APPLICATION FOR RENEWED OPERATING LICENSE

MONTICELLO NUCLEAR GENERATING PLANT

DOCKET NO. 50-263 LICENSE NO. DPR-22

March 2005

TECHNICAL AND ADMINISTRATIVE INFORMATION

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1.0 ADMINISTRATIVE INFORMATION

This application has been prepared to provide the administrative, technical and environmental information required by 10 CFR Part 54 (Reference 1) and 10 CFR Part 51 (Reference 2) to support the renewal of the Operating License for the Monticello Nuclear Generating Plant (MNGP).

Consistent with the requirements of the Nuclear Regulatory Commission (NRC) Final Rule on Electronic Maintenance and Submission of Information (Reference 3), one plain copy of the License Renewal Application (LRA) on compact disk (CD) and one paper copy are being sent to the NRC Document Control Desk for docketing. Another copy, with internal links, is being provided for the NRC ADAMS website.

For the NRC's convenience, 80 copies of a CD with the MNGP LRA and links to the MNGP Updated Safety Analysis Report (USAR) and the MNGP license renewal system boundary drawings are being transmitted under separate cover. Included in this transmittal are additional paper copies of the license renewal system boundary drawings and the MNGP LRA. Copies of this CD are also being provided to the NRC Region III Office, the NRC Senior Resident Inspector, the Mayor of the City of Monticello, Minnesota, and the Minnesota Department of Commerce.

The USAR and system boundary drawings are for information only, and are not part of the MNGP LRA.

Section 1.0 of the application provides the following information:

1. Information on the organization of the application (Section 1.1).
2. General description of the MNGP (Section 1.2).
3. The administrative information required by 10 CFR 54.17 and 54.19 (Section 1.3).
4. Requirements for amendments to the LRA pursuant to 10 CFR 54.21(b) (Section 1.4).
5. Summary of abbreviations (Section 1.5).
6. Distribution list for written communications related to the application (Section 1.6).

1.1 Application Format and Content

The following discussion describes the content of the MNGP LRA. The overall structure of the application is consistent with NEI 95-10, Rev. 4 (Reference 4). The table structure follows a format arrived at during discussions between the NRC License Renewal review staff and the nuclear power industry during 2002 and 2003.

Section 1.0 provides the administrative information required by Part 54 of Title 10 of the Code of Federal Regulations, Sections 17 and 19 (10 CFR 54.17 and 10 CFR 54.19).

Section 2.0 provides the scoping and screening methodology. Section 2.0 also describes and justifies the methodology used to determine the systems, structures, and components within the scope of license renewal and the structures and components subject to an Aging Management Review (AMR). The system and structure groupings in Sections 2.0 and 3.0 are organized to be consistent with NUREG-1800 (Reference 5). Table 2.2-1, Plant Level Scoping Results, provides a list of the plant mechanical systems, electrical/instrumentation and controls systems, and structures and identifies those plant systems and structures that are within the scope of license renewal. Section 2.3, Section 2.4, and Section 2.5 provide a description of in-scope systems and structures, their intended functions, and cross references to USAR sections and license renewal drawings. Each system/structure subsection has a table listing component groups subject to an AMR and their intended function.

Section 3.0 identifies the components and structures subject to aging management review, describes the results of the aging management reviews, and compares these results with NUREG-1801, Generic Aging Lessons Learned (GALL) Report (Reference 6). Those MNGP component groups with aging effects, and aging management programs consistent with NUREG-1801, are listed in a set of tables that are structured like those in NUREG-1801, Volume I, and NUREG-1800, Standard Review Plan (SRP) for License Renewal. A second set of tables in each Section 3.0 system grouping provides aging management information including component type, intended function, material, environment, aging effect requiring management and selected aging management programs for each component type. These system-specific tables also include columns with references to NUREG -1801, Volume 2, line items and associated NUREG-1801 Volume 1 line items (duplicated in Table 3.x.1 of each SRP system group). The last column of each table in Section 3.0 is set aside for notes or additional explanatory information specific to that line item. These tables have hyperlinked cross references to the detailed aging management program information in Appendix B. A detailed description of table construction and interrelationships is provided in Section 3.0.

Section 4.0 provides the list of time-limited aging analyses (TLAAs) defined by 10 CFR 54.3. It includes the identification of the component or subject and an explanation of the time-dependent aspects of the calculation or analysis. Section 4.0 demonstrates that the analyses remain valid for the period of extended operation, the analyses have been projected to the end of the period of extended operation, or the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

APPENDIX A, Updated Safety Analysis Report Supplement, contains a summary description of the programs for managing the effects of aging for the period of extended operation. A summary description of the evaluation of TLAAs for the period of extended operation is also included.

APPENDIX B, Aging Management Programs (AMPs), describes the AMPs and activities. Appendix B demonstrates that the aging effects on the components and structures within the scope of the License Renewal Rule will be managed such that they will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation. Where the MNGP programs are consistent with corresponding programs in NUREG-1801, the appropriate NUREG-1801 program is referenced.

Appendix C is not used for this application.

APPENDIX D, Technical Specification Changes, concludes that no technical specification changes are necessary to manage the effects of aging during the period of extended operation.

APPENDIX E, Environmental Report, contains an environmental report analyzing the potential environmental impacts of license renewal and alternatives to license renewal, as provided in NRC regulations 10 CFR 51.53(c) and 10 CFR 54.23. The NRC has determined that nuclear power plant license renewal decisions are major federal actions requiring preparation of an environmental impact statement. In an effort to streamline the license renewal environmental review, the NRC conducted a generic analysis and published the results in NUREG-1437, Generic Environmental Impact Statement for the License Renewal of Nuclear Power Plants (GEIS). To fulfill National Environmental Policy Act (NEPA) requirements, the NRC is required to publish site-specific analyses in the form of a supplement to the GEIS.

1.2 Plant Description

MNGP is located within the city limits of Monticello, Minnesota on the south bank of the Mississippi River. The plant and approximately 2150 acres of land at the plant site are owned by Northern States Power Company (NSP)-Minnesota. NSP-Minnesota is a wholly owned utility operating subsidiary of Xcel Energy Corporation (Xcel Energy). The current MNGP operating license (Facility Operating License No. DPR-22) expires at midnight on September 8, 2010.

The reactor is a 1775 MWt single-cycle, forced circulation, General Electric BWR-3, boiling water reactor producing steam for direct use in a steam-turbine. The reactor vessel contains the reactor core and supporting structure, steam separator and dryer assemblies, jet pumps, control rod guide tubes, and other components. Some of the main connections to the reactor vessel include the four main steam lines, two jet pump motive flow recirculation loop lines, four reactor feedwater lines, ten jet pump inlet lines, and 121 control rod drive thimbles. Other connections are provided for the reactor Standby Liquid Control System, Emergency Core Cooling System (ECCS), and the various instrumentation and control systems.

The fuel for the reactor core consists of slightly enriched uranium dioxide pellets contained in sealed Zircaloy tubes. The complete core loading consists of 484 fuel assemblies.

Control of reactivity is accomplished through control rod movements. The control rods are of cruciform shape and are dispersed throughout the lattice of fuel assemblies. The control rods are of the bottom-entry type and are moved vertically within the reactor core by individual, hydraulically operated, locking piston type control rod drives.

Reactor coolant enters the bottom of the reactor core and flows upward through the fuel assemblies where boiling produces steam. The steam-water mixture is separated by a steam separator and dryer assemblies located within the reactor vessel. The steam passes through main steam lines to the turbine, while the separated water mixes with the incoming feedwater and is returned to the core bottom inlet through jet pumps located within the reactor vessel. The motive force for the jet pumps is supplied by the water from the two Reactor Recirculation System loops. Each loop has a variable speed centrifugal pump with mechanical seals, motor operated gate valves for isolation of pumps for maintenance, and instrumentation for recirculation flow measurements and control.

A General Electric Mark I Primary Containment System, consisting of a steel light bulb-shaped drywell, a steel doughnut-shaped pressure suppression chamber, and interconnecting vent pipes, provides the first containment barrier surrounding the reactor vessel and reactor primary system. Any leakage from the Primary Containment System enters the Secondary Containment System, which consists of the Reactor Building, the plant Standby Gas Treatment System, and the plant main stack. The integrated plant containment system and its associated engineered safety features are designed so that off-site doses resulting from postulated design basis accidents are well below the reference values stated in 10 CFR 100.

In addition to the turbine-generator and the main condenser systems, multiple, independent, auxiliary process systems are provided for the purpose of cooling the reactor and primary containment system under various normal and abnormal conditions.

The electrical output of the plant (approximately 600 MWe net) is fed into the plant’s high voltage switchyard, and from the switchyard to Xcel Energy's network grid system via independent 345 kV, 230 kV and 115 kV transmission lines. Plant auxiliary electrical power is supplied from the 115 kV lines, the 345 kV switchyard, or both. The plant Emergency Diesel Generator System (two essential and one non-essential units) provides onsite standby emergency auxiliary electrical power.

A Gaseous Radwaste System is provided to control, recombine, filter, store, monitor, and record the process off-gases as appropriate before release through the main plant stack during normal and abnormal plant operation. A Liquid Radwaste System is provided for control, collection, treatment, storage, and disposal of liquid wastes. Liquid wastes are collected in sumps and drain tanks and transferred to the radwaste facility for further treatment, storage, or disposal.

Detailed descriptions of the MNGP systems and structures can be found in the MNGP USAR. Additional descriptive information about the MNGP systems, structures, and components is provided in Sections 2.0, 3.0, and 4.0 of this Application. References to the MNGP USAR are provided where pertinent.

An increase in rated thermal power from 1670 MWt to 1775 MWt was approved by the NRC and implemented at the MNGP in 1998. Review of operating experience during the more than six years of operation at 1775 MWt shows that this change has had a negligible impact on plant SSCs. License renewal evaluations have assumed continued plant operation at 1775 MWt. Many of the evaluations in Section 4.0 of the LRA conservatively assume a reactor thermal power level of 1880 MWt.

1.3 Information Required by 10 CFR 54.17 and 10 CFR 54.19

1.3.1 Name of Applicant

Nuclear Management Company (NMC), the operating licensee, hereby applies for renewed operating licenses for Monticello Nuclear Generating Plant. NMC submits this application individually and as agent for the owner licensee Northern States Power Company (NSP), a wholly owned utility operating subsidiary of Xcel Energy Corporation (Xcel Energy).

1.3.2 Address of Applicant

Nuclear Management Company, LLC
700 First Street
Hudson, Wisconsin 54016

Northern States Power Company
800 Nicollet Mall
Minneapolis, MN 55402

Address of the Monticello Nuclear Generating Plant

Monticello Nuclear Generating Plant
2807 West County Road 75
Monticello, MN 55362

1.3.3 Description of Business or Occupation of Applicant

Northern States Power Company - Minnesota

Northern States Power Company (NSP) - Minnesota was incorporated in 2000 under the laws of State of Minnesota. NSP-Minnesota is an operating utility engaged in the generation, transmission and distribution of electricity and the transportation, storage and distribution of natural gas. NSP-Minnesota provides generation, transmission and distribution of electricity in Minnesota, North Dakota and South Dakota.

NSP-Minnesota also purchases, distributes and sells natural gas to retail customers and transports customer-owned gas in Minnesota, North Dakota and South Dakota.

NSP-Minnesota provides retail electric utility service to approximately 1.3 million customers and gas utility service to approximately 430,000 customers.

NSP-Minnesota owns the following direct subsidiaries: United Power and Land Co., which holds real estate, and NSP Nuclear Corp., which holds interest in the Nuclear Management Co. NSP-Minnesota is an equity member of Private Fuel Storage, LLC, a consortium formed to develop a temporary storage facility for spent nuclear fuel.

The Federal Energy Regulatory Commission (FERC) has jurisdiction over rates for electric transmission service in interstate commerce and wholesale electric energy, hydro facility licensing and certain other activities of NSP-Minnesota. Federal, state and local agencies also have jurisdiction over many of NSP’s other activities, including regulation of retail rates and environmental matters.

Retail rates, services and other aspects of NSP-Minnesota operations are subject to the jurisdiction of the Minnesota Public Utilities Commission (MPUC), the North Dakota Public Service Commission (NDPSC) and the South Dakota Public Utilities Commission (SDPUC) within their respective states.

