply for the seal supply tank. The tank serves as a source of makeup for the system and as a head tank. The tank has an un-valved overflow to a local drain. The boundary continues at the suction of, and through, the seal supply pump and continues at the discharge where the line divides to a 140 psig recirculation pressure control line and then continues and divides to supply the seals for the two letdown degasifier pumps. The boundary continues at the outlet of the seals where the piping joins to form a single line continuing to the heat exchanger cooled by Primary Component Cooling Water System and returns to the pump suctions to complete the boundary loop.

Interfacing Systems

Not included in the Mechanical Seal Supply System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems.

- Demineralized Water System
- Primary Component Cooling Water System
- Waste Processing Liquid Drains System

System Intended Functions

This system contains components which perform function credited for Non-Safety Affecting Safety (NSAS).	10CFR 54.4(a)(2)

UFSAR References

- None

License Renewal Drawings

- PID-1-DM-LR20350
- PID-1-DM-LR20352
- PID-1-DM-LR20353
- PID-1-DM-LR20354
- PID-1-WLD-LR20219
- PID-1-WLD-LR20222

Table 2.3.3-22 Mechanical Seal Supply System Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage Boundary (Spatial)
Heat Exchanger Components	Leakage Boundary (Spatial)
Instrumentation Element	Leakage Boundary (Spatial)
Piping and Fittings	Leakage Boundary (Spatial)
Pump Casing	Leakage Boundary (Spatial)
Tank	Leakage Boundary (Spatial)
Valve Body	Leakage Boundary (Spatial)

The aging management review results for these components are provided in Table 3.3.2-22, Summary of Aging Management Evaluation - Mechanical Seal Supply System.

2.3.3.23 Miscellaneous Equipment

System Description

Miscellaneous Equipment contains the hydraulic piping and components that operates the personnel hatch doors for entry into containment. The hydraulic network equalizes air lock pressure, rotates the locking ring to the unlock position and opens the outer door. On close demand the network closes the door, closes the equalizing valve, rotates and locks the locking ring. Similarly, a personnel air lock hydraulic reservoir inside the containment operates with a network of control valves, piping, interlock controls and actuating pistons. The hydraulic network equalizes air lock pressure, rotates the locking ring to the unlock position and opens the inner door. On close demand the network closes the door, closes the equalizing valve then rotates and locks the locking ring.

In-Scope Boundary Description

Personnel Air Lock
PID-1-MM-LR20945:

The in scope portion of the Miscellaneous Equipment includes the personnel air lock hydraulic equipment, and the liquid filled piping and equipment required to operate the containment hatch doors.

Interfacing Systems

The Miscellaneous Equipment System does not interface with any license renewal systems.

System Intended Functions

Provide Main Control Board status monitoring lights and annunciators.	10CFR 54.4(a)(1)
Provide protection and process control for Westinghouse 7300 NSSS and BOP cabinets.	10CFR 54.4(a)(1)
Provide safe shutdown control and indication (Post Accident Monitoring)	10CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)

This system contains components which perform functions credited for Anticipated Transients Without Scram (ATWS).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Environmental Qualification (EQ).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Station Blackout (SBO).	10 CFR 54.4(a)(3)

UFSAR References

- Table 7.4-1
- Table 7.5-1

License Renewal Drawings

- PID-1-MM-LR20945

Table 2.3.3-23 Miscellaneous Equipment Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage Boundary (Spatial)
Flexible Hose	Leakage Boundary (Spatial)
Piping and Fittings	Leakage Boundary (Spatial)
Pump Casing	Leakage Boundary (Spatial)
Tank	Leakage Boundary (Spatial)
Valve Body	Leakage Boundary (Spatial)

The aging management review results for these components are provided in Table 3.3.2-23, Summary of Aging Management Evaluation - Miscellaneous Equipment.

2.3.3.24 Nitrogen Gas System

System Description

The function of the Nitrogen Gas System is to supply nitrogen at controlled pressures to various locations in the unit for:

- Pressurizing the safety injection accumulators
- Inerting and purging systems
- Use as a cover gas
- Used in preventing corrosion during wet and dry lay-up of components.

The Nitrogen Gas System supplies the following major Systems/Components:

Safety Injection accumulators, Waste Processing Liquid Drains System's reactor coolant drain tank, Reactor Coolant System's primary relief tank, Waste Gas System, Vent Gas System, Release Recovery System Tanks, Chemical and Volume Control System's volume control tank and letdown degasifier, Resin Sluice System Tanks, Reactor Makeup Water Tank, Main Steam System, Boron Recovery System's primary drain tanks and degasifier, and Steam Generator Blowdown System.

In-Scope Boundary Description

Volume Control Tank and Letdown Degasifier
PID-1-NG-LR20135, PID-1-RMW-LR20360, PID-1-VSL-LR20775:

The Nitrogen Gas system boundary associated with the volume control tank begins with a support anchor on the Nitrogen Gas supply to the Volume Control tank and continues to the tank interface. The Nitrogen Gas boundary associated with the letdown degasifier begins at the first normally closed valve and continues to the tank interface. The leakage boundary for the piping from the Reactor Makeup Water System storage tank (1-RMW-TK-12), and Vent Gas System tank (1-VG-TK-108) goes to the first check valve. The boundary also includes the valve stem leak-off line from the letdown degassifier nitrogen control valve to the Valve Stem Leak-off System.

Safety Injection Accumulators
PID-1-SI-LR20450, PID-1-NG-LR20136:

The Nitrogen Gas supply to the Safety Injection accumulators begins at a support outside the containment. The boundary continues through an outside containment isolation and an inside isolation. The boundary ends at a support anchor and continues again with each of the four supply lines at a support anchor. The boundary continues through the control valves and a check to the individual accumulators where the boundary ends.

Containment Nitrogen Gas Supplied Equipment
PID-1-NG-LR20136, PID-1-MS-LR20580, PID-1-MS-LR20581, PID-1-RC-LR20841, PID-1-RC-LR20842, PID-1-RC-LR20843, PID-1-RC-LR20844, PID-1-RC-LR20846, 1PID-1-RMW-LR20360, PID-1-WLD-LR20218:

The Nitrogen Gas supply to the Steam Generator Blowdown, Main Steam, Reactor Coolant drain tank, and the pressure relief tank begins at an anchor outside the containment. The boundary continues through an outside containment isolation and an inside isolation. The boundary continues with the piping to the four Steam Generator Blowdown lines and two of the four Main Steam headers where this portion of the boundary ends.

The supply to the remaining two Steam Generators, Reactor Coolant drain tank, and the primary relief tank begin at an anchor on the Main Steam supply and end at the Main Steam header. The supply for the Reactor Coolant Drain Tank begins at the last check valve in line and continues to the vent header for the Reactor Coolant drain tank. The supply for the pressure relief tank begins at the last check valve in line and continues to the pressure relief tank where the boundary ends.

Relief Recovery Tank PID-1-RR-LR200061:

The supply for the Relief Recovery tank begins at the last check valve ending at the relief header for the tank.

Interfacing Systems

Not included in the Nitrogen Gas System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems.

- Chemical and Volume Control System
- Main Steam System
- Reactor Coolant System
- Reactor Makeup Water System
- Relief Recovery System
- Safety Injection System
- Steam Generator Blowdown System

- Vent Gas System
- Valve Stem Leak-off System
- Waste Gas System

System Intended Functions

Provides Safety Injection accumulator overpressure.	10 CFR 54.4(a)(1)
This system has components that blanket and purge miscellaneous equipment.	10 CFR 54.4(a)(1)
Provide containment isolation function.	10 CFR 54.4(a)(1)
Provide safe shutdown control and indication (Post Accident Monitoring).	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Environmental Qualification (EQ).	10 CFR 54.4(a)(3)

UFSAR References

- Section 9.3.4
- Table 6.2-83

License Renewal Drawings

- PID-1-NG-LR20135
- PID-1-NG-LR20136
- PID-1-MS-LR20580
- PID-1-MS-LR20581
- PID-1-RC-LR20841
- PID-1-RC-LR20842
- PID-1-RC-LR20843

- PID-1-RC-LR20844
- PID-1-RC-LR20846
- PID-1-RMW-LR20360
- PID-1-RR-LR20061
- PID-1-SI-LR20450
- PID-1-VSL-LR20775
- PID-1-WLD-LR20218

Table 2.3.3-24 Nitrogen Gas System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Flexible Hose	Leakage Boundary (Spatial)
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary Structural Integrity (Attached)
Valve Body	Leakage Boundary (Spatial) Pressure Boundary Structural Integrity (Attached)

The aging management review results for these components are provided in Table 3.3.2-24, Summary of Aging Management Evaluation - Nitrogen Gas System.

2.3.3.25 Oil Collection For Reactor Coolant Pumps System

System Description

The seismically designed lube oil collection system for the four Reactor Coolant pumps has been designed with two collection tanks, with two pumps draining to each tank. Each of the two tanks has been sized to contain 125 percent of the oil inventory of one pump. A seismically designed dike has been provided around each tank. Each tank in combination with its associated dike has been sized to contain the entire inventory of two pumps. The tanks and the dikes have been located so that the excess oil does not present a fire hazard to any safety-related equipment. Additionally, there is no ignition source near the diked area.

In-Scope Boundary Description

PID-1-OC-LR20180:

The license renewal boundary for Oil Collection for Reactor Coolant Pumps (OC) System begins with oil collection tanks enclosures and drip pans on each of the four Reactor Coolant pumps. The boundary includes the flex hoses and piping to the two oil collection tanks. Each tank services two Reactor Coolant pumps. The tank boundary includes the tank, drain line, valve, and the vent line including the flame arrestor.

Interfacing Systems

The Oil Collection for Reactor Coolant Pumps System does not interface with any license renewal systems.

System Intended Functions

This system contains components which perform functions credited for Fire Protection (FP).	10CFR 54.4(a)(3)

UFSAR References

- Section 9.5.1.3

License Renewal Drawings

- PID-1-OC-LR20180.

Table 2.3.3-25 Oil Collection for Reactor Coolant Pumps System Components Subject to Age Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Drip Pan	Pressure Boundary
Flame Arrester	Pressure Boundary
Flexible Hose	Pressure Boundary
Piping and Fittings	Pressure Boundary
Tank	Pressure Boundary
Valve Body	Pressure Boundary

The aging management review results for these components are provided in Table 3.3.2-25, Summary of Aging Management Evaluation - Oil Collection for Reactor Coolant Pumps System.

2.3.3.26 Plant Floor Drain System

System Description

The floor drains in this system are located outside any area with a potential for contamination. The Plant Floor Drain system is located in those areas where automatic sprinkler and spray systems are installed. These drains are sized to pass the expected flows resulting from automatic system actuation, as well as that produced by manual hose application if employed. In areas where hand hose lines are the only water sources utilized to combat a fire, drains are provided if accumulation of fire fighting water could result in unacceptable damage to safety-related equipment in the area. In such areas, the operator can use the hose to control the quantity of drain water to avoid unacceptable damage to equipment.

Drainage within the Diesel Generator Building is designed to prevent the spread of fire from one area to another. Other areas with combustible liquids have normally closed shut-off valves in the drain lines or drain directly to the oil/water separation vault.

The electrical tunnels contain no sources of flood water other than the Fire Protection System piping. The Fire Protection System piping are zoned pre-action dry pipe systems with the zone valves located external to the tunnel areas. The individual Fire Protection System zones will be actuated by ionization fire detectors. Fire detectors are provided in the areas zoned to provide for local indication and for an audible and visual alarm in the control room and the guardhouse. Water from the fire protection system will be drained from the tunnel zones to a sump external to the electrical tunnel areas (located in Emergency Feed Water Pump House). Redundant pumps have been installed in the sump to pump the water collected from the tunnel to the Storm Drain System (not in scope of license renewal).

Failure of a Circulating Water System expansion joint in the Turbine Building will flood the ground floor pit east of the condensers in the Turbine Building. Assuming the worst possible failure to be a 2" gap all around, the pit would fill up in about 3 minutes, unless prompt action by the operator is taken. There are two level switches (1-DR-LSH-5984 and 5985) in the condenser pit that provide sequential alarms in the control room to warn the operator of the flooded condition. No loss of offsite power is induced by a failure of this equipment provided operator action is taken within 22.2 minutes to mitigate the consequences of the flood.

In-Scope Boundary Description

Control Building
PID-1-CBA-LR20303:

The control building air handling portion of the Plant Floor Drain System boundary begins with a sump pump installed in the yard control room air intake structure and includes the discharge piping and check valve ending as the line continues to a local catch basin.

West Main Steam and Feedwater Pipe Chase
PID-1-DF-LR20200, PID-1-DR-LR20633, PID-1-SD-LR20402:

The West Main Steam and Feedwater floor drain portion of the system begins with the discharge piping of the two west pipe chase pumps as they exit the sump. The pipes continue through two check valves, isolation valves and connected drain valves to join in a single line continuing to the Emergency Feedwater Pump House roof where the boundary joins the roof drain system. The boundary ends as the piping exits the building and enters the storm drain system.

Emergency Feedwater Pump House
PID-1-DF-LR20194, PID-1-DF-LR20195:

The Emergency Feedwater Pump House floor drain portion of the system begins on elevation 27' with seven drains, two cleanouts and a connection from main steam drains. The piping joins to form a single line and continues, with three yard cleanout connections, to oil/water separator vault number one. The boundary continues through an isolation valve and the oil/water separator ending at the water holding tank.

East Main Steam and Feedwater Pipe Chase
PID-1-DF-LR20200, PID-1-SD-LR20402:

The East Main Steam and Feedwater Pipe Chase portion of the system begins with the discharge piping of the two east pipe chase pumps as they exit the sump. The pipes continue through two check valves, isolation valves and connected drain valves to join in a single line continuing to the yard storm drains where the boundary ends.

Intake and Discharge Transition Structures
PID-1-DF-LR20200:

The Intake and Discharge Transition Structure portions are similar, each beginning with the piping as it exits the sump and includes a check and isolation valve and piping ending as it exits the building's exterior wall.

Electrical Tunnels
PID-1-DF-LR20200, PID-1-SD-LR20402:

The boundary for the electrical tunnels begins with the floor drain hubs located at elevations 0', (-)20' and (-)26'. The drains join in four lines and empty into the electrical tunnel sump. The boundary continues with the two sump pumps and discharge pipes through two check valves, isolation valves and connected drain valves to join in a single line continuing through the Emergency Feedwater Pump House and continuing to the yard storm boundary where the boundary ends.

Diesel Generator Building
PID-1-DF-LR20196:

The Diesel Generator Building portion of the boundary includes two floor drains in the fuel oil day room and one outside the room at elevation 51' 6" that join to form two lines with check valves each ending in the associated train's elevation (-)16' floor trench. Each train elevation 21' 6" trench also drains via associated piping and check valve to the train's elevation (-) 16' floor trench. Each train sump pump and suction pipe from the exit of the sump is included in the boundary. The boundary continues with the sump pumps discharge lines with branches to instrumentation, vent, relief and emergency discharge connections. The boundary ends as the pipes leave the building and enter the yard.

Interfacing Systems

Not included in the Plant Floor Drain System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Main Steam System
- Feedwater System
- Potable Water System
- Roof Drain System
- Demineralized Water
- Dewatering System

System Intended Functions

Provide safe shutdown control and indication (Post Accident Monitoring).	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)

UFSAR References

- Appendix A, Section F.3, Page 41

License Renewal Drawings

- PID-1-CBA-LR20303
- PID-1-DF-LR20194
- PID-1-DF-LR20195
- PID-1-DF-LR20196
- PID-1-DF-LR20200
- PID-1-DR-LR20633
- PID-1-SD-LR20402

Table 2.3.3-26 Plant Floor Drain System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary
Pump Casing	Leakage Boundary (Spatial) Pressure Boundary
Tank	Leakage Boundary (Spatial)
Valve Body	Leakage Boundary (Spatial) Pressure Boundary

The aging management review results for these components are provided in Table 3.3.2-26, Summary of Aging Management Evaluation - Plant Floor Drain System.

2.3.3.27 Potable Water System

System Description

Potable water received from the town of Seabrook water main is metered at the Fire Pump House then piped to the fire water storage tanks and the plant distribution system. The fire protection tank fill line is equipped with a backflow preventer. Chlorine injection is provided for control of biological growths in the fire protection tanks and associated piping. The Water Treatment Makeup System uses the undedicated 200,000-gallon capacity of each fire water storage tank as its source of makeup water. The system is not safety related and is not relied on to perform a safety related function.

The distribution system consists of branch mains to the various personnel areas, Service Water Cooling Tower fill, the Demineralized Water Makeup System and the fire water storage tank fills. Branch headers and branches lead to the various fixtures. Drinking fountains, eye and face wash fountains, lavatories, urinals, water closets, showers, safety showers, water coolers, water heaters, and special fixtures are provided according to occupancy. Connections are provided to kitchen, laboratory and similar equipment requiring potable water. The branch main to personnel areas is equipped with a backflow preventer and hose bib vacuum breakers to prevent backflow or siphoning.

In-Scope Boundary Description

Control Building Air Handling
PID-1-CBA-LR20303:

Potable Water supplies two Control Building Air Handling System loop seal fill supply lines

Control and Diesel Generator Building
PID-1-PW-LR20916:

The Control and Diesel Generator Building portion of the Potable Water system boundary begins as the header enters the Diesel Generator Building and branches to supply three hose connections, and two Control Building Air Handling System loop seal fill supply lines. The boundary continues as the header enters the Control Building and branches to supply two hose connections, two humidifiers, a vent, shock arrestor, water heater, refrigerator, water purifier, the men's and women's restrooms and the kitchen sink.

Radiologically Controlled Area Tunnel, Primary Auxiliary Building, 21 Foot Control Building
PID-1-PW LR20919: PID-1-LR20918: PID-1-DF-LR20200

The Radiologically Controlled Area tunnel portion of the Potable Water System boundary begins as the header enters the tunnel from the Administration Building and branches to seven hose connections and an unused connection to a sanitary facility. The boundary continues with piping to the instrument and controls hot shop, through the Radiologically Controlled Area check point and to a hose connection in the personnel hatch area. Another branch connection from the tunnel header supplies a hose connection in the Emergency Feedwater Pump House. Another branch from the tunnel header enters the Control Building and divides to include eyewash station supplies in train "A" and "B" Essential Switch Gear Rooms and two shock arrestors and hose connections. A Potable Water hose connection in the Service Water Pump House and a flush supply to the Electrical Tunnels sump are included in the boundary.

Interfacing Systems

Not included in the Potable Water System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Control Building Air Handling System
- Diesel Generator System
- Plant Floor Drain System

System Intended Functions

This system contains components that perform functions credited for Non-Safety Affecting Safety (NSAS).	10CFR 54.4(a)(2)

UFSAR References

- Section 9.2.4

License Renewal Drawings

- PID-1-CBA-LR20303
- PID-1-DF-LR20200
- PID-1-PW-LR20916
- PID-1-PW-LR20918
- PID-1-PW-LR20919

Table 2.3.3-27 Potable Water System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage Boundary (Spatial)
Heater Housing	Leakage Boundary (Spatial)
Piping and Fittings	Leakage Boundary (Spatial)
Tank	Leakage Boundary (Spatial)
Valve Body	Leakage Boundary (Spatial)

The aging management review results for these components are provided in Table 3.3.2-27, Summary of Aging Management Evaluation - Potable Water System.

2.3.3.28 Primary Auxiliary Building Air Handling System

System Description

The function of the normal Heating and Ventilating System for the Primary Auxiliary Building is to provide sufficient circulation of filtered outside air for removal of heat generated by lighting and equipment in the summer, and to offset building heat losses in the winter, in rooms and areas of the Primary Auxiliary Building. The Primary Auxiliary Building Ventilation and Heating System [Primary Auxiliary Building Air Handling (PAH)] System also supplies conditioned air to the Fuel Storage Building and makeup to the containment enclosure area. Under normal operating conditions, the charging pump rooms are exhausted through this heating and ventilating system.

The ventilation function is provided by the Primary Auxiliary Building Air Handling System. The heating function is provided by the Hot Water Heating System and is evaluated separately. The normal heating and ventilating system, equipment and ductwork is non-seismic Category I and has no safety classification, with the following exceptions: the ductwork passing through the containment enclosure providing conditioned air to the Fuel Storage Building, the containment enclosure makeup air and exhaust air isolation dampers, and the exhaust ductwork from the charging pump rooms are all seismic Category I, Safety Class 2. The Primary Component Cooling Water pump area and the boron injection equipment area are provided with a Safety Class 3, seismic Category I ventilation system for emergency use should the normal ventilation system not be available.

In-Scope Boundary Description

Primary Auxiliary Building Cleanup Filter
PID-1-MAH-LR20494:

The in-scope boundary consists of safety system related components which are the Primary Auxiliary Building Air Handling System tornado dampers. The boundary for the non-safety related components is the non safety related ductwork connected to the safety related tornado dampers and the air cleaning unit 1-PAH-F-16 housing.

Primary Auxiliary Building and Containment Enclosure Ventilation Area
PID-1-MAH-LR20495:

This consist of safety related components which are the Primary Auxiliary Building Air Handling System tornado dampers, and the components that comprise the safety related flow path to and from the Containment Enclosure Ventilation Area along with components that provide flow path associated with fans 1-PAH-FN-42A & B. The non-safety related boundary consists of the non safety related ductwork attached to the safety related ductwork. The criterion (a)(3) boundary consist of the Primary Auxiliary Building Air Handling System fire dampers and components that are also the same components that are included in the safety related boundary.

Primary Auxiliary Building Air Handling
PID-1-MAH-LR20496:

The boundary consist of criterion (a)(3) components which are the Primary Auxiliary Building Air Handling System fire dampers.

Chilled Water
PID-1-MAH-LR20507:

The chilled water portion of the Primary Auxiliary Building Air Handling System boundary begins with the interface to Hot Water Heating System and continues through the air separator and divides to supply the two suctions of the Primary Auxiliary Building Air Handling System chilled water pumps. The boundary continues through the two pumps combining in a single line and ending at the lines exit from the Primary Auxiliary Building to the Waste Process Building roof. The boundary continues as the return chilled water line enters from the roof into the Primary Auxiliary Building. The piping then continues to a temperature control valve and bypass line with a recirculation line to the inlet of the air separator. The boundary ends at the interface with the Hot Water Heating System.

Interfacing Systems

Not included in the Primary Auxiliary Building Air Handling System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Containment Enclosure Air Handling System
- Containment Online Purge System
- Hot Water Heating System
- Waste Processing Liquid Drains System

System Intended Functions

Isolate the Containment Enclosure Ventilation Area (CEVA), in the event of a loss of coolant accident, LOCA, or failure of the Primary Auxiliary Building supply/exhaust system.	10 CFR 54.4(a)(1)

Provide additional cooling to the Primary Component Cooling Water pump area to maintain area design temperature.	10 CFR 54.4(a)(1)
Provide safe shutdown control and indication (Post Accident Monitoring).	10 CFR 54.4(a)(1)
Provide pressure relief protection in the event of a tornado (Tornado Dampers).	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Environmental Qualification (EQ).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Station Blackout (SBO).	10 CFR 54.4(a)(3)

UFSAR References

- Section 9.4.3
- Section 3.3

License Renewal Drawings

- PID-1-MAH-LR20494
- PID-1-MAH-LR20495
- PID-1-MAH-LR20496
- PID-1-MAH-LR20507

Table 2.3.3-28 Primary Auxiliary Building Air Handling System Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Damper Housing	Fire Barrier Pressure Boundary
Ducting	Pressure Boundary Structural Integrity (Attached)
Ducting Closure Bolting	Pressure Boundary
Fan Housing	Pressure Boundary
Filter Housing	Leakage Boundary (Spatial) Structural Integrity (Attached)
Flexible Connector	Pressure Boundary
Piping and Fittings	Leakage Boundary (Spatial)
Pump Casing	Leakage Boundary (Spatial)
Valve Body	Leakage Boundary (Spatial)

The aging management review results for these components are provided in Table 3.3.2-28, Summary of Aging Management Evaluation - Primary Auxiliary Building Air Handling System.

2.3.3.29 Primary Component Cooling Water System

System Description

The Primary Component Cooling Water System supplies flow to the following safeguard components which are required for safe shutdown and/or to ameliorate the consequences of an accident:

- Containment Building Spray pumps
- Containment Building Spray heat exchangers
- Residual Heat Removal pumps
- Residual Heat Removal heat exchangers
- Safety Injection pumps
- Centrifugal charging pumps
- Containment enclosure coolers

The system serves as an intermediate fluid barrier between the Reactor Coolant and Service Water Systems assuring that leakage of radioactive fluid from the components being cooled is not released to the environment.

The Primary Component Cooling Water System consists of loops A and B which are two independent and redundant flow loops and a Reactor Coolant Pump Thermal Barrier loop. Loops A and B each supplies component cooling water to one of the redundant components performing engineered safeguard functions to the Reactor Coolant Pump Thermal Barrier loop, and to other non-safeguard loads.

A supply and return cross connect and a Primary Component Cooling Water head tank outlet line cross connect are included in the system design. Each cross connect consists of two isolation valves. These valves are locked closed when two independent Primary Component Cooling Water trains are required to be operable in accordance with plant Technical Specifications.

The Reactor Coolant Pump Thermal Barrier loop is designed to provide 100 percent of the cooling capacity required to cool the Reactor Coolant Pump Thermal Barrier cooling coils under all normal plant operating conditions. The Reactor Coolant Pump Thermal Barrier loop has been classified as nonessential, but it incorporates the following special design features to provide a high degree of reliability:

a. Primary Component Cooling Water loops A and B each provide cooling to the Reactor Coolant Pump Thermal Barrier loop.

b. Pipe supports and pressure-retaining system components are designed in accordance with ASME III Safety Class 3 and Seismic Category I requirements.

c. Flow instrumentation trains to the annunciator, pumps, pump drive motors, and associated controls are redundant, are qualified to 1E requirements, and are designed to operate with power from the Diesel Generators in the event of a loss of offsite power.

d. Instrument sensing lines are designed in accordance with the requirements of ISA Standard 67.02-1980.

Those portions of the Primary Component Cooling Water System which furnish cooling water to safeguards components are designated Safety Class 3, seismic Category I, and are located in seismic Category I structures. The cross connects are designated Safety Class 3, Seismic Category I and are located in Seismic Category I structure.

To provide increased reliability for cooling safety-related components, a cross connect from the Fire Protection and Demineralized Water Systems to the Primary Component Cooling Water System is included in the System design. This cross connect can be used to provide cooling water to the charging pump lube oil coolers or provide emergency makeup water to safety-related portions of the Primary Component Cooling Water system. This cross connect is backed up by a seismic Category I Service Water System and booster pump makeup source.

Those portions of the Primary Component cooling Water System which are non-seismic Category I portions of the system are isolated in the event of a leak. The isolation valves will close on a Primary Component Cooling Water Head Tank low level alarm. Thus, the system safety function is not compromised in the event of a leak in the non-safety portion of the system.

In-Scope Boundary Description

Primary Component Cooling Water (CC) System Loop A
PID-1-CC-LR20205, PID-1-CC-LR20206, PID-1-CC-LR20207, PID-1-CC-LR20208, PID-1-DM-LR20350, PID-1-FP-LR20268, PID-1-IA-LR20643:

The boundary piping for the Primary Component Cooling Loop A begins at the suction of the two Primary Component Cooling Water pumps and continues through pump discharge check valves and isolation valves to a common line. Flow is then directed to the Primary Component Cooling Water heat exchanger and bypass line. The boundary piping then divides into five branches. A flow nozzle is located in the discharge line before the second and third branches.

The first branch includes supply and return lines for the containment enclosure cooling coils, spent fuel heat exchanger, charging pump oil cooler, charging pump backup fire water cooling supply valve and piping, backup demineralized water supply valve and piping, outside backup cooling discharge valve and piping, and the post accident sample heat exchanger.