Nuclear Management Company, LLC (NMC)

NMC is the exclusive licensed operator of the Monticello Nuclear Generating Plant, and is engaged in the operation of nuclear power plants. NMC operates the Duane Arnold Energy Center for Interstate Power and Light Company, a subsidiary of Alliant Energy Corporation, Central Iowa Power Cooperative, and Corn Belt Power Cooperative; Monticello Nuclear Generating Plant and Prairie Island Nuclear Generating Plant Units 1 and 2 for NSP-Minnesota, a subsidiary of Xcel Energy Inc.; Palisades Nuclear Plant for Consumers Energy Company, a subsidiary of CMS Energy Corporation; Point Beach Nuclear Plant (PBNP), Units 1 and 2 for Wisconsin Electric Power Company (WEPCo), a unit of Wisconsin Energy Corporation (WEC), doing business under the name of WE Energies; and Kewaunee Nuclear Power Plant for Wisconsin Public Service Corporation and Wisconsin Power and Light Company, a subsidiary of Alliant Energy Corporation. The combined electric generation of the six plants is in excess of 4,500 MW.

NMC has been established as a Wisconsin limited liability corporation owned by Alliant Energy Nuclear, LLC, Consumers Nuclear Services, LLC, NSP Nuclear Corporation, WEC Nuclear Corporation, and WPS Nuclear Corporation. Alliant Energy Nuclear, LLC is a wholly owned subsidiary of Alliant Energy Corporation, the parent holding company of Wisconsin Power and Light Company and Interstate Power and Light Company. Consumers Nuclear Services, LLC is a wholly owned subsidiary of Consumers Power Company. NSP Nuclear Corporation is a wholly owned subsidiary of NSP-Minnesota. WEC Nuclear Corporation is a wholly owned subsidiary of Wisconsin Energy Corporation, the parent holding company of WEPCo, which owns Point Beach. WPS Nuclear Corporation is a wholly owned subsidiary of WPS Resources, Inc., the parent holding company of Wisconsin Public Service Corporation. NMC's corporate purpose is to provide services in connection with the operation and eventual decommissioning of licensed nuclear facilities on behalf of, and for the benefit of, the owner utilities.

Organization and Management of Applicant

The Monticello Nuclear Generating Plant is owned by NSP-Minnesota, a Minnesota corporation, with principal office located in Minneapolis, MN.

NMC is a limited liability corporation incorporated under the laws of the State of Wisconsin, with its principal office located in Hudson, Wisconsin.

NSP-Minnesota and NMC are not owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government. NSP-Minnesota and NMC make this application on their own behalf and are not acting as an agent or representative of any other person. The names and business addresses of NSP-Minnesota and NMC directors and principal officers are listed below. All persons listed are U.S. citizens.

Northern States Power Company-Minnesota

Directors

Name	Address
Wayne H. Brunetti Chairman and Chief Executive Officer Xcel Energy, Inc.	800 Nicollet Mall Minneapolis, MN 55402
Richard C. Kelly President and Chief Operating Officer Xcel Energy, Inc.	800 Nicollet Mall Minneapolis, MN 55402
Gary R. Johnson Vice President and General Counsel Xcel Energy, Inc.	800 Nicollet Mall Minneapolis, MN 55402

Principal Officers

Name	Address
Wayne H. Brunetti Chairman and Chief Executive Officer	800 Nicollet Mall Minneapolis, MN 55402
Richard C. Kelly President and Chief Operating Officer	800 Nicollet Mall Minneapolis, MN 55402
Paul J. Bonavia Vice President	800 Nicollet Mall Minneapolis, MN 55402
Benjamin GS Fowie III Vice President and Chief Financial Officer	800 Nicollet Mall Minneapolis, MN 55402
Raymond E. Gogel Vice President	800 Nicollet Mall Minneapolis, MN 55402
Cathy J. Hart Vice President and Secretary	800 Nicollet Mall Minneapolis, MN 55402
Gary R. Johnson Vice President and General Counsel	800 Nicollet Mall Minneapolis, MN 55402

Kent T. Larson Vice President	800 Nicollet Mall Minneapolis, MN 55402
Cynthia L. Lesher Vice President	800 Nicollet Mall Minneapolis, MN 55402
Teresa S. Madden Vice President and Controller	800 Nicollet Mall Minneapolis, MN 55402
George E. Tyson II Vice President and Treasurer	800 Nicollet Mall Minneapolis, MN 55402
Patricia K. Vincent Vice President	800 Nicollet Mall Minneapolis, MN 55402
David M. Wilks Vice President	800 Nicollet Mall Minneapolis, MN 55402

Nuclear Management Company, LLC

Directors

Name	Address
Michael B. Sellman President and Chief Executive Officer Nuclear Management Company, LLC	Nuclear Management Company, LLC 700 First Street Hudson, Wisconsin 54016
Frederick (Rick) Kuester Executive Vice President WE Energies	WE Energies 231 West Michigan Street Milwaukee, WI 53201
David W. Joos, Chairman President and Chief Operating Officer Consumers Energy Corp.	Consumers Energy Corp. 1 Energy Plaza Jackson, MI 49201
David M. Wilks President Energy Supply Xcel Energy, Inc.	Xcel Energy 800 Nicollet Mall Minneapolis, MN 55402

Eliot G. Protsch Senior Executive Vice President and Chief Financial Officer Alliant Energy Corp.	Alliant Energy Corp. 200 First Street SE Cedar Rapids, IA 52406
Charles Schrock President and Chief Operating Officer - Generation Wisconsin Public Service Corp.	Wisconsin Public Service Corp. 700 North Adams St. Green Bay, WI 54307

Principal Officers

Name	Address
Michael B. Sellman President and Chief Executive Officer	700 First Street Hudson, Wisconsin 54016
Craig G. Anderson Senior Vice President	700 First Street Hudson, Wisconsin 54016
Lyle Bohn Senior Vice President	700 First Street Hudson, Wisconsin 54016
Steve Bylow Vice President Human Resources	700 First Street Hudson, Wisconsin 54016
Douglas E. Cooper Senior Vice President Group Operations	700 First Street Hudson, Wisconsin 54016
John Paul Cowan Executive Vice President and Chief Nuclear Officer	700 First Street Hudson, Wisconsin 54016
Craig W Lambert Vice President Engineering	700 First Street Hudson, Wisconsin 54016
Thomas J. Palmisano Site Vice President Monticello Nuclear Generating Plant	Monticello Nuclear Generating Plant 2807 West County Road 75 Monticello, Minnesota 55362

Greg Palmer Vice President and Chief Financial Officer	700 First Street Hudson, Wisconsin 54016
Jonathan Rogoff Vice President, Council, and Secretary	700 First Street Hudson, Wisconsin 54016
Joel Sorensen Vice President Corporate Training	700 First Street Hudson, Wisconsin 54016
Gary Van Middlesworth Vice President Fleet Standardization	700 First Street Hudson, Wisconsin 54016
Dave Wilson Vice President Assessment	700 First Street Hudson, Wisconsin 54016

Legal Counsel

David R. Lewis	Shaw Pittman 2300 N Street, NW Washington, DC 20037

1.3.4 Class of License, Use of Facility, and Period of Time for which the License is Sought

NMC requests renewal of the Class 104b operating license for the Monticello Nuclear Generating Plant (Facility Operating License DPR-22) for a period of 20 years beyond the expiration of the current license. This would extend the operating license from midnight September 8, 2010, to midnight September 8, 2030.

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 licenses and issued pursuant to 10 CFR Parts 30, 40 and 70.

The facility will continue to be known as the Monticello Nuclear Generating Plant.

1.3.5 Earliest and Latest Dates for Alterations, if Proposed

NMC 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.

1.3.6 Listing of Regulatory Agencies Having Jurisdiction and News Publications

In addition to the Nuclear Regulatory Commission, The Federal Energy Regulatory Commission (FERC) and the State of Minnesota Public Utilities Commission are the principal regulators of the company's electric operations in Minnesota.

The Honorable Magalie R. Salas
Secretary
Federal Energy Regulatory Commission
888 First Street, NE, Room 1A
Washington, DC 20426

Mr. Burl W. Haar
Executive Secretary
State of Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

The area news publications and their associated addresses are provided below:

The Monticello Times
Mr. Donald Q. Smith, Editor and Publisher
116 East River Street
Monticello, MN 55362

The Saint Paul Pioneer Press
Mr. Par Ridder, Publisher & President
345 Cedar Street
St. Paul, MN 55101

The Saint Cloud Times
Mr. Bill Albrecht, Publisher
3000 Seventh St. N
St. Cloud, MN 56302

The Star Tribune
Mr. J Keith Moyer, Publisher & President
425 Portland Avenue
Minneapolis, MN 55488-0002

1.3.7 Conforming Changes to Standard Indemnity Agreement

The requirements at 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-42 for the Monticello Nuclear Generating Plant states that the agreement shall terminate at the time of expiration of the license.

The indemnity agreement lists DPR-22 as the applicable license number. Should the license number be changed upon issuance of the renewed license, NMC requests that conforming changes be made to the indemnity agreement as appropriate.

1.3.8 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, NMC, 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 Parts 25 and/or 95.

1.4 Current Licensing Basis Changes During NRC Review

Each year, following the submittal of the MNGP License Renewal Application and at least three months before the scheduled completion of the NRC review, NMC will submit amendments to the MNGP application pursuant to 10 CFR 54.21(b). These revisions will identify any changes to the current licensing basis that materially affect the contents of the License Renewal Application, including the USAR supplements and any other aspects of the application.

1.5 Abbreviations

This section contains the abbreviations that pertain to the administrative and technical information within the license renewal application. The abbreviations that pertain to the environmental information are included as part of Appendix E (Environmental Report).

AC	Alternating Current
ACBs	Air Circuit Breakers
ACI	American Concrete Institute
ACSR	Aluminum Conductor Steel Reinforced
ADS	Automatic Depressurization System
AERM	Aging Effect Requiring Management
AIR	Instrument and Service Air
AMAs	Aging Management Activities
AMG	Aging Management Guideline
AMP	Aging Management Program
AMR	Aging Management Review
AN2	Alternate Nitrogen System
ANSI	American National Standards Institute
AOV	Air Operated Valve
APR	Automatic Pressure Relief
APRM	Average Power Range Monitor
AR	Action Request
ARI	Alternate Rod Injection
ARM	Area Radiation Monitor
ART	Adjusted Reference Temperature
ASD	Alternate Shutdown
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing of Materials
ATWS	Anticipated Transients Without a Scram

AWI	Administrative Work Instruction
BAW	Babcock and Wilcox
BWR	Boiling Water Reactor
BWROG	Boiling Water Reactor Owners Group
BWRVIP	Boiling Water Reactor Vessel Internals Project
CA	Calculation
CAP	Corrective Action Program
CASS	Cast Austenitic Stainless Steel
CCCW	Closed-Cycle Cooling Water
CDR	Main Condenser
CD-ROM	Compact Disk-Read Only Memory
CE	Combustion Engineering
CFR	Code of Federal Regulations
CFW	Condensate and Feedwater
CGC	Combustible Gas Control
CLB	Current Licensing Basis
CMAA	Crane Manufactures Association of America
CRD	Control Rod Drive
CRDA	Control Rod Drop Accident
CSP	Core Spray
CST	Condensate Storage Tank
CUF	Cumulative Usage Factor
CV	Control Valve
CW	Circulating Water
DBA	Design Basis Accident
DBA CO	Design Basis Accident Condensation Oscillation

DBD	Design Basis Document
DBE	Design Basis Earthquake
DC	Direct Current
DG	Diesel Generator
DGB	Diesel Generator Building
DOE	Department Of Energy
DPR	Division of Power Reactors
DWS	Demineralized Water System
ECCS	Emergency Core Cooling System
EDG	Emergency Diesel Generator
EFB	Emergency Filtration Train Building
EFPY	Effective Full Power Years
EFT	Emergency Filtration Train
EMA	Equivalent Margin Analysis
EOCI	Electric Overhead Crane Institute
EOL	End Of License
EOP	Emergency Operating Procedure
EPA	Electrical Protection Assemblies
EPR	Ethylene Propylene Rubber
EPRI	Electric Power Research Institute
EQ	Environmental Qualification
EQML	Environmental Qualification Master List
EQSS	Environmental Qualification Summary Sheet
ESF	Engineered Safety Feature
ESW	Emergency Service Water
EXT	External
FAC	Flow-Accelerated Corrosion

Fen	Environmental Fatigue
FERC	Federal Energy Regulatory Commission
FHA	Fire Hazards Analysis
FIR	Fire System
FOH	Diesel Fuel Oil Transfer House
FP	Fire Protection
FSAR	Final Safety Analysis Report
FW	Feedwater
GALL	Generic Aging Lessons Learned
GE	General Electric
GEIS	Generic Environmental Impact Statement
GL	Generic Letter
GSI	Generic Safety Issue
HELB	High Energy Line Break
HEPA	High Efficiency Particulate Filter
HGR	Hangers and Supports
HPB	HPCI Building
HPC	High Pressure Coolant
HPCI	High Pressure Coolant Injection
HTV	Heating and Ventilation
HVAC	Heating, Ventilation and Air Conditioning
HWC	Hydrogen Water Chemistry
HX	Heat Exchanger
I&C	Instrumentation & Controls
IASCC	Irradiation Assisted Stress Corrosion Cracking
ID	Inside Diameter

IEB	Inspection and Enforcement Bulletin
IEEE	Institute of Electrical and Electronics Engineers, Inc.
IF	Intended Function
IGA	Intergranular Attack
IGSCC	Intergranular Stress Corrosion Cracking
IN	Information Notice
INS	Intake Structure
INPO	Institute of Nuclear Power Operations
IPA	Integrated Plant Assessment
IR	Insulation Resistance
IRM	Intermediate Range Monitor
ISG	Interim Staff Guidance
ISI	In-Service Inspection
ISP	Integrated Surveillance Program
IWB	Requirements for Class 1 Components of Light-Water Cooled Power Plants
IWC	Requirements for Class 2 Components of Light-Water Cooled Power Plants
IWD	Requirements for Class 3 Components of Light-Water Cooled Power Plants
IWE	Requirements for Class MC and Metallic Liners of Class CC Components of Light-Water Cooled Power Plants
IWF	Requirements for Class 1, 2, 3, and MC Component Supports of Light-Water Cooled Power Plants
IWL	Requirements for Class CC Concrete Components of Light-Water Cooled Power Plants
KIC	Reference Stress Intensity Factor As A Function Of The Metal Temperature T and The Metal References Nil-Ductility Temperature RT_{NDT}

KIP	1000 Lbs or 1 kilo-Pound
KIR	ASME Fracture Toughness Curve KIR
Ksi	One KIP per Square Inch, 1000 psi
kV	1000 Volts or 1 kilo-Volt
LDR	Load Definition Report
LLC	Limited Liability Company
LO	Lubricating Oil
LOCA	Loss-Of-Coolant-Accident
LOOP	Loss Of Offsite Power
LP	Low Pressure
LPCI	Low Pressure Coolant Injection
LPRM	Local Power Range Monitor
LR	License Renewal
LRA	License Renewal Application
LWR	Light Water Reactor
MCC	Motor Control Center
MCR	Main Control Room
MeV	Million Electron Volts
MG	Motor Generator
MIC	Microbiologically Induced Corrosion
MNGP	Monticello Nuclear Generating Plant
MOD	Motor Operated Disconnect
MR	Maintenance Rule
MSIV	Main Steam Isolation Valve
MST	Main Steam
MUD	Makeup Demineralizer
MVP	Mechanical Vacuum Pump

MW	Megawatts
MWe	Megawatt Electric
MWh	Megawatt Hour
MWt	Megawatt Thermal
NDE	Non-Destructive Examination
NEI	Nuclear Energy Institute
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
Ni	Nickel
NMC	Nuclear Management Company, LLC
NMS	Neutron Monitoring System
NP	Nuclear Procedure
NPS	Nominal Pipe Size
NPSH	Net Positive Suction Head
NRC	Nuclear Regulatory Commission
NSAC	Nuclear Safety Analysis Center
NSAS	Non-Safety Affecting Safety
NSP	Northern States Power Company
NSR	Non-Safety Related
NSSS	Nuclear Steam Supply System
NUMARC	Nuclear Utility Management and Resource Council
NUREG	Designation of publication prepared by NRC Staff
OCA	Owner Control Area
OCCW	Open-Cycle Cooling Water Program
ODSCC	Outside Diameter Stress Corrosion Cracking
OE	Operating Experience
OGB	Off Gas Storage and Compressor Building

OGS	Off Gas Stack
OQAP	Operational Quality Assurance Plan
OSP	Off Site Power
P&ID	Piping and Instrument Diagram
PA	Public Address System
PAB	Plant Administration Building
PASS	Post Accident Sampling System
PBDs	Program Basis Documents
PBX	Private Branch Exchange
PCT	Primary Containment
PCIS	Primary Containment Isolation System
PCM	Primary Containment Mechanical
PFM	Probabilistic Fracture Mechanics
pH	Concentration of Hydrogen Ions
PM	Preventative Maintenance
PPM	Parts Per Million
PPS	Plant Protection System
PRM	Process Radiation Monitor
PSI	Pounds Per Square Inch
P-T	Pressure Temperature
PTS	Pressurized Thermal Shock
PUAAG	Plant Unique Analysis Application Guide
PUAR	Plant Unique Analysis Report
PULD	Plant Unique Load Definition
PVC	Polyvinyl Chloride (Plastic)
PWR	Pressurized Water Reactor
QA	Quality Assurance

QC	Quality Control
Q-List	Quality List
RAD	Radwaste Solid & Liquid
RAI	Request for Additional Information
RBC	Reactor Building Closed Cooling Water
RBM	Rod Block Monitor
RCI	Reactor Core Isolation
RCIC	Reactor Core Isolation Cooling
RCPB	Reactor Coolant Pressure Boundary
RCS	Reactor Coolant System
REC	Reactor Recirculation
RG	Regulatory Guide (NRC)
RHR	Residual Heat Removal
RHV	Reactor Head Vent
RI-ISI	Risk Informed In-Service Inspection
RIT	Reactor Internals
RLC	Reactor Level Control
RMC	Reactor Manual Control
RMS	Radiation Monitoring System
RPS	Reactor Protection System
RPT	Recirculation Pump Trip
RPV	Reactor Pressure Vessel
RSW	Residual Heat Removal Service Water
RT_{NDT}	Reference Temperature for Nil Ductility Transition
RV	Relief Valve
RVI	Reactor Vessel Instrumentation
RWB	Radioactive Waste Building
RWC	Reactor Water Cleanup

RX	Reactor
RXB	Reactor Building
SAS	Structures Affecting Safety
SBGT	Standby Gas Treatment
SBO	Station Blackout
SC	Structure and Component
SCBA	Self-Contained Breathing Apparatus
SCC	Stress Corrosion Cracking
SCT	Secondary Containment
SE	Safety Evaluation
SER	Safety Evaluation Report
SJAE	Steam Jet Air Ejector
SLC	Standby Liquid Control
SOC	Statement Of Considerations
SOER	Significant Operating Event Report
SR	Safety Related
SRM	Source Range Monitor
SRP	Standard Review Plan
SRP-LR	Standard Review Plan for License Renewal
SRV	Safety Relief Valve
SS	Stainless Steel
SSA	Safety System Actuation
SSC	System, Structure, or Component
SSW	Service & Seal Water
SW	Service Water
TAC	Technical Assignment Control (internal NRC work management tool)

TAP	Torus Attached Piping
TGB	Turbine Building
TIP	Traversing Incore Probe
TLAA	Time-Limited Aging Analysis
TR	Technical Report
TSC	Technical Support Center
TSV	Turbine Stop Valve
UAC	Uninterruptible Alternating Current
UDB	Underground Duct Bank
UPS	Uninterruptible Power Supply
USAR	Updated Safety Analysis Report
USAS	United States of America Standards
USE	Upper Shelf Energy
UT	Ultrasonic Testing
UV	Ultraviolet
VAC	Volts-Alternating Current
VDC	Volts-Direct Current
VT	Visual Examination
WDW	Well and Domestic Water
WO	Work Order
XLPE	Cross-Linked Polyethylene

1.6 Communications

Written communications on this application should be directed to:

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Section 1.0 References

1. 10 CFR 54, Requirements for Renewal of Operating Licenses for Nuclear Power Plants, U.S. Nuclear Regulatory Commission.

2. 10 CFR 51, Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions, U.S. Nuclear Regulatory Commission.

3. Final NRC Rule, “Electronic Maintenance and Submission of Information,” Federal Register (68 FR 58792), October 10, 2003.

4. NEI 95-10, Industry Guideline for Implementing the Requirements of 10 CFR Part 54 -The License Renewal Rule, Rev. 4, Nuclear Energy Institute.

   Note: Used for LRA format only. Rev. 3 is the NRC approved revision.

5. NUREG-1800, Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants, U.S. Nuclear Regulatory Commission, July 2001.

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

2.1 Scoping and Screening Methodology

2.1.1 Introduction

The Monticello Nuclear Generating Plant (MNGP) License Renewal Program consists of several distinct processes, specifically Scoping, Screening, Aging Management Reviews (AMRs), Time Limited Aging Analyses (TLAAs), and Aging Management Programs (AMPs). The purpose of this section is to describe the Scoping and Screening process used in the MNGP License Renewal Program. AMRs, TLAAs, and AMPs are discussed in Sections 3.0, 4.0, and Appendix B, respectively.

MNGP License Renewal (LR) Project Procedures provide detailed instructions for these processes. They incorporate the guidance provided in NEI 95-10, “Industry Guideline for Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule,” Revision 3 (Reference 1) and the Statements of Consideration accompanying 10 CFR Part 54 (Reference 2).

The scoping process categorizes the entire plant in terms of major systems and structures and identifies system level functions. These systems and structures are then evaluated against the scoping criteria in 10 CFR Part 54.4 (a)(1), (2), and (3). This identifies the SSCs that perform or support an intended function for responding to a design basis event, are non-safety-related and whose failure could prevent accomplishment of a safety-related function, or support a specific requirement for one of the regulated events applicable to LR.

Each License Renewal Application (LRA) must then provide an Integrated Plant Assessment that fulfills the requirements of 10 CFR Part 54.21. 10 CFR Part 54.3, “Definitions,” defines the Integrated Plant Assessment (IPA) as:

> IPA 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 and that the effects of aging on the functionality of such structures and components will be managed to maintain the CLB [Current Licensing Basis] such that there is an acceptable level of safety during the period of extended operation.

The Integrated Plant Assessment, based on criteria in 10 CFR Part 54.21(a), includes:

- Identifying those in-scope components that are passive, long-lived, and serve an in-scope intended function,

- Providing a description and justification for the methods used to identify SSCs that are in-scope and subject to an AMR, and
- Providing assurance that the effects of aging are adequately managed so that the intended functions will be maintained consistent with the CLB for the period of extended operation.

The screening process identifies in-scope, long-lived, passive system components and structural components that are subject to an AMR. Commodity groups may be used to facilitate these reviews.

Figure 2.1-1 illustrates the overall Scoping and Screening process.

2.1.2 License Renewal Database

The MNGP LR database served as an information repository for system, structure, and component evaluations. The LR database also assisted in the administration of equipment data and project reports. The LR database was designed to be consistent with the process guidance in NEI 95-10 and the process requirements of 10 CFR Part 54.

Initially, population of the LR database used the assets of the MNGP plant equipment database. Each plant equipment database system was matched to its appropriate LR system. The component data from the plant equipment database was then used to electronically populate the LR database. Component information in the plant equipment database relevant to license renewal was also transferred.

Not all systems and components from the plant equipment data base were included in the population of the LR database. Equipment groups and types that did not represent permanently installed equipment were not transferred to the LR database. The components in these systems and equipment groups/types were reviewed to ensure components potentially in-scope for LR were not omitted.

The MNGP uses the plant equipment database to electronically store component information to prepare Work Orders and support other plant functions. It is a relational database system that contains essential information on most onsite equipment. This key information was used for the LR database, including design-related information and maintenance-related information.

Additional information found in the plant equipment database includes seismic classification, Quality Assurance (QA) classification, and location. The plant equipment database also indicates whether a component is included in the Fire Protection Program, Environmental Qualification (EQ) Program, Anticipated Transients Without Scram (ATWS) implementation, or Station Blackout (SBO) implementation. The LR database also received this information electronically from the plant equipment database.

The plant equipment database does not uniquely identify all components installed in the plant. For example, the plant equipment database does not typically include items such as cables, raceways, piping, conduits, fireproofing, general construction items (e.g., nuts, bolts), or consumable materials (e.g., diesel fuel, resins, etc.). Components not uniquely identified in the plant equipment database that were in-scope for LR were identified as commodities or generic assets (e.g., pipe, structural steel) in their respective system or structure in the LR database to ensure proper coverage and evaluation.

In addition to the plant equipment database, controlled drawings, vendor information, and current licensing basis (CLB) documentation were used to ensure a complete set of components were identified and evaluated.