The second branch includes supply and return lines for the, letdown heat exchanger, seal water heat exchanger, four steam generator sample coolers, two pressurizer sample coolers, two Reactor Coolant System loop sample coolers, letdown degassifier trim cooler, degassifier hot well condenser and seal supply heat exchanger.

The third branch includes supply and return lines for the containment components isolated by "P" signal actuated supply and return valves. This includes the three containment structure cooling units, containment service air compressor, two Reactor Coolant pumps, Reactor Coolant drain tank heat exchanger, Containment Building Spray heat exchanger, Containment Building Spray pump seal cooler, Residual Heat Removal pump seal cooler, Residual Heat Removal heat exchanger and the Safety Injection pump seal cooler. The supply and return for thermal barrier heat exchanger are off this branch but have no automatic isolation.

The fourth branch includes supply and return lines for the system radiation monitoring unit.

The fifth branch includes supply and return lines for the cross train connect lines. Each branch return path ends in a common line, and then divides into two lines continuing to an isolation valve and to the respective component cooling pump suction. A head tank suction line connection and head tank is included in the boundary as is a normally isolated recirculation line to the head tank from the pump discharge line.

The Waste Processing Building has no safety related components or piping hence the supply piping boundary terminates on entry to the Waste Process Building and begins again as the return piping exits the Waste Process Building.

Primary Component Cooling Water Loop B
PID-1-CC-LR20211, PID-1-CC-LR20212, PID-1-CC-LR20213, PID-1-CC-LR20214, PID-1-CC-LR20215, PID-1-FP-LR20268, 1-PID-IA-LR20643:

The boundary piping for the Primary Component Cooling Water Loop B begins at the suction of the two Primary Component Cooling Water pumps and continues through pump discharge check and isolation valves to a common line. Flow is then directed to the Primary Component Cooling Water heat exchanger and bypass line. The boundary piping then divides into five branches. A flow nozzle is located in the discharge line before the second and third branches.

The first branch includes supply and return lines for the containment enclosure cooling coils, Spent Fuel Pool Cooling heat exchanger, charging pump oil cooler, charging pump backup fire water cooling supply valve and piping, backup demineralized water supply valve and piping and the outside backup cooling discharge valve and piping.

The second branch includes supply and return lines for the seal water heat exchanger, steam blowdown skid, flash steam condenser/cooler, blowdown flash steam condenser, flash tank bottoms cooler 88A, flash tank bottoms cooler 88B and the Boron Thermal Regeneration System Chiller.

The third branch includes supply and return lines for the positive displacement charging pump, containment building spray heat exchanger, containment building spray pump seal cooler, residual heat removal pump seal cooler, residual heat removal heat exchanger, safety Injection pump seal cooler and the thermal barrier heat exchanger. Containment components isolated by "P" signal actuated supply and return valves are the three containment structure cooling units, two Reactor Coolant pumps, containment Service Air compressor, excess letdown heat exchanger, pressurizer relief tank heat exchanger.

The fourth branch includes supply and return lines for the radiation monitoring unit.

The fifth branch includes supply and return lines for the cross connect lines.

Each branch return path combines in a common line, and then divides into two lines continuing to an isolation valve and to the respective component cooling pump suction. A head tank suction line connection and head tank is included in the boundary as is a normally isolated recirculation line to the head tank from the pump discharge line.

The Waste Processing Building has no safety related components or piping hence the supply piping boundary terminates on entry to the Waste Process Building and begins again as the return piping exits the Waste Process building.

Thermal Barrier Cooling Loop
PID-1-CC-LR20209:

Independent of loop A and B, the boundary piping for the Thermal Barrier Cooling Loop begins at the suction of the two thermal barrier pumps and continues through pump discharge check and isolation valves to a common line and normally isolated recirculation line. The boundary then continues to the two series thermal barrier heat exchangers. The boundary piping then continues to the inlet of the four Reactor Coolant Pump Thermal Barrier Coolers and continues at the cooler's outlet line and combine to form a single line returning to the head tank.

Primary Component Cooling Water Drains

PID-1-WLD-LR20219, PID-1-WLD-LR20220, PID-1-WLD-LR20222, PID-1-WLD-LR20223:

The boundary consists of non-safety related components which are the drain piping that interfaces with the Waste Processing Liquid Drains System.

Letdown Degassifier Mechanical Seal Supply Heat Exchanger PID-1-DM-LR20354:

The boundary consists of the non-safety related components which are the supply and return piping to Mechanical Seal Supply heat exchanger for the letdown degasifier recirculation pumps.

Interfacing Systems

Not included in the Primary Component Cooling Water System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Containment Air Handling System
- Containment Building Spray System
- Containment Enclosure Air Handling System
- Chemical and Volume Control System
- Demineralized Water System
- Instrument Air System
- Mechanical Seal Supply System
- Primary Auxiliary Building Air Handling System
- Radiation Monitoring System
- Reactor Coolant System

- Residual Heat Removal System
- Safety Injection System
- Sample System
- Service Air System (Included in Instrument Air System)
- Spent Fuel Pool Cooling System
- Steam Generator Blowdown System
- Waste Processing Liquid Drains System

System Intended Functions

Transfer safety-related heat loads to the Service Water System, including shutdown cooling.	10 CFR 54.4(a)(1)
Initiate/maintain systematic isolation of non-safety related heat loads (includes inventory control).	10 CFR 54.4(a)(1)
Provide and maintain a barrier between radioactive systems and the environment (within release limits).	10 CFR 54.4(a)(1)
Provide thermal barrier cooling, including proper loop inventory.	10 CFR 54.4(a)(1)
Initiate and maintain systematic isolation of a failed thermal barrier cooler.	10 CFR 54.4(a)(1)
Provide safe shutdown control and indication (Post Accident Monitoring).	10 CFR 54.4(a)(1)
Provide containment isolation function.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS)	10CFR 54.4(a)(2)
This system contains components which perform functions credited for Anticipated Transients Without Scram (ATWS)	10CFR 54.4(a)(3)

This system contains components that perform functions credited for Environmental Qualification (EQ).	10CFR 54.4(a)(3)
This system contains components which perform functions credited for Fire Protection (FP).	10CFR 54.4(a)(3)

UFSAR References

- Section 9.2.2
- Table 6.2-83
- Table 7.4-1
- Table 7.5-1

License Renewal Drawings

- PID-1-CC-LR20205
- PID-1-CC-LR20206
- PID-1-CC-LR20207
- PID-1-CC-LR20208
- PID-1-CC-LR20209
- PID-1-CC-LR20211
- PID-1-CC-LR20212
- PID-1-CC-LR20213
- PID-1-CC-LR20214
- PID-1-CC-LR20215
- PID-1-DM-LR20350
- PID-1-DM-LR20354
- PID-1-FP-LR20268
- PID-1-IA-LR20643

- PID-1-WLD-LR20219
- PID-1-WLD-LR20220
- PID-1-WLD-LR20222
- PID-1-WLD-LR20223

Table 2.3.3-29 Primary Component Cooling Water System Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Flexible Hose	Leakage Boundary (Spatial) Pressure Boundary
Heat Exchanger Components	Heat Transfer Pressure Boundary
Instrumentation Element	Pressure Boundary Leakage Boundary (Spatial)
Orifice	Pressure Boundary Throttle
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary
Piping Element	Pressure Boundary
Pump Casing	Pressure Boundary
Tank	Pressure Boundary
Thermowell	Leakage Boundary (Spatial) Pressure Boundary
Valve Body	Leakage Boundary (Spatial) Pressure Boundary

The aging management review results for these components are provided in Table 3.3.2-29, Summary of Aging Management Evaluation - Primary Component Cooling Water System.

2.3.3.30 Radiation Monitoring System

System Description

The Radiation Data Management System [Radiation Monitoring System (RM)] consists of three subsystems: process and effluent radiation monitoring system, area radiation monitoring system, and airborne and particulate radioactivity monitoring system. The functional performance requirements for the Radiation Monitoring System are to:

- Warn of leakage from process systems containing radioactivity
- Monitor the amount of radioactivity released in effluents
- Isolate lines containing liquid and gaseous activity when activity levels reach a preset limit
- Record the radioactivity present in various station systems and effluent streams
- Provide a means for leakage detection
- Provide information on failed fuel.
- Monitor plant areas within the Radiologically Controlled Area for radiation

In-Scope Boundary Description

PID-1-CC-LR20205, PID-1-CC-LR20211, PID-1-SB-LR20626, PID-1-MAH-LR20504, and PID-1-SS-LR20521:

The in-scope portion of the Radiation Monitoring System skids includes all skid components for two Primary Component Cooling Water System radiation monitors, four Steam Generator Blowdown System liquid radiation monitors, the Steam Generator Blowdown System flash tank outlet liquid radiation monitor (and magnetite filters) and the lines to and from the containment gas monitor.

PID-1-CBA-LR20303, PID-1-MAH-LR20495, PID-1-MAH-LR20504, PID-1-MS-LR-20580, PID-1-MS-LR20581:

Other safety related Radiation Monitor instrumentation included are:

- Main Steam radiation monitors
- Control Building Air Handling air intake radiation monitors

- Containment Enclosure emergency exhaust radiation monitor
- Containment Online Purge radiation monitors
- Manipulator crane radiation monitors
- Containment post LOCA radiation monitors

Interfacing Systems

Not included in the Radiation Monitoring System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Containment Air Handling System
- Containment Enclosure Air Handling System
- Control Building Air Handling System
- Demineralized Water System
- Main Steam System
- Primary Component Cooling Water System
- Sample System
- Steam Generator Blowdown System

System Intended Functions

Provide safety related area radiation monitoring that is required in all modes of operation.	10CFR 54.4(a)(1)
Provide safety related radiation process monitoring that is used for post accident trend monitoring.	10CFR 54.4(a)(1)
Provide safety related airborne radiation monitoring associated with the control room intake and containment on-line purge.	10CFR 54.4(a)(1)
Provide airborne radiation monitoring that is used for post accident trend monitoring.	10CFR 54.4(a)(1)

This system contains components which perform functions credited for Environmental Qualification (EQ).	10CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10CFR 54.4(a)(2)

UFSAR References

- Table 7.5-1
- Section 11.5.1
- Section 12.3.4.2

License Renewal Drawings

- PID-1-CBA-LR20303
- PID-1-CC-LR20205
- PID-1-CC-LR20211
- PID-1-MAH-LR20495
- PID-1-MAH-LR20504
- PID-1-MS-LR20580
- PID-1-MS-LR20581
- PID-1-SB-LR20626
- PID-1-SS-LR20521

Table 2.3.3-30 Radiation Monitoring System Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage Boundary (Spatial)
Filter Housing	Leakage Boundary (Spatial)
Heat Exchanger Components	Leakage Boundary (Spatial)
Instrumentation Element	Leakage Boundary (Spatial)
Piping and Fittings	Leakage Boundary (Spatial) Structural Integrity (Attached)
Piping Element	Leakage Boundary (Spatial)
Pump Casing	Leakage Boundary (Spatial)
Thermowell	Leakage Boundary (Spatial)
Valve Body	Leakage Boundary (Spatial) Structural Integrity (Attached)

The aging management review results for these components are provided in Table 3.3.2-30, Summary of Aging Management Evaluation - Radiation Monitoring System.

2.3.3.31 Reactor Makeup Water System

System Description

The function of the Reactor Makeup Water System is to provide for the storage and distribution of reactor grade water. It also provides storage capacity for water recycled by the Boron Recovery System.

The Reactor Makeup Water System consists of one reactor makeup water storage tank, two redundant, full capacity reactor makeup water pumps and associated piping, valves, instrumentation and controls. The reactor makeup water storage tank is located in an enclosure between the Primary Auxiliary Building and the Waste Processing Building. The tank is equipped with an internal floating cover to preclude the diffusion of air into the makeup water. Steam heating panels encircle each tank to provide freeze protection. Minimum water temperature is maintained at approximately 45 to 55F.

The unit has two reactor makeup water pumps. Each pump has sufficient capacity to supply the expected loads. The reactor makeup water pumps are located on the 7' 0" level of the Primary Auxiliary Building. Because the reactor makeup water pump has a drooping head characteristic at low flow, a restrictive orifice maintains a minimum recirculation flow to the reactor makeup water storage tank. This orifice is sized to allow sufficient pump flow to ensure operation at a stable point on the pump curve. A manual bypass valve at the restrictive orifice allows larger recirculation flows for tank recirculation prior to sampling.

The supply line to the Waste Process Building is controlled by a pressure reducing valve to avoid exceeding the design pressure of the equipment in the Spent Resin Sluicing and Boron Recovery Systems.

In-Scope Boundary Description

Reactor Makeup Water
PID-1-RMW-LR20360:

The Reactor Makeup Water boundary begins at the Reactor Makeup Water tank in the tank farm area. Common suction piping for the two Reactor Makeup Water pumps leads to the two Reactor Makeup Water pumps located in the Primary Auxiliary Building. The discharge of the two pumps combines in a common header which then divides into three branches.

The first branch includes supply piping to the chemical and volume control resin fill tank, boric acid blender and boric acid batch tank. The branch piping continues through the pipe tunnel to the fuel building where it terminates as a source of makeup for the spent fuel pool.

The second branch boundary includes a continuous recirculation path, supply piping to boron thermal regeneration flush, and makeup piping to the spray additive tank in the tank farm. The boundary ends at the waste process building but briefly re-enters the tank farm and becomes in-boundary at the line connected to drain valve 1-RMW-V-134.

The third branch passes through the penetration tunnel and into the containment. The boundary includes the supply to the reactor coolant drain tank, the Reactor Coolant system primary relief tank and the four Reactor Coolant pump number three standpipe fill lines.

PID-1-AS-LR20571:

The boundary consists of criterion (a)(2) liquid filled components which are the components that interface with Auxiliary Steam System.

PID-1-ACS-LR20907:

The boundary consists of criterion (a)(2) liquid filled components which are the liquid filled components that interface with Auxiliary Steam and Auxiliary Steam Condensate Systems.

PID-1-BRS-LR20861:

The boundary consists of criterion (a)(2) liquid filled components which are the components that interface with the Boron Recovery System in the Tank Farm.

PID-1-CBS-LR20233:

The boundary consists of criterion (a)(1) components which are the components that are providing a pressure boundary with the Containment Building Spray System.

PID-1-CS-LR20723:

The boundary consists of criterion (a)(2) liquid filled components which are the components that interface with the Chemical and Volume Control System.

PID-1-CS-LR20725:

The boundary consists of criterion (a)(1) components which are the components that are proving a pressure boundary with the Chemical and Volume Control System.

PID-1-CS-LR20727:

The boundary consists of criterion (a)(1) components which are the components that are proving a pressure boundary with the Chemical and Volume Control System.

PID-1-CS-LR20729:

The boundary consists of criterion (a)(1) components which are the components that provide pressure boundary with the Chemical and Volume Control System. The criterion (a)(2) boundary consists of the liquid filled components.

PID-1-RC-LR20841, PID-1-RC-LR20842, PID-1-RC-LR20843, PID-1-RC-LR20844:

The boundary consists of criterion (a)(2) liquid filled components which are the components that interface with the Reactor Coolant System.

PID-1-RC-LR20846:

The boundary consists of criterion (a)(2) liquid filled components which are the components that interface with the Reactor Coolant System.

PID-1-SF-LR20483:

The boundary consists of criterion (a)(2) liquid filled components which are the components that interface with the Spent Fuel Pool Cooling System

PID-1-WLD-LR20218:

The boundary consists of criterion (a)(2) liquid filled drain lines which interface with the Waste Processing Liquid Drains System.

PID-1-WLD-LR20219:

The boundary consists of criterion(a)(2) liquid filled drain lines which interface with the Waste Processing Liquid Drains System.

Interfacing Systems

Not included in the Reactor Makeup Water System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Auxiliary Steam System
- Auxiliary Steam Condensate System
- Chemical and Volume Control System
- Containment Building Spray System
- Demineralized Water System
- Nitrogen Gas System

- Reactor Coolant System
- Resin Sluicing System
- Spent Fuel Pool Cooling System
- Waste Processing Liquid Drains System

System Intended Functions

Provide safe shutdown control and indication (Post Accident Monitoring)	10 CFR 54.4(a)(1)
Maintain system interface with the Chemical and Volume Control System and the Containment Building Spray System.	10 CFR 54.4(a)(1)
Provide containment isolation function.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Environmental Qualification (EQ).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Station Blackout (SBO)	10 CFR 54.4(a)(3)

UFSAR References

- Section 9.2.7
- Table 6.2-83
- Table 7.5-1

License Renewal Drawings

- PID-1-RMW-LR20360
- PID-1-AS-LR20571

- PID-1-ASC-LR20907
- PID-1-BRS-LR20861
- PID-1-CBS-LR20233
- PID-1-CS-LR20723
- PID-1-CS-LR20725
- PID-1-CS-LR20727
- PID-1-CS-LR20729
- PID-1-RC-LR20841
- PID-1-RC-LR20842
- PID-1-RC-LR20843
- PID-1-RC-LR20844
- PID-1-RC-LR20846
- PID-1-SF-LR20483
- PID-1-WLD-LR20218
- PID-1-WLD-LR20219

Table 2.3.3-31 Reactor Makeup Water System Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Filter Housing	Leakage Boundary (Spatial)
Heater Housing	Leakage Boundary (Spatial)
Instrumentation Element	Leakage Boundary (Spatial) Pressure Boundary
Orifice	Leakage Boundary (Spatial)
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary
Piping Element	Leakage Boundary (Spatial)
Pump Casing	Leakage Boundary (Spatial)
Tank	Leakage Boundary (Spatial)
Thermowell	Leakage Boundary (Spatial)
Valve Body	Leakage Boundary (Spatial) Pressure Boundary

The aging management review results for these components are provided in Table 3.3.2-31, Summary of Aging Management Evaluation - Reactor Make-up Water System.

2.3.3.32 Release Recovery System

System Description

The Release Recovery System contains and quenches relief valve discharge from the Chemical and Volume Control System and Boron Recovery System degasifiers as well as the Boron Recovery System, Steam Generator Blowdown System and Waste Processing Liquid System evaporators.

Release Recovery tank, 1-RR-TK-258, is in scope for License Renewal from a spatial consideration due to it's location in the Primary Auxiliary Building. The relief valve in the degasifier system opens at 60 psig to direct flow to the Release Recovery tank, 1-RR-TK-258, located in the Primary Auxiliary Building hallway, outside the degasifier cubicle. Quench tank, 1-RR-TK-258, and the Release Recovery System piping will normally be under a nitrogen blanket to eliminate the potential for explosive gas mixtures if hydrogen is present in the relieving fluid. Under normal conditions, 1-RR-TK-258 will be half filled with demineralized water to ensure that quenching of a design base release can be accomplished. The tank is designed for an eight second release from full open 1-RR-V-655.

In-Scope Boundary Description

Release Recovery
PID-1-RR-LR20061, PID-1-CS-LR20724:

The Release Recovery license renewal scoping boundary consists of the Release Recovery tank and internal piping, a drain line and valve, and level instrument connections. Discharge piping from the letdown degasifier relief valve to the Release Recovery tank is in scope as well as the gas vent line and valves to the Chemical and Volume Control System.

Interfacing Systems

Not included in the Release Recovery System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Chemical and Volume Control System
- Demineralized Water System
- Nitrogen Gas System
- Sample System

System Intended Functions

This system contains components which perform functions credited for Non Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)

UFSAR References

- Section 9.3.5 and 9.3.4

License Renewal Drawings

- PID-1-CS-LR20724
- PID-1-RR-LR20061

Table 2.3.3-32 Release Recovery System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage Boundary (Spatial)
Piping and Fittings	Leakage Boundary (Spatial)
Tank	Leakage Boundary (Spatial)
Thermowell	Leakage Boundary (Spatial)
Valve Body	Leakage Boundary (Spatial)

The aging management review results for these components are provided in Table 3.3.2-32, Summary of Aging Management Evaluation - Release Recovery System.

2.3.3.33 Resin Sluicing System

System Description

The Spent Resin Sluicing System [Resin Sluicing System (RS)] collects the spent resin from all the demineralizers and ion exchangers of the nuclear plant.

In-Scope Boundary Description

PID-1-RS-LR20252, PID-1-CS-LR20723, PID-1-CS-LR20728, PID-1-SF-LR20483:

The Resin Sluicing System boundary begins with the entry of the resin sluice supply piping entry into the Primary Auxiliary Building. The pipe divides into four branches. The first provides recirculation the spent resin sluice tank. The second is the supply piping to spent fuel cleanup demineralizer up to the Resin Sluicing / Spent Fuel Pool Cooling System interface. The third is the Resin Sluicing System supply to the Chemical and Volume Control System mixed beds and cation demineralizers up to the Resin Sluicing / Chemical and Volume Control System interface. The last is the Resin Sluicing supply to the Boron Thermal Regeneration System's demineralizer sluice header ending at the Resin Sluicing / Chemical and Volume Control System interface. The return lines from the mixed beds and from the Boron Thermal Regeneration System are in scope for the Chemical and Volume Control System.

Interfacing Systems

Not included in the Resin Sluicing System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Chemical and Volume Control System
- Spent Fuel Pool Cooling System
- Waste Processing Liquid Drains System

System Intended Functions

Provides pressure boundary with the Chemical and Volume Control System.	10CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10CFR 54.4(a)(2)

UFSAR References

- Section 12.2.1.9

License Renewal Drawings

- PID-1-CS-LR20723
- PID-1-CS-LR20728
- PID-1-RS-LR20252
- PID-1-SF-LR20483

Table 2.3.3-33 Resin Sluicing System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage Boundary (Spatial)
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary
Valve Body	Leakage Boundary (Spatial) Pressure Boundary

The aging management review results for these components are provided in Table 3.3.2-33, Summary of Aging Management Evaluation - Resin Sluicing System.

2.3.3.34 Roof Drains System

System Description

The Roof Drains System is non-safety related. It is installed on major buildings that have relatively flat roofs. The system removes rain water and water from melting snow from the roof. It consists of roof mounted strainers that collect the water and transport it through connected ceiling mounted pipes to the Storm Drain System (not in scope of license renewal). The plant Dewatering System discharges water to the Roof Drains System, which then flows to the Storm Drain System and out to the Circulating Water System for discharge.

In-Scope Boundary Description

PID-1-DR-LR20633, PID-1-DR-LR20634, PID-1-DR-LR20635:

The Roof Drains System boundary consists of those plant roof drains that enter safety related buildings, including connections and cleanouts until the piping leaves the building to the storm drains. The buildings with in-boundary Roof Drain piping are the Fuel Storage Building, East and West Main Steam and Feedwater Pipe Chases, Emergency Feedwater Pump House, Equipment Vaults, Primary Auxiliary Building, Tank Farm, Control Building, Diesel Generator Building and Service Water Pump House.

Interfacing Systems

Not included in the Roof Drains System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Dewatering System
- Plant Floor Drain System

System Intended Functions

This system contains components which perform functions credited for Non Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)

UFSAR References

- Section 2.4.2.3
- Section 3.4.1.2

License Renewal Drawings

- PID-1-DR-LR20633
- PID-1-DR-LR20634
- PID-1-DR-LR20635

Table 2.3.3-34 Roof Drains System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage Boundary (Spatial)
Filter Housing	Leakage Boundary (Spatial)
Piping and Fittings	Leakage Boundary (Spatial)

The aging management review results for these components are provided in Table 3.3.2-34, Summary of Aging Management Evaluation - Roof Drains System.

2.3.3.35 Sample System

System Description

The Sample subsystems from the Reactor Coolant, Steam Generators and other auxiliary systems provide representative gas and liquid samples for laboratory analysis, in accordance with Regulatory Guide 1.21, Positions C.6 and C.7. Typical information obtained includes: Reactor Coolant boron, sodium ion and halogen concentrations, fission product radioactivity level, hydrogen, oxygen, and fission gas content, corrosion product concentration, and chemical additive concentration.

The sample subsystem for secondary steam and water systems provides representative samples for measuring specific and cation conductivity, concentrations of sodium ion, dissolved oxygen and hydrazine.

The system is divided into five subsystems: Reactor Coolant sampling, Steam Generator Blowdown sampling, auxiliary system sampling, secondary steam and water sampling, and post-accident sampling.

In-Scope Boundary Description

Steam Generator Sampling Boundary
PID-1-SS-LR20521, PID-1-SB-LR20626, PID-1-WLD-LR20222:

The sample system boundary for each of the four steam generator sample portions of the Sample System (SS) begin at the inlet to the Steam Generator sample heat exchanger. Each of the four steam generator boundaries continue with the steam generator sample heat exchanger dividing into two branches. The first branch leads to a pair of duplex steam generator sample line filter filters and pressure control valves ending at the system boundary for the Radiation Monitoring System.

Return flow from each radiation monitor continues from the radiation monitor boundary to the steam blowdown flash tank drains. Radiation Monitoring vent lines beginning at the Radiation Monitoring / Sample System boundary combine and flow to the waste liquid drains.

The second branch continues to the chemical sample panel pressure regulator and constant temperature heat exchanger. Each line downstream of the constant temperature heat exchanger continues and divides into a grab sample three-way valve that is normally aligned to a back pressure control valve or alternately to a line for grab samples. Both the grab sample and backpressure flows continue to and terminate in the steam generator sample sink. The remaining line continues through a sample filter.

The outlet of the sample filter divides into four branches, one for pH, one for strong acid cation, one for the sodium concentration and last cation, conductivity. The cation conductivity branch terminates at the Steam Generator sample sink. The last three branches terminate at a connection to waste liquid drains. The sample sink, drain, trap and piping to waste liquid drains are included in the boundary.

Constant temperature chiller liquid and vapor line boundaries begin as they enter the primary auxiliary building and continue to the sample constant temperature cooler.

Pressurizer, Loops 1 and 3 and Residual Heat Removal Sample Boundary PID-1-SS-LR20518, PID-1-SS-LR20519, PID-1-BRS-LR20854, PID-1-CS-LR20725, PID-1-WLD-LR20222:

The Sample System for the pressurizer and, loop one and three sample line boundaries begin at the inlet to the respective pair of series sample coolers. The outlets of the second sample coolers include a valved crossover. These lines then continue to their respective pressure control valve. Downstream of the pressure control valve, the line branches off to a relief valve and the relief valve flow continues to the panel exit leading to the waste liquid drains. The line then divides, going to the sample sink or, joining in a single pipe with a flow indicator for flushing to the volume control tank or alternately the primary drains. A line from the Residual Heat Removal pump discharge connects to the sample sink and upstream of the flow indicator for flushing, a branch connection goes to the Post Accident Sample System panel.

Also connecting upstream of the flow indicator are flush lines from the letdown degasifier cooler, thermal regenerative demineralizer, cation and mixed bed demineralizers and letdown heat exchanger. The primary sample sink drain, trap and piping to waste liquid drains are included in the boundary.

Post Accident Sample Boundary PID-1-SS-LR20520, PID-1-SS-LR20518, PID-1-SS-LR20519, PID-1-WLD-LR20219, PID-1-RH-LR20663:

The Post Accident Sample boundary begins at the Reactor Coolant / Sample System interface just upstream of the Reactor Coolant post accident sample inlet isolation. The boundary continues, through the post accident sample system heat exchanger, joining with the argon purge connection and containment recirculation sump sample lines (from the residual heat removal pumps). The boundary continues up to the sample cask and bypass lines to the flush tank. The outlet of the flush tank continues through a containment isolation valve and into the containment, ending as it discharges to the containment trench.

Another Sample System boundary begins at the inlet to the Reactor Coolant loop 1 and 3 liquid sample heat exchanger continues through outlet piping including a flex hose to the second liquid sample heat exchanger and on to the primary sample panel. At the panel, flow continues through a pressure control valve where it branches to the sample sink and branches to a relief valve and continues to the panel exit leading to the waste liquid drains.

A third Reactor Coolant / Sample System boundary begins at the inlet to the Reactor Coolant pressurizer steam sample heat exchanger continues through outlet piping including a flex hose to the second steam sample heat exchanger and on to the primary sample panel. At the panel, flow continues through a pressure control valve where it branches to the sample sink and at the panel, flow continues through a pressure control valve where it branches to the sample sink and branches to a relief valve and continues to the panel exit leading to the waste liquid drains.

The Sample System streams from the liquid and steam lines merge to a single line along with sample streams from thermal regenerative demineralizers, letdown heat exchanger, Residual Heat Removal heat exchanger, letdown degasifier and the cation and mixed bed demineralizers. The combined flow passes through a flow indicator where it exits the sample panel. The exit flow branches to the Chemical and Volume Control and to the Waste Processing Liquid Drains systems where the boundary ends.

Wet Lay-up Sample Boundary
PID-1-FW-LR20690:

The wet lay-up portion of the Sample System begins at the Feedwater / Sample System interface at the discharge of each of the four recirculation and wet lay-up pumps. Each line boundary continues through an isolation valve and then to a hose connection. The boundary continues at the outlet of the flex hose and includes the inlet pipe to the sample cooler, the sample cooler and the outlet pipe. The outlet pipe continues to, and includes the sample sink.

Interfacing Systems

Not included in the Sample System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Chemical and Volume Control System
- Demineralized Water System
- Feedwater System

- Radiation Monitoring System
- Reactor Coolant System
- Residual Heat Removal System
- Steam Generator Blowdown System
- Waste Processing Liquid Drains System

System Intended Functions

Provide safe shutdown control and indication (Post Accident Monitoring).	10CFR 54.4(a)(1)
Provide liquid samples from various locations within the Chemical and Volume Control System.	10 CFR 54.4(a)(1)
Provide containment isolation function.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Environmental Qualification (EQ).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)

UFSAR References

- Section 9.2.3.1
- Section 9.3.2.2
- Table 6.2-83
- Table 7.5-1

License Renewal Drawings

- PID-1-BRS-LR20854
- PID-1-CS-LR20725

- PID-1-FW-LR20690
- PID-1-RH-LR20663
- PID-1-SB-LR20626
- PID-1-SS-LR20518
- PID-1-SS-LR20519
- PID-1-SS-LR20520
- PID-1-SS-LR20521
- PID-1-WLD-LR20219
- PID-1-WLD-LR20222

Table 2.3.3-35 Sample System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage Boundary (Spatial)
Filter Housing	Leakage Boundary (Spatial)
Flexible Hose	Leakage Boundary (Spatial)
Heat Exchanger Components	Leakage Boundary (Spatial)
Heater Housing	Leakage Boundary (Spatial)
Instrumentation Element	Leakage Boundary (Spatial)
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary
Piping Element	Leakage Boundary (Spatial)
Tank	Leakage Boundary (Spatial)
Thermowell	Leakage Boundary (Spatial)
Trap	Leakage Boundary (Spatial)
Valve Body	Leakage Boundary (Spatial) Pressure Boundary

The aging management review results for these components are provided in Table 3.3.2-35, Summary of Aging Management Evaluation - Sample System.

2.3.3.36 Screen Wash System

System Description

The Service Water traveling screens form a full-channel mesh strainer that removes debris from the water flowing into each Service Water pump bay. The debris collected on the screen is removed by a high pressure water spray supplied by the Service Water screen wash pump.

The Circulating Water traveling screens prevent fish and debris from entering the Circulating Water System. One traveling screen is provided for each Circulating Water pump bay. Debris is collected on the upstream side of the traveling screen and is carried upward as the screen rotates. As the debris nears the top of screen travel, high velocity jets of water from the screen wash nozzles flush it out.

The Circulating Water screen wash pumps are one means to supply the Chlorination System with salt water. Flow to the Chlorination System from the Screen Wash System pumps goes through a common header. The sodium hypochlorite metering pumps discharge into this common header.

During initial startup or total Circulating Water System shutdown, water is supplied to one of two Circulating Water lube water pumps from the Service Water screen wash pump.

In-Scope Boundary Description

The Screen Wash (SCW) System consists of criterion (a)(2) components which are potentially liquid filled piping components located in buildings that contains safety related components.

Screen Wash System
PID-1-SCW-LR20709:

The Screen Wash System scoping boundary begins at the suction of the Service Water screen wash pump in the Service Water Pump House fore bay. The pump discharge piping divides to supply the two Service Water traveling screens via individual strainers. The boundary includes the traveling screen housing and a 2" drain line ending in the trash trough.

The supply header boundary includes a supply to the Circulating Water lubricating water system with the boundary ending as the piping exits the Service Water Pump House. The header also has connections to future unit 2 piping, ending at blank flanges.

Interfacing Systems

The Screen Wash System does not interface with any license renewal systems.

System Intended Functions

This system contains components which perform functions credited for Non Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)

UFSAR References

- 10.4.5

License Renewal Drawings

- PID-1-SCW-LR20709

Table 2.3.3-36 Screen Wash System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage Boundary (Spatial)
Filter Housing	Leakage Boundary (Spatial)
Piping and Fittings	Leakage Boundary (Spatial)
Pump Casing	Leakage Boundary (Spatial)
Valve Body	Leakage Boundary (Spatial)

The aging management review results for these components are provided in Table 3.3.2-36, Summary of Aging Management Evaluation - Screen Wash System.

2.3.3.37 Service Water System

System Description

The Service Water System was originally designed for two units. The Service Water Pump House has a pump bay for each unit. Each pump bay has two supplies one from the intake discharge transition structure and one from the discharge transition structure. The unit two supply valves are locked closed and de-energized. Unit two is non operational. The Unit two service water return is blanked off and is not used.

The Unit One Service Water System consists of two independent and redundant flow trains, each of which supplies cooling water to a primary component cooling water heat exchanger, a Diesel Generator jacket water cooler, the secondary component cooling water heat exchangers, the auxiliary secondary component cooling water heat exchangers, the condenser water box priming pump seal water heat exchangers, and, except during a loss of coolant accident, to the Fire Protection System during a fire.

Flow in each redundant train is supplied by two redundant Service Water pumps. Each Service Water pump is capable of supplying 100 percent of the flow required by each flow train to dissipate plant heat loads during normal full power operation. Thus, for full power operation two pumps (one pump per flow train) will be required.

The four Service Water pumps take suction from a common bay in the Service Water Pumphouse. Seawater flow is supplied to the Service Water Pumphouse from the Atlantic Ocean due to the static head of the ocean above the elevation of the Service Water pumps suctions.

The Atlantic Ocean serves as the normal ultimate heat sink for Seabrook Station. In the unlikely event that seawater flow to the Service Water Pumphouse is restricted (>95 percent blockage) due to seismically induced damage to the circulating water (seawater) intake and discharge tunnels, a mechanical draft evaporative cooling tower is provided to dissipate shutdown and accident heat loads. The mechanical draft cooling tower is completely independent of the circulating water tunnels and the Atlantic Ocean.

The Cooling Tower consists of one independent cell with one fan and a center cell with two fans. A third cell was included for anticipated Unit 2 operation but remains nonfunctional. The cooling tower basin consists of a pump well and one catch basin for each of the two tower spray cells. The unit has an "A" and a "B" cooling tower complex flow train. The Cooling Tower pumps with associated valves, piping and equipment in the trains circulate cooling water from the pump well basin through the primary component cooling heat exchangers and the Secondary Component Cooling Water heat exchangers during normal operations or the Diesel Generator heat exchangers during loss of offsite power conditions or both during test.

Makeup to the Cooling Tower can be provided by a portable tower makeup pump, (in the event that normal makeup source is unavailable and the Service Water pumps are unavailable). Regulatory Guide (RG) 1.27 requires a heat sink capable of providing cooling for 30 days; the Cooling Tower has a 7 day supply. The pump is maintained on site and stored in a seismic area. The Cooling Tower makeup pump is tested every 18 months per Technical Specifications. After the pump is tested it is flushed with potable water. It is capable of providing makeup water to the tower basin from the nearby Browns River or Hampton Harbor with several locations accessible by road. It consists of 3000 feet of 5-inch rubber-lined polyester flexible hose and associated hose couplings and a portable diesel-driven pump that is self-priming within 15 feet of water level, and is designed to deliver a minimum of 200 gpm from the water source to the tower basin. The seven-day period that the tower can operate without makeup water provides sufficient time to move the pump into position, lay the hose and make the system ready for operation. This pump is in scope of License Renewal as functional (a)(2).

In-Scope Boundary Description

Service Water Ocean Cooling
PID-1-SW-LR20794, PID-1-SW-LR20795:

The Service Water System boundary begins at the intake transition structure wall with the normal supply line ending in the Service Water forebay. During periods of heat treating, the ocean cooling supply is aligned from the discharge transition structure supply line ending in the Service Water forebay.

Flow continues through a traveling water screen (part of the screen wash system boundary). Multistage long shaft pumps take suction on the seawater and discharge both forward and to a continuous vent line with orifice returning to the forebay. The pairs of train related pump discharge lines join to form two lines continuing from the Service Water pumphouse. The lines join the train associated Service Water Cooling Tower supply. The two lines then continue underground and enter the pipe tunnel. The A train supply header has a branch connection to supply the Fire Protection stand pipe header. The two train boundaries continue and include the two Service Water strainers. At the outlet of the strainers the boundary branches to support the secondary loads, component cooling and Diesel Generator heat exchangers.

The "A" and "B" train secondary supplies join in a single line to supply secondary loads with the boundary terminating at the exit of the Service Water vault. A single line returning from the auxiliary secondary component cooling water heat exchangers begins as the line enters the Service Water vault and divides and connects down stream of the two component cooling water heat exchangers.

The "A" train component cooling and Diesel Generator heat exchangers are in parallel as are the "B" train component cooling and Diesel Generator heat exchangers. The outlet lines from each parallel set of heat exchangers branch to form a common line for normal discharge, and a train related line for cooling tower return to the spray headers. The normal discharge line with overflow pipe continues underground and branches to the intake transition structure wall and to the discharge transition structure wall. During periods of heat treating the ocean cooling return is aligned to the intake transition structure.

Service Water Cooling Tower
PID-1-SW-LR20794, PID-1-SW-LR20795, PID-1-SW-LR20796:

The Service Water Cooling Tower boundary begins as the Cooling Tower pumps take suction from the Service Water Cooling Tower basin. Each train discharge divides into a spray header test line, a pump recirculation / spent fuel cooling supply line and, the system supply line.

The Service Water Cooling Tower supply from the train associated tower pump joins the normal Service Water pump discharge as noted above. The spray header test lines join the returning Service Water to the tower spray headers while the recirculation line branches to the tower basin. The recirculation line also branches to join with the opposite train to supply the alternate spent fuel cooling heat exchanger, ending at a blank flange as the line leaves the cooling tower building.

The Service Water returns to the tower from the normal Service Water return lines beginning at the outlet of the each train of component cooling heat exchangers. The lines pass underground to the tower where the lines continue to the spray headers, separately ending at the Unit 1 and at the common bay spray nozzles. Each header also has a branch to spray bypass lines ending underwater in the respective basin. Each header ends at a blank flange in the Unit 2 bay.

PID-1-SW-LR20794, PID-1-SW-LR20795:

Pump motor oil lines are in-boundary for cooling tower pumps and for the cooling tower fan gear boxes.

Diesel heat exchanger relief valves, vents and drains join in a single line ending at the Primary Auxiliary Building drain to the salt water curbed collection area.

PID-1-WLD-LR20222:

This license renewal boundary drawing shows the boundary between the Diesel Generator jacket water heat exchanger relief valve discharge and drain lines and the Waste Processing Liquid Drains system.

Interfacing Systems

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

- Diesel Generator
- Fire Protection System
- Primary Component Cooling Water System
- Waste Processing Liquid Drains System

System Intended Functions

Provide ocean cooling water for the plant primary heat loads, including required process controls.	10 CFR 54.4(a)(1)
Provide alternate cooling water from the Cooling Tower for the plant primary heat loads, including required process controls.	10 CFR 54.4(a)(1)
Provide design basis secondary heat load isolation.	10 CFR 54.4(a)(1)
Provide safe shutdown control and indication (Post Accident Monitoring)	10 CFR 54.4(a)(1)
Provide Cooling Tower makeup (This is a functional (a)(2) function).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Anticipated Transient Without a Scram (ATWS).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Environmental Qualification (EQ)	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)

This system contains components which perform functions credited for Station Blackout (SBO).	10 CFR 54.4(a)(3)

UFSAR References

- Section 9.2.1
- Section 9.2.5
- Table 7.4-1
- Table 7.5-1

License Renewal Drawings

- PID-1-SW-LR20794
- PID-1-SW-LR20795
- PID-1-SW-LR20796
- PID-1-WLD-LR20222

Table 2.3.3.37 Service Water System
Components Subject to Aging Management review

Component Type	Intended Function
Bolting	Pressure Boundary
Expansion Joint	Leakage Boundary (Spatial) Pressure Boundary
Filter Element	Filter
Filter Housing	Pressure Boundary
Instrumentation Element	Leakage Boundary (Spatial) Pressure Boundary
Nozzle	Spray
Orifice	Pressure Boundary Throttle
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary Structural Integrity (Attached)
Piping Element	Leakage Boundary (Spatial) Pressure Boundary
Pump Casing	Leakage Boundary (Spatial) Pressure Boundary
Thermowell	Pressure Boundary
Valve Body	Leakage Boundary (Spatial) Pressure Boundary

The aging management review results for these components are provided in Table 3.3.2-37, Summary of Aging Management Evaluation - Service Water System.

2.3.3.38 Service Water Pump House Air Handling System

System Description

The Service Water Pump House heating and ventilation systems are comprised of the heating and ventilation systems for the pump room area of the Service Water Pump House.

The ventilation function is provided by the Service Water Pump House Air Handling System. The heating function is provided by the Hot Water Heating System and is evaluated separately.

The pump room area is ventilated and cooled with outside air supplied through pneumatically operated dampers, and exhausted through exhaust fans and backdraft dampers. Each exhaust fan and its associated supply air damper are controlled by a separate thermostat located in the pump room area. The thermostat settings are staggered such that the fans will start in sequence. Each fan is powered by a separate and independent Engineered Safety Features electrical train. Each supply air damper is designed to fail open on loss of air or electric power to its solenoid valve.

The switchgear areas of the Service Water Pump House, one for Electrical Train A equipment and the other for electrical Train B equipment, are ventilated with filtered outside air supplied by one of two full-sized supply fans through a seismically supported duct system. Each fan is powered by a separate and independent Engineered Safety Features electrical train. Air is drawn from the outside through a roll-type filter, a fan, a backdraft damper, and then distributed through ductwork into the two switchgear areas. Air is exhausted from each switchgear area through its respective relief damper. There are two thermostats per fan to control its operation, one in Train "A" switchgear room and the other in Train B switchgear room. Both the thermostats on the lead fan have identical set points.

The Service Water Cooling Tower heating and ventilation systems are comprised of a heating system and a ventilation system for each redundant switchgear room and a ventilation system for the pump room. Each switchgear room and the pump room are ventilated by drawing air from, and exhausting to, the outside.

Ventilation and cooling air is drawn into the ventilation and mechanical equipment area of the pump room from the outside through fixed louvers and a roughing filter.

Cooling of the pump room area, when required, is accomplished by redundant exhaust fans. Each fan is controlled by its individual thermostat. Thermostats are set so if one thermostat, fan or its power supply fails, the redundant fan, served by a separate Class 1E power supply, will start before overheating occurs.

Each of the two Cooling Tower switchgear rooms is supplied with ventilating and cooling air, when required, from its own independent supply fan located in the mechanical equipment area. The supply air fan for each switchgear room is provided electrical power for a Class 1E power source which is independent of the other three. Each supply fan is cycled by a thermostat located in its respective switchgear room. Supply air is directed to the switchgear room via sheet metal ductwork. Heat-laden air from the switchgear rooms is exhausted through a relief damper to the outside.

In-Scope Boundary Description

PID-1-SWA-LR20372:

The Service Water Pump House Air Handling System (SWA) boundary applies to the cooling systems for both the Cooling Tower and the Service Water Pump House.

The Cooling Tower SWA System boundary begins at the outdoor intake through train common filter 1-SWA-F-192. The boundary continues through Train A and B supply fans taking suction on the Cooling Tower ventilation and mechanical room atmosphere. The fans discharge to individual discharge dampers, ducts and fire dampers into the associated Cooling Tower electrical switchgear room. The boundary includes each room's outlet damper to atmosphere. Air for pump area cooling is also supplied via 1-SWA-F-192 and includes two exhaust ventilation fans and dampers discharging to atmosphere.

The Service Water Pump House SWA System boundary begins outdoors at a common tornado damper. The boundary continues through individual roll filters, fans, and discharge dampers to a common duct. The common duct divides and supplies Train A and B Service Water Pump House switchgear rooms through separate dampers. Heated switchgear room air discharges through individual dampers and tornado dampers returning to atmosphere. The pump area cooling air boundary begins at the outdoor intake area through four intake dampers. Two discharge fans and associated dampers discharge to atmosphere. In addition, two Unit 2 non-functional discharge dampers are included in the boundary.

Interfacing Systems

The Service Water Pump House Air Handling System does not interface with any license renewal systems.

System Intended Functions

Provide cooling via outside air for the Service Water pump area to maintain area design temperatures.	10 CFR 54.4(a)(1)
Provide cooling via outside air for the Service Water (ocean) switchgear rooms to maintain area design temperatures.	10 CFR 54.4(a)(1)
Provide cooling via outside air for the Cooling Tower pump area to maintain area design temperatures.	10 CFR 54.4(a)(1)
Provide cooling via outside air for the Cooling Tower switchgear rooms to maintain area design temperatures.	10 CFR 54.4(a)(1)
Provide pressure relief protection in the event of a tornado (Tornado Dampers)	10 CFR 54.4(a)(1)
Provide safe shutdown control and indication (Post Accident Monitoring).	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Station Blackout (SBO).	10 CFR 54.4(a)(3)

UFSAR References

- Section 9.4.13
- Section 9.4.14
- Table 7.4-1
- Table 7.5-1

License Renewal Drawings

- PID-1-SWA-LR20372

Table 2.3.3-38 Service Water Pump House Air Handling System Components Subject to Aging Management Review

Component Type	Intended Function
Damper Housing	Fire Barrier Pressure Boundary
Ducting	Pressure Boundary
Ducting Closure Bolting	Pressure Boundary
Fan Housing	Pressure Boundary
Filter Housing	Pressure Boundary
Flexible Connector	Pressure Boundary
Screen	Filter

The aging management review results for these components are provided in Table 3.3.2-38, Summary of Aging Management Evaluation - Service Water Pump House Air Handling System.

2.3.3.39 Spent Fuel Pool Cooling System

System Description

The functions of the Spent Fuel Pool Cooling and Cleanup System are to:

- Continuously remove decay heat generated by fuel elements stored in the pool,
- Continuously maintain a minimum of 13 feet of water over the spent fuel elements to shield personnel, and
- Maintain the chemical parameters and optical clarity of the spent fuel pool water, and the water in the reactor cavity and refueling canal during refueling operations.

All portions of the Spent Fuel Pool Cooling loop are designated Safety Class 3, and are designed and constructed to meet seismic Category I requirements. Those portions of the cleanup system not designed to these requirements are normally isolated from the cooling loop.

The Spent Fuel Pool Cooling and Cleanup System is comprised of three sub-systems:

- Spent Fuel Pool Cooling subsystem
- Spent Fuel Pool cleanup subsystem
- Reactor cavity and canal cleanup subsystem.

Spent Fuel Pool Cooling Subsystem:

The spent fuel cooling pumps take suction from the pool and circulate water through the heat exchangers which are cooled by the Primary Component Cooling Water System. Pool water enters the suction line through a strainer near one wall of the pool at a point thirteen feet higher than the return line terminations. The return lines are located at a sufficient distance from the suction line to assure adequate circulation and uniform pool water temperatures. All system connections to the fuel pool penetrate at elevations sufficiently above the top of the fuel to maintain adequate shielding in the event the water level drains to the penetration level. Piping arrangement precludes siphoning below this level. All components in contact with the spent fuel cooling water are stainless steel. The spent fuel pool pump motors are Class 1E motors. 1-SF-P-10A and 1-SF-P-10B are powered from separate emergency busses. 1-SF-P10C can be aligned to be powered from either emergency bus.

Spent Fuel Pool Cleanup Subsystem:

Spent fuel pool water quality is maintained by a pool skimmer loop which filters and demineralizes the circulated water. The pool skimmer loop consists of five pool surface skimmers, a skimmer pump, two filters and a demineralizer. This system is utilized to maintain the pool surface free from floating particles and other materials and to remove radioactive materials in the water. The system is sized to process approximately 120 gpm, which means that one-half of the pool volume is processed in a day. All spent fuel pool cooling and cleanup system equipment is located in the Fuel Storage Building, except the filters and demineralizer which are located in the demineralizer area of the Primary Auxiliary Building. The skimmer pump motor is not Class 1E, and is supplied from a local control center. The spent fuel pool cleanup subsystem can also be used to purify the Refueling Water Storage Tank water, drain the water in the cask loading and fuel transfer canal areas (using a submersible pump), and purify the refueling cavity water during refueling operations. A cleanup system (1-CBS-SKD-161) is also used for Refueling Water Storage Tank or spent fuel pool processing.

Reactor Cavity and Canal Cleanup Subsystem:

The reactor cavity cleanup portion of the system is designed to purify the reactor cavity during refueling operations to improve the optical clarity of the water. The system consists of five surface skimmers at the water surface of the refueling cavity and canal and three drains, all piped to the suction of the reactor cavity cleanup skimmer pump via a lead-shielded disposable cartridge type filter unit. The lead-shielded filter removes radioactive particulate in the refueling water in order to prevent CRUD buildup in socket welded piping downstream of the skimmer pump. This filter also minimizes CRUD buildup in the Chemical and Volume Control System and Spent Fuel Pool Cleanup System filters and demineralizers depending on the particular lineup. The cavity water is pumped through the chemical and volume control system mixed bed demineralizer and filters to the suction of the residual heat removal pumps where it is returned to a cold leg through a residual heat removal heat exchanger. During cavity drain down upon completion of refueling, refueling water can be routed via the Reactor Cavity Cleanup System to the Refueling Water Storage Tank via the Spent Fuel Pool Cleanup System. Also, the Reactor Cavity Cleanup System may be used to send refueling water to the Liquid Waste System floor drain tanks. This lineup would be primarily utilized at the conclusion of drain down when the residual refueling water may not be suitable for return to the Refueling Water Storage Tank. As an alternative to utilizing the installed cavity cleanup pump and shielded filter, a provision exists to install temporary equipment between isolation valves 1-SF-V-81 and 85. The reactor cavity cleanup pump motor is not Class 1E, and is supplied from a motor control center in the Control Building

In-Scope Boundary Description

Spent Fuel Pool Cooling
PID-1-SF-LR 20482:

The Spent Fuel Pool Cooling system boundary begins with the pipe at the outlet of the suction strainer in the spent fuel pool. This line joins with the flanged low suction to form a single line. The suction line divides to supply the two train related spent fuel pool pumps. Two sample lines to the sample sink are attached to the pump casing vents. A third pump takes suction from the same single line and discharges to the common crosstie where it can be aligned to either heat exchanger.

The two pumps discharge to both to the individual heat exchangers and to a common line that is blank flanged at the inlet to an alternate heat exchanger in abandoned status. The discharge also combines to form one line that supplies purification at the inlet to the Spent Fuel purification pre-filter. The third pump can supply either heat exchanger and the purification loop.

The boundary for the normal flow path includes the heat exchangers and the outlet piping that combines into a single line ending in the pool water. Also attached to this line are the makeup line from the Refueling Water Storage Tank and the return from the alternate heat exchanger that begins at a blank flange in the fuel building.

Spent Fuel Pool Cleanup
PID-1-SF-LR20483, PID-1-CBS-LR20233:

The Spent Fuel Pool Cleanup System boundary begins at the five spent fuel pool skimmers and piping which combines to form a single line leading to the spent fuel pool skimmer pump and branching to the Refueling Water Storage Tank and Containment Building Spray System clean up skid (1-CBS-SKD-161).

The Spent Fuel Pool skimmer pump discharge joins with the spent fuel pool cross tie and the connection from the refueling canal skimmer pump a branch line goes to the sample sink. The boundary continues with the fuel pool pre-filter and the pre-filter bypass line. The boundary then continues to the fuel pool demineralizer (with connections to/from resin sluice) and demineralizer bypass line.

The outlet line of the Spent Fuel Pool demineralizer leads to the fuel pool post filter and filter bypass. The line then branches to the Refueling Water Storage Tank and Borated Water Storage Tank, a branch line goes to the sample sink. The Borated Water Storage Tank line boundary ends upon entry into the waste processing building. The line continues and terminates in the spent fuel pool two lines connect to the makeup system one from the Chemical and Volume Control System blender and the other from the Reactor Make-up Water pumps.

PID-1-SF-LR20484:

The boundary for this flow path includes the containment penetration X-39 and the containment isolation valves and the non-safety related piping up to the seismic anchors or equivalent anchors.

PID-1-CS-LR-20723:

Shows Interface with the Chemical and Volume Control System purification demineralizers.

PID-1-RS-LR20252:

Shows interface with the Spent Resin Sluicing System.

PID-1-SW-LR20796:

Shows pressure boundary for the spent fuel pool cooling supply and return lines form 1-SF-E-15C each ending at a blank flange.

PID-1-WLD-LR20219:

Shows non-safety attached to safety relief valve discharge line to containment trench.

PID-1-WLD-LR20220:

Shows interface with the Waste Processing Liquid Drains System in the fuel storage building.

PID-1-WLD-LR20222, PID-1-WLD-LR20223:

Shows interface with the Waste Processing Liquid Drains System in the Primary Auxiliary Building.

Spent Fuel Pool storage racks are civil/structural components, and for License Renewal, are evaluated with the Fuel Storage Building structure.

Interfacing Systems

Not included in the Spent Fuel Pool Cooling System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Boron Recovery System
- Containment Building Spray System

- Chemical and Volume Control System
- Primary Component Cooling Water System
- Reactor Make-Up Water System
- Resin Sluicing System
- Sample System
- Service Water System
- Waste Processing Liquid Drains System

System Intended Functions

Transfer Spent Fuel Pool heat load to the Primary Component Cooling Water system during normal operations.	10 CFR 54.4(a)(1)
Maintain system inventory during normal operations and accident conditions.	10 CFR 54.4(a)(1)
Provide containment isolation function.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Environmental Qualification (EQ).	10 CFR 54.4(a)(3)

UFSAR References

- Section 9.1.2
- Section 9.1.3

License Renewal Drawings

- PID-1-SF-LR20482
- PID-1-SF-LR20483
- PID-1-SF-LR20484

- PID-1-CBS-LR20233
- PID-1-CS-LR20723
- PID-1-RS-LR20252
- PID-1-SW-LR20796
- PID-1-WLD-LR20219
- PID-1-WLD-LR20220
- PID-1-WLD-LR20222
- PID-1-WLD-LR20223

Table 2.3.3-39 Spent Fuel Pool Cooling System Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Filter Housing	Leakage Boundary (Spatial)
Flexible Hose	Leakage Boundary (Spatial)
Heat Exchanger Components	Heat Transfer Pressure Boundary
Instrumentation Element	Leakage Boundary (Spatial) Pressure Boundary
Piping and Fittings	Pressure Boundary Leakage Boundary (Spatial)
Piping Element	Leakage Boundary (Spatial)
Pump Casing	Pressure Boundary Leakage Boundary (Spatial)
Tank	Leakage Boundary (Spatial)
Thermowell	Pressure Boundary Leakage Boundary (Spatial)
Valve Body	Pressure Boundary Leakage Boundary (Spatial)

The aging management review results for these components are provided in Table 3.3.2-39, Summary of Aging Management Evaluation - Spent Fuel Pool Cooling System.