2.1.3 Plant Information Sources

2.1.3.1 Current Licensing Basis

10 CFR Part 54.3 defines the CLB. The CLB for MNGP has been defined in accordance with this regulation.

The MNGP CLB includes the NRC regulations contained in 10 CFR parts 2, 19, 20, 21, 26, 30, 40, 50, 51, 54, 55, 70, 72, 73, 100 (including appendices); orders; license conditions; exemptions; and Technical Specifications (Reference 3). It also includes the plant-specific design-basis information documented in the MNGP Updated Safety Analysis Report (USAR) (Reference 4), commitments remaining in effect that were made in docketed licensing correspondence such as licensee responses to NRC bulletins, generic letters, and enforcement actions, as well as licensee commitments documented in NRC safety evaluations or licensee event reports.

2.1.3.2 Design Basis Events

The functions performed by SSCs for MNGP design basis events (DBEs) established the safety classification of SSCs. The DBEs are defined in the MNGP CLB.

Chapter 14 of the USAR provides the analyses of DBEs for the MNGP. These analyses include both design basis accidents and bounding transients. Chapter 12 of the USAR contains evaluations of natural phenomena and external events applicable to the MNGP.

There are a number of supplemental information sources, including the MNGP Design Basis Documents (DBDs). The DBDs cover a number of support and accident mitigation systems, selected licensing topical issues, and accident analyses. DBDs are a tool to help explain the requirements behind the design basis for selected systems and topics and complement information obtained from primary CLB sources. DBDs are not CLB documents, and serve strictly as an information resource.

2.1.3.3 Quality Classifications

The Q-List, Appendix A of the Operational Quality Assurance Plan (OQAP) (Reference 5) specifies the Quality Assurance Program boundaries for systems, structures, and components at the MNGP. The QA boundary includes safety related SSCs and activities associated with these items subject to the requirements of 10 CFR 50, Appendix B.

The MNGP Q-List Extension Administrative Work Instruction further clarifies which structures, major sub-structures, and areas are classified as safety related. The Q-List Extension also lists fire protection-related and security-related equipment, which are covered under elements of the OQAP. The MNGP Q-List and Q-List Extension were used to code items as safety-related in the MNGP plant equipment database.

2.1.3.4 Other Information Sources

Other information sources also assist in performing license renewal system and structure evaluations. These include:

- Controlled Drawing File
- Industry Codes, Standards, and Regulations
- NRC Docketed Correspondence and Documents
- Technical Correspondence, Analyses, and Reports
- Calculations
- Plant Modifications and Alterations
- Nuclear Steam Supply System Supplier, Architect-Engineer, and Vendor Reports, Specifications, and Drawings

2.1.4 Scoping Methodology

The scoping process categorizes the entire plant in terms of major systems, structures, components (SSCs), and commodity groups with respect to license renewal. SSC and commodity group functions are identified and evaluated against criteria provided in 10 CFR Part 54.4 (a)(1), (2), and (3) to determine whether the item should be considered within the scope of license renewal.

Even if only a portion of a SSC or commodity fulfills a scoping criterion, the SSC falls within the scope for license renewal and receives further screening. Eliminated are those SSCs or commodities not meeting any scoping criterion.

The scoping methodology utilized by the MNGP is consistent with the guidance provided by the NRC in NUREG 1800, by the industry in NEI 95-10, and by interim staff guidance as discussed in Section 2.1.4.3.

This review uses existing plant documentation, including the MNGP Current Licensing Basis documents, controlled drawings, and the plant equipment database. Once identified as being in-scope, the systems and structures move to component and commodity level scoping and then to the next step in the IPA process - screening.

2.1.4.1 System, Structure, and Commodity Group Identification

Systems

System identifier codes are used to sort and track plant systems and components in the plant equipment database. This identification scheme supports plant needs with respect to maintenance work, but is not sufficient to identify license renewal system functional boundaries. For this reason, revision or the combination of some plant equipment database system identifiers was necessary for license renewal purposes.

License renewal systems were defined to account for all of the plant equipment database systems that contain permanently installed equipment consistent with the system descriptions in the MNGP USAR. Therefore, redefining system boundaries for License Renewal had no impact on whether or not an SSC performs a LR intended function.

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

Structures

The plant equipment database includes a category for structures that comprises all of the MNGP buildings and structures. The individual buildings were input into the LR database as individual or grouped LR 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 LR intended functions regardless of their coverage in the plant equipment database.

Commodity Groups

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.

Commodity groups accounted for all electrical AMRs and two structural AMRs.

2.1.4.2 SSC Functions

Numerous sources, including the MNGP USAR, docketed correspondence with the NRC, Maintenance Rule documents, and DBDs provided system and structure-level function information. Documentation of references used in this process was included for each system function as appropriate.

The process used at the MNGP identified all system-level and structure-level functions. If the functions met any of the criteria specified in 10 CFR Part 54.4 (a)(1), (2), or (3), then the system or structure was in-scope for LR. Structures whose only function is to support or house in-scope systems were also in-scope for LR.

Once system and structure-level functions were identified, and their LR status determined, this information was used in combination with the plant equipment database and other information sources to identify component functions and determine if these functions are in-scope for LR. The same scoping criteria applied at the system and structure level was applied at the component level. The intended functions, and definitions, used in this process for MNGP are defined in Table 2.1-1

When the only components performing a license renewal intended function in a system were evaluated as in-scope commodities (e.g., fire protection barriers, hangers, and supports), a system-level AMR was not necessary. For example, a non-safety related ventilation system contains components that act as fire protection barriers (fire dampers). Within the system evaluation boundary, no other functions performed by the system are LR intended functions. It was permissible to evaluate the system components that perform the fire barrier function within the fire barrier commodity group and designate the non-safety related ventilation system as having no assets requiring an AMR.

The critical element of scoping is to ensure that all SSCs that perform LR intended functions are identified and that the basis for this determination is clearly documented. The LR database provided assistance in documenting CLB information used in the scoping process.

2.1.4.2.1 Scoping Criterion 1 - Safety Related SSCs

The first of the three criteria in 10 CFR Part 54 used to determine if SSCs fall within the scope of the rule is:

> Safety-related systems, structures, and components that are relied upon to remain functional during and following design-basis events (as defined in 10 CFR 50.49 (b)(1)) to ensure the following functions-
>
> (i)The integrity of the reactor coolant pressure boundary
>
> (ii)The capability to shut down the reactor and maintain it in a safe shutdown condition; or
>
> (iii)The capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposure comparable to the guidelines in §50.34(a)(1), §50.67(b)(2), or § 100.11 of this chapter, as applicable.

This is the current NRC definition of "safety-related." In recent years this, or very similar wording, has been introduced in NRC regulations and guidance documents. The design, construction, and licensing of the MNGP predates this definition of safety-related (SR).

The MNGP Q-List and Q-List Extension were used to code items as safety-related in the MNGP plant equipment database. The MNGP plant equipment database, in turn, served as one of the information sources used to identify SSCs meeting Scoping Criterion 1 - Safety Related Systems and Structures.

As described in Section 2.1.4.2, SSC functions were identified using a number of information sources including the CLB. These functions were compared to Scoping Criterion 1 to identify those that are in-scope for LR for MNGP DBEs regardless of their current classification in the plant equipment database or supporting Q-List information sources.

In addition to the plant equipment database, the Monticello Color Coded P&IDs and other controlled drawings were used to identify components required to support in-scope system-level and structure-level functions. These components were included in-scope for LR and generally matched information contained in the plant equipment database. Where differences were noted they were documented and resolved. Some of these differences resulted in the issuance of an Action Request for further evaluation within the site Corrective Action Program. Results were documented in the LR database and on the License Renewal Boundary Drawings for mechanical components.

Therefore, the SSCs which perform Scoping Criterion 1 functions for MNGP DBEs have been included in the scope of License Renewal and the identification of these components and commodities was based on a variety of information sources.

While the MNGP definition of safety related is not identical to the definition in §54.4(a)(1), there is assurance that all components falling within the scope of §54.4(a)(1) were identified.

2.1.4.2.2 **Scoping Criterion 2 - Non-Safety Related Affecting Safety Related**

10 CFR Part 54.4(a)(2) requires that all non-safety-related (NSR) SSCs whose failure could prevent satisfactory accomplishment of any of the functions identified in Scoping Criterion 1 be included within the scope of license renewal (Scoping Criterion 2).

SSCs meeting Scoping Criterion 2 for the MNGP are included in one of the following three categories:

a. CLB Topics. The MNGP CLB includes a number of topics that identify NSR 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 Scoping Criterion 1 function (e.g., Seismic interactions),
b. For the purpose of license renewal, NSR SSCs directly connected to Scoping Criterion 1 SSCs (typically piping systems), or
c. For the purpose of license renewal, NSR SSCs that are not directly connected to Scoping Criterion 1 SSCs, but whose failure due to spatial proximity could prevent the satisfactory accomplishment of a Scoping Criterion 1 function.

SSCs meeting Scoping Criterion 2 in the first two categories were typically identified during document reviews including the MNGP USAR, plant drawings, design documents, piping analyses, the plant equipment database, and other CLB documents. SSCs in the third category are typically identified by both document reviews and extensive plant walk downs to identify possible spatial interactions meeting the broader criteria established for license renewal.

a. **CLB Review.**

Based on a review of the CLB, those topics that meet Scoping Criterion 2 are:

- High Energy Line Break (HELB). High energy line breaks outside containment were previously evaluated as documented in Appendix I of the MNGP USAR. With one noted exception, all high-energy lines identified in USAR Appendix I (regardless of safety classification) and their associated in-line components are included in-scope of license renewal. This also includes those lines that met the “less than 2% use” exclusion criteria that were not further evaluated in the CLB. The one noted exception is NSR high energy lines located in the Recombiner Building. These lines were excluded from consideration on the same basis they were excluded from additional consideration in the CLB HELB analysis, i.e., failure would have no impact on systems required to mitigate accidents.
- High energy lines of one-inch diameter or smaller nominal pipe size were excluded from the HELB analysis as discussed in the USAR. These small lines were further evaluated and placed in-scope for LR if their failure could adversely affect a safety related SSC.
- Internal and External Flooding Events. Flooding from various internal sources (e.g., pipe breaks) and external sources (e.g., river floods) were evaluated during the design of the plant. A number of design features were installed in the plant to ensure safe shutdown as required by the CLB for the specific events evaluated. These features (e.g., sump pumps, level switches, flood barriers, pump spray hoods, drain systems, etc.) are in-scope for LR.
- Internal and External Missile Hazards. Missiles that could be generated from internal sources or external sources such as rotating equipment and tornados were evaluated during the design of the plant. Both preventive (e.g., overspeed 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 LR.
- Overhead Handling Systems. Overhead handling systems associated with heavy loads as described in NUREG-0612 meet the criteria of 10 CFR 54.4(a)(2) and are in-scope for license renewal. Additionally, the

refueling platform and fuel preparation machine meet the criteria of 10 CFR 54.4(a)(2) and are in-scope for LR.

- Seismic Interaction. Within the MNGP CLB, some lines and structures designed to Class II seismic requirements were reanalyzed to more stringent requirements due to potential adverse interaction with safety-related SSCs. These lines (including supports) and structures are in-scope for license renewal.

b. NSR SSCs Directly Connected to Scoping Criterion 1 SSCs

- For NSR SSCs directly connected to Scoping Criterion 1 SSCs, the in-scope boundary for license renewal extends into the NSR portion of the piping and supports up to and including the first equivalent anchor beyond the safety/non-safety interface. For Monticello, the first equivalent anchor is that point beyond which failure of the piping system will not prevent the satisfactory accomplishment of the Scoping Criterion 1 function of the connected SSCs. Examples that constitute the first equivalent anchor include: a true anchor; a large piece of plant equipment; a building penetration; and, two levels of support in each orthogonal direction. In general, equivalent anchors were selected consistent with the pipe analyses of record that demonstrate seismic adequacy of the various configurations. The piping components and supports up to and including the first equivalent anchor are in-scope for license renewal. Moreover, when further evaluated, NSR piping components and supports attached to Scoping Criterion 1 piping were found to be in-scope for license renewal for other reasons in most cases.
- NSR structures attached to, or next to, Scoping Criterion 1 structures are in-scope for license renewal if their failure could prevent a Scoping Criterion 1 SSC from performing its intended function.
- In addition to mechanical and structural items, the potential exists by plant design and license for NSR electrical components to be electrically connected to or in close proximity with safety-related electrical components. Cable separation, electrical isolation (e.g., use of relays, optical isolators, etc.), breaker/fuse coordination, automatic load shedding, and other design features were implemented consistent with the plant CLB to address such interfaces. As noted in Section 2.1.4.2.1, most electrical components are in-scope for license renewal as commodities (e.g., cables) regardless of their safety classification or screen out due to the active nature of the device. Where a commodity group in-scope distinction was made for the

purpose of license renewal, it was conservatively based on area location and support function performed by the commodity (as described further below). Therefore, electrical separation and isolation requirements did not impact the scope of electrical components included in license renewal.

c. NSR SSCs in Spatial Proximity of Scoping Criterion 1 SSCs

For NSR SSCs that are not directly connected to Scoping Criterion 1 SSCs, the NSR SSCs may be in-scope if their failure could prevent the performance of a Scoping Criterion 1 function.