2.3.3.40 Switchyard

System Description

The 345-kV switching station consists of metal-enclosed, gas-insulated components (circuit breakers, disconnect switches, buses, surge arresters, potential devices, etc.) connected by an integral bus system. Pressurized sulphur hexafluoride (SF_6), a nonflammable, nontoxic gas, is used as the insulating and arc-quenching medium. Each circuit breaker and each bus section of the 345-kV switching station forms a separate gas-insulated system that is individually monitored as a 3-phase system. Each 3-phase circuit breaker is supplied with its own self-contained SF_6 gas system. There is no interconnection between the circuit breaker SF_6 gas systems and the switching station gas systems.

The bus section gas systems include the 3-phase bus connections between two circuit breakers, extending to the point of connection to a transformer or to an overhead line. Metal-enclosed, SF_6-insulated buses connect the 345-kV switching station directly to the high voltage bushings of the Generator Step-Up Transformers and the Reserve Auxiliary Transformers.

The electrical configuration of the 345-kV switching station is a breaker-and-half arrangement.

In-Scope Boundary Description

SF_6 ducts and boundary fittings forming the pressure boundary of the Switchyard (SY) System
PID-1-SY-LR20021, PID-1-SY-LR20022, PID-1-SY-LR20023, PID-1-SY-LR20024, PID-1-SY-LR20025:

The first boundary begins at the three phase duct connections to the Generator Step-Up Transformer also shown as detail "L". The three duct boundaries continue (see detail "G" and "H"), dividing and connecting to the three phases of breaker number 11 shown on detail "C-1". The boundary ends at the three phases of breaker number 163 shown on detail "B-1". The boundary includes one voltage transformer connection per phase as depicted in detail "B-1" and "K".

The second boundary begins at the three duct connections on each of the reserve auxiliary transformers shown in detail "I". The individual phases join to form three phase ducts that continue and branch to two breakers, breaker 52 and 95. Each phase common duct boundary contains one voltage transformer connection.

Each breaker contains a gas control system connecting to the interconnected pole tanks (low pressure gas). The boundary leads, through a filter and dryer to a compressor, oil filter, filter dryer, and to the main high pressure reservoir where the excess gas condenses ready for the next breaker cycle.

Interfacing Systems

The Switchyard does not interface with any license renewal systems.

System Intended Functions

This system contains components which perform functions credited for Anticipated Transient Without a Scram (ATWS).	10 FR 54.4(a)(3)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Station Blackout (SBO).	10 CFR 54.4(a)(3)

UFSAR References

- Section 8.1.1
- Section 8.2.1
- Section 8.3.1

License Renewal Drawings

- PID-1-SY-LR20021
- PID-1-SY-LR20022
- PID-1-SY-LR20023
- PID-1-SY-LR20024
- PID-1-SY-LR20025

Table 2.3.3-40 Switchyard
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Expansion Joint	Pressure Boundary
Filter Housing	Pressure Boundary
Piping and Fittings	Pressure Boundary
Rupture Disc	Pressure Boundary
Valve Body	Pressure Boundary

The aging management review results for these components are provided in Table 3.3.2-40, Summary of Aging Management Evaluation – Switchyard.

2.3.3.41 Valve Stem Leak-Off System

System Description

The Valve Stem Leak-off System collects any stem leak leakage and directs it to a low point drain. This helps reduce the spread of contamination and keeps the water off the floor.

Initially, all manually and motor-operated valves of the Reactor Coolant System, which are 3 inches and larger were provided with double-packed stuffing boxes and intermediate lantern ring leakoff connections. Exceptions to this criterion are gate valves that have been determined to be susceptible to pressure locking, which have been modified to utilize the valve stem leak-off connection as a vent path for the bonnet cavity. Packing configurations have evolved so that the preferred packing configuration is a single packing set. The industry has moved away from double packed stuffing boxes. These changes in packing configuration have been approved for use at Seabrook Station. Accordingly, either packing design configuration is acceptable for use at Seabrook Station. These valves use only a single packing set. Leakage to the atmosphere is essentially zero for these valves.

In-Scope Boundary Description

PID-1-VSL-LR20775:

The boundary for Valve Stem Leak-off System consists of the tubing designated as Valve Stem Leak-off serving valves in the three charging pump rooms, Chemical and Volume Control System valve room, pipe chase room, letdown degasifier room, letdown degasifier pump room and boric acid room all ending at local drains.

PID-1-VSL-LR20777:

In the containment boundary tubing designated as Valve Stem Leak-off serves designated Chemical and Volume Control, Waste Processing Liquid, and Reactor Coolant System valves ending as it joins the Safety Injection System drain header to the Reactor Coolant Drain Tank.

PID-1-VSL-LR20776:

The Valve Stem Leak-off System boundary tubing also services stem leak-offs in Equipment Vaults 1 and 2, the radioactive tunnel, and filter bay area ending at area drains.

Interfacing Systems

Not included in the Valve Stem Leak-off System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Boron Recovery System
- Chemical and Volume Control System
- Nitrogen Gas System
- Reactor Coolant System
- Residual Heat Removal System
- Safety Injection System
- Waste Processing Liquid Drains System

System Intended Functions

This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)

UFSAR References

- Section 5.4.12

License Renewal Drawings

- PID-1-VSL-LR20775
- PID-1-VSL-LR20776
- PID-1-VSL-LR20777

Table 2.3.3-41 Valve Stem Leak-off System
Components Subject to Aging Management Review

Component Type	Intended Function
Piping and Fittings	Leakage Boundary (Spatial)

The aging management review results for these components are provided in Table 3.3.2-41, Summary of Aging Management Evaluation - Valve Stem Leak-off System.

2.3.3.42 Vent Gas System

System Description

The Equipment Vent System [Vent Gas System (VG)] consists of three separate and distinct headers; an aerated vent header, a hydrogenated vent header, and a reactor coolant vent header. Local vents are not considered a part of this system but are vented to nearby ventilation system ducts.

Aerated Vent Header:

The aerated vent header receives vent gas that is predominantly air plus radioactive contaminants from various components in the Boron Recovery System, Liquid Waste System [Waste Processing Liquid System (WL)], Waste Solidification System, Steam Generator Blowdown System, Equipment and Floor Drainage System [Waste Processing Liquid Drains System (WLD)], and the letdown degasifier during an oxygenated letdown sequence. The gas is then filtered and discharged to the atmosphere via the Primary Auxiliary Building normal ventilation cleanup exhaust unit.

Hydrogenated Vent Header:

The hydrogenated vent header collects radioactive contaminated hydrogen gas from the Reactor Coolant Drain Tank, Chemical Volume Control Tank, Pressurizer Relief Tank sample vessel, Chemical Volume Control Tank sample vessel, Primary Drain Tank, Primary Drain Tank degasifier, and the letdown degasifier. Additionally, dependent on gaseous activity, the pressurizer may be purged to the hydrogenated vent header in preparation for outages. The collected gas is then processed through the Radioactive Gaseous Waste System [Waste Gas System (WG)]. The safety valve surge tank provides additional header capacity and reduces the magnitude of pressure fluctuations within the header. A pressure regulating valve maintains a constant pressure of 2 psig in the influent line of the Radioactive Gaseous Waste System that serves to isolate the Radioactive Gaseous Waste System influent line from hydrogenated vent header pressure surges.

Reactor Coolant Vent Header:

The reactor coolant vent header provides for the evacuation of the Reactor Coolant System during filling operations. Additionally, dependent on gaseous activity, the pressurizer may be purged to the hydrogenated vent header via the reactor coolant vent header in preparation for outages. During normal plant operations, the reactor coolant vent header is isolated from the hydrogenated vent header by a locked closed valve. Prior to the Reactor Coolant System filling operation, the hydrogenated vent header is isolated from the reactor coolant vent header, except for a path to the Primary

Auxiliary Building exhaust unit and the line is purged with nitrogen. The reactor coolant vent header is then connected to the components and piping of the Reactor Coolant System by the insertion of a spool piece between the vent line. A separator/silencer separates any entrained liquid which is then drained to containment sump "A". Prior to entering an outage and the opening of the Reactor Coolant System, the pressurizer gas space may be purged to the Primary Auxiliary Building exhaust unit or the hydrogenated vent header dependent on gaseous activity. When routed to the hydrogenated vent header, the reactor coolant vent header is aligned to the pressurizer via the vent spool and purged with nitrogen. Following completion of the pressurizer purge the reactor coolant vent header is isolated from the hydrogenated vent header. An evacuation pump is used during filling operations to direct the air from the reactor coolant vent header to the hydrogenated vent header where it is filtered and discharged to the atmosphere.

In-Scope Boundary Description

Hydrogenated Vent Header
PID-1-VG-LR20780:

The boundary begins in the containment at a support and through a containment isolation valve, containment penetration and continues out of the containment through a containment isolation valve into the mechanical penetration area. The line continues outside the containment ending at a pipe support anchor.

Safety Valve Surge Tank
PID-1-VG-LR20780, PID-1-WLD-LR20223:

The boundary includes the safety valve surge tank and drain line to the waste liquid drain. Connected to the drain line is a nitrogen purge from the Nitrogen Gas / Vent Gas system interface to the drain line.

Interfacing Systems

Not included in the Vent Gas System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Nitrogen Gas System
- Waste Processing Liquid Drains System

System Intended Functions

Provide containment isolation function.	10 CFR 54.4(a)(1)
Provide safe shutdown control and indication (Post Accident Monitoring)	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Environmental Qualification (EQ).	10 CFR 54.4(a)(3)

UFSAR References

- Section 9.3.6
- Table 6.2-83
- Table 7.5-1

License Renewal Drawings

- PID-1-VG-LR20780
- PID-1-WLD-LR20223

Table 2.3.3-42 Vent Gas System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Piping and Fittings	Structural Integrity (Attached) Leakage Boundary (Spatial)
Piping and Fittings (Containment Isolation)	Pressure Boundary
Tank	Leakage Boundary (Spatial)
Trap	Leakage Boundary (Spatial)
Valve Body	Structural Integrity (Attached) Leakage Boundary (Spatial)
Valve Body (Containment isolation)	Pressure Boundary

The aging management review results for these components are provided in Table 3.3.2-42, Summary of Aging Management Evaluation - Vent Gas System.

2.3.3.43 Waste Gas System

System Description

Hydrogenated fission product gases from the reactor coolant letdown stream and from the liquids collected in the primary drain tank and the reactor coolant drain tank are processed in the Radioactive Gaseous Waste System [Waste Gas system (WG)]. An iodine guard bed and a molecular sieve dryer reduce the contamination level of the gases before further processing by the carbon delay beds. The carbon delay beds provide a minimum of 60 days xenon delay and 85 hours krypton delay. Low activity aerated gas streams from the reactor plant aerated vent header, and condenser vacuum pump units are filtered, monitored, and discharged to the plant unit vent.

The Waste Gas System is designed to provide sufficient processing so that gaseous effluents are discharged to the environment at concentrations below the regulatory limits of 10 CFR 20 and within the "as low as is reasonably achievable" guidelines set forth in 10 CFR 50, Appendix I. The Waste Gas System also provides sufficient holdup and control of gaseous releases, as specified in 10 CFR 50, Appendix A, General Design Criterion 60. The Waste Gas System can process a maximum surge flow of 1.2 SCFM from the degasifiers, which is based on the maximum letdown flow of 120 gpm from the Reactor Coolant System to the Chemical and Volume Control System. This represents the most limiting plant operating condition for the Waste Gas System.

The portion of the Waste Processing Building which houses the Waste Gas System is seismic Category I.

The Waste Gas System is designated non-nuclear safety related (NNS). Hydrogen concentration is monitored in cubicles containing Waste Gas System components to detect a leak in the system. Monitoring of hydrogen concentration is not required while the Waste Gas System is inerted with nitrogen. Dual oxygen monitors are provided to sample the process stream to monitor formation of explosive mixtures. An alarm is initiated at a predetermined setpoint prior to reaching a potentially explosive mixture. The Waste Gas System is designed to withstand a H_2 explosion.

The systems compressor waste gas stream is either:

- Returned directly to the Reactor Coolant System via the Volume Control Tank, or the hydrogen injector,
- Stored in the hydrogen surge tank,
- Released to the environment via the equipment vent system, or

- Recycled to the hydrogenated vent header as makeup gas.

In-Scope Boundary Description

PID-1-WG-LR20773, PID-1-NG-LR20135, PID-1-CS-20724:

The Waste Gas system boundary begins as the header enters the Primary Auxiliary Building from the Waste Processing Building. The piping divides to the chemical and volume control tank, and to the static mixer. The chemical and volume control tank line boundary ends at the Waste Gas / Nitrogen Gas System interface. The line to the static mixer line boundary includes a flow transmitter, flow control valve, check valve where the boundary ends at the Waste Gas / Chemical and Volume Control System interface.

Interfacing Systems

Not included in the Waste Gas System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Chemical and Volume Control System
- Nitrogen Gas System

System Intended Functions

Collect and process fission product gases from the reactor coolant letdown stream and from the liquids collected in the primary drain tank and reactor coolant drain tank for release to the plant vent.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)

UFSAR References

- Section 11.3.1
- Section 11.3.2

License Renewal Drawings

- PID-1-CS-LR20724
- PID-1-NG-LR20135
- PID-1-WG-LR20773

Table 2.3.3-43 Waste Gas System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary Structural Integrity (Attached)
Valve Body	Leakage Boundary (Spatial) Pressure Boundary Structural Integrity (Attached)

The aging management review results for these components are provided in Table 3.3.2-43, Summary of Aging Management Evaluation - Waste Gas System.

2.3.3.44 Waste Processing Liquid System

System Description

The Liquid Waste System [Waste Processing Liquid System (WL)] is non-nuclear safety class (NNS) and non-seismic Category I, in accordance with Regulatory Guides 1.26 and 1.29. The Liquid Waste System is designed to meet applicable requirements specified in 10 CFR, Parts 20 and 50, as follows:

- Provide a central collection point for radioactive liquid waste. This includes approximately 1200 gallons per week of reactor grade and nonreactor grade leakage from various systems and approximately 400 gallons per week of floor drainage from area wash down.
- Provide preliminary processing through the use of a strainer and filters.
- Concentrate nonvolatile and, to some extent, volatile radioactive liquid contaminants, through evaporation, with a minimum decontamination factor (D.F. = Ratio of specific activity in the bottoms and distillate) of 104, at a bottoms concentration of 12 percent by weight.
- Concentrate the residual contaminants (bottoms) up to 12 percent total dissolved solids for transfer to the Waste Solidification System.
- Produce up to 25 gpm of distillate from the evaporator/condenser. The distillate is demineralized (if necessary) and tested in the Waste Processing Liquid waste test tank before disposal offsite.
- Maintain, during normal operation, the radioactivity content of liquid effluents from the Seabrook Station site within the concentration limits expressed in 10 CFR 20, Appendix B, Table II, Column 2, on an instantaneous release basis and on an annual average release basis to maintain the radioactive liquid effluents so that the dose guidelines expressed in the Appendix I to 10 CFR 50 are not exceeded.
- Provide processing equipment and capacity sufficient to maintain radioactivity in liquid effluents within the applicable flexibility provisions of Appendix I to 10 CFR 50 during anticipated operational occurrences.

In-Scope Boundary Description

Storage and Filtration
PID-1-WL-LR20829:

The (a)(3) boundary consists of the floor drain tanks, piping and components that form the pressure boundary that allows the removal of fire fighting water from safety related building sumps where fixed water fire suppression system have been installed.

Demineralization, Test, and Tank Heating
PID-1-WL-LR20831, PID-1-AS-LR20575, PID-1-ASC-LR20902:

The (a)(2) scoping boundary begins with the two waste test tanks including the six panel heaters. The tank vent lines from the two tanks join and continue until the boundary ends as the line leaves the tank farm area. The boundary includes the waste test tank pump suction and discharge lines inside the tank farm. The boundary also includes the liquid filled components that are located in the Intake & Discharge Transition Structure. Each pump suction line includes a local drain line. The return piping from the clean up skid (1-CBS-SKD-161) ends at the Steam Generator Blowdown system interface.

Interfacing Systems

Not included in the Waste Processing Liquid System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Auxiliary Steam System
- Auxiliary Steam Condensate System
- Steam Generator Blowdown System
- Waste Processing Liquid Drains System

System Intended Functions

This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)

UFSAR References

- Section 11.2

License Renewal Drawings

- PID-1-AS-LR20575
- PID-1-ASC-LR20902
- PID-1-WL-LR20829
- PID-1-WL-LR20831

Table 2.3.3-44 Waste Processing Liquid System Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage Boundary (Spatial)
Flexible Hose	Leakage Boundary (Spatial)
Heater Housing	Leakage Boundary (Spatial)
Piping and Fittings	Leakage Boundary (Spatial)
Tank	Leakage Boundary (Spatial) Pressure Boundary
Thermowell	Leakage Boundary (Spatial)
Valve Body	Leakage Boundary (Spatial)

The aging management review results for these components are provided in Table 3.3.2-44, Summary of Aging Management Evaluation - Waste Processing Liquid System.

2.3.3.45 Waste Processing Liquid Drains System

System Description

This system includes tanks, sumps, pumps, piping and instrumentation, as required, to collect, segregate and control liquid leakage within the radioactively contaminated portions of the plant.

The Equipment and Floor Drainage System [Waste Processing Liquid Drains System (WLD)] is operable during all normal modes of operation. The entire system is classified as NNS, non-seismic Category I, non-Class 1E, with the exception of piping runs through the containment walls, and the isolation valves for these penetrations.

The system is designed to handle all anticipated normal leakage volumes from component and liquid drain sources within the area covered by the Equipment and Floor Drainage System.

The system is also designed to handle all anticipated abnormal leakage from sources such as malfunctioning pump seals, leaky flange gaskets and blown valve stem packing. The maximum expected flow rate into any one sump from all expected abnormal sources is less than the 50 gpm capacity of the sumps in areas containing safety class equipment. Abnormal flows from pipe breaks are not included in the system design.

The areas covered by this system are designed to prevent the backup of water for the areas covered by the system from within the plant or from outside.

Liquids are segregated with respect to their potential for reuse in the plant.

Pump design heads are selected to achieve full-rated pump discharge under worst case operating conditions.

The system is designed to achieve radiation levels in all areas that are as low as is reasonably achievable.

The system is designed to preclude discharge of contaminated liquids into non-contaminated systems.

The system is designed to remove water used for fire fighting. While the postulated fire using two fire hoses at 75 gpm each is in excess of the pumping capability of any two sumps, the resultant minor flooding will not prevent operation of the sump pumps or any equipment in the flooded area.

System Description (By Buildings)

1. Containment Building:

There are two sumps in the Containment Building; one on the minus 26'-0" level (sump A), the other on the minus 53'-4" level (sump B) in the reactor instrument pit. Each sump has two pumps (WLD-P-5A, 5B, 5C and 5D), each with a rated capacity of 25 gpm. Under normal conditions, the lower sump will always be dry as there are no drains directed to it. Entry of water into the instrument pit is prevented by curbs around the two openings at the minus 26'-0" elevation. The tops of these curbs are at an elevation of minus 23'-6". Part of the Equipment and Floor Drain System in the containment is the Reactor Coolant Drain Tank (1-WLD-TK-55) and its associated pumps (WLD-P-33A and 33B). Each pump has a rated capacity in excess of any leakage which could be accepted from the components draining to the RCDT.

2. Primary Auxiliary Building:

The only sump in the PAB is located on the minus 26'-0" elevation. This sump has two pumps (1-WLD-P-70A and 70B), each with a rated capacity of 25 gpm. A pump running-time-totalizer permits checking of gradual increase of leak rate from the Primary Component Cooling Water pumps and other inputs to the sump. Visual inspection of the pipe openings from the Primary Component Cooling Water pumps at the floor drain funnel permits determining which of the pumps may be leaking excessively.

3. RHR/CBS Equipment Vaults:

There are two sumps (sump A and B) in these areas, both on the minus 61'-0" elevation. Each sump has two pumps (1-WLD-P-71A and 71B for sump A and 1-WLD-P-71C and 71D for sump B). All liquid collected in this area is pumped directly from the sumps to the floor drain tanks in the Waste Processing Building.

4. Fuel Storage Building:

There are two sumps in the Fuel Storage Building, one on the 4'-0" elevation (sump A) and one on the 10'-0" elevation (sump B). Each sump has two pumps (sump A, 1-WLD-P-72A and 72B; sump B, 1-WLD-P-72C and 72D) with rated capacity of 25 gpm. All floor drain liquid in the building is pumped to the floor drain tank.

5. Waste Processing Building (not in scope for License Renewal):

The Waste Processing Building has two sumps (sump A and sump B). Both are located at the minus 31'-0" elevation, each with two pumps (1-WLD-P-

101A and 101B for sump A; 1-WLD-P-101C and 101D for sump B). Due to the differing leakage volumes expected in each sump, the pumps in sump "A" each have a rated capacity of 50 gpm, while those in sump B are rated at 25 gpm each. The majority of the leakage in the building directed to the floor drain tanks (1-WLD-TK-59A and 59B). In a separate category is the liquid pumped to the Waste Processing Building from the chemical drain tank (1-WLD-TK-86) in the Administration and Service Building. This liquid is segregated in the two chemical drain treatment tanks (1-WLD-TK-87A and 87B at 3600 gallons each) where it can be treated by adjusting the pH prior to sending it to the Solid Waste System. The liquid, depending on its characteristics, is then pumped by the chemical drain treatment pump (1-WLD-P-142, at 30 gpm) to one of the tanks listed below for disposition:

Waste Test Tank 1-WL-TK-63A & B

Floor Drain Tank 1-WL-TK-59A & B

Waste Concentrates Tank 1-WS-TK-76

Waste Feed Tanks 1-WS-TK-198A & B

Recovery Test Tanks 1-BRS-TK-58A & B

6. Administration and Service Building RCA Walkways (not in scope for License Renewal):

There is just one sump (sump A) in the Administration Building that receives drainage from all contaminated areas. The sump has a single pump (1-WLD-P-230) installed, with rated capacity of 35 gpm. There are two sumps in the Radiologically Controlled Area walkways (sump B and sump C), each with one pump (1-WLD-P-77B and 77C). There is no drainage to any of these sumps. Their purpose is to provide pumping capability in case of pipe leakage in the tunnel. The 1000-gallon chemical drain tank (1-WLD-TK-86) collects drainage from all areas in the Administration Building where the quality of the drain liquids and the contaminants therein could be such to make it undesirable for handling in the Floor Drain System. Instead, the liquid is transferred by the chemical drain transfer pump (40 gpm) to the chemical drain treatment tanks (1-WLD-TK-87A and 87B) in the Waste Processing Building for testing, treatment and final disposition, in a manner suitable to its characteristics.

In-Scope Boundary Description

Reactor Coolant Drain and Chromated Water Collection
PID-1-WLD-LR20218, PID-1-WLD-LR20222, PID-1-BRS-LR20854:

The Waste Processing Liquid Drains (WLD) System boundary begins at the Reactor Coolant Drain Tank with a connection from the Reactor Coolant System receiving influent from the Reactor Coolant pump number 2 seals and the reactor vessel seal leak-off line. The other influent is from the valve stem leak-off header, Vent Gas System up to the Waste Processing Liquid Drains/Vent Gas System interface and to a relief discharging to the containment trench. The outlet boundary continues to a relief and then divides to supply the two reactor coolant drain tank pumps. Each pump has an in-boundary cavity drain to sump "A".

The pump discharges combine to a common line continuing to the reactor coolant drain tank heat exchanger and bypass line through a flow element. The line divides with one branch returning to the tank and the second continuing through the containment penetration and isolation valves to outside the containment and to the Primary Auxiliary Building, ending as the line leaves the Primary Auxiliary Building and enters the Waste Process Building.

The chromated water collection portion of the system boundary begins with the tank and outlet piping leading to the chromated water pump and discharge line. The line divides with each line leading to a train related head tank, each terminating at the Waste Processing Liquid Drains /Primary Component Cooling Water interface.

Primary Auxiliary Building Floor Drains and Sump
PID-1-WLD-LR20222, PID-1-WLD-LR20223, PID-1-WLD-LR20229:

The Primary Auxiliary Building floor drains boundary begins with three drains and a cleanout on the 81' elevation. The line joins with sixteen drains, one cleanout and the drain from the eyewash station. The line continues to the 25' elevation where the boundary joins with eleven drains, an eyewash station, drains from a sample sink and one drain from the 37' elevation. The boundary then continues to the 7' elevation where it joins six drains from the containment enclosure via a loop seal, seven drains and three cleanouts.

Also connecting to the boundary is a line from elevation 25' elevation which collects eleven drains, one eyewash station and two cleanouts. The line continues and joins two drains and a cleanout from the (-) 6' elevation and three drains from the (-) 26' elevation.

The line also accepts a line collecting two drains on the 53' and one on the 25' elevation, the line collects three more drains on the 2' elevation, three on the (-)

6 elevation and five drains on the 7' elevation, two on the 15' 5" elevation with three cleanouts all ending as the piping enters the sump "A".

A single drain from the 26' elevation of the pipe penetration area joins with five drains and a cleanout on the 7' elevation of the Primary Auxiliary Building ending as the piping enters the PAB sump "A".

The Primary Auxiliary Building sump "A" contains two pumps discharging to a header with a sparge line. The discharge joins with the equipment vaults and waste process sump discharges and continues to the floor drain tank inlet header.

Containment Drains and Sumps
PID-1-WLD-LR20219, PID-1-WLD-LR20221:

The boundary includes eight drains from the containment '0' elevation combining and ending at the (-) 26' elevation containment trench. A single drain at the (-) 3' elevation provides drainage for the seal table. The line ends at the containment trench. Included in the boundary is the trench termination and pipe connecting to the sump.

Four additional drains at the 0' elevation combine and end upon entry into the containment sump.

Two sump pumps are included in the boundary for each sump. The sump "A" pump discharge lines combine and branch to a sump sparge line and to the discharge. The sump "B" pumps discharge line combine and join with the combined sump "A". The line continues and branches to two relief valves and exits the containment through the containment penetration and isolation valves then to the waste processing building floor drain tanks.

Equipment Vault Drains and Sumps
PID-1-WLD-LR20221, PID-1-WLD-LR20229:

The Residual Heat Removal Equipment Vault 1 boundary includes one drain from the (-) 31' 10" elevation joining two drains from the (-) 50' elevation combining with three drains from the (-) 61' elevation and one drain from the (-) 34' 6" elevation. The line ends upon entry to the equipment vault sump "A".

The Residual Heat Removal Equipment Vault 2 boundary includes one drain and a cleanout then continues to the (-) 61' elevation. The line joins with three drains from the (-) 61' elevation and ends upon entry to the equipment vault sump "B". Another drain starts at the (-) 31'-10" elevation and is joined by two other drains at the (-) 50' elevation combining with the drain at the (-) 61' elevation.

Each of the sumps contains two pumps discharging to a header with a sparge line. The discharges of the two sumps combine and join with the containment sump, Primary Auxiliary Building sump and fuel storage buildings discharge and continue to the floor drain tank inlet header.

Other System Interfaces:
PID-1-WLD-LR20220:
The Fuel Storage Building boundary includes four drains from the 64' elevation, combining with two drains at the 21' 6" elevation joining 4 drains from the 7' elevation and joining one line and a cleanout at the 25'elevation. The drain continues joined by one drain at the 4' elevation and ends at sump A.

The two sumps in the Fuel Storage Building contain two pumps discharging to a header with a sparger line. The discharges of the two sumps combine and join with the containment sump, Primary Auxiliary Building sump and discharge and continue to the floor drain tank inlet header.

PID-1-WLD-LR20225, PID-MAH-LR20494:
This boundary drawing shows a portion of the drain system that is in scope for fire protection.

PID-1-WLD-LR20228, PID-1-BRS-LR20857, PID-1-DM-LR20351, PID-1-RS-LR20252, PID-1-SB-LR20626, PID-1-SF-LR20484, PID-1-WL-LR20829, PID-1-WL-LR20830:
This boundary drawing shows some of the piping isolation boundaries for the path to the floor drain tanks.