- **Spatial Interactions Identified During Walk Downs**. In order to identify spatial interactions that could result in SSCs meeting Scoping Criterion 2, the following approach and criteria were implemented.

  A list of Scoping Criterion 1 components and commodities was assembled based on the plant equipment database, drawings, walk downs and plant knowledge.

  A list of rooms containing safety related equipment was developed. Since almost every room in an affected structure contained safety related equipment (e.g., Reactor Building), all rooms in these structures were listed and walk downs performed.

  Senior personnel knowledgeable in plant layout, system design, and operation performed walk downs of all accessible areas. For inaccessible areas during plant operation (due to high radiation), a review using controlled piping layout and other physical configuration drawings was performed. Walk downs of some of these areas were later performed as allowed by plant operating conditions.

  The walk downs were performed on a spaces approach using a conservative set of walk down criteria to identify Scoping Criterion 2 components. Both spray (pressurized liquid or steam lines) and leaks (non-pressurized liquid lines) were identified and evaluated for their impact on Scoping Criterion 1 components. Spray and leak interactions were evaluated without regard to whether the Scoping Criterion 1 components were active or passive and without regard to the duration of the spray or leak. All pressurized liquid systems in the general area of Scoping Criterion 1 components are in-scope for license renewal and assumed to leak anywhere around the circumference or along the length of the pipe. General area is defined as being on the same floor of a building with no barrier walls between the fluid or steam source and the Scoping Criterion 1 component. All non-pressurized liquid systems directly above Scoping Criterion 1 components were also in-scope for license renewal. These leaks were assumed to occur anywhere along the length of the piping system. Since all piping supports in buildings with Scoping Criterion 1 components are in-scope for license renewal, NSR piping systems are not evaluated for fall or impact interactions.

Air and gas systems (non-liquid) are not a hazard to other plant equipment. A site specific review was made of operating experience in regards to air/gas systems which verified that Monticello air/gas systems have not negatively affected other plant equipment. A review of industry operating experience also failed to reveal any events of this nature. Since none of the air/gas lines are high-energy lines and all supports in buildings with Scoping Criterion 1 components are in-scope for license renewal, air/gas systems are not Scoping Criterion 2 items.

A second set of walk downs for select rooms was performed to further refine initial results. During these additional walk downs it was confirmed that no Scoping Criterion 1 components were located in these areas or there were no NSR components that could spray or leak on Scoping Criterion 1 components (using the above walk down criteria). Therefore, some NSR components were eliminated from Scoping Criterion 2 considerations.

- **NSR Conduits, Trays, Junction Boxes, and Lighting Fixtures.** NSR conduits, cable trays, junction boxes, lighting fixtures may contain or be routed near Scoping Criterion 1 cables or other components. Therefore for determining which of these commodities to consider in-scope for license renewal, a conservative simplified approach is used. All NSR conduits, trays, junction boxes and lighting fixtures and their supports located within structures housing safety related equipment are in-scope for license renewal. Additionally, 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.
- **NSR HVAC Ducts and Supports.** Though most HVAC ducts and their supports are NSR, they are located throughout the plant and typically run along ceilings and thus above many Scoping Criterion 1 SSCs. Similar to air/gas pipe systems, HVAC ducts are not a hazard to other plant equipment. The only spatial interaction concern is falling. Similar to conduit and cable trays, a conservative simplified

approach is used. All HVAC duct supports located within structures housing Scoping Criterion 1 components are in-scope for LR.

- **Steam Dryer Assembly.** Industry operating experience has shown that steam dryer assembly structural failures can occur. In some cases, operating at higher power levels was a contributing factor. In 1998, the thermal power of Monticello was increased from 1670 MWt to 1775 MWt. MNGP has not experienced any steam dryer failures during the period of increased power operation and dryer failures in the industry have typically been attributed to design, not aging, concerns. During evaluation of the Dresden/Quad Cities Station LRA, the NRC recommended the steam dryers be categorized as Scoping Criterion 2 items. Consistent with this recommendation, the MNGP has included the steam dryer assembly as in-scope for license renewal.

2.1.4.2.3 Scoping Criterion 3 - Other Regulations Identified in 10 CFR Part 54

The third scoping category in 10 CFR Part 54.4 involves SSCs relied upon by licensees to address five regulated events. Specifically, 10 CFR Part 54.4 (a)(3) defines SSCs as in-scope for LR 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 Part 50.48)
- EQ (10 CFR Part 50.49)
- Pressurized Thermal Shock (10 CFR Part 50.61)
- ATWS (10 CFR Part 50.62)
- Station Blackout (10 CFR Part 50.63)

Any SSC that is required to function in order to meet compliance requirements of one or more of these regulations was identified as a Criterion 3 item. All Criterion 3 SSCs are in-scope for LR.

With the exception of Pressurized Thermal Shock, SSCs subject to these regulations are identified in the plant equipment database. In addition to this, a separate review was performed of the regulated events, to independently determine SSCs that would be in-scope for LR. The results of this review were documented in position papers and incorporated into the LR database. The following discussion describes the methodology used in this review.

2.1.4.2.4 **Fire Protection**

Fire Protection Program

The design of the MNGP Fire Protection program is based upon the defense-in-depth concept. Multiple levels of protection are provided so that should a fire occur, the plant can be safely shut down and the risk of a radioactive release to the environment will be minimized. These levels of protection include fire prevention, fire detection and mitigation, and the capability to achieve and maintain safe shutdown should a fire occur. This protection is provided through compliance with 10 CFR 50.48, 10 CFR 50, Appendix R, and commitments made to NRC Branch Technical Position APCSB 9.5-1, Appendix A. Fire protection features and commitments are described in detail in the USAR, the Safe Shutdown Analysis (SSA), and the Fire Hazards Analysis (FHA). The SSCs at Monticello that support these multiple levels of protection are in-scope for LR.

Items such as fire extinguishers, fire hoses, portable lighting, and air packs were subjected to the MNGP's scoping and screening process. This process is consistent with the NRC Staff's guidance on consumables provided in NUREG-1800, Table 2.1-3.

Two of the primary information sources that were used in performing this portion of the scoping effort are the SSA and FHA. These are further discussed below:

<u>Safe Shutdown Analysis</u>

Section III.G.1 of Appendix R to 10 CFR 50 requires that fire protection features be provided for SSCs important to safe shutdown. In order to meet these requirements, all equipment required for safe shutdown, including the associated power and control cables, and any equipment which could adversely affect safe shutdown if spuriously actuated by fire-induced faults, has been identified for every fire area in the plant in order to assess the fire protection required. Safe shutdown is defined as hot standby conditions as a minimum, with the capability to proceed to cold shutdown should conditions warrant. Using this information, a SSA was performed to determine the impact of a postulated fire on the safe shutdown equipment and circuitry within each fire area. Where a safe shutdown function was prevented, corrective actions (e.g., cable rerouting, cable protection, procedure changes, etc.) have been implemented to resolve the concern, or operator manual actions have been specified. In some cases, credit is taken for equipment (other than the redundant counterpart) that provides a redundant function to equipment affected by a postulated fire.

Fire Hazards Analysis

A systematic approach was used for the review of the fire hazards and their exposure to safety-related equipment and components necessary for safe shutdown within the area. The type and quantity of combustible materials, type of fire hazards these materials present in the area, and the fire protection features (passive, active and manual) for the area were reviewed. The effects of postulated fires on the performance of safe shutdown functions and the minimization of radioactive releases to the environment were evaluated for each fire area. These evaluations identify those portions of the plant Fire Protection system that are relied on to support the safe shutdown function of 10 CFR 50, Appendix R.

Plant drawings, FHA, SSA, USAR, Operations Manual, and other source documents were used to identify SSCs which perform fire protection functions and which support fire protection equipment relied upon to achieve post-fire safe shutdown. A list of equipment was compiled from this review and used to compare to equipment designated as fire protection or Appendix R related in the plant equipment database. A combined list was established through this comparison that was further reviewed against plant surveillance procedures for performing fire door and fire damper inspections and against plant drawings that identify fire zones and fire penetration seals to ensure completeness. Components and commodities included on the list are in-scope for license renewal.

2.1.4.2.5 **Environmental Qualification**

The criteria for determining which equipment requires environmental qualification is defined by 10 CFR Part 50.49:

(1) Safety-related electric equipment

i) This equipment is that relied upon to remain functional during and following design basis events to ensure--

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

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

(C) 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.

(ii) Design Basis Events are defined as conditions of normal operation, including anticipated operational occurrences, design basis accidents, external events, and natural phenomena for which the plant must be designed to ensure functions (b)(1)(i)(A) through (C) of this section.

(2) Non-safety related electric equipment whose failure under postulated environmental conditions could prevent satisfactory accomplishment of safety functions specified in subparagraphs (b)(1)(i)(A) through (C) of paragraph (b)(1) of this section by the safety-related equipment.

(3) Certain post-accident monitoring equipment.

Components that meet the above criteria for MNGP are identified on the Environmental Qualification Master List (EQML).

Electrical equipment has to be qualified for the worst-case accident environment to which it may be subjected. In addition, the effect of radiation and temperature on the life of the equipment during normal operation, such as thermal and radiation aging, has to be evaluated.

All equipment identified on the EQML supporting the MNGP CLB was included within the scope of LR as components or commodities.

2.1.4.2.6 **Pressurized Thermal Shock (PTS)**

This event deals with operations and inspections of equipment to minimize and monitor pressurized thermal transients to Pressurized Water Reactors. It is not applicable to boiling water reactors such as the MNGP.

2.1.4.2.7 **Anticipated Transients without Scram (ATWS)**

The NRC, by its issuance of the Anticipated Transients without Scram (ATWS) Rule (10 CFR 50.62), required certain plants to install or modify systems used to support mitigation of an ATWS event.

For Boiling Water Reactors, the Final ATWS Rule required:

a. An Alternate Rod Injection (ARI) system, diverse from the reactor protection system, to vent the scram air header automatically under ATWS conditions.

b. A Recirculation Pump Trip (RPT) system to trip the reactor recirculation pumps automatically under ATWS conditions.

c. A Standby Liquid Control System (SLCS) with the capability of inserting negative reactivity equivalent to 86 gpm of 13 weight percent of natural sodium pentaborate decahydrate solution into a 251-inch inside diameter reactor vessel.

MNGP's system for accommodating ATWS events is described in detail in Section 14.8 of the MNGP USAR.

Plant and vendor drawings, the USAR, docketed correspondence, modifications, and the plant equipment database were reviewed to identify components relied upon to mitigate the ATWS event as part of the systems which comprise the Final ATWS Rule. These components are in-scope for license renewal

2.1.4.2.8 **Station Blackout (SBO)**

On July 21, 1988, the Nuclear Regulatory Commission amended its regulations in 10 CFR Part 50 by adding a new section, 50.63, Loss of All Alternating Current Power. The objective of this requirement was to assure that all nuclear power plants are capable of withstanding a Station Blackout and maintaining adequate reactor core cooling and appropriate containment integrity for a required duration. The staff issued Regulatory Guide 1.155, Station Blackout, to provide guidance for meeting the requirements of 10 CFR 50.63. Concurrent with the development of this regulatory guide, the Nuclear Utility Management and Resource Council (NUMARC) developed a document titled, Guidelines and Technical Basis for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors, NUMARC 87-00. These documents provide detailed guidelines and procedures on how to assess each plant's capabilities to comply with the SBO Rule. The NRC staff concluded that the NUMARC document provides acceptable guidance for addressing the 10 CFR 50.63 requirements.

At MNGP, the SBO Rule is implemented by methods described in NUMARC 87-00 and Regulatory Guide 1.155. SBO Rule implementation details for the MNGP are described in docketed correspondences, NRC staff SERs, SBO equipment lists, and supporting calculations. USAR Section 8.12 summarizes the licensing criteria that are the CLB for resolution of this issue at the MNGP.

Components relied on at MNGP to perform an SBO were identified through review of plant specific SBO calculations, the USAR, plant drawings, modifications, and the plant equipment database.

The NRC issued revised staff guidance for license renewal on April 1, 2002 that directs that the plant portion of the offsite power system used to restore offsite power be included in-scope for LR (NRC ISG-02). To ensure the guidance of ISG-02 was used, a review of one-line drawings and plant procedures, for performing offsite power restoration, was performed. Components (e.g., breakers, switches, transformers, etc.) explicitly identified in offsite power restoration procedures and their interconnections (busses, disconnect switches, etc.) are in-scope for license renewal. Offsite sources identified for power restoration, and therefore in-scope for license renewal, include the 345 kV, 115 kV, and 13.8 kV offsite sources. Components and commodities in-scope for license renewal are those from the plant 4.16 kV busses, through and including the interconnecting transformers, disconnect switches, and busses out to and including the switchyard circuit breakers that connect to these offsite sources.

2.1.4.3 Interim Staff Guidance (ISG)

The scoping and screening process has been significantly affected by NRC Staff positions developed subsequent to finalization of 10 CFR Part 54. During license renewal application reviews, the NRC staff identified 21 issues (ISGs) for which additional NRC and industry clarification was necessary. Five of the ISGs have been issued for implementation. Sixteen others are currently the subject of discussion between the industry and the NRC Staff. These 16 issues are currently unresolved.

2.1.4.3.1 Resolved ISGs

The resolved ISGs are:

- ISG-01 - How to Credit Plant Programs and Activities
- ISG-02 - Station Blackout Scoping
- ISG-03 - Concrete
- ISG-04 - Fire Protection System Piping
- ISG-05 - Electrical Fuse Holder

Following is a discussion of the general process used during the License Renewal Integrated Plant Assessment at the MNGP for each of the five resolved issues:

ISG-01 - How to Credit Plant Programs and Activities

Resolved between industry and NRC Staff. Alternative programs to the GALL Report are acceptable based on NRC correspondence dated November 23, 2001.

ISG-02 - Station Blackout Scoping

NRC issued guidance dated April 1, 2002 on this issue is as follows (Reference 6.):

> Consistent with the requirements specified in 10 CFR 54.4(a)(3) and 10 CFR 50.63(a)(1), the plant system portion of the offsite power system should be included within the scope of license renewal. Further clarification was provided which stated that, "the staff has determined that the plant system portion of the offsite power system that is used to connect the plant to the offsite power source should be included within the scope of the rule. This path typically includes the switchyard circuit breakers that connect to the offsite power system transformers (Startup transformers), the transformers themselves, the intervening overhead or underground circuits between circuit breaker and transformer and transformer and onsite electrical distribution system, and the associated control circuits and structures.

The SSCs assumed to be necessary for the coping strategy, including both primary and alternative SSCs available to manage the event, are in-scope for LR.

As stated above the License Renewal regulatory guidance also mandates the inclusion of selected off site power SSCs used for SBO recovery beyond those identified in the regulatory commitments made to satisfy 10 CFR 50.63 criteria. Therefore, systems and structures that provide a function for SBO coping and systems or structures that provide a function for recovery from an SBO condition in accordance with the current License Renewal regulatory interpretation are within the scope of License Renewal.

ISG-03 - Concrete

As a result of the performance of AMRs for in-scope concrete components, NMC has concluded that many of these components do not require aging management for the period of extended operation. This conclusion is based on a review of the material of construction, the environment, and industry and plant-specific operating experience for these components. MNGP uses a Mark I steel containment, therefore ASME requirements for concrete containments do not apply. The associated AMP is not credited for MNGP license renewal.

Structures subject to an aging management review will receive inspections as part of the Structures Monitoring Program. The GALL Report does not recommend further evaluation of concrete components in inaccessible areas for which the applicant can demonstrate a non-aggressive environment.

The environment for inaccessible concrete at MNGP is not aggressive. MNGP data indicates that a pH > 7, chlorides <100 ppm, and sulfates < 100 ppm is typical for the site. Therefore, further evaluation of normally inaccessible structures will only be contemplated when excavations allow access or when aging effects on accessible concrete structures indicate that potential detrimental aging effects could also be occurring in inaccessible areas.

ISG-04 Fire Protection System Piping

In a December 3, 2002, letter from the NRC to NEI entitled, “Interim Staff Guidance On Aging Management Of Fire Protection Systems For License Renewal,” the NRC provided changes to their previous guidance to the industry on aging management for passive SSCs comprising fire protection. The MNGP has performed the IPA for aging management in a manner consistent with the proposed guidance.

ISG-05 - Electrical Fuse Holder

Consistent with the requirements specified in 10 CFR 54.4(a), fuse holders (including fuse clips and fuse blocks) are passive electrical components. Fuse holders are scoped, screened, and included in the aging management review (AMR) in the same manner as terminal blocks and other types of electrical connections. However, fuse holders inside the enclosure of an active component, such as switchgear, power supplies, power inverters, battery chargers, and circuit boards, are piece parts of the larger assembly. Since piece parts and subcomponents in such an enclosure are inspected regularly and maintained as part of the MNGP normal maintenance and surveillance activities, they are not subject to an AMR.

Fuse holders perform a primary function similar to electrical connections by providing an electrical circuit to deliver rated voltage, current, or signals.

These intended functions meet the criteria of 10 CFR 54.4(a). Intended functions are performed without moving parts or without a change in configuration or properties as described in 10 CFR 54.21 (a)(1)(i). Fuse holders are therefore passive, long-lived electrical components within the scope of license renewal and subject to an AMR. Therefore, aging management of the fuse holders is required for those cases where fuse holders are not piece parts of a larger assembly.

No aging effects for fuse holders were identified at the MNGP which require management.

2.1.4.3.2 **Unresolved ISGs**

The 16 issues which are currently the subject of discussion between the industry and the NRC Staff are:

- Housing for Active Components
- Scoping Guidance
- The ISG Process
- Scoping Criteria 54.4(a)(2)
- License Renewal Application Format
- Environmental Fatigue for Carbon/Low-alloy Steel
- Cracking of Class 1 Small-Bore Piping
- The Loose Parts Monitoring System
- Cracking in Bolting
- Revision to GALL (XI.E2)
- License Renewal Applications (TLAAs)
- Bus Ducts
- Inaccessible Cable (GALL XI.E3)
- Revision to GALL (XI.M11)
- Revision to GALL (XI.M19)
- Reactor Vessel Internals (GALL XI.M9 and XI.M.16)

Following is a discussion of each of these open ISGs and their applicability to the MNGP:

Housing for Active Components

Examples of structures and components that perform passive functions are listed in 10 CFR 54.21(a)(1)(ii), which states, “These structures and components include, but are not limited to, pump casings, valve bodies....”

Pumps and valves were used as an example, meant to focus the AMR process on the passive function of an SSC. That passive function is not limited to the pressure boundary of the reactor coolant system. The exclusion of an SSC due to its active nature only applies to that portion of the SSC with an active function and not to those portions of the SSC with a passive function. Therefore, at the MNGP, fan housings and fire damper housings are within scope and subject to an AMR.

Scoping Guidance

The review performed to identify the MNGP fire protection SSCs within scope for license renewal was comprehensive and included the sources cited by the proposed guidance.

The ISG Process

This is an administrative issue and does not affect the MNGP LRA.

Scoping Criteria 54.4(a)(2)

The methodology used for scoping of MNGP SSCs in accordance with 10 CFR 54.4(a)(2) is described in Section 2.1.4.2.2 of the MNGP LRA. This approach is consistent with our current understanding of the proposed guidance.

License Renewal Application Format

The NEI Standard Format for License Renewal Applications was used in the preparation of the MNGP LRA. This approach is consistent with our current understanding of the proposed guidance.

Environmental Fatigue for Carbon/Low-Alloy Steel

Aging management of environmental effects on metal fatigue is addressed in Section 4.5 of the MNGP LRA.

Cracking of Class 1 Small-Bore Piping

The MNGP One-Time Inspection Program for small-bore piping will be representative of all Class 1 piping, including 1-inch and less, with full penetration butt welds.

The Loose Parts Monitoring System

There is insufficient information related to this issue to address the ISG at this time.

Cracking in Bolting

The aging management program for bolting integrity is described in Section B2.1.4 of the MNGP LRA.

Revision to GALL (XI.E2)

The aging management program for electrical cables not subject to 10 CFR 50.49, used in instrument circuits, is described in Section B2.1.16 of the MNGP LRA.

License Renewal Application (TLAAs)

Section 4.2 of the MNGP LRA (Neutron Embrittlement of the Reactor Pressure Vessel and Internals) is consistent with our current understanding of the proposed guidance.

Bus Ducts

The plant specific MNGP aging management program for bus ducts is described in Section B2.1.6 of the MNGP LRA.

Inaccessible Cable (GALL XI.E3)

Aging management of inaccessible medium voltage cable is addressed in Section B2.1.21 of the MNGP LRA.

Revision to GALL (XI.M11)

This ISG is not applicable to the MNGP. This GALL program is not credited for license renewal.

Revision to GALL (XI.M19)

This ISG is not applicable to the MNGP. This GALL program is not credited for license renewal.

Reactor Vessel Internals (GALL XI.M9 and XI.M16)

Aging management of reactor vessel internals is addressed in Section B2.1.12 of the MNGP LRA.

2.1.4.4 Evaluation Boundaries - License Renewal Boundary Drawings

Application of all three 10 CFR Part 54.4 criteria generated a listing of SSCs that are in-scope for LR. Not every component of a system may support the system intended functions, therefore some components within a system or structure are not subject to an AMR.

In-scope boundaries are depicted in the License Renewal Boundary Drawings which accompany the MNGP LRA, but are not considered part of the application. The drawings consist of simplified process and instrumentation drawings (for mechanical systems), a plant level one-line diagram (for electrical systems), and a site plan drawing (for major structures and buildings). The colored portions of the drawing are within the scope of license renewal as defined in the accompanying legend on each drawing. An index (LR-36032-1) and legend LR-36032 are provided for the License Renewal Boundary Drawings.

2.1.5 Screening Process

2.1.5.1 License Renewal Screening

The SRP-LR (Reference 7) uses the term “screening” when referring to the application of §54.21 (a)(1)(i) and (ii) criteria (SRP LR Section 2.1.1.2). These criteria are provided, in part, as follows:

> 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.

2.1.5.2 General Screening Methodology

The screening process identifies the components from the systems, structures, and commodity groups within the scope of license renewal that are subject to an AMR. These components are those that perform or support a component-level intended function without moving parts or change in configuration or properties and that are not subject to replacement based on a qualified life or specified time period.

A component-level intended function is one that supports the system-level intended function. The plant systems, structures, and commodity groups that are within the scope of license renewal and their system-level intended functions were previously identified during the scoping process.

The screening process consists of the following distinctive steps:

- Identification of the components that are subject to an AMR (passive and long-lived) for each system, structure, or commodity in-scope for LR.
- Identification of the component-level intended functions for all components subject to an AMR.
- Identification of the applicable references used to make these determinations.

2.1.5.3 Component Classification (Passive, long-lived)

As part of the screening process, components that were within the license renewal evaluation boundaries that functioned with moving parts or with a change in configuration or properties (i.e., active components) were identified. An aging management review was not required for these components. Appendix B to NEI 95-10 provides guidance regarding component types generally classified as passive or active.

Cables, connections, and electrical penetrations associated with the 10 CFR 50.49 environmental qualification program are defined as short lived (i.e., subject to replacement based on qualified life) and are addressed by TLAAs. Therefore, these cables, connections, and electrical penetrations are not included in the set of electrical components requiring aging management review.

The screening process also identified those components classified as short-lived. If a work control document was found to provide for the periodic replacement of the component, or the component was found to have an established qualified life, the component has been identified as short-lived and an aging management review was not required for that component.

Consumables are a special class of short-lived items that can include packing, gaskets, component seals, O-rings, oil, grease, component filters, system filters, fire extinguishers, fire hoses, and air packs. Evaluation of items to determine whether or not they are consumables followed the guidance presented in Table 2.1-3 of NUREG-1800 as summarized below:

a. Packing, Gaskets, Component Seals, and O-Rings

Packing, gaskets, component mechanical seals, and O-rings provide a leak-proof seal when components are mechanically joined together. These items are commonly found in components such as valves, pumps, heat exchangers, ventilation units/ducts, and piping segments. These types of consumables are subcomponents of the identified components and, therefore, are not subject to their own condition or performance monitoring. Therefore, the AMR for the component includes an evaluation of the sealing materials in those instances where none of the following applied:

1. The sealing materials are short-lived because they are replaced on a fixed frequency or have a qualified life established (e.g., for EQ purposes), or

2. The sealing materials are not relied on in the CLB to maintain any of the following:

- Leakage below established limits
- System pressure high enough to deliver specified flow rates
- A pressure envelope for a space

b. Oil, Grease, and Filters

Oil, grease, and filters (both system and component filters) have been treated as consumables because either:

1. A program for periodic replacement exists, or

2. A monitoring program (e.g., predictive analysis activities, condition monitoring) exists that replaces these consumables, based on established performance criteria, when their condition begins to degrade, but before there is a loss of intended function.

c. Fire Extinguishers, Fire Hoses, and Air Packs

Components such as fire hoses, fire extinguishers, self-contained breathing apparatus (SCBA), and SCBA cylinders are consumables that are routinely tested or inspected. The Fire Protection Program complies with the applicable

NFPA safety standards, which specify performance and condition monitoring programs for these specific components. They are replaced as necessary. Therefore, while these consumables are in the scope of license renewal, they do not require an AMR.