PID-1-CC-LR20205, PID-1-CC-LR20211:

This boundary drawing shows a portion of the path from the chromated water collection tank.

PID-1-DM-LR20350:

This boundary drawing shows the drain path from safety showers in the primary auxiliary building.

PID-1-VSL-LR20776:

This boundary drawing shows floor drains that are also shown on other drawings.

PID-1-VSL-LR20777:

This boundary drawing shows Reactor Coolant and Valve Stem Leak-off connections to the system.

PID-1-WL-LR20831:

This boundary drawing shows Waste Processing Liquid System connection to waste liquid drains.

Interfacing Systems

Not included in the Waste Processing Liquid Drains System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Auxiliary Steam Condensate System
- Boron Recovery System
- Chemical and Volume Control System
- Containment Air Handling System
- Containment Building Spray System
- Containment Enclosure Air Handling System
- Demineralized Water System
- Diesel Generator
- Fuel Storage Building Air Handling System
- Mechanical Seal Supply System
- Primary Auxiliary Building Air Handling System
- Primary Component Cooling Water System
- Reactor Coolant System
- Reactor Make-up Water System
- Residual Heat Removal System
- Resin Sluicing System
- Safety Injection System
- Sample System
- Service Water System

- Spent Fuel Pool Cooling and Clean-up System
- Steam Generator Blowdown System
- Valve Stem Leak-Off System
- Vent Gas System
- Waste Processing Liquid System

System Intended Functions

Provide containment isolation function.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Environmental Qualification (EQ).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)
Provide safe shutdown control and indication (Post Accident Monitoring)	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Station Blackout (SBO).	10 CFR 54.4(a)(3)

UFSAR References

- Section 9.3.3
- Table 6.2-83
- Table 7.5-1

License Renewal Drawings

- PID-1-BRS-LR20854
- PID-1-BRS-LR20857
- PID-1-CC-LR20205

- PID-1-CC-LR20211
- PID-1-DM-LR20350
- PID-1-DM-LR20351
- PID-1-MAH-LR20494
- PID-1-RS-LR20252
- PID-1-SB-LR20626
- PID-1-SF-LR20484
- PID-1-VSL-LR20776
- PID-1-VSL-LR20777
- PID-1-WL-LR20829
- PID-1-WL-LR20830
- PID-1-WL-LR20831
- PID-1-WLD-LR20218
- PID-1-WLD-LR20219
- PID-1-WLD-LR20220
- PID-1-WLD-LR20221
- PID-1-WLD-LR20222
- PID-1-WLD-LR20223
- PID-1-WLD-LR20225
- PID-1-WLD-LR20228
- PID-1-WLD-LR20229

Table 2.3.3-45 Waste Processing Liquid Drains System Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage Boundary (Spatial)
Filter Housing	Leakage Boundary (Spatial) Pressure Boundary
Heat Exchanger Components	Leakage Boundary (Spatial)
Instrumentation Element	Leakage Boundary (Spatial)
Orifice	Pressure Boundary Throttle
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary
Piping and Fittings (Containment Isolation)	Pressure Boundary
Pump Casing	Leakage Boundary (Spatial) Pressure Boundary
Tank	Leakage Boundary (Spatial)
Thermowell	Leakage Boundary (Spatial)
Valve Body	Pressure Boundary Leakage Boundary (Spatial)
Valve Body (Containment Isolation)	Pressure Boundary

The aging management review results for these components are provided in Table 3.3.2-45, Summary of Aging Management Evaluation - Waste Processing Liquid Drains.

2.3.4 STEAM AND POWER CONVERSION SYSTEMS

The following systems are addressed in this section:

- Auxiliary Steam System (2.3.4.1)
- Auxiliary Steam Condensate System (2.3.4.2)
- Auxiliary Steam Heating System (2.3.4.3)
- Circulating Water System (2.3.4.4)
- Condensate System (2.3.4.5)
- Feedwater System (2.3.4.6)
- Main Steam System (Includes Main Steam Drain System, 2.3.4.7)
- Steam Generator Blowdown System (2.3.4.8)

2.3.4.1 Auxiliary Steam System

System Description

The Auxiliary Steam System is comprised of the following equipment:

- Two package boilers, each rated at 80,000 lbs/hr of saturated steam at 150 psig, complete with forced draft fans, breeching and common stack
- One 170,000 lb/hr de-aerating heater with storage tank
- Three motor-driven boiler feed pumps rated at 180 gpm each (one spare)
- Triplex fuel oil pumping set (one spare pump)
- One blowdown tank, one fuel oil storage tank and two skid-mounted chemical feed units
- Interconnecting piping
- Safety-related Primary Auxiliary Building isolation valves

During plant start-up excess condensate from auxiliary steam used for turbine gland sealing and shell warming is returned to the Auxiliary Steam Condensate system.

Feedwater from the de-aerator is pumped to the auxiliary boilers and evaporated. Steam is piped to building heating units and operating equipment. Building heating system condensate and the equipment steam and/or drains are added to the main cycle or returned to the auxiliary boiler de-aerator.

The boilers are fired by No. 2 fuel oil. Steam atomization is used during normal boiler operation. Air is the atomizing medium for startup.

During normal plant operation, a branch line from Main Steam System lines can supply the required steam to the Auxiliary Steam System. A pressure-reducing valve reduces the Main Steam pressure to that equivalent to the output of the auxiliary boilers. The pressure reducing station is closed during station startup, when the auxiliary boilers furnish the required steam. The Auxiliary Steam Primary Auxiliary Building isolation valves are operable from the Main Control Board and close automatically on a High Energy Line Break (HELB) signal.

In-Scope Boundary Description

Primary Auxiliary and Fuel Storage Buildings
PID-1-AS-LR20570, PID-1-HW-LR20051:

The first portion of the Primary Auxiliary Building Auxiliary Steam license renewal boundary begins as the Auxiliary Steam line enters the Primary Auxiliary Building roof and divides to a pressure control valve, bypass line and a drain trap. The outlet of the pressure control valve has two branches. The first branch supplies a pressure control valve for a hot water heat exchanger with trap. The second branch continues to the Waste Process Building before returning to the Primary Auxiliary Building where the piping and traps are included in the boundary.

A second line enters the Primary Auxiliary Building where the boundary continues to the inlet of the degassifier heat exchanger and the degassifier preheat heat exchanger with inline condensate traps. The trap drains end at the Auxiliary Steam / Auxiliary Steam Condensate interface. A branch line continues to the Fuel Storage Building supplying a regulator with a trap and five hose connections.

PID-1-MS-LR20582:

A branch connection enters the Emergency Feedwater Pump House and supplies steam for testing the steam driven Emergency Feedwater pump.

Personnel Hatch Area and West Main Steam and Feedwater Pipe Chase:
PID-1-AS-LR20569:

The boundary begins at a pipe anchor in the yard before the Auxiliary Steam piping enters the West Main Steam and Feedwater Pipe Chase. The main Auxiliary Steam line continues through the chase with the boundary terminating at a pipe anchor as the pipe exits the chase.

A branch off the main Auxiliary Steam line enters the pipe tunnel and then proceeds to the personnel hatch area where the boundary includes a regulator and bypass to the Auxiliary Steam / Auxiliary Steam Heating interface. The branch line in the pipe tunnel has a pipe terminating at the Auxiliary Steam / Auxiliary Steam Condensate interface.

Tank Farm Area
PID-1-AS-LR20571, PID-1-AS-LR20575, PID-1-ASC-LR20907, PID-1-ASC-LR20902, PID-1-WL-LR20831, PID-1-CBS-LR-20233, PID-1-BRS-LR20861:

The first Auxiliary Steam boundary in the tank farm is a continuation of the Primary Auxiliary Building piping in the tank farm. The pipe enters the tank farm and divides in four supplies. One line leads to a control valve, bypass, and drain, and ends at the heating panels for the reactor makeup water tank.

The second line leads to a control valve, bypass, and drain, and ends at the heating panels for the refueling water storage tank. The third line leads to a control valve, bypass, and drain, and ends at the heating panels for the spray additive tank. The last supply has a drain and divides into two lines, both exiting to the Primary Auxiliary Building and ending at the two unit heaters Auxiliary Steam / Auxiliary Steam Heating interface.

The second Auxiliary Steam boundary in the tank farm begins as Auxiliary Steam enters the tank farm roof and connects to four control valves, bypass drain sets, and a header drain. Two of the control valves supply the heating for Boron Recovery test tanks and the other two supply the Waste Processing Liquid tanks. The Auxiliary Steam supply piping boundary ends at each of the four tank's heaters.

The last boundary in the tank farm area are the thermowells associated with temperature indicating components that are installed in the Waste Processing Liquid system tanks 1-WL-TK-63-A and 1-WL-TK-63-B, the Refueling Water Storage Tank 1-CBS-TK-8, the Spray Additive Tank 1-CBS-TK-13, and the Boron Recovery system tanks 1-BRS-TK-58A and 58B.

Interfacing Systems

Not included in the Auxiliary Steam system license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Auxiliary Steam Condensate System
- Auxiliary Steam Heating System
- Boron Recovery System
- Chemical and Volume Control System
- Containment Building Spray System
- Hot Water Heating System
- Main Steam System
- Reactor Makeup Water System
- Waste Processing Liquid System

System Intended Functions

Provide Primary Auxiliary Building (PAB), Auxiliary Steam isolation.	10 CFR 54.4(a)(1)
Provide pressure boundary for the Refueling Water Storage Tank and the Spray Additive Tank in the Containment Building Spray system.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Environmental Qualification (EQ).	10 CFR 54.4(a)(3)

UFSAR References

- Section 10.4.11

License Renewal Drawings

- PID-1-AS-LR20569
- PID-1-AS-LR20570
- PID-1-AS-LR20571
- PID-1-AS-LR20575
- PID-1-ASC-LR20902
- PID-1-ASC-LR20907
- PID-1-BRS-LR20861
- PID-1-CBS-LR20233
- PID-1-HW-LR20051
- PID-1-MS-LR20582
- PID-1-WL-LR20831

Table 2.3.4-1 Auxiliary Steam System Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Filter Housing	Leakage Boundary (Spatial)
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary
Thermowell	Leakage Boundary (Spatial) Pressure Boundary
Trap	Leakage Boundary (Spatial)
Valve Body	Leakage Boundary (Spatial) Pressure Boundary

The aging management review results for these components are provided in Table 3.4.2-1, Summary of Aging Management Evaluation - Auxiliary Steam System.

2.3.4.2 Auxiliary Steam Condensate System

System Description

The Auxiliary Steam Condensate system is part of the Auxiliary Steam system as described in the USFAR Chapter 10.4.11.

During plant start-up, excess condensate from Auxiliary Steam used for turbine gland sealing and shell warming is returned to the Auxiliary Steam Condensate System. During normal operation, building heating system condensate and the equipment steam and/or drains are added to the main cycle or returned to the auxiliary boiler de-aerator. In the event that any of the systems being supplied with Auxiliary Steam become contaminated, the auxiliary condensate will in turn become contaminated. To prevent the auxiliary boiler from becoming contaminated, the unit is equipped with a radiation monitor which samples the condensate in the condensate return line. If the radionuclide concentration exceeds a pre-selected level, the monitor automatically terminates the condensate return.

In-Scope Boundary Description

Tank Farm Area
PID-1-ASC-LR20902:

The boundary in the tank farm area includes the Auxiliary Steam Condensate lines from the six Waste Processing Liquid System tank heating panels, three Boron Recovery System tank heating panels connecting to an Auxiliary Steam Condensate 1½-inch line (evaluated with Auxiliary Steam System) and ending as the line leaves the room and enters an area that does not contain safety related equipment.

PID-1-ASC-LR20907:

The boundary for the Refueling Water Storage Tank area includes the Auxiliary Steam Condensate lines from the Spray Additive Tank, Reactor Makeup Water System tank, and Refueling Water Storage Tank heating panels, and two unit heaters continuing into the Primary Auxiliary Building to 1-ASC-TK-116. The boundary includes 1-ASC-TK-116 piping and pumps except for roof mounted components, and ends upon exit from the building.

Personnel Hatch Area
PID-1-ASC-LR20908, PID-1-ASC-LR20926, PID-1-AS-LR20569:

The Auxiliary Steam Condensate boundary starting at the Auxiliary Steam trap drain in the personnel hatch area continues to, and returns from 1-ASC-TK-239. It then joins a line from the main steam and feedwater area Auxiliary Steam trap drain and a line from the Primary Auxiliary Building receiver (upon entry into the penetration tunnel from outside). The boundary ends upon exit from the penetration tunnel at a pipe support.

Primary Auxiliary Building
PID-1-ASC-LR20906, PID-1-AS-LR20570:

The boundary for the Primary Auxiliary Building area begins with the combined trap drains from the fuel building, and letdown degassifier and degassifier pre-heater at the Auxiliary Steam / Auxiliary Steam Condensate interface. The line continues and connects to the boundary of 1-ASC-TK-116.

PID-1-WLD-LR20223:

The boundary for the Auxiliary Steam Condensate is the drain lines from the Auxiliary Steam Condensate traps, strainers, and pump skid drains.

Fire Pump House
PID-1-ASC-LR20912:

Fire Pump House Auxiliary Steam Condensate boundary includes drains from steam lines, Unit Heaters, Tank Heaters up to and including 1-ASH-TK-280, pumps, connected piping, vents, and drains.

Interfacing Systems

Not included in the Auxiliary Steam Condensate System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Auxiliary Steam System
- Auxiliary Steam Heating System
- Boron Recovery System
- Chemical and Volume Control System
- Containment Building Spray System
- Fire Protection System
- Hot Water Heating System
- Radiation Monitoring System
- Reactor Makeup Water System
- Waste Processing Liquid System

- Waste Processing Liquid Drains System

System Intended Functions

This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)

UFSAR References

- Section 10.4.11

License Renewal Drawings

- PID-1-AS-LR20569
- PID-1-AS-LR20570
- PID-1-ASC-LR20902
- PID-1-ASC-LR20906
- PID-1-ASC-LR20907
- PID-1-ASC-LR20908
- PID-1-ASC-LR20912
- PID-1-ASC-LR20926
- PID-1-WLD-LR20223

Table 2.3.4-2 Auxiliary Steam Condensate System Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage Boundary (Spatial) Pressure Boundary
Filter Housing	Leakage Boundary (Spatial)
Instrumentation Element	Leakage Boundary (Spatial) Pressure Boundary
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary Structural Integrity (Attached)
Piping Element	Leakage Boundary (Spatial) Pressure Boundary
Pump Casing	Leakage Boundary (Spatial) Pressure Boundary
Tank	Leakage Boundary (Spatial) Pressure Boundary
Thermowell	Leakage Boundary (Spatial)
Trap	Leakage Boundary (Spatial) Pressure Boundary
Valve Body	Leakage Boundary (Spatial) Pressure Boundary

The aging management review results for these components are provided in Table 3.4.2-2, Summary of Aging Management Evaluation - Auxiliary Steam Condensate System.

2.3.4.3 Auxiliary Steam Heating System

System Description

The Auxiliary Steam Heating System provides low pressure saturated steam to various plant equipment/buildings for heating purposes.

In-Scope Boundary Description

Tank Farm Area
PID-1-ASC-LR20907:

The Auxiliary Steam Heating boundary includes the two unit heaters between the Auxiliary Steam Heating / Auxiliary Steam Condensate interfaces.

Personnel Hatch Area
PID-1-ASC-LR20908, PID-1-AS-LR20569:

The boundary begins at the Auxiliary Steam / Auxiliary Steam Heating interface in the personnel hatch area and continues through a temperature control valve to the Auxiliary Steam Heating / Hot Water Heating Supply interface at the heat exchanger. The boundary includes the piping and connected vacuum breaker. The boundary begins again at the condensate drain and continues up to the Auxiliary Steam Heating / Auxiliary Steam Condensate interfaces.

Primary Auxiliary Building
PID-1-ASC-LR20906:

The Primary Auxiliary Building Auxiliary Steam Heating System boundary includes the piping and thermostatic vent for the Primary Auxiliary Building hot water system heat exchanger. The Auxiliary Steam Heating boundary also includes the condensate drains up to the Auxiliary Steam Heating / Auxiliary Steam Condensate interfaces at the inlet to the trap, and the trap bypass line.

Fire Pump House
PID-1-ASC-LR20912:

The fire pump house Auxiliary Steam Heating boundary begins with the Auxiliary Steam Heating boiler, including the stack, and continues until it exits from the roof. The boundary continues with the steam outlet piping and drain trap. The boundary continues to include five unit heaters and drain lines up to the traps. The supply boundary also includes piping and control valves up to two fire tank heaters, continuing at the exit of the heaters to the traps. The supply piping boundary ends with a line up to the trap and ending at the Auxiliary Steam Heating / Auxiliary Steam Condensate interface on the drain line.

Near Personnel Hatch Area
PID-1-HW-LR20056:

Steam supply to the Hot Water Heating System heat exchanger 1-HWS-E-132 and the associated temperature control valve and piping.

Interfacing Systems

Not included in the Auxiliary Steam Heating System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Auxiliary Boiler (All Systems)
- Auxiliary Steam System
- Auxiliary Steam Condensate System
- Hot Water Heating System
- Fire Protection System

System Intended Functions

This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)

UFSAR References

- Section 10.4.11

License Renewal Drawings

- PID-1-AS-LR20569
- PID-1-ASC-LR20906
- PID-1-ASC-LR20907
- PID-1-ASC-LR20908
- PID-1-ASC-LR20912
- PID-1-HW-LR20056

Table 2.3.4-3 Auxiliary Steam Heating System Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage Boundary (Spatial) Pressure Boundary
Filter Element	Filter
Filter Housing	Leakage Boundary (Spatial) Pressure Boundary
Heat Exchanger Components	Leakage Boundary (Spatial) Heat Transfer Pressure Boundary
Instrumentation Element	Pressure Boundary
Piping Element	Pressure Boundary
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary
Tank	Pressure Boundary
Thermowell	Leakage Boundary (Spatial)
Valve Body	Leakage Boundary (Spatial) Pressure Boundary

The aging management review results for these components are provided in Table 3.4.2-3, Summary of Aging Management Evaluation - Auxiliary Steam Heating System.

2.3.4.4 Circulating Water System

System Description

The Circulating Water System provides cooling water to the main condensers to remove the heat rejected by the turbine cycle and auxiliary systems. The design of the system also includes the capability for furnishing cooling water to the Service Water System, and returning it to the Circulating Water discharge flow. Cooling and lubricating water for the Circulating Water pumps and motors is provided by the discharge of the operating pumps. On the startup of the first Circulating Water pump, the Service Water Screen Wash System pump provides the water source.

In-Scope Boundary Description

Intake and Discharge Transition Structures:
PID-1-CW-LR20673:

The Circulating Water System intake boundary begins at the Intake Transition Structure drywell wall through four 102-inch lines, with one valve and one expansion joint per line, ending at the Circulating Water system pump bay inlet flumes. Two of the four lines are associated with Unit 2 and are not used, but are subject to ground water in-leakage and are thus, included in the boundary.

The Circulating Water system discharge boundary begins at the Discharge Transition Structure drywell wall through two 120-inch lines, valves (1-CW-V-38 and 2-CW-V-68) and expansion joints ending at the Discharge Transition Structure. The Unit 1 return boundary contains an 8-inch connection to the Chlorination System booster pump. Two 120-inch backwash supply lines consisting of piping, valves (1-CW-V-40 and 2-CW-V-70), and expansion joints are located in the Discharge Transition Structure drywell and connect the Discharge Transition Structure to the Unit 1 and Unit 2 backwash conduits.

The boundary includes two 120-inch Circulating Water backwash return lines consisting of piping, valves (1-CW-V-39 & 2-CW-V-69), and expansion joints which are located in a drywell and connect the Unit 1 return flow (backwash) and storm drain effluent to the Intake Transition Structure.

The boundary also includes intake and discharge temperature instrumentation and a vent.

Interfacing Systems

Not included in the Circulating Water system license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Chlorination system

System Intended Functions

This system contains components which perform functions credited for Non Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)

UFSAR References

- Section 10.4.5

License Renewal Drawings

- PID-1-CW-LR20673

Table 2.3.4-4 Circulating Water System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Leakage Boundary (Spatial)
Expansion Joint	Leakage Boundary (Spatial)
Piping and Fittings	Leakage Boundary (Spatial)
Thermowell	Leakage Boundary (Spatial)
Valve Body	Leakage Boundary (Spatial)

The aging management review results for these components are provided in Table 3.4.2-4, Summary of Aging Management Evaluation - Circulating Water System.

2.3.4.5 Condensate System

System Description

The Condensate System, in conjunction with the Feedwater System, returns the condensate from the turbine condenser hotwells through the regenerative feed heating cycle to the steam generators while maintaining the water inventories throughout the cycle.

Three motor-driven, constant-speed, vertical canned-type condensate pumps withdraw condensate from the three condenser hotwells. During normal operation, only two pumps will be operating and one will be on standby. Seal and priming water are supplied to the condensate pumps from the Condensate Storage Tank or the Demineralized Water System. The condensate pumps discharge into a common header that carries the flow to the steam packing exhauster, which condenses the turbine sealing steam and exhausts noncondensibles through blowers to the atmosphere. The common condensate header distributes the flow equally to the suction side of the two steam generator feed pumps.

Condenser hot well makeup is provided from either the Condensate Storage Tank or the Demineralized Water Storage Tanks upon receipt of a hotwell low level signal. The Condensate Storage Tank is protected from freezing by a recirculation system which utilizes a heat exchanger and pump controlled by tank temperature. All Condensate System connections to the Condensate Storage Tank which are required for normal system operation are located above the tank level required for emergency plant shutdown. The bottom half of the tank (212,000 gallons) is used only for emergency plant shutdown and cooldown by the Emergency Feedwater pumps. The Emergency Feedwater System is evaluated under the Feedwater System.

A steam generator startup feed pump provides normal requirements for startup, cooldown, and no-load operation. The pump takes suction from the Condensate Storage Tank and discharges through a startup heater into the high pressure feed water heater discharge piping. The Startup Feedwater System is evaluated under the Feedwater System. The condensate pumps can also be used for startup by using the steam generator feed water pump bypass piping.

In-Scope Boundary Description

Condensate Storage Tank and Turbine Building
PID-1-CO-LR20426, PID-1-DM-LR20349, PID-1-CO-LR20423, PID-1-CO-LR20422, PID-1-CPS-LR20152:

The Condensate System license renewal boundary begins with the Condensate Storage Tank. The high and low suction pipes join and exit the Condensate Storage Tank enclosure. The line continues through the yard and into the Turbine Building where it provides suction for the startup feed pump and the suction line valve to the condensate transfer pump and includes the bypass line around the pump. The line continues through the condensate heat exchanger and returns to the Condensate Storage Tank, a branch line ends at 1-DM-V-551. Connecting to this line are the demineralized water tank demineralized water makeup line from the Condensate / Demineralized Water interface, a line from the Condensate Storage Tank make up, an isolated line to the condenser shell, an isolated line to the condensate pump suction header, an isolated line terminating at 1-CO-V-518, a connection to the condenser outlet valves stem and condensate pump seal water, the startup feed pump lube oil cooler outlet, a connection from condensate cleaning up to the first check valve, and makeup to the polishing system to the Condensate / Condensate Polishing System interface. Also included in the boundary is the piping from the outlet of the restricting orifice to the inlet of the lube oil heat exchanger, and the line from the tank heater as it exits the Condensate Storage Tank building.

Emergency Feedwater
PID-1-FW-LR20688, PID-1-CO-LR20426:

The Emergency Feedwater portion of the boundary includes the two individual Emergency Feedwater suction lines from the Condensate Storage Tank to the Emergency Feedwater pumps. The combined miniflow line from the Feedwater / Condensate interface to the Condensate Storage Tank is included.

Interfacing Systems

Not included in the Condensate System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Demineralized Water System
- Feedwater System

System Intended Functions

Provide water supply to Emergency Feedwater pumps and alternate connection from the Condensate Storage Tank to the Spent Fuel Pool.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Anticipated Transient Without a Scram (ATWS).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Station Blackout. (SBO).	10 CFR 54.4(a)(3)

UFSAR References

- Section 6.8.2
- Section 9.2.6
- Section 10.4.7
- Table 7.4-1

License Renewal Drawings

- PID-1-CO-LR20422
- PID-1-CO-LR20423
- PID-1-CO-LR20426
- PID-1-CPS-LR20152
- PID-1-DM-LR20349
- PID-1-FW-LR20688

Table 2.3.4-5 Condensate System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Instrumentation Element	Pressure Boundary
Heat Exchanger Components	Pressure Boundary
Orifice	Pressure Boundary Throttle
Piping and Fittings	Pressure Boundary
Piping Element	Pressure Boundary
Pump Casing	Pressure Boundary
Tank	Pressure Boundary
Thermowell	Pressure Boundary
Valve Body	Pressure Boundary

The aging management review results for these components are provided in Table 3.4.2-5, Summary of Aging Management Evaluation - Condensate System.

2.3.4.6 Feedwater System

System Description

The Feedwater System receives water from the Condensate System and a portion of the Heater Drain System, (specifically, drains from high pressure heaters No. 6, low pressure heaters No. 5, moisture separator reheater shell drains and moisture separator reheater drains). The feedwater is pumped through the final stage of feedwater heaters (high pressure heaters No. 6) to the four steam generators.

The four feedwater lines exit the Turbine Building; two routed east of the Containment and two routed west, where they enter the East and West Main Steam and Feedwater Pipe Chases. The east and west pipe chases house the feedwater isolation valves, which are located just upstream of the containment penetrations and connections to the steam generators. Immediately upstream of the feedwater isolation valve is a check valve and a flow measuring device. The Emergency feedwater pump discharge connection to each main feedwater line is located between the containment penetration and the feedwater isolation valve.

An ultrasonic feedwater flow measurement system is installed in the common feedwater header just upstream of the feedwater regulating valves. This system is comprised of a 36-inch in-line flow measurement spool piece and a local system processor panel. The ultrasonic flow measurement system provides high accuracy mass flow, feedwater temperature and feedwater pressure signals to the Main Plant Computer System via a digital communication link. These signals are utilized as inputs to the secondary power calorimetric calculation performed by the Main Plant Computer System.

Each steam generator feedwater pump has a recirculation control system which protects the pumps from damage at low loads by ensuring minimum flow. A feed pump gland seal water system regulates the flow of condensate from the condensate pump discharge header to the feed pump seals. Leak-off from the seals to the seal water receiver tank is returned to the condenser using a tank level controller which operates a control valve in the outlet line from the tank to the condenser.

Individual steam turbines drive the steam generator feedwater pumps. The turbine drives are of the dual admission type, and each is equipped with two sets of stop and control valves. One set regulates high pressure steam from the Main Steam System, and the other set regulates low pressure steam extracted from the crossover piping. Gland steam is provided to the turbines from the main turbine gland steam supply system. The exhaust steam from the steam generator feedwater pump turbine drives is condensed in main condenser shells "A" and "C".

One steam generator startup feed pump provides normal requirements for startup, cooldown and no-load operation. The pump takes suction from the Condensate Storage Tank and discharges through a startup heater into the high pressure feed water heater discharge piping. The pump suction may also be aligned to the Demineralized Water Storage Tanks as a backup water source. Startup feedwater flow may also be directed through both high pressure feed water heaters in series. The Startup Feedwater System is described in Subsection 10.4.12 of the UFSAR. The condensate pumps can also be used for startup by using the steam generator feedwater pump bypass piping. A sampling system is provided and connected to various points in the Condensate, Feedwater and Heater Drains Systems (see UFSAR Subsection 9.3.2).

Condensate and Feedwater chemistry is controlled as described in UFSAR Subsection 10.3.5.

The chemical feed for the condensate and steam generator wet lay up systems is stored in covered tanks for personnel protection.