A component (or component commodity group) that was determined to be active or short-lived is not subject to an AMR, and is screened out by the process.

2.1.5.4 Scoping and Screening of Electrical Equipment

The scoping and screening process for electrical equipment was unique in several aspects. All electrical systems were evaluated to determine if the system intended functions met the requirements of 10 CFR 54.4(a)(1) through (a)(3). Those systems, structures and components, which supported intended functions were considered within the scope of license renewal. Component level screening was performed for “in scope” components associated with electrical and mechanical systems. Most component level screening was performed and documented in the LR database on a commodity basis. Components identified as being within the scope of license renewal were evaluated per NEI 95-10 Appendix B criteria to determine if the component was considered “active.” Components were either screened out as active or were included in a commodity group. Long-lived, passive components were divided into four commodity groups: Non-EQ Cables and Connections, Fuse Holders, Electrical Penetrations and Off Site Power/SBO Recovery Path. Aging management was performed only on these four commodity groups. This process allowed for the quick removal of large numbers of out-of-scope and active components. This approach was both efficient and reduced the number of AMRs needed.

Mechanical systems contain some electrical only components (relays, power supplies, motors, etc.). If a question on electrical components came up, an informal cross discipline review was performed. Because electrical components are evaluated on a commodity basis or screen out due to active functions, it was not necessary to track each individual component (either in a mechanical document or in an electrical document). Existing electrical components in the equipment database were transferred to the LR database, but not evaluated on an individual basis.

Based on the complexity of identifying whether or not an individual insulated cable or connection supports a license renewal intended function, MNGP elected to initially include all non-EQ insulated cable and connections in-scope, but excluded individual circuits (non-EQ cables and connections) on a case-by-case basis during the aging management review evaluation process, when it was determined that these cables and components were not safety-related, that failure of these cables or components would not prevent satisfactory accomplishment of any safety related intended functions, and that these cables and components performed no functions that supports a regulated event.

2.1.5.5 Components Subject to Aging Management Review

A component-level intended function is one that is required for the system or structure to perform its system-level intended functions.

The components (or component commodity groups) that are subject to an AMR are those in-scope components that perform a component-level intended function without moving parts or a change in configuration or properties and are not subject to replacement based on a qualified life or specified time period. Components may have more than one intended function. If a component did not have at least one component-level intended function, the component was not subject to an AMR.

Detailed scoping and screening reports have been prepared which identify all structures and components subject to an AMR. These reports have been prepared for all systems, structures, or commodity groups (except electrical commodities) in-scope for LR. Electrical commodities subject to an AMR were identified using guidance in NEI 95-10 and the EPRI License Renewal Electrical Handbook (Reference 8).

Section 2.1 References

1 NEI 95-10, “Industry Guidance for Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule,” Nuclear Energy Institute, Revision 3

2 10 CFR Part 54, “Requirements For Renewal Of Operating Licenses For Nuclear Power Plants,” U.S. Nuclear Regulatory Commission (60 FR 22461, 61 FR 65175, 64 FR 72002)

3 Monticello Nuclear Generating Plant Technical Specifications, Appendix A to NRC Operating License DPR-22

4 Monticello Nuclear Generating Plant Updated Safety Analysis Report (USAR), Revision 21

5 Xcel Energy, Inc., Operational Quality Assurance Plan for the Monticello and Prairie Island Nuclear Generating Plants, Revision 25, Appendix A. Note: A new Operational Quality Assurance Plan applicable to all Nuclear Management Company facilities is expected to be implemented in mid-2005.

6. NRC letter to Alan Nelson (Nuclear Energy Institute) and David Lochbaum (Union of Concerned Scientists), “Staff Guidance on Scoping of Equipment Relied Upon to Meet the Requirements of The Station Blackout (SBO) Rule (10 CFR 50.63) For License Renewal (10 CFR 54.4(a)(3)),” dated April 1, 2002

7 NUREG-1800, “Standard Review Plan for Review of LRAs for Nuclear Power Plants,” U.S. Nuclear Regulatory Commission, April 2001

8 EPRI 1003057, License Renewal Electrical Handbook, Rev. 0 (December 2001)

Figure 2.1-1 Scoping and Screening Process Overview

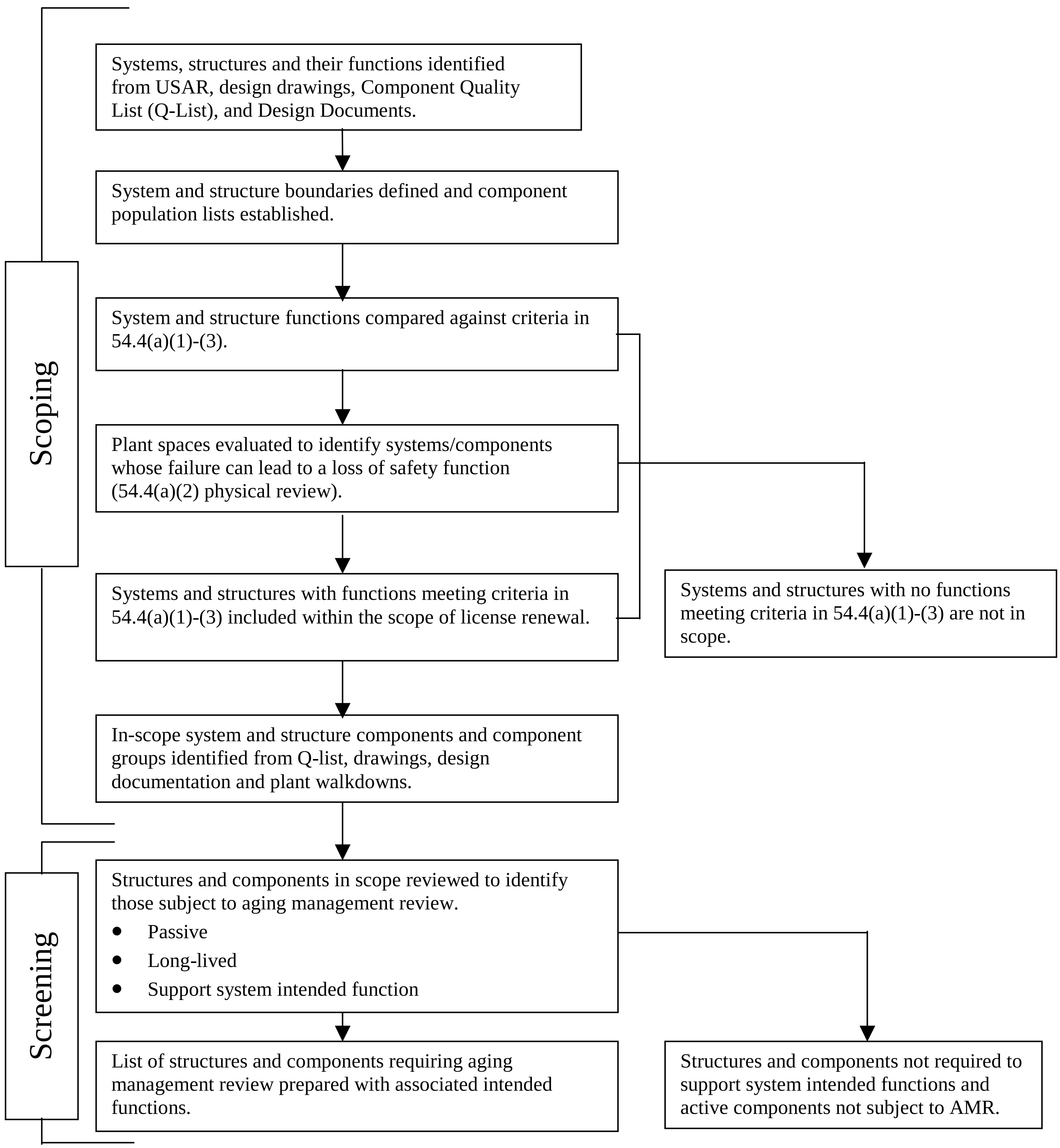

Table 2.1-1 Intended Function Definitions

Component Intended Functions	Definition
Mechanical	
Component Structural Support	Provide structural support to safety related components.
Filtration	Provides filtration.
Flow Restriction	Provide flow restriction.
Heat Transfer	Provides for heat transfer.
Plateout & Holdup of Radioactive Materials	Provides removal and holdup for fission products released in design basis accidents.
Pressure Boundary	Provide pressure-retaining boundary so that sufficient flow at adequate pressure is delivered.
Pressure Boundary/Fission Product 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 support to safety related components.
Structural Support for Non-Safety Related	Provide structural support to non-safety related components whose failure could prevent satisfactory accomplishment of any of the required safety related functions.
Thermal Insulation	Limit heat transfer to maintain temperature within design limits.
Electrical	
Insulate and Support an Electrical Conductor	Same
Provide Electrical Connections to Specified Sections of an Electrical Circuit to Deliver Voltage, Current, or Signals	Same
Civil & Structural	
Absorb Neutrons	Provide shielding against neutron radiation.
Cooling Water Source	Provide source of cooling water for plant shutdown.

Table 2.1-1 Intended Function Definitions

Component Intended Functions	Definition
Fire Barrier	Provide rated fire barrier to confine or retard a fire from spreading to or from adjacent areas of the plant.
Flood Barrier	Provide flood protection barrier (internally or externally generated).
Gaseous Discharge	Provide path for release of filtered and unfiltered gaseous discharge.
Heat Sink	Provide heat sink during SBO or design basis accidents.
HELB Barrier	Provide shielding against high energy line breaks.
Missile Barrier	Provide missile barrier (internally or externally generated).
Non-Safety Support	Provide structural support to non-safety related components whose failure could prevent satisfactory accomplishment of any of the required safety related functions.
Pressure Boundary	Provide pressure boundary or essentially leak tight barrier to protect public health and safety in the event of any postulated design basis events.
Radiation Shielding	Provide shielding against radiation.
Safety Related Support	Provide structural support to safety related components.
Shelter/Protection	Provide shelter/protection to safety related components.
Whip Restraint	Provide pipe whip restraint.

2.2 Plant Level Scoping Results

The systems, structures, and commodities at Monticello were evaluated to determine whether they were within the scope of license renewal, using the methodology described in Section 2.1.4. The results are shown in Table 2.2-1.

Table 2.2-1 Plant Level Scoping Results

Description	System or Structure Code	Within Scope of License Renewal?	Comments
SRP Evaluation Group: Reactor Vessel, Internals, and Reactor Coolant System			
Reactor Head Vent (Section 2.3.1.1)	RHV	Yes	
Reactor Pressure Vessel (Section 2.3.1.2)	RPV	Yes	
Reactor Pressure Vessel Internals (Section 2.3.1.3)	RIT	Yes	
Reactor Recirculation (Section 2.3.1.4)	REC	Yes	The Reactor Recirculation System is part of the Reactor Coolant Pressure Boundary. In addition, portions of the Reactor Coolant Pressure Boundary are evaluated in the Automatic Pressure Relief, Condensate and Feedwater, Control Rod Drive, Core Spray, High Pressure Coolant Injection, Main Steam, Reactor Core Isolation Cooling, Reactor Head Vent, Reactor Pressure Vessel, Reactor Vessel Instrumentation, Residual Heat Removal, Reactor Water Cleanup, and Standby Liquid Control systems. The Reactor Recirculation System includes the Recirculation Flow Control subsystem.
Reactor Vessel Instrumentation (Section 2.3.1.5)	RVI	Yes	

Table 2.2-1 Plant Level Scoping Results

Description	System or Structure Code	Within Scope of License Renewal?	Comments
SRP Evaluation Group: Engineered Safety Features			
Automatic Pressure Relief (Section 2.3.2.1)	APR	Yes	This system includes the Automatic Depressurization and Low-Low Set systems as subsystems.
Combustible Gas Control (Section 2.3.2.2)	CGC	Yes	NRC approval granted to remove system. System to be isolated and capped during 2005 refueling outage.
Core Spray (Section 2.3.2.3)	CSP	Yes	
High Pressure Coolant Injection (Section 2.3.2.4)	HPC	Yes	This system includes the steam supply piping from the Main Steam system to the High Pressure Coolant Injection system turbine.
Primary Containment Mechanical (Section 2.3.2.5)	PCM	Yes	This system includes the Containment Atmosphere Control, Drywell Nitrogen Air Supply, Hydrogen-Oxygen Analyzing, Hard Pipe Vent and Post Accident Sampling subsystems; as well as, the mechanical portion of the Traversing In-Core Probe System supporting primary containment isolation.
Reactor Core Isolation Cooling (Section 2.3.2.6)	RCI	Yes	This system includes the steam supply piping from the Main Steam system to the Reactor Core Isolation Cooling system turbine.
Residual Heat Removal (Section 2.3.2.7)	RHR	Yes	This system includes the Low Pressure Coolant Injection (LPCI), drywell and suppression chamber spray (Containment Spray/Cooling), and Reactor Shutdown Cooling subsystems.