Emergency Feedwater System

Upon loss of normal feedwater flow, the reactor is tripped, and the decay and sensible heat is transferred to the steam generators by the Reactor Coolant System via the reactor coolant pumps or by natural circulation when the pumps are not operational.

Heat is removed from the steam generators via the main condensers or the main steam safety and/or steam generator atmospheric relief valves. Steam generator water inventory is maintained by water makeup from the Emergency Feedwater System. The system will supply feedwater to the steam generators to remove sufficient heat to prevent the over-pressurization of the Reactor Coolant System, and to allow for eventual system cooldown.

The Emergency Feedwater System is comprised of two full-sized pumps (one motor and one turbine driven) whose water source is the Condensate Storage Tank. Suction lines are individually run from the Condensate Storage Tank to each pump. A common emergency feedwater pump recirculation line discharges back to the Condensate Storage Tank. This return line functions for recirculation pump testing and ensures minimum flow to prevent pump damage for any system low-flow operating condition. Both pumps feed a common discharge header, which in turn supplies the four emergency feed lines. The common discharge header includes normally open gate valves between each branch connection to provide isolation in the event of a pipe break or for maintenance. Each emergency feed line is connected to one of the main feedwater lines downstream of the Feedwater isolation valve. Each main feedwater line enters the containment through a single penetration and feeds a single steam generator.

Additional redundant pumping capability is provided by the startup feed pump in the Feedwater System.

A dedicated 196,000 gallons of demineralized water is maintained in the lower half of the Condensate Storage Tank for the exclusive use of the Emergency Feedwater System.

The branch lines to each steam generator include a manual gate isolation valve, two motor-operated flow control valves, a flow venturi, and a flow orifice. The flow control valves are normally in the open position when the system is not operating and are automatically closed during system operation in the event of a pipe break. These valves can be operated remotely as described in UFSAR Subsection 6.8.5 to control steam generator water level. Two valves in series are provided for redundancy and are powered from different trains. Each valve is also provided with a hand wheel to permit manual operation. The open position of the flow control valves for system limiting conditions will be set to insure the minimum required flow of 470 gpm to three steam generators and a minimum total flow of 650 gpm to four steam generators with one emergency feedwater pump operational.

In-Scope Boundary Description

Startup Feedwater
PID-1-CO-LR20423, PID-1-CO- LR20426, PID-1-FW- LR20687, PID-1-FW-LR20688:

The startup feedwater portion of the license renewal boundary begins with the startup feed pump and first stage supply to the gland seals and to the lube oil cooler. The boundary continues with the pump discharge line and mini-flow piping up to the normally closed pressure control valve. The piping continues at a tie-in line and provides a flow path to the emergency feedwater pumps discharge header and ends at three normally closed valves at interface points a line to the condenser with a normally installed spectacle flange and closed valve, a makeup line to the condenser ending at the feedwater / condensate interface, and a line to the Feedwater / Condensate interface.

PID-1-FW-LR20691:

The lube oil starts at the suction from the lube oil reservoir and continues to the lube oil pump. The discharge passes through a cooler and filter before splitting into two lines, one feeding the outboard pump bearing and the other the motor side pump bearing and the motor bearings. The return flows to the reservoir. A prelube pump takes suction on the oil reservoir and discharges to the same discharge piping as the shaft driven pump.

Emergency Feedwater
PID-1-FW-LR20688, PID-1-FW-LR20686:

The electrically driven emergency Feedwater pump boundary includes the thrust balancing pipe and the first stage supply to gland seals including the restricting orifices.

The turbine driven pump boundary includes the thrust balancing pipe, a first stage supply to gland seals, including the restricting orifices, piping, and orifice to the tube side of the lube oil cooler. The lube oil boundary includes the shaft driven oil pump. The pump suction includes the oil returning from the bearings and any oil from the overpressure relief valve. The pump discharge line flows to the lube oil cooler shell then through an oil filter and on to the pump bearings and governor bearing. Both pumps discharge lines connect to mini-flow lines which join and continue to the Condensate Storage Tank, ending at a Feedwater / Condensate interface. The pumps discharge boundary then joins in a common loop header.

PID-1-FW-LR20690, PID-1-CAS-LR-20411, PID-1-DF-LR20200:

The boundary on these drawings consists of non-safety related components which consist of all the liquid filled components that are contained in safety related buildings.

PID-1-MS-LR20580, PID-1-MS-LR20581:

The boundary on these drawings consists of safety related piping components which are downstream of the Main Steam root valves to Feedwater instruments.

Interfacing Systems

Not included in the Feedwater System license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Condensate System
- Main Steam System
- Plant Floor Drain System
- Sample System
- Steam Generators
- Steam Generator Blowdown System

System Intended Functions

Provide design basis reactor coolant system decay heat removal with Emergency Feedwater pumps 1-FW-P-37A and 1-FW-P-37B.	10 CFR 54.4(a)(1)
Maintains design basis water inventory and indication for the Emergency Feedwater function.	10 CFR 54.4(a)(1)
Protect Emergency Feedwater inventory by automatic isolation of a faulted steam generator while maintaining flow to the intact steam generators.	10 CFR 54.4(a)(1)
Maintain main Feedwater to Emergency Feedwater isolation during normal power operation.	10 CFR 54.4(a)(1)
Provide safe shutdown control and indication (Post Accident Monitoring).	10 CFR 54.4(a)(1)
Provide Feedwater flow isolation, including line break reverse flow.	10 CFR 54.4(a)(1)
Provide design basis response to ESFAS signals.	10 CFR 54.4(a)(1)
Provide design basis reactor trip, ESFAS, and ATWS signals.	10 CFR 54.4(a)(1)
Provide Containment Isolation function.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Anticipated Transients without Scram (ATWS).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Environmental Qualification (EQ).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Station Blackout (SBO).	10 CFR 54.4(a)(3)

UFSAR References

- Section 6.8
- Section 9.3.2
- Section 10.3.5
- Section 10.4.7
- Section 10.4.12
- Table 7.4-1
- Table 7.5-1
- Table 6.2-83

License Renewal Drawings

- PID-1-CAS-LR20411
- PID-1-CO-LR20423
- PID-1-CO-LR20426
- PID-1-DF-LR20200
- PID-1-FW-LR20686
- PID-1-FW-LR20687
- PID-1-FW-LR20688
- PID-1-FW-LR20690
- PID-1-FW-LR20691
- PID-1-MS-LR20580
- PID-1-MS-LR20581

Table 2.3.4-6 Feedwater System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Filter Housing	Leakage Boundary (Spatial) Pressure Boundary
Heat Exchanger Components	Heat Transfer Pressure Boundary
Instrumentation Element	Pressure Boundary Leakage Boundary (Spatial)
Orifice	Pressure Boundary Throttle
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary
Piping Element	Pressure Boundary
Pump Casing	Leakage Boundary (Spatial) Pressure Boundary
Tank	Leakage Boundary (Spatial) Pressure Boundary
Thermowell	Leakage Boundary (Spatial) Pressure Boundary
Turbine Casing	Pressure Boundary
Valve Body	Leakage Boundary (Spatial) Pressure Boundary

The aging management review results for these components are provided in Table 3.4.2-6, Summary of Aging Management Evaluation - Feedwater System.

2.3.4.7 Main Steam System (Includes Main Steam Drain System)

System Description

The major function of the Main Steam System is to transport the steam generated in the four steam generators to the turbine generator for conversion to electrical power. Heat transferred from the reactor core to the reactor coolant system is subsequently transferred across the steam generator U-tubes for conversion of secondary feedwater into Main Steam. This steam passes through a moisture separator and a flow restrictor as it leaves the steam generator and enters its Main Steam header. The moisture separator improves steam quality, while the flow restrictor prevents excessive steam flow in the event of an unisolable steam line rupture.

The Main Steam System utilizes the following major components:

- Atmospheric steam dump valves (4)
- Steam Generator safety valves (20)
- Main Steam isolation valves (4)
- Main Steam manifold
- Main condenser steam dump valves (12)

Each of the four steam headers penetrates the containment structure and enters the East and West Main Steam and Feedwater Pipe Chase. The pipe chases consist of independent east and west structures, each containing two steam headers. The Main Steam headers travel through the pipe chases to the Main Steam manifold and then into the turbine building. One atmospheric steam dump valve and five steam generator safety valves branch off of each header upstream of the Main Steam isolation valve. The atmospheric steam dump valves act as an alternate heat sink for the reactor core, and the steam generator safety valves provide overpressure protection for the steam generator secondary side. Each header contains a Main Steam isolation valve. These valves provide automatic isolation in the event of a Main Steam line break. The Main Steam isolation valves are designed to seat against full steam pressure in either direction.

The four Main Steam headers leave the pipe chases and join at the Main Steam manifold outside the south end of the turbine building. The Main Steam manifold distributes the steam load evenly between the four steam generators. The Main Steam manifold discharges to the turbine building via six headers. Four of these headers supply the high pressure turbine. The remaining two headers supply the following components:

- Moisture separator reheaters
- Steam Generator feed pump turbines
- Auxiliary Steam System
- Main condenser steam dump valves

The steam driven emergency feed pump requires a guaranteed source of steam in the event the Main Steam isolation valves are closed. Therefore, two 100% capacity steam supplies are provided for the steam driven emergency feed pump. The emergency feed pump supply headers are connected to Main Steam headers "A" and "B" only, upstream of the Main Steam isolation valve. That arrangement ensures that at least one source, from either the East or West Main Steam and Feedwater Pipe Chase, is available to supply the required steam flow.

The Main Steam Drain System components and functions were moved into the Main Steam System for evaluation.

In-Scope Boundary Description

Main Steam
PID-1-MS-LR20580, PID-1-MS-LR20581, PID-1-MS-LR20583:

The Main Steam boundary consists piping downstream of the four flow restrictors on each steam generator. The boundary continues to and includes the forgings downstream of the Main Steam isolation valves. This boundary also includes the Main Steam instruments and up to the root valves on the Feedwater component instruments.

The boundary also includes piping, atmospheric relief valves, discharge lines with noise silencers, emergency feed pump turbine (on the "A" and "B" steam lines only) and the safety relief valves and ball joints up to where the pipe exits the roof. In addition, the boundary includes main stream drain piping.

Emergency Feedwater Pump Supply
PID-1-MS-LR20582, PID-1-MS-LR20587:

Each Main Steam supply for the turbine Emergency Feedwater pump boundary continues from the Main Steam lines for the "A" or "B" steam generators, through a manual isolation, connecting to a drain line and continuing to a control valve then joining to a single line with a control valve and to the stop/throttle valve integral with the turbine ending at the turbine inlet. The supply piping and turbine incorporates various vents and drains shown on the drawing. The drain boundaries terminate on exit from the East and West Main Steam and Feedwater Pipe Chases.

Main Steam Drains
PID-1-DF-LR20200:

The Main Steam Drains to the miscellaneous buildings' drains go to the East and West Main Steam and Feedwater Pipe Chase sumps.

Interfacing Systems

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

- Auxiliary Steam System
- Feedwater System
- Instrument Air System
- Nitrogen Gas System
- Plant Floor Drain System
- Steam Generators

System Intended Functions

Provide steam to the turbine-driven Emergency Feedwater pump.	10 CFR 54.4(a)(1)
Transport steam from the Steam Generator to the main turbine. (Safety-related up to the Class 2 Forging downstream of the Main Steam Isolation Valves.)	10 CFR 54.4(a)(1)
Provide Steam Generator secondary side overpressure protection.	10 CFR 54.4(a)(1)
Provide controlled cooldown capability and primary pressure control using the Atmospheric Steam Dump Valves when the condenser is not available.	10 CFR 54.4(a)(1)
Provide steam line isolation.	10 CFR 54.4(a)(1)
Provide indication, control, and protection signals.	10 CFR 54.4(a)(1)

Provide safe shutdown control and indication (Post Accident Monitoring).	10 CFR 54.4(a)(1)
Drain accumulated condensate from the Emergency Feedwater turbine-driven pump steam supply lines.	10 CFR 54.4(a)(1)
Provide Containment Isolation function.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Environmental Qualification (EQ).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Anticipated Transients Without Scram (ATWS)	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Station Blackout (SBO).	10 CFR 54.4(a)(3)

UFSAR References

- Section 10.3
- Table 6.2-83
- Table 7.4-1
- Table 7.5-1

License Renewal Drawings

- PID-1-MS-LR20580
- PID-1-MS-LR20581
- PID-1-MS-LR20582
- PID-1-MS-LR20583
- PID-1-MS-LR20587
- PID-1-DF-LR20200

Table 2.3.4-7 Main Steam System
Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Filter Housing	Leakage Boundary (Spatial) Pressure Boundary
Instrumentation Element	Leakage Boundary (Spatial)
Orifice	Leakage Boundary (Spatial) Pressure Boundary Throttle
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary
Piping Element	Leakage Boundary (Spatial)
Pump Casing	Pressure Boundary
Tank	Pressure Boundary
Trap	Leakage Boundary (Spatial)
Valve Body	Leakage Boundary (Spatial) Pressure Boundary

The aging management review results for these components are provided in Table 3.4.2-7, Summary of Aging Management Evaluation - Main Steam System.

2.3.4.8 Steam Generator Blowdown System

System Description

Each of the four steam generators is provided with a bottom blowdown connection on the secondary side above the tube sheet. During normal operation, each steam generator undergoes continuous blowdown with the blowdown water passing through a containment isolation valve, flow meter, and system valves. A small quantity of blowdown is continuously drawn off automatically into the sample system through a sample heat exchanger for monitoring of the activity in the blowdown. If the activity in the blowdown discharge is higher than allowable, blowdown is automatically secured. The blowdown liquid then flows through a manual control valve which establishes the blowdown rate. Some of the liquid flashes upon passing through the control valve, and two-phase flow then enters the flash tank. There, approximately 30 percent of the blowdown flow exits the top of the tank as saturated steam. The remaining 70 percent exits the bottom of the tank as saturated water.

In-Scope Boundary Description

Steam Generator Blowdown to 1-SB-TK-40
PID-1-RC-LR20841, PID-1-RC-LR20842, PID-1-RC-LR20843, PID-1-RC-LR20844, PID-1-SB-LR20626, PID-1-FW-LR20690, PID-1-SS-LR20521:

Each of the four Steam Generator Blowdown loop license renewal boundaries begins at two connections, each with a manual isolation valve, on the shell of the associated steam generator. The two individual connections join and connect to a drain. The loop steam blowdown lines leave the containment with inside and outside containment isolation valves and continue to the Primary Auxiliary Building. In the Primary Auxiliary Building the boundary includes a connection to the Steam Generator Recirculation and Wet Lay-up pumps ending at the Steam Generator Blowdown / Feedwater interface. The boundaries continue to a flow element and piping to the sample system. Each boundary continues to include the blowdown flash tank.

Blowdown Flash Tank:
PID-1-SB-LR20626, PID-1-SB-LR20627, PID-1-SB-LR20629, PID-1-FW-LR20690, PID-1-WL-LR20831, PID-1-WLD-LR20222:

The boundary continues with the blowdown flash tank including relief valves and discharge lines to atmosphere. A tank drain is connected to Waste Processing Liquid Drains. The vapor outlet of the tank divides to continue to the flash steam condenser and to the normal vapor extraction to the turbine building with the boundary ending as the line exits the pipe chase and enters the yard.

The liquid effluent from the flash tank divides and enters the two flash tank bottoms coolers. The "B" heat exchanger has a relief valve and tailpipe included in the boundary. The piping leaving the heat exchangers combine and connect to a normally isolated line to the distillate pumps, and then continues through a level control valve, and continues connecting to two radiation monitor connections. The piping enters the Waste Process Building where it divides to two branches. The first branch has a control valve and the line branches to the liquid waste system ending at the Steam Generator Blowdown / Waste Processing Liquid interface and to the blowdown recovery system ending as the line exits the Waste Process Building. The second branch exits to the liquid waste drain where it ends at the Steam Generator Blowdown / Waste Processing Liquid Drains interface, and to the blowdown recovery system where the boundary ends at two points, as it leaves the pipe chase and as it enters the portion of the Waste Process Building, which is not in scope.

The condensate drain line boundary from the flash steam condenser continues and divides to the two flash tank distillate pumps and a bypass line. The three lines join at the exit of the pumps and include a recirculation line back to the flash steam condenser. The distillate discharge line divides and the boundary terminates as the line leaves the Primary Auxiliary Building.

Interfacing Systems

Not included in the Steam Generator Blowdown system license renewal scoping boundaries are the following interfacing systems, which are separately evaluated as license renewal systems:

- Demineralized Water System
- Feedwater System
- Nitrogen Gas System
- Radiation Monitoring System
- Sample System
- Steam Generators
- Waste Processing Liquid System
- Waste Processing Liquid Drains System

System Intended Functions

Maintain steam generator secondary side pressure boundary	10 CFR 54.4(a)(1)
Provide blowdown isolation on a high energy line break signal.	10 CFR 54.4(a)(1)
Provide safe shutdown control and indication (Post Accident Monitoring)	10 CFR 54.4(a)(1)
Provide Containment Isolation function.	10 CFR 54.4(a)(1)
This system contains components which perform functions credited for Non-Safety Affecting Safety (NSAS).	10 CFR 54.4(a)(2)
This system contains components which perform functions credited for Environmental Qualification (EQ).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Fire Protection (FP).	10 CFR 54.4(a)(3)
This system contains components which perform functions credited for Station Blackout (SBO).	10 CFR 54.4(a)(3)

UFSAR References

- Section 10.4.8
- Table 6.2-83
- Table 7.4-1
- Table 7.5-1

License Renewal Drawings

- PID-1-FW-LR20690
- PID-1-RC-LR20841
- PID-1-RC-LR20842
- PID-1-RC-LR20843

- PID-1-RC-LR20844
- PID-1-SB-LR20626
- PID-1-SB-LR20627
- PID-1-SB-LR20629
- PID-1-SS-LR20521
- PID-1-WL-LR20831
- PID-1-WLD-LR20222

Table 2.3.4-8 Steam Generator Blowdown System Components Subject to Aging Management Review

Component Type	Intended Function
Bolting	Pressure Boundary
Filter Housing	Leakage Boundary (Spatial)
Heat Exchanger Components	Leakage Boundary (Spatial)
Instrumentation Element	Pressure Boundary
Orifice	Leakage Boundary (Spatial)
Piping and Fittings	Leakage Boundary (Spatial) Pressure Boundary
Pump Casing	Leakage Boundary (Spatial)
Tank	Leakage Boundary (Spatial)
Thermowell	Leakage Boundary (Spatial)
Valve Body	Leakage Boundary (Spatial) Pressure Boundary

The aging management review results for these components are provided in Table 3.4.2-8, Summary of Aging Management Evaluation - Steam Generator Blowdown System.

2.4 SCOPING AND SCREENING RESULTS: STRUCTURES AND STRUCTURAL COMPONENTS

The determination of structures and structural components within the scope of license renewal is made by identifying Seabrook Station structures and structural components and then reviewing them to determine which ones satisfy one or more of the criteria in 10 Code of Federal Regulations (CFR) 54.4. This process is described in LRA Section 2.1 and the results of the structures and structural components review are contained in LRA Section 2.2. LRA Section 2.1 also provides the methodology for determining the components within the scope of 10 CFR 54.4 that meet the requirements contained in 10 CFR 54.21(a)(1). The structural components that meet these screening criteria are identified in this section. These identified structural components subsequently require an aging management review for license renewal.

The structures and structural components in the scope of license renewal:

- Buildings, Structures Within License Renewal (2.4.1)
- Containment Structures (2.4.2)
- Fuel Handling and Overhead Cranes (2.4.3)
- Miscellaneous Yard Structures (2.4.4)
- Primary Structures (2.4.5)
- Supports (2.4.6)
- Turbine Building (2.4.7)
- Water Control Structures (2.4.8)

2.4.1 BUILDINGS, STRUCTURES WITHIN LICENSE RENEWAL

Structures Description

The Building, Structures Within License Renewal are miscellaneous buildings that are non-nuclear safety related whose failure could prevent satisfactory accomplishment of a 10 CFR 54.4(a)(1) function or house equipment for any of the 10 CFR 54.4(a)(3) regulated events.

Discharge Transition Structure

The Discharge Transition Structure provides path to discharge cooling water from condenser through discharge tunnel to the ocean, during normal operation. Discharge Transition Structure is also aligned to provide water from discharge tunnel to the Service Water Pumphouse and the Circulating Water Pumphouse if necessary. Discharge Transition Structure is a Non-Category I, seismic structure.

The Discharge Transition Structure also acts as a barrier, designed to resist internal and external missiles.

Fire Pumphouse (including Fire Protection Water Storage Tanks (foundations only), Fire Pumphouse Boiler Building, Boiler Fuel Tank (foundation and steel framing only), and two Fuel Oil Day Tanks (foundations and steel framing only)

The Fire Pumphouse is a Non-Category I, seismic structure which houses electric and diesel-driven fire pumps and associated controls for use in extinguishing any fire that may occur on the site.

Two 500,000 gallon water storage tanks are located adjacent to the Fire Pumphouse. The Fire Protection Water Storage Tanks are Non-Category I, seismic structure.

The Fire Pumphouse Boiler Building & Boiler Fuel Tank are Non-Category I, seismic structure. They are located adjacent to east of the Fire Pumphouse. The Boiler provides heat to the Fire Pumphouse.

Two Fuel Oil Day Tanks provide diesel to the 2 diesel driven fire pumps.

Intake Transition Structure

The Intake Transition Structure provides seawater from the ocean and intake tunnel to the Service Water Pumphouse and the Circulating Water Pumphouse. Intake Transition Structure serves as surge chamber that stabilizes changing water levels. Intake Transition Structure is a Non-Category I, seismic structure.

The Intake Transition Structure also acts as a barrier, designed to resist internal and external missiles.

Nonessential Switchgear Building

The Nonessential Switchgear Building is located on the north side of the Control Building and houses and protects the electrical equipment used to provide lighting for the plant. The building houses Appendix R emergency lighting needed for operation of safe shutdown equipment and for access and egress routes thereto. It is a Non-Category I, seismic structure.

Nonessential Switchgear Building is designed mechanistically to fall away from the Control and Diesel Generator Building under the action of a collapsing of Administration and Service Building. Thus, no significant load is applied to the Control and Diesel Generator Building by either the falling Administration and Service Building or the falling Nonessential Switchgear Building (due to tornado wind and Safe Shutdown Earthquake (SSE) loadings).

Revetment

The Revetment provides flood protection for safety-related structures from a predicted Probable Maximum Hurricane (PMH) Surge. To ensure the flood protection of the safety-related structures during peak PMH surge, protective retaining wall, vertical seawall and revetment (riprap) have been provided along the portions of the site perimeter which will be exposed to wave action. These protective structures are Non-Category I, seismic structure.

Steam Generator Blowdown Recovery Building

The Steam Generator Blowdown Recovery Building is located on the south side of the Waste Processing Building and Tank Farm area, and houses the Steam Generator Blowdown Recovery System.

The Steam Generator Blowdown Recovery Building is a Non-Category I, seismic structure. The tornado effects of the steel framing portion upon the systems and components located within the Steam Generator Blowdown Recovery Building are not a design consideration because the loss of function of these systems and components will not affect the capability of a safe reactor shutdown. The Steam Generator Blowdown Recovery Building is designed not to collapse.

Structures Intended Functions

The Revetment provides protection of safety related structures, systems, and components from Maximum Credible Flood.	10CFR54.4(a)(2)
The Nonessential Switchgear Room provides protection of safety related structures, systems, and components from collapse of the Nonessential Switchgear Room.	10CFR54.4(a)(2)

The Steam Generator Blowdown Recovery Building provides protection of safety related structures, systems, and components from collapse of the Steam Generator Blowdown Recovery Building.	10CFR54.4(a)(2)
The Discharge Transition Structure and the Intake Transition Structures provide the path for ocean water supply to the Service Water Pumphouse and the Circulating Water Pumphouse. Discharge Transition Structure provides path for cooling water from the condenser to the discharge tunnel	10CFR54.4(a)(2)
The Intake and Discharge Transition Structures provides missile protection.	10CFR54.4(a)(2)
The Fire Pump House and the Nonessential Switch Gear Room provide physical support and protection of Systems, Structures, and Components (SSC) credited in the current licensing basis for Fire Protection.	10CFR54.4(a)(3)

UFSAR Reference

Additional details of structures included in the Buildings, Structures Within License Renewal System are provided in the Seabrook Station Updated Final Safety Analysis Report (UFSAR) Sections 1.2.2.19, 1.2.2.20, 2.4, 2.4.5.5, 2.4.11.5, 2.5.5, 9.2.1, 9.5.3; UFSAR Figures 1.2-1, 2.4-21, 2.4-24 and 2.5-47; and UFSAR Tables 3.3.-4, 3.5-1, and 3.7(B)-22.

License Renewal Drawings

- LR-001

Components Subject to an Aging Management Review

LRA Table 2.4.1 lists the commodity groups of the Buildings, Structures Within License Renewal System that require aging management review, including their intended function(s).

LRA Table 3.5.2.1 provides a summary of the results of the aging management review for the Buildings, Structures Within License Renewal System.

Table 2.4.1

BUILDINGS, STRUCTURES WITHIN LICENSE RENEWAL

Component/Commodity Type	Intended Function
CARBON STEEL IN AIR - INDOOR UNCONTROLLED	Structural Support
CARBON STEEL IN AIR - OUTDOOR	Structural Support Flood Barrier Support
CARBON STEEL IN RAW WATER	Flood Barrier Support
CONCRETE MASONRY UNITS IN AIR - INDOOR UNCONTROLLED	Structural Support Fire Barrier
CONCRETE MASONRY UNITS IN AIR - OUTDOOR	Structural Support
CONCRETE IN AIR - INDOOR UNCONTROLLED	Structural Support
CONCRETE IN AIR - OUTDOOR	Structural Support Flood Barrier Missile Barrier Support
CONCRETE IN RAW WATER	Structural Support
CONCRETE BELOW GRADE/SOIL	Flood Barrier Support
FLUOROGOLD IN AIR - INDOOR UNCONTROLLED	Structural Support
ROCK IN AIR - OUTDOOR	Flood Barrier Support
ROOFING, ETHYLENE PROPYLENE DIENYL MONOMER (EPDM) IN AIR - OUTDOOR	Structural Support
STAINLESS STEEL IN AIR - INDOOR UNCONTROLLED	Structural Support

2.4.2 CONTAINMENT STRUCTURES

Structures Description

The Containment Structures are building/structures that enclose, provide physical support and protection for the reactor coolant system, and consists of the following seismic Category I structures; Containment Structure including containment Internal Structures, Containment Enclosure and Containment Enclosure Ventilation Area.

Containment Structure

The containment structure completely encloses a Reactor Coolant System and is a seismic Category I reinforced concrete structure in the form of a right vertical cylinder with a hemispherical dome and flat foundation mat founded on bedrock. The inside face is lined with a welded carbon steel plate, providing a high degree of leak tightness. A protective 4-ft thick concrete mat that forms the floor of the Containment protects the liner over the foundation mat. The containment structure provides biological shielding for normal and accident conditions.

Containment penetrations are provided in the lower portion of the structure, and consist of a personnel lock and an equipment hatch/personnel lock, a fuel transfer tube, and piping, electrical, instrumentation, and ventilation penetrations. All penetrations are anchored to sleeves (or to barrels) which are embedded in the concrete containment wall. This embedment is accomplished by means of an engineered anchorage system that is welded to the sleeve (or barrel) which is, in turn, welded to the locally thickened liner.

The containment structure provides the primary containment.

Containment Enclosure Building

The containment enclosure surrounds the containment structure and is designed in a similar configuration as a vertical right cylindrical seismic Category I, reinforced concrete structure with dome and ring base.

The containment enclosure is designed to entrap, filter and then discharge any leakage from the containment structure. To accomplish this, the space between the containment enclosure and the containment structure, as well as the penetration and safety-related pump areas, are maintained at a negative pressure following a loss-of-coolant accident by fans which take suction from the containment enclosure and exhaust to atmosphere through charcoal filters. To ensure air tightness for the negative pressure, leakage through all joints and penetrations has been minimized.

The containment enclosure provides the secondary containment.

Containment Enclosure Ventilation Area

The containment enclosure ventilation area is an irregularly shaped reinforced concrete building that houses ventilation equipment (fans, filters, etc.) for the Enclosure Building and is located on the southwest side of the containment.

Containment Internals

The containment internals include the intermediate floor slabs, internal walls, steel framing, and other support appurtenances.

The internals provide structural support for safety and non safety related equipment, shielding, and High Energy Line Break (HELB) protection.

Structures Intended Functions

Containment Structures (Containment Enclosure Building, Containment Enclosure Ventilation Area, Containment Internals, and Containment Structure) limit the site boundary radiation doses.	10 CFR 54.4(a)(1)
Containment Structures (Containment Enclosure Building, Containment Enclosure Ventilation Area, Containment Internals, and Containment Structure) provide structural support to safety related components.	10 CFR 54.4(a)(1)
Containment Structures (Containment Enclosure Building, Containment Enclosure Ventilation Area, Containment Internals, and Containment Structure) provide shelter and protection for safety related components.	10 CFR 54.4(a)(1)
Containment Structures (Containment Enclosure Building, Containment Enclosure Ventilation Area, Containment Internals, and Containment Structure) provide structural and functional support to non-safety related components.	10 CFR 54.4(a)(2)
Containment Structures (Containment Enclosure Building, Containment Enclosure Ventilation Area, Containment Internals, and Containment Structure) provide missile protection.	10 CFR 54.4(a)(2)

Containment Structures (Containment Enclosure Ventilation Area, Containment Internals, and Containment Structure) provide HELB shielding.	10 CFR 54.4(a)(2)
Containment Structures (Containment Enclosure Building, Containment Enclosure Ventilation Area, Containment Internals, and Containment Structure) provide flood barrier.	10 CFR 54.4(a)(2)
Containment Structures (Containment Enclosure Ventilation Area, and Containment Structure) house SSC's credited in coping with Anticipated Transient Without Scram (ATWS) (10CFR50.62).	10 CFR 54.4(a)(3)
Containment Structures (Containment Enclosure Ventilation Area and Containment Structure) enclose and protect Environmental Qualification Program (EQ) SSC's (10CFR50.49).	10 CFR 54.4(a)(3)
Containment Structures (Containment Enclosure Ventilation Area and Containment Structure) enclose and protect safety related SSC's credited in coping with Station Blackout (SBO) (10CFR50.63).	10 CFR 54.4(a)(3)
Containment Structures (Containment Enclosure Ventilation Area, Containment Internals, and Containment Structure) provide Fire Protection (FP) (10CFR50.48).	10 CFR 54.4(a)(3)

UFSAR References

The Containment Structures details are provided in Sections 1.2.2, 3.8, and 6.5.3 of the Seabrook Station Updated Final Safety Analysis Report or UFSAR.

License Renewal Boundary Drawings

- LR-001

Components Subject to an Aging Management Review

LRA Table 2.4-2 lists the components and commodity groups of the Containment Structures that require aging management review, including their intended function(s).

LRA Table 3.5.2-2 provides a summary of the results of the aging management review for the Containment Structures.

Table 2.4-2
Containment Structures

Component/Commodity Type	Intended Function
CONCRETE IN AIR - INDOOR UNCONTROLLED	Fire Barrier Flood Barrier HELB Shielding Missile Barrier Shelter, Protection Shielding Structural Pressure Barrier Structural Support
CONCRETE IN AIR - OUTDOOR	Flood Barrier Missile Barrier Structural Pressure Barrier Shelter, Protection Structural Support
CONCRETE IN BELOW GRADE/SOIL	Shelter, Protection Structural Support
CARBON STEEL IN AIR - INDOOR UNCONTROLLED CARBON	Fire Barrier HELB Shielding Shelter, Protection Structural Pressure Barrier Structural Support
CARBON STEEL IN AIR - WITH BORATED WATER LEAKAGE	Fire Barrier HELB Shielding Shelter, Protection Structural Pressure Barrier Structural Support
CARBON STEEL IN AIR - OUTDOOR	Structural Support
ELASTOMER SEAL IN AIR - INDOOR UNCONTROLLED	Fire Barrier Structural Pressure Barrier
ELASTOMER SEAL IN AIR - OUTDOOR	Expansion/Separation Structural Pressure Barrier
GLASS IN AIR – INDOOR UNCONTROLLED	Structural Pressure Barrier
ROOFING IN AIR - OUTDOOR	Shelter, Protection
STAINLESS STEEL IN AIR - INDOOR UNCONTROLLED	Expansion/Separation Fire Barrier Shielding Structural Pressure Barrier Structural Support

Component/Commodity Type	Intended Function
STAINLESS STEEL IN AIR - WITH BORATED WATER LEAKAGE	Expansion/Separation Fire Barrier Shielding Structural Pressure Barrier Structural Support
STAINLESS STEEL IN AIR - OUTDOOR	Structural Support
STAINLESS STEEL IN RAW WATER	Structural Support
THERMAL INSULATION STAINLESS STEEL JACKETING IN AIR WITH BORATED WATER LEAKAGE	Structural Support
THERMAL INSULATION ALUMINUM JACKETING IN AIR WITH BORATED WATER LEAKAGE	Structural Support

2.4.3 FUEL HANDLING AND OVERHEAD CRANES

Structure Description

The Fuel Handling and Overhead Cranes at the Seabrook Station consists of inspection of overhead heavy load cranes encompassed by NUREG-0612 and light load related to refueling handling systems.

These systems are associated with reactor vessel assembly, fuel movement, spent fuel cask, and other overhead lifting activities that could have an affect on safe shutdown equipment or fuel integrity, and are listed below:

- 1-CBS-CR-18A, B (Radioactive Pipe Tunnel Service Monorail Hoists)
- 1-CC-CR-15A, B (Component Cooling Water Pump Service Monorail Hoists)
- 1-CC-CR-41 (Component Cooling Heat Exchanger Service Monorail Hoist)
- 1-CS-CR-5 (Filter Cask Monorail Hoist)
- 1-CS-CR-6 (Boric Acid Batching Monorail Hoist)
- 1-CS-CR-13 (Chemical and Volume Control System Heat Exchanger Monorail Hoist)
- 1-CS-CR-14A, B (Charging Pump Service Monorail Hoists)
- 1-CS-CR-14C (Charging Pump Service Monorail Hoist)
- 1-DG-CR-28A, B (Diesel Generator Service Crane)
- 1-FH-RE-1 (Spent Fuel Cask Handling Crane)
- 1-FH-RE-2 (Spent Fuel Bridge & Hoist)
- 1-FH-RE-5 (Refueling Machine or Manipulator Crane)
- 1-FH-RE-24E, F, G (Radial Arm Stud Tensioner Hoists)
- 1-FW-CR-27 (Emergency Feed Pump Monorail Hoist)
- 1-MM-CR-3 (Polar Gantry Crane)
- 1-MM-CR-49 (Personnel Hatch Jib Crane)
- 1-MS-CR-25A (Main Steam Feedwater Pipe Chase Crane - Monorail)
- 1-MS-CR-25B (Main Steam Feedwater Pipe Chase Crane - Monorail)
- 1-SI-CR-40A, B (Safety Injection Pump Service Monorail Hoist)

Structure Intended Functions

Crane or crane operation could affect safety related system or component	10 CFR 54.4(a)(2)

UFSAR References

Additional details of structures included in the Fuel Handling and Overhead Cranes System are provided in the Seabrook Station Updated Final Safety Analysis Report (UFSAR) Sections 9.1.4, 9.1.5, and UFSAR Table 9.1-7.

License Renewal Drawings

Due to the disparate nature of its components, the Fuel Handling and Overhead Cranes System is not depicted on a License Renewal Drawing.

Components Subject to an Aging Management Review

LRA Table 2.4.3 lists the commodity groups of the Fuel Handling and Overhead Cranes System that require aging management review, including their intended function(s).

LRA Table 3.5.2-3 provides a summary of the results of the aging management review for the Cranes – Overhead and Fuel Handling System.

Table 2.4.3

Fuel Handling and Overhead Cranes

Component/Commodity Type	Intended Function
CARBON STEEL IN AIR - INDOOR UNCONTROLLED	Structural Support
CARBON STEEL IN AIR WITH BORATED WATER LEAKAGE	Structural Support

2.4.4 MISCELLANEOUS YARD STRUCTURES

Structures Description

Miscellaneous Yard Structures are non building structures that are exposed to an outdoor environment. They consist of miscellaneous buried vaults, duct banks and manholes, Condensate Storage Tank Enclosure, and Station Blackout Structures.

Condensate Storage Tank Enclosure

The enclosure is a cylindrical reinforced concrete wall, 2 feet thick and 43 feet high, which surrounds the Condensate Storage Tank. The wall extends from the top of it's foundation at Elev. 23'-0" to Elev. 65'-10". The foundation is a 6 foot thick mat based at Elev. 17'-0". Two irregularly shaped rooms, the North and South Valve Rooms, are built integrally with the circular wall. The Condensate Storage Tank Enclosure is a seismic Category I structure.

Control Room Makeup Air Intake Structures

The control room makeup air intake structures serve as terminals for buried ductwork that provides air for the control rooms during accident conditions. The west air intake air structure consists of a vertical 12-inch diameter carbon-steel pipe terminating in a 180° bend. The Control Room Makeup Air structures are seismic Category I.

Non Safety Related Electrical Duct Banks/Manholes

Select, Non Safety Related Electrical Duct Banks/Manholes house cable supporting Fire Pump 1-FP-P21. The Manholes are reinforced concrete structures.

Safety Related Electrical Duct Banks/Manholes

Safety Related Electrical Duct Banks/Manholes are reinforced concrete structures. The Manholes and the Duct Banks are isolated by seismic joints.

Service Water Access Vault

The Service Water Access Vault is located underground on the plant site north of the Cooling Towers. The Service Water Access Vault provides access to 24" Service Water piping. The Service Water Access Vault is a seismic Category I structure.

Yard Structures that Support Coping with Station Blackout

Equipment Enclosure, and support structures for the following:

345 Kv circuit breakers and controls; SF_6 gas system equipment

345 Kv gas insulated bus ducts

Generator step-up transformers (GSUs)

Unit auxiliary transformers (UATs)

Reserve auxiliary transformers (RATs)

25 Kv bus ducts

5 Kv bus ducts

Structures Intended Functions

The Condensate Storage Tank Enclosure, Control Room Makeup Air Intake Structures, Safety Related Electrical Duct Banks/Manholes, and Service Water Access Vault provide support for safety related components.	10CFR54.4 (a)(1)
The Condensate Storage Tank Enclosure, Control Room Makeup Air Intake Structures, Safety Related Electrical Duct Banks/Manholes, and Service Water Access Vault provide shelter and protection for safety related SSCs.	10CFR54.4 (a)(1)
The Condensate Storage Tank Enclosure, Control Room Makeup Air Intake Structures, and Safety Related Electrical Duct Banks/Manholes provide missile protection.	10CFR54.4(a)(2)
The Condensate Storage Tank Enclosure supports equipment credited for response to Anticipated Transients Without Scram (10 CFR 50.62).	10CFR54.4(a)(3)
The Condensate Storage Tank Enclosure and Non Safety Related Electrical Duct Banks/Manholes house components required by Fire Protection (10 CFR 50.48).	10CFR54.4(a)(3)
Yard Structures that Support Coping with Station Blackout support or protect equipment credited for response to Station Blackout (10 CFR 50.63).	10CFR54.4(a)(3)

UFSAR Reference

Additional details of structures included in Miscellaneous Yard Structures are provided in the Seabrook Station Updated Final Safety Analysis Report (UFSAR) Sections 3.8, and 9.5.

License Renewal Drawings

- LR-001

Components Subject to an Aging Management Review

LRA Table 2.4.4 lists the commodity groups of the Miscellaneous Yard Structures that require aging management review, including their intended function(s).

LRA Table 3.5.2.4 provides a summary of the results of the aging management review for the Miscellaneous Yard Structures.

Table 2.4.4

Miscellaneous Yard Structures

Component/Commodity Type	Intended Function
ALUMINUM IN AIR - OUTDOOR	Structural Support
CONCRETE IN AIR - INDOOR UNCONTROLLED	Fire Barrier Structural Support
CONCRETE IN AIR - OUTDOOR	Missile Barrier Structural Support
CONCRETE BELOW GRADE/SOIL	Structural Support
CONCRETE IN RAW WATER	Structural Support
CONCRETE MASONRY UNITS IN AIR - OUTDOOR	Fire Barrier Structural Support
CONCRETE SUMP IN RAW WATER	Structural Support
CARBON STEEL IN AIR - INDOOR UNCONTROLLED	Structural Support
CARBON STEEL IN AIR - OUTDOOR	Shelter, Protection Structural Support
CARBON STEEL DOOR IN AIR - INDOOR UNCONTROLLED	Structural Support
ISOLATION JOINT, ELASTOMER SEALANTS (RUBBER, NEOPRENE, SILICONE, ETC.) IN AIR - INDOOR UNCONTROLLED	Expansion/Separation
ROOFING IN AIR - OUTDOOR	Shelter, Protection
SEAL, ELASTOMER SEALANTS (RUBBER, NEOPRENE, SILICONE, ETC.) IN AIR - OUTDOOR	Shelter, Protection
STAINLESS STEEL IN AIR - OUTDOOR	Structural Support

2.4.5 PRIMARY STRUCTURES

Structures Description

The Primary Structures are all seismic Category I building/structures that are not part of the Containment Structures or Water Control Structures.

Containment Equipment Hatch Missile Shield

The Containment Equipment Hatch Missile Shield is a removable, precast, reinforced concrete wall located outside the equipment hatch. It protects the hatch from tornado-generated missiles.

Control Building and Diesel Generator Building

The Control and Diesel Generator Building is a reinforced concrete structure founded on fill concrete and rock below grade. This is a multi-function structure in which the two portions, the control room area and the diesel generator area, are separated by a common wall in the north-south direction and are not seismically isolated. The building was analyzed and designed as a unit.

The east portion of the structure (Control Building) has three floors and extends from grade to approximately 79 feet above grade. The two intermediate floors and roof are supported on steel columns in the center and on concrete walls all around. The ground floor contains an electrical equipment room which houses the switchgear, batteries, rod drive controls, and rod drive M-G sets; the second floor is for cable spreading; and the third floor is the main control room.

The control room occupies the entire 75'-0" level of the Control Building, and includes the main control room area, computer room, Technical Support Center, office, conference room and library, emergency storage room, Heating, Ventilation, and Air Conditioning (HVAC) equipment room, kitchen and sanitary facilities. The Control Building contains the building services necessary for continuous occupancy of the control room complex by operating personnel during all operating conditions. The control room emergency makeup air and filtration subsystem is capable of performing the following functions during normal operation, and following a Loss of Coolant Accident (LOCA), a safe shutdown earthquake or a tornado: maintain a positive pressure within the complex at all times with respect to adjacent areas and the outside atmosphere.

The Cable Spreading Room (CSR) on Elevation 50' – 0" of the Control Building has penetration seals through the floor which are designed to be watertight to protect the electrical equipment below in the Essential Switchgear Rooms.

The west portion of the structure (Diesel Generator Building), which is 95 feet long, has two floors and extends from 36 feet below grade to approximately

59 feet above grade. The portion below grade houses storage tanks for diesel fuel. The area between elevations 20'-0" and 50'-0" is divided, north and south, by a 2 feet thick reinforced concrete wall which supports the second floor and provides protection for each diesel generator against missiles generated by the other. The second floor contains air intakes for the diesel generators and building ventilation equipment. The roof is supported by concrete walls all around and by steel columns in the center extending from the second floor and located directly over the dividing missile wall below.

The building is a seismic Category I, reinforced concrete structure which houses two diesel generators together with their auxiliary equipment and two diesel generator fuel oil storage tanks.

Emergency Feedwater Pump House (Building), including Electrical Cable Tunnels and Penetration Area (Control Building to Containment) and Pre-Action Valve Building

The Emergency Feedwater Pump Building is a seismic Category I structure which is located adjacent to the containment structure. The building consists of the emergency feedwater pump room located above a two-story high electrical cable tray tunnel.

The emergency feedwater pump room contains emergency feedwater pumps, demineralized water makeup pumps, valve stations and an auxiliary control panel. A monorail is provided for servicing the pump. The electrical penetration areas are approximately 84 feet wide and are situated one on top of the other. These tunnels penetrate the Enclosure Building and join with the Containment Structure.

The Pre-Action Valve Building contains the deluge valve for the Fire Protection System and is located on the east side of the Emergency Feedwater Building.

Fuel Storage Building

The spent fuel storage and handling facility consists of four main areas:
(1) the spent fuel pool, (2) the fuel transfer canal, (3) the spent fuel cask loading area and (4) a decontamination area.

The spent fuel pool is a water-filled cavity designed to safely store irradiated fuel assemblies. This pool is constructed of reinforced concrete, with all interior surfaces lined with stainless steel.

The spent fuel pool is monitored for leakage by a series of leak detection channels located adjacent to each liner seam weld. The Leak Monitor System has three channels which will gravity drain to a sump located in the Fuel Storage Building. This zoning arrangement can be used to aid in establishing the location of the leakage. By monitoring the leakage rate, any change in the integrity of the liner can be established.

The fuel storage area is protected against external tornado missiles by 2-foot thick reinforced concrete walls. The large roll-up door on the west wall of the Fuel Storage Building is not designed for tornado missiles; however, a missile wall is provided inside the building to prevent any missiles that could possibly penetrate the roll-up door from reaching the storage pool or cooling equipment.

The elevation of the vehicle loading/unloading area is 20'-6". Protection against flooding is assured since the pool operating floor level elevation is at 25'-0", which is above any postulated flooding conditions resulting from any potential ponding on the site due to extreme rain and wave overtopping.

The storage racks which hold the spent fuel assemblies are modular units, and each unit is freestanding. The spent fuel pool is separated from the fuel transfer canal by a concrete shielding wall with a gate to facilitate the transfer of fuel assemblies. The fuel transfer canal contains the necessary equipment to transfer the fuel assemblies to and from the reactor containment. This equipment includes: (1) a fuel transfer system conveyor car, (2) fuel transfer valve, (3) fuel transfer system lifting frame equipment, (4) fuel transfer system control panel, (5) new fuel elevator, and (6) portions of the Spent Fuel Pool Bridge Crane control console.

Main Steam and Feedwater Pipe Chases – East & West

The main steam and feedwater pipe chase (east) is a reinforced concrete structure which houses and protects the main steam and feedwater piping. The east penetration area is a room located at the southern end of the pipe chases which houses the control panels for the hydrogen recombiner.

The main steam and feedwater pipe chase (west) is a reinforced concrete structure which houses and protects the main steam and feedwater piping. Located below the chase area is the mechanical penetration area which houses piping running between the Containment and the Primary Auxiliary Building. This region is partitioned into several smaller areas which include the radiation and nonradiation shield tunnels.

Personnel Hatch Area

The Personnel Hatch Area is an irregularly shaped seismic Category I, reinforced concrete structure located outside the personnel hatch of the Containment, for which it provides protection from missiles and illegal entry. The Personnel Hatch Area is connected to the west pipe chase.

Primary Auxiliary Building including Residual Heat Removal Equipment Vault

The Primary Auxiliary Building is a seismic Category I, reinforced concrete structure which is located adjacent to the containment structure, and contains most of the auxiliary systems for the Reactor Coolant System. Those systems whose main components are in the Primary Auxiliary Building include the Chemical and Volume Control, Primary Component Cooling, Sample, Low

Pressure Safety Injection, Residual Heat Removal and Containment Spray Systems.

The Primary Auxiliary Building has two intermediate reinforced concrete floors which support miscellaneous auxiliary nuclear equipment, such as heat exchangers, pumps, demineralizers, filters, tanks and ventilation equipment. Reinforced concrete walls and steel columns support the intermediate floors and reinforced concrete roof slab. The building also houses components essential for safe plant shutdown which could be subject to the environmental effects of a High Energy Line Break (HELB).

Three minimum ventilation areas have been defined for the Primary Auxiliary Building. These areas, which are potential sources of airborne activity, are maintained at a negative pressure with respect to surrounding areas.

The residual heat removal and containment spray pumps and their associated heat exchangers are located in water tight compartments in the northern part of the Primary Auxiliary Building. The compartments are isolated from the rest of the Primary Auxiliary Building by concrete walls to preclude flooding the pumps due to a rupture anywhere else in the building. The containment spray pumps are located below grade to satisfy net positive suction head requirements.

The Residual Heat Removal (RHR) equipment vault is subdivided into six compartments by continuous concrete walls as follows: two for containment spray pumps and heat exchangers, two for residual heat removal pumps and heat exchangers, and two for access stairs. Plugs are provided in the reinforced concrete roof for removal of the heat exchangers. The entrance vestibule into the Equipment Vault section of the Primary Auxiliary Building is at elevation 20 feet 8 inches. The floor of this vestibule is sloped up 4 inches so that the high pint in the floor is 1 foot above the plant grade of 20 ft Mean Sea Level (MSL).

Below-grade reinforced concrete pipe tunnels connect the building to the Containment and Waste Processing Building. Monorail hoists are provided to handle materials and servicing of equipment.

Tank Farm (Tunnels) – including Dikes and Foundations for Refueling Water Storage Tank (RWST) and Reactor Makeup Water Storage Tank (RMUWST)

The tank farm area consists of a reinforced concrete portion and structural steel framing portion. The reinforced concrete portions, including the foundation, dike walls, pipe tunnels and pipe chases, are structures associated with safety-related systems and are designed as Seismic Category I.

The structural steel framing portion, which includes steel framing, concrete roofing and metal siding, is used to enclose the area above the tanks and to form the motor control center and switchgear room. The steel framing portion is designated Non-Category I, seismic structure and designed and constructed so that the safe shutdown earthquake (SSE) would not cause the steel framing portion to collapse upon any safety-related structure, system or component within or surrounding the tank farm area.

The tunnels provide a passageway for piping which runs between the Primary Auxiliary Building and either the Service Water Pumphouse or the Service Water Cooling Tower.

The dikes are reinforced concrete walls surrounding the tanks and extending to Elevations 42'-0" and 30'-0" for the RWST dike and the RMUWST dike, respectively. Structural steel framing is used between the tops of the dikes and the roof framing, which is also structural steel.

Waste Process Building

The Waste Processing Building is a seismic Category I, reinforced concrete and steel structure. It houses the Liquid and Gas Waste Processing, Boron Recovery and Solid Waste Systems.

The building contains systems to process radioactive gases, liquids and solids. The gases are processed through charcoal delay beds to provide for iodine removal and radioactive decay of the noble gases. Liquids are processed in demineralizer skids, and can be recycled back into the plant or released if low enough in activity. Evaporators, installed as plant design, are available as an alternate method of processing liquids. Radioactive waste is stored in various locations in the Waste Process Building. Solids are normally stored in various containers and stored on site prior to shipment offsite for burial. The plant contains equipment designed to solidify waste which may be used to process solid waste prior to shipment off site.

Structures Intended Functions

The Control Building and Diesel Generator Building, the Emergency Feedwater Pump Building, the Fuel Storage Building, the Main Steam and Feedwater Pipe Chases, the Personnel Hatch Area, the Primary Auxiliary Building, the Tank Farm, and the Waste Process Building provide for seismic separation.	10CFR54.4 (a)(1)
The Control Building and Diesel Generator Building, the Emergency Feedwater Pump Building, the Fuel Storage Building, the Main Steam and Feedwater Pipe Chases, the Primary Auxiliary Building, and the Tank Farm provide shelter and protection to safety-related components.	10CFR54.4 (a)(1)

The Fuel Storage Building, the Main Steam and Feedwater Pipe Chases, the Primary Auxiliary Building, the Tank Farm, and the Waste Process Building provide shielding against radiation.	10CFR54.4 (a)(1)
The Fuel Storage Building and parts of the Primary Auxiliary Building provide a pressure boundary or essentially leak tight barrier to protect public health and safety.	10CFR54.4 (a)(1)
The Control Building and Diesel Generator Building, the Emergency Feedwater Pump Building, the Fuel Storage Building, the Main Steam and Feedwater Pipe Chases, the Primary Auxiliary Building, and the Tank Farm provide structural support to safety-related components.	10CFR54.4 (a)(1)
The Control Building and Diesel Generator Building minimizes inleakage by maintaining positive pressure in Control Building.	10CFR54.4(a)(2)
The Control Building and Diesel Generator Building, the Emergency Feedwater Pump Building, the Fuel Storage Building, the Main Steam and Feedwater Pipe Chases, the Personnel Hatch Area, the Primary Auxiliary Building, the Tank Farm, and the Waste Process Building provide flood protection barrier.	10CFR54.4(a)(2)
The Control Building and Diesel Generator Building, the Fuel Storage Building, the Main Steam and Feedwater Pipe Chases, and the Primary Auxiliary Building provide shielding against high energy line breaks (HELB).	10CFR54.4(a)(2)
The Containment Equipment Hatch Missile Shield, the Control Building and Diesel Generator Building, the Emergency Feedwater Pump Building, the Fuel Storage Building, the Main Steam and Feedwater Pipe Chases, the Personnel Hatch Area, the Primary Auxiliary Building, and the Tank Farm provide missile barriers.	10CFR54.4(a)(2)

The Control Building and Diesel Generator Building, the Emergency Feedwater Pump Building, the Fuel Storage Building, the Main Steam and Feedwater Pipe Chases, the Personnel Hatch Area, the Primary Auxiliary Building, the Tank Farm, and the Waste Process Building provide structural or functional support to non safety-related components.	10CFR54.4(a)(2)
The Control Building and Diesel Generator Building, the Emergency Feedwater Pump Building, the Main Steam and Feedwater Pipe Chases, the Primary Auxiliary Building, and the Tank Farm provide support and protection to the systems, structures, and components that are required for 10 CFR 50.62 (Automatic Trip Without Scram).	10CFR54.4(a)(3)
The Emergency Feedwater Pump Building, the Fuel Storage Building, the Main Steam and Feedwater Pipe Chases, the Primary Auxiliary Building, and the Tank Farm provide support and protection to the systems, structures, and components that are required for 10 CFR 50.49 (Environmental Qualification).	10CFR54.4(a)(3)
The Control Building and Diesel Generator Building, the Emergency Feedwater Pump Building, the Fuel Storage Building, the Main Steam and Feedwater Pipe Chases, the Personnel Hatch Area, the Primary Auxiliary Building, the Tank Farm, and the Waste Process Building provide support and protection to the systems, structures, and components that are required for 10 CFR 50.48 (Fire Protection).	10CFR54.4(a)(3)
The Control Building and Diesel Generator Building, the Emergency Feedwater Pump Building, the Main Steam and Feedwater Pipe Chases, and the Primary Auxiliary Building provide support and protection to the systems, structures, and components that are required for 10 CFR 50.63 (Station Blackout).	10CFR54.4(a)(3)

UFSAR Reference

Additional details of the Primary Structures System are provided in the Seabrook Station Updated Final Safety Analysis Report (UFSAR) Sections 1.2.2, 2.4, 3.6, 3.8, 9.1, 12.3, and Table 3.7(B)-22.

License Renewal Drawings

- LR-001.

Components Subject to an Aging Management Review

LRA Table 2.4.5 lists the components and commodity groups of the Primary Structures System that require aging management review, including their intended function(s).

LRA Table 3.5.2.5 provides a summary of the results of the aging management review for the Primary Structures System.