Table 2.2-1 Plant Level Scoping Results

Description	System or Structure Code	Within Scope of License Renewal?	Comments
Secondary Containment (Section 2.3.2.8)	SCT	Yes	This system is comprised of the mechanical portions of the secondary containment boundary (e.g., dampers, ductwork, etc.) and the Standby Gas Treatment subsystem.
SRP Evaluation Group: Auxiliary Systems			
Alternate Nitrogen (Section 2.3.3.1)	AN2	Yes	
Biocide Injection	BIS	No	The Biocide Injection system is used to chemically treat the Emergency Service Water system and the Fire system. The Biocide Injection system is manually initiated when process system treatment is desired, normally during routine surveillance testing. Normally closed isolation valves and check valves isolate the Biocide Injection system from the connected systems. These valves, and their required pressure boundary functions are included with the respective in-scope interfacing system.
Chemistry Sampling (Section 2.3.3.2)	CHM	Yes	
Circulating Water (Section 2.3.3.3)	CWT	Yes	
Control Rod Drive (Section 2.3.3.4)	CRD	Yes	This system includes the Control Rod Drive system (e.g., control rod drive mechanism, hydraulic control units, etc.) and the Control Rod Drive Hydraulic system (e.g., supply pumps, filters, control valves, etc.) as subsystems.
Demineralized Water (Section 2.3.3.5)	DWS	Yes	This system includes the Makeup Demineralizer system as a subsystem.

Table 2.2-1 Plant Level Scoping Results

Description	System or Structure Code	Within Scope of License Renewal?	Comments
Drywell Atmosphere Cooling	DAC	No	The Drywell Atmosphere Cooling system distributes cooled gas via a ring supply header in the drywell. This function supports normal operation. The Drywell Atmosphere Cooling system is non-safety related and is not required during and following design basis events. See USAR Section 5.2.1.2.1 and Section 5.2.2.5.2 for additional information.
Emergency Diesel Generators (Section 2.3.3.6)	DGN	Yes	This system includes the Diesel Oil system as a subsystem
Emergency Filtration Train (Section 2.3.3.7)	EFT	Yes	
Emergency Service Water (Section 2.3.3.8)	ESW	Yes	This system includes the Emergency Diesel Generator Emergency Service Water, Emergency Service Water, and Residual Heat Removal Service Water systems as subsystems
Fire (Section 2.3.3.9)	FIR	Yes	
Fuel Pool Cooling and Cleanup (Section 2.3.3.10)	FPC	Yes	
Heating and Ventilation (Section 2.3.3.11)	HTV	Yes	
Heating Boiler	HTB	No	The heating boiler is located in a separate building. System does not satisfy any license renewal scoping criteria.

Table 2.2-1 Plant Level Scoping Results

Description	System or Structure Code	Within Scope of License Renewal?	Comments
Hydrogen Water Chemistry	HWC	No	The Hydrogen Water Chemistry system is designed to reduce the level of dissolved oxygen in the reactor water by injecting hydrogen into the feedwater. The Hydrogen Water Chemistry system is not safety related and is not required during and following design basis events. See USAR Section 4.6 for additional information.
Instrument and Service Air (Section 2.3.3.12)	AIR	Yes	
Off Gas Holdup and Recombiner	ORS	No	The function of the recombiner subsystem is to recombine the radiolytic hydrogen and oxygen normally present in the off-gas. Recombination substantially reduces the volume of off-gas to be subsequently stored for decay and renders the off-gas non-combustible and, therefore, safe for compression and storage. The function of the off gas holdup subsystem is to provide sufficient off-gas holdup time to allow decay of the short-lived radioisotopes and minimize iodine and radioactive particle release to the atmosphere. The Off Gas Holdup and Recombiner system is not safety related and is not required during and following design basis events. See USAR Section 9.3 for additional information.
Radwaste Solid and Liquid (Section 2.3.3.13)	RAD	Yes	Includes the liquid and solid radwaste systems as subsystems.
Reactor Building Closed Cooling Water (Section 2.3.3.14)	RBC	Yes	

Table 2.2-1 Plant Level Scoping Results

Description	System or Structure Code	Within Scope of License Renewal?	Comments
Reactor Water Cleanup (Section 2.3.3.15)	RWC	Yes	
Service Air Blower	SAB	No	The Service Air Blower can be used to supply the air requirements of the Condensate Demineralizer subsystem during backwashing of the filter elements. The Service Air Blower provides a backup air supply to the Air Surge Backwash subsystem. The Air Surge Backwash and Condensate Demineralizer are subsystems of the Condensate and Feedwater system. The Service Air Blower system is non-safety related and is not required during and following design basis events. See USAR Section 10.3.4.2.1 for additional information concerning the Service Air Blower subsystem. See USAR Section 11.7 for additional information concerning the Condensate Demineralizer subsystem.
Service and Seal Water (Section 2.3.3.16)	SSW	Yes	This system includes the Seal Water and the Service Water systems as subsystems.
Standby Liquid Control (Section 2.3.3.17)	SLC	Yes	
Wells and Domestic Water (Section 2.3.3.18)	WDW	Yes	This system includes the Domestic Water and the Sewer and Non-radioactive Drain systems as subsystems.
SRP Evaluation Group: Steam and Power Conversion System			
Condensate Storage (Section 2.3.4.1)	CST	Yes	

Table 2.2-1 Plant Level Scoping Results

Description	System or Structure Code	Within Scope of License Renewal?	Comments
Condensate and Feedwater (Section 2.3.4.2)	CFW	Yes	This system includes the Condensate Demineralizers, Reactor Feedwater Pump Seal, and GEZIP, as subsystems.
Main Condenser (Section 2.3.4.3)	CDR	Yes	
Main Steam (Section 2.3.4.4)	MST	Yes	
Turbine Generator (Section 2.3.4.5)	TGS	Yes	Includes Generator Electrical, Generator Physical, Hydrogen Cooling, Hydrogen Seal Oil, Main Steam Pressure Control, Stator Cooling, Main Turbine and auxiliaries.
SRP Evaluation Group: Containments, Structures and Component Supports			
Cooling Towers	CLT	No	These structures are well separated from the power block structures. Refer to LR Drawing LR-36444. Structures do not satisfy any license renewal scoping criteria.
Cranes, Heavy Loads, Rigging (Section 2.4.1)	CRN	Yes	Includes Reactor Component Handling Equipment.
Diesel Fuel Oil Transfer House (Section 2.4.2)	FOH	Yes	

Table 2.2-1 Plant Level Scoping Results

Description	System or Structure Code	Within Scope of License Renewal?	Comments
Discharge Structure	DCS	No	This structure provides support and anchorage for non-safety related equipment and equipment that is not required to support regulated events (ATWS, Fire Protection, EQ, and SBO). None of the major components in this structure presents a seismic II/I situation. This structures is well separated from the power block structures. Refer to LR Drawing LR-36444.
Emergency Diesel Generator Building (Section 2.4.3)	DGB	Yes	
Emergency Filtration Train Building (Section 2.4.4)	EFB	Yes	
Fire Protection Barriers Commodity Group (Section 2.4.5)	FPB	Yes	Concrete barriers and fire doors are evaluated with each structure and are not included in this group.
Hangers and Supports Commodity Group (Section 2.4.6)	HGR	Yes	Includes component and equipment supports, pipe restraints, junction boxes, control panels (treated as supports), electrical raceways and electrical conduit. Includes the grout under the baseplate and fasteners used with the support or equipment anchorage.
HPCI Building (Section 2.4.7)	HPB	Yes	

Table 2.2-1 Plant Level Scoping Results

Description	System or Structure Code	Within Scope of License Renewal?	Comments
Hydrogen Storage Building	HSB	No	This structure provides support and anchorage for non-safety related equipment and equipment that is not required to support regulated events (ATWS, Fire Protection, EQ, and SBO). None of the major components in this structure presents a seismic II/I situation. This structures is adjacent to, but separate from, the power block structures. Refer to LR Drawing LR-36444.
Intake Structure (Section 2.4.8)	INS	Yes	This structure includes the Access Tunnel and the Diesel Fire Pump House. The Ultimate Heat Sink for the MNGP is the Mississippi River. Refer to Section 10.4.1.2 of the USAR. There is no separate system or structure for the Ultimate Heat Sink.

Table 2.2-1 Plant Level Scoping Results

Description	System or Structure Code	Within Scope of License Renewal?	Comments
Miscellaneous Non-Safety Related Buildings and Structures	MNS	No	The following structures are included: 1. Warehouse 1 (Cold Mach Shop) 2. Warehouse 2 (Construction) 3. Warehouse 3 4. Warehouse 4 5. Warehouse 5 6. Warehouse 6 7. Fab Shop 8. Seismic Building 9. Sand Blasting/Paint Shop 10. Guardhouse 11. Old Guardhouse 12. Security Diesel Gen Building 13. Site Administration Building 14. Turbine Rotor Storage Building 15. Meteorological Equipment House 16. Well Pressure Tank Structure 17. Disch Canal Rad Monitoring Bldg 18. Carpenters Shop 19. Gatehouse 20. Discharge Canal 21. Transformer Yard Sump 22. Sewage Lift Station 23. Liquid Hydrogen Storage Area 24. Liquid Oxygen Storage Area 25. Intake Dredge Settling Basin 26. 11 Clg Tower Fan Control House 27. 12 Clg Tower Fan Control House 28. Discharge Retention Basin 29. Boneyard Building 30. Sparger Bridge 31. Log Boom 32. Pump House 33. EP Bldg Van Storage 34. EPA Buildings 1 – 5 35. Communication Tower/Building 36. Green Building 37. Hazardous Waste Building 38. 11 Cooling Tower Deluge House 39. 12 Cooling Tower Deluge House 40. Maintenance Training Building 41. Fire Equipment Houses

Table 2.2-1 Plant Level Scoping Results

Description	System or Structure Code	Within Scope of License Renewal?	Comments
Miscellaneous Non-Safety Related Buildings and Structures	MNS	No	42. Main Transformer Foundation 43. Demin Water, Lube Oil Dump Liquid N2 Storage, and Cond Storage Tank Foundations 44. Driveways and Parking Lots 45. Security Barriers (Fences and Concrete Barriers) 46. 230KV House 47. Discharge Structure 48. Substation Structures These are Category II structures and major civil features that do no satisfy the requirements of 10 CFR 54.4(a). These structures provide support and anchorage for non-safety related equipment and equipment that is not required to support regulated events (ATWS, Fire Protection, EQ, and SBO). None of these structures and major components in these structures present a seismic II/I situation. These structures are generally separated from the power block structures. Refer to LR Drawing LR-36444.
Miscellaneous SBO Yard Structures (Section 2.4.9)	MSS	Yes	

Table 2.2-1 Plant Level Scoping Results

Description	System or Structure Code	Within Scope of License Renewal?	Comments
Non-Essential Diesel Generator Building	NDB	No	This structure provides support and anchorage for non-safety related equipment and equipment that is not required to support regulated events (ATWS, Fire Protection, EQ, and SBO). None of the major components in this structure presents a seismic II/I situation. This structures is adjacent to, but separate from, the power block structures. Refer to LR Drawing LR-36444.
Off Gas Stack (Section 2.4.10)	OGS	Yes	
Off Gas Storage and Compressor Building (Section 2.4.11)	OGB	Yes	
Outboard MSIV Air Supply Building	MSB	No	This structure provides support and anchorage for non-safety related equipment and equipment that is not required to support regulated events (ATWS, Fire Protection