Table 2.4.5

Primary Structures

Component/Commodity Type	Intended Function
ALUMINUM IN AIR – INDOOR UNCONTROLLED	Fire Barrier
ALUMINUM IN AIR WITH BORATED WATER LEAKAGE	Fire Barrier
CONCRETE IN AIR – INDOOR UNCONTROLLED	Fire Barrier HELB Shielding Shielding Structural Support
CONCRETE IN AIR – OUTDOOR	Missile Barrier Shelter, Protection
CONCRETE BELOW GRADE/SOIL	Flood Barrier Structural Support
CONCRETE IN RAW WATER	Structural Support
CARBON STEEL IN AIR – INDOOR UNCONTROLLED	Fire Barrier Flood Barrier HELB Shielding Structural Support
CARBON STEEL IN AIR WITH BORATED WATER LEAKAGE	Fire Barrier Flood Barrier HELB Shielding Structural Support
CARBON STEEL IN AIR – OUTDOOR	Shelter, Protection Structural Support
ELASTOMER SEAL IN AIR - INDOOR UNCONTROLLED	Control Bldg Habitability Fire Barrier Flood Barrier Shelter, Protection Structural Pressure Barrier
ELASTOMER SEAL IN AIR - OUTDOOR	Expansion/Separation Shelter, Protection Structural Pressure Barrier

LUBRITE IN AIR - INDOOR UNCONTROLLED	Structural Support
NON-METALLIC FIRE PROOFING IN AIR - INDOOR UNCONTROLLED	Fire Barrier
ROOFING IN AIR - OUTDOOR	Shelter, Protection
STAINLESS STEEL IN AIR - INDOOR UNCONTROLLED	Structural Support
STAINLESS STEEL IN AIR - OUTDOOR	Structural Support
STAINLESS STEEL IN RAW WATER	Shelter, Protection
STAINLESS STEEL IN TREATED BORATED WATER	Shelter, Protection
STAINLESS STEEL IN AIR WITH BORATED WATER LEAKAGE	Structural Support
THERMAL INSULATION STAINLESS STEEL JACKETING IN AIR WITH BORATED WATER LEAKAGE	Structural Support
THERMAL INSULATION ALUMINUM STEEL JACKETING IN AIR WITH BORATED WATER LEAKAGE	Structural Support

2.4.6 SUPPORTS

Structures Description

Supports at Seabrook Station includes ASME & NON-ASME pipe restraints/supports, jet impingement barriers/shields (e.g., High Energy Line Break barriers), pipe whip restraints, supports for Tube Track, instrument tubing, miscellaneous mechanical equipment, electrical raceways and conduit, HVAC ducts, racks, panels, cabinets, enclosures for electrical equipment, junction boxes, platforms, grout under baseplates and fasteners for support or equipment anchorage and other miscellaneous structures, instrument and battery racks, support base plate pads (silicone caulking, ethafoam, elastomer, teflon and sealant compounds) for components and equipment that are in scope for license renewal or are located within structures containing safety related components.

The spent fuel pool storage racks are designed to maintain the spent fuel assemblies in a subcritical array during all credible storage conditions. The storage racks are divided into two regions with twelve free standing self-supporting racks. Region 1 has six racks with Boral and Region 2 has six racks with Boraflex. The Boral (poison sheets) in region 1 is used for the neutron-absorbing capacity for the criticality analyses. The Boraflex utilized in the Region 2 racks is not credited for the neutron-absorbing capacity in the criticality analyses and therefore will not be manage for reduction of neutron-absorbing.

The Snubber portion of the support structures are considered an active component and are not included in the License Renewal (LR) boundary.

Supports provide the connection between a system's equipment or component and a plant structural member (e.g. wall, floor, ceiling, column, or beam). They provide support for distributed loads (e.g. piping, tubing, HVAC ducting, conduit, cable trays) and localized loads (e.g. individual equipment). Specific types of equipment and components evaluated as part of this commodity group include:

- Pipe Supports/Restraints, Tube Track & Instrument Tubing Supports - Includes all items used for supporting and/or restraining piping and components, tube track & instrument tubing. The support boundary includes all the auxiliary steel back to the structure's surface, grout and anchor bolts.
- Equipment Supports - Includes structural steel, sliding surfaces, and fasteners (e.g., bolts, studs, nuts) that secure equipment to structures. Also includes Spent Fuel racks and Boral poison sheets, Reactor Pressure Vessel (RPV) supports, steam generator supports, pressurizer supports, and reactor coolant pump supports.

- HVAC Duct Supports - Includes structural steel and fasteners (e.g., bolts, studs, nuts) that support/attach ventilation duct to structures.
- Raceways - Generic component type that is designed specifically for holding electrical wires and cables, such as cable trays, exposed and inaccessible metallic conduit or wireways. Commodity assets for raceways include both the component and the component's support and attachment.
- Electrical Enclosures - Generic component type that contains electrical components such as conduit, panels, boxes, cabinets, consoles, and bus ducts. An electrical enclosure includes both the enclosure and its supports and attachments.
- Platform and Shielding Supports - Includes structural steel, fasteners (e.g., bolts, studs, nuts) that secure platforms to structures.

Supports in air with borated water leakage are in scope for boric acid corrosion in steel, galvanized steel, stainless steel, and aluminum for all types of support members (including safety and non-safety), welds, bolted connections and support anchorage to building structure. These Supports are incorporated as part of the carbon steel, stainless steel and aluminum commodities in the appropriate structures that contain borated water systems.

Structures Intended Functions

Provide structural support to safety-related components	10 CFR 54.4(a)(1)
Limit offsite exposure comparable to 10 CFR Part 100 guidelines	10 CFR 54.4(a)(1)
Provide structural support to non-safety related components	10 CFR 54.4(a)(2)
Provides shelter, support and protection for components required by the current licensing basis for the FP regulated event (10 CFR 50.48)	10 CFR 54.4(a)(3)
Provide support and protection for components required by the current licensing basis for EQ (10 CFR 50.49)	10 CFR 54.4(a)(3)
Provide support and protection for components required by the current licensing basis for ATWS regulated event (10 CFR 50.62)	10 CFR 54.4(a)(3)

Provide support and protection for components required by the current licensing basis for SBO regulated event (10 CFR 50.63)	10 CFR 54.4(a)(3)

UFSAR References

The Supports details are provided Sections 3.2, and 9.1 of the Seabrook Station Updated Final Safety Analysis Report or UFSAR.

License Renewal Boundary Drawings

There is no License Renewal Boundary Drawing for Supports.

Components Subject to an Aging Management Review

LRA Table 2.4-6 lists the components and commodity groups of the Supports that require aging management review, including their intended function(s).

LRA Table 3.5.2-6 provides a summary of the results of the aging management review for the Support.

Table 2.4-6
Supports

Component/Commodity Type	Intended Function
ALUMINUM IN AIR - INDOOR UNCONTROLLED	Structural Support
ALUMINUM IN AIR – WITH BORATED WATER LEAKAGE	Structural Support
BORAL, BORON STEEL IN TREATED WATER	Absorb Neutrons
CONCRETE IN AIR - INDOOR UNCONTROLLED	Structural Support
CONCRETE IN AIR - OUTDOOR	Structural Support
CARBON STEEL IN AIR - INDOOR UNCONTROLLED	Structural Support
CARBON STEEL IN AIR - WITH BORATED WATER LEAKAGE	Structural Support
CARBON STEEL IN AIR - OUTDOOR	Structural Support
ELASTOMER IN AIR - INDOOR UNCONTROLLED	Structural Support
LUBRITE IN AIR - INDOOR UNCONTROLLED	Structural Support
STAINLESS STEEL IN AIR - INDOOR UNCONTROLLED	Structural Support
STAINLESS STEEL IN AIR - WITH BORATED WATER LEAKAGE	Structural Support
STAINLESS STEEL IN RAW WATER	Structural Support
STAINLESS STEEL IN TREATED WATER	Structural Support

2.4.7 TURBINE BUILDING

Structure Description

The Turbine Building is a non seismic Category I structure which houses a turbine generator and associated condensers, pumps and feedwater heaters. The lube oil, secondary component cooling and service and instrument air systems are also located in the Turbine Building.

The Turbine Building, structure within the scope of license renewal supports an (a) 2 or (a) 3 function only. The structure does not support any safety related (a) 1 function.

The entire Turbine Building is designed against failure in the north-south direction. The south end is designed against failure in the east-west direction; an east-west failure in the north end will not affect any seismic Category I structures due to Tornado Wind and SSE Loads.

Structure Intended Functions

The Turbine Building is designed against collapse onto adjacent Category I Structures due to tornado wind or SSE loads	10 CFR 54.4(a)(2)
Provide support and protection for the systems, structures or components required for fire protection (10CFR50.48)	10 CFR 54.4(a)(3)
Provide support and protection for the systems, structures or components required for anticipated transients without scram (ATWS) events. (10CFR50.62)	10 CFR 54.4(a)(3)
Provide support and protection for the systems, structures or components that are required for station blackout (10CFR50.63)	10 CFR 54.4(a)(3)

UFSAR References

The Turbine Building details are provided in Sections, 1.2, 3, and Tables 3.3-4, and 3.7(B)-22 of the Seabrook Station Updated Final Safety Analysis Report or UFSAR.

License Renewal Drawings

- LR-001

Components Subject to an Aging Management Review

LRA Table 2.4-7 lists the components and commodity groups of the Turbine Building that require aging management review, including their intended function(s).

LRA Table 3.5.2-7 provides a summary of the results of the aging management review for the Turbine Building.

Table 2.4.7

Turbine Building

Component/Commodity Type	Intended Function
ALUMINUM BUS DUCTS IN AIR - INDOOR UNCONTROLLED	Structural Support
CARBON STEEL IN AIR - INDOOR UNCONTROLLED	Structural Support
CARBON STEEL IN AIR - OUTDOOR	Structural Support
CONCRETE MASONRY UNITS IN AIR - INDOOR UNCONTROLLED	Structural Support
CONCRETE IN AIR - INDOOR UNCONTROLLED	Structural Support
CONCRETE IN AIR - OUTDOOR	Structural Support
CONCRETE IN RAW WATER	Structural Support
FIRE PENETRATION IN AIR – INDOOR UNCONTROLLED	Fire Barrier
PENETRATION SEAL - OUTDOOR	Structural Support
ROOFING (EPDM) IN AIR - OUTDOOR	Shelter, Protection

2.4.8 WATER CONTROL STRUCTURES

Structures Description

The Water Control Structures are used for cooling water for the Ultimate Heat Sink.

Service Water Cooling Tower

The cooling tower is a seismic Category I structure that is composed of a concrete basin, pump rooms, electrical switchgear rooms and mechanical equipment rooms. The pump rooms house vertical centrifugal pumps. The cooling tower serves as an ultimate heat sink in the unlikely event that the cooling water tunnels are rendered inoperative. The cooling tower houses pumps, fans, water distribution system and nozzles. The switchgear rooms house the switchgear, substation, and motor control center for the cooling tower.

Service Water Pumphouse

The Service Water Pumphouse is seismic Category I structure which is adjacent to the Circulating Water Pumphouse. It contains the four service water pumps which are available for normal operation and for post-accident cooldown. The Circulating Water Pumphouse is designed so that its loss or collapse will not impair the Service Water Pumphouse or system.

Circulating Water Pumphouse

The Circulating Water Pumphouse concrete below elevation 21'-0 is a seismic Category I structure. The Circulating Water Pumphouse basin is integrally connected to the Service Water Pumphouse basin by a common east-west wall. The Circulating Water Pumphouse steel framing is evaluated to prove that the collapse will not impair the Service Water Pumphouse or system. It is composed of a forebay and three bays with a circulating water pump in each. Each pump bay also has one traveling screen. The three pumps supply cooling water to the condensers.

Structures Intended Functions

Service Water Cooling Tower provides the Ultimate Heat Sink source of cooling water.	10 CFR 54.4(a)(1)
Service Water Cooling Tower, Service Water Pumphouse and Circulating Water Pumphouse provide shelter and protection for safety-related systems and components.	10 CFR 54.4(a)(1)

Service Water Cooling Tower, Service Water Pumphouse and Circulating Water Pumphouse provide physical support for safety related components.	10 CFR 54.4(a)(1)
Service Water Cooling Tower and Service Water Pumphouse provide missile protection	10 CFR 54.4(a)(2)
Service Water Cooling Tower, Service Water Pumphouse and Circulating Water Pumphouse provide structural or functional support to non-safety related components that could effect safety related components.	10 CFR 54.4(a)(2)
Service Water Cooling Tower and Service Water Pumphouse provide support and protection for component functions credited in the current licensing bases for Fire Protection (10CFR 50.48	10 CFR 54.4(a)(3)
Service Water Pumphouse provides support and protection for component functions credited in the current licensing bases for Station Blackout (10CFR 50.63)	10 CFR 54.4(a)(3)

UFSAR References

The Water Control Structures details are provided in Sections 1.2, 3.8, and Tables 3.7(B)-22 and 3.3-4 of the Seabrook Station Updated Final Safety Analysis Report or UFSAR.

License Renewal Boundary Drawings

- LR-001

Components Subject to an Aging Management Review

LRA Table 2.4-8 lists the components and commodity groups of the Water Control Structures that require aging management review, including their intended function(s).

LRA Table 3.5.2-8 provides a summary of the results of the aging management review for the Water Control Structures.

Table 2.4-8
Water Control Structures

Component/Commodity Type	Intended Function
CONCRETE IN RAW WATER	Structural Support Ultimate Heat Sink
CARBON STEEL IN AIR – INDOOR UNCONTROLLED	Fire Barrier Structural Support
CARBON STEEL IN AIR – OUTDOOR	Shelter, Protection Structural Support
CARBON STEEL IN RAW WATER	Structural Support
CONCRETE BELOW GRADE/SOIL	Structural Support
CONCRETE IN AIR – INDOOR UNCONTROLLED	Fire Barrier Structural Support
CONCRETE IN AIR - OUTDOOR	Missile Barrier Shelter, Protection
ELASTOMER IN AIR - INDOOR UNCONTROLLED	Fire Barrier
ELASTOMER IN AIR - OUTDOOR	Shelter, Protection
ROOFING IN AIR – OUTDOOR	Shelter, Protection

2.5 SCOPING AND SCREENING RESULTS:ELECTRICAL AND INSTRUMENTATION AND CONTROLS (I&C) SYSTEMS/COMMODITY GROUPS

The determination of electrical/Instrumentation and Controls (I&C) systems within the scope of License Renewal is made through the application of the process described in Subsection 2.1.1. The results of the electrical/I&C systems scoping review are contained in Section 2.2.

Electrical/I&C commodity groups were formed using a "bounding" approach. In this approach, all electrical and instrumentation components were combined into groups (commodities) of similar function, similar design or similar materials of construction. This approach does not attempt to distinguish the component's function with regards to 10CFR 54.21 (a)(1), (a)(2) or (a)(3). By using this approach, all electrical/I&C components were reviewed as a group regardless of the system assigned to each component.

The components in the recovery path for loss of off site power due to a Station Blackout (SBO) are discussed in Section 2.5.3. These components are included based on their intended function.

Environmental Qualification (EQ) of Electric Components is evaluated as a Time Limited Aging Analysis (TLAA) in Section 4.4. All electrical and instrumentation and control (I&C) penetrations including assembly cables and connections at Seabrook Station are included in the EQ program. The pressure boundary function of the electrical and I&C penetrations is addressed as part of the Containment Structures in Section 2.4.

The interface of electrical/I&C components with other types of components and the assessments of these interfacing components are provided in the appropriate mechanical or structural sections. The evaluation of the following commodities is provided in the structural assessment documented in Section 2.4.

- Instrumentation Racks, Frames, Panels, and Enclosures
- Electrical Panels, Racks, Cabinets, and Other Enclosures
- Cable Trays and Supports
- Conduit and Supports
- Exterior Surfaces and Elastomers of Metal Enclosed Bus (MEB)
- Switchyard structural features required to support components required as part of the off site Alternating Current (AC) power recovery path

- In-scope electrical manholes and duct banks

2.5.1 COMMODITY GROUPS

The following electrical/I&C commodity groups were determined to be passive and long lived. These groups were evaluated to determine the groups that require aging management review:

- Electrical Cables and Connections
- Uninsulated Ground Conductors
- Cable Ties
- Metal Enclosed Bus
- Fuse Holders (Not Part of a Larger Assembly) Metallic Clamps
- Cable Connections (Metallic Parts)
- SF_6 Insulated Bus, Connections and Insulators

NEI 95-10 Appendix B and NUREG-1800 Table 2.1-5 identified other commodity groups that are classified as passive. The following is a discussion of why those groups are excluded.

- High Voltage Insulators
- Switchyard bus
- Transmission conductors
- Segregated phase bus

The Seabrook Station connects to the off site power grid via a Sulfur Hexafluoride (SF_6) switchyard. This type of switchyard does not include high voltage insulators, switchyard bus or transmission conductors that are typically associated with open air switchyards. For this reason, high voltage insulators, switchyard bus and transmission conductors are not included in the review.

Seabrook Station does not use segregated phase bus.

2.5.2 ELECTRICAL / I&C COMMODITY GROUP EVALUATIONS

The following is a detailed evaluation of each passive long lived commodity group.

2.5.2.1 Non-EQ Electrical Cables and Connections

All electrical insulated cables and connections not subject to environmental qualification requirements of 10 CFR 50.49 are included in this group.

The types of insulated connections included in this review are splices, connections, insulating material of fuse holders and terminal blocks.

The intended function of this group is to provide electrical connections to specified sections of an electrical circuit to deliver voltage, current or signals.

2.5.2.2 Uninsulated Ground Conductors

Uninsulated ground conductors bond metal raceways, building structural steel, and plant equipment to earth ground through an installed ground grid. The uninsulated ground conductors are nonsafety-related and provide for personnel and equipment protection. In the event of a fault in an electrical circuit or component, the ground conductors provide a direct path to ground for the fault currents to minimize equipment damage. The ground conductors do not prevent faults and are not required for equipment operation. Failure of a ground conductor cannot affect the accomplishment of any license renewal intended functions. Therefore, un-insulated ground conductors do not perform a license renewal intended function and are not within the scope of license renewal and are not subject to an Aging Management Review (AMR).

2.5.2.3 Cable Tie Wraps

The intended functions of cable ties have been the subject of recent industry discussions. Seabrook Station performed a review of cable tie applications. The review concluded that failure of cable ties will not prevent in-scope electrical conductors from performing their intended function. Therefore, an AMR is not required for cable ties installed at Seabrook Station.

2.5.2.4 Metal Enclosed Bus

Metal Enclosed Bus is bus that is not part of an active component such as switchgear, load centers or motor control centers. For Seabrook Station these include:

- Isolated Phase Bus
- Non-Segregated Phase Bus

The intended function for all items except the Metal Enclosed Bus insulators is to provide electrical connections to specified sections of an electrical circuit to deliver voltage or current.

The intended function of Metal Enclosed Bus insulators is to insulate and support an electrical conductor.

2.5.2.5 Fuse Holders (Not Part of a Larger Assembly) Metallic Clamps

All fuse holders which are part of larger assemblies are managed as part of the active component. Fuse holders located in enclosures without active components are subject to an AMR. Seabrook Station has identified panels which contain in-scope fuses that are subject to an AMR.

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

2.5.2.6 Cable Connections (Metallic Parts)

Insulated portions of electrical connections are included with the commodity groups Non-EQ Electrical Cable and Connections.

The various metals used for Cable Connections (Metallic Parts) of electrical connections are evaluated separately. This component type includes the metallic portions of cable connections. This commodity group includes external connections terminating at an active or passive device. The components in this group are subject to an AMR.

The intended function of this group is to provide electrical connections to specified sections of an electrical circuit to deliver voltage, current or signals.

2.5.2.7 SF_6 Insulated Bus, Connections and Insulators

Section 2.5.3 provides a description of the SF_6 insulated bus and the components in the Station Blackout (SBO) recovery path. SF_6 gas provides the insulating media for the bus.

The SF_6 gas, connections, insulators and the pressure boundary which contains the gas are subject to an AMR.

The intended function for the SF_6 insulated bus and connections are to provide electrical connections to specified sections of an electrical circuit to deliver voltage or current. The intended function of the SF_6 bus insulators is to insulate and support an electrical conductor.

2.5.3 SBO RECOVERY PATH DISCUSSION

Seabrook Station performed additional screening for components which are relied on for restoration of offsite power.

To restore offsite power after an SBO event, two possible recovery paths are identified and the path includes the Seabrook Station switchyard 345 kilovolt (kV) power circuit breakers. The electrical components in these paths were considered in the scope of License Renewal (LR) based on their intended function. The components are shown on Figure 2.5-1, SBO Offsite Recovery Path License Renewal Drawing.

The first path includes all components required to restore offsite power from the 345 kV Switchyard Power Circuit Breakers through the Unit Auxiliary Transformers (UAT) to the diesel backed 4160 volt (V) emergency buses. This path includes the SF_6 bus from 345 kV Power Circuit Breakers 11 and 163 to the Generator Step Up (GSU) transformer, the Isolated phase bus from the GSU to the UAT's, and the non-segregated bus from the UATs to 4160 V Bus E5 (EDE-SWG-5) and E6 (EDE-SWG-6).

The second path includes the SF_6 bus from 345 kV Power Circuit Breakers 52 and 695 to the Reserve Auxiliary Transformers (RAT's), and the non-segregated bus from the RAT's to 4160 V Bus E5 (EDE-SWG-5) and E6 (EDE-SWG-6).

Based on their intended functions, the passive long lived devices in the SBO recovery path are in scope and require an AMR. The MEB passive devices include the non-segregated bus, isolated phase bus, and electrical cables and connections. Because of the unique design, the SF_6 bus and the SF_6 bus insulators are discussed separately.

The design and operation of the Seabrook Station switchyard is significantly different from a traditional open air switchyard. Seabrook Station connects to the off site power grid via the 345kV SF_6 Switchyard. The switchyard consists of SF_6 insulated bus duct, disconnect switches, power circuit breakers and protective relays. The SF_6 switchyard is an enclosed system that is different from the traditional overhead type systems. The SF_6 system design does not incorporate transmission lines, high voltage insulators, or exposed switchyard bus.

The SF_6 buses are phase-isolated. Each SF_6 insulated bus consists of a tubular conductor that is surrounded by a concentric metal enclosure filled with SF_6 gas. The tubular conductor is centered within the enclosure by a conical 345kV epoxy insulator. The SF_6 gas provides additional insulation between the bus and the exterior housing.

2.5.4 ELECTRICAL / I&C COMMODITY GROUPS SUBJECT TO AGING MANAGEMENT REVIEW

The following electrical/I&C component groups require an AMR:

- Non-EQ Electrical Cables and Connections

  This commodity group includes non-EQ cables and connections, connectors, electrical splices, fuse holders, terminal blocks, power cables, control cables, instrument cables, insulated cables and communication cables.

- Metal Enclosed Bus

  This commodity group includes isolated phase bus and non-segregated phase bus.

- Fuse Holders (Not Part of a Larger Assembly) Metallic Clamps

  This commodity group includes the metallic clamps of fuse holders that are located in enclosures that do not contain active devices.

- Cable Connections (Metallic Parts)

  This commodity group includes the metallic portions of electrical connections which terminate to an active or passive device. Wiring connections internal to an active assembly are considered a part of the active assembly and therefore are not included in the group.

  Connections exposed to borated water are included in this commodity group.

- SF_6 Insulated Bus, Connections and Insulators

The portions of the SF_6 bus required to recover off site power as shown on License Renewal Figure 2.5-1 are subject to an AMR.

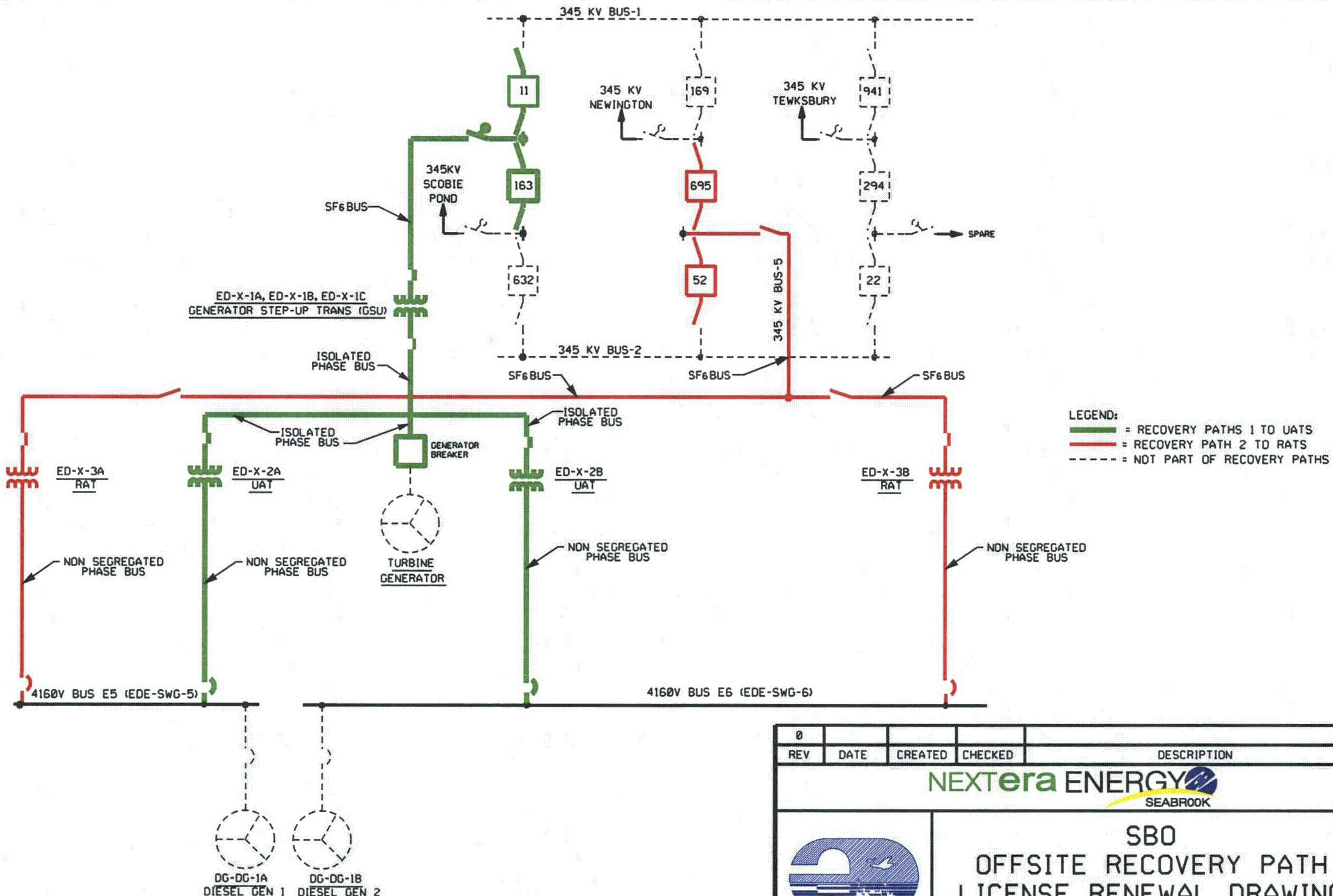
Table 2.5.4-1 summarizes the results of the scoping and screening effort by including the commodity groups and the intended function of those groups which are subject to an AMR.

TABLE 2.5.4-1

Component / Commodity Types Subject to Aging Management Review

Component / Commodity Type	Intended Function
Non-EQ Electrical Cables and Connections	Electrical Continuity
Metal Enclosed Bus	Electrical Continuity Insulation-Electrical
Fuse Holders (Not Part of a Larger Assembly) Metallic Clamp	Electrical Continuity
Cable Connections (Metallic Parts)	Electrical Continuity
SF_6 Insulated Bus, Connections and Insulators	Electrical Continuity Insulation-Electrical

The aging management review results are provided in Table 3.6.2-1.



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REV	DATE	CREATED	CHECKED	DESCRIPTION

NEXTera ENERGY SEABROOK

SEABROOK STATION

SBO
OFFSITE RECOVERY PATH
LICENSE RENEWAL DRAWING

FIGURE 2.5-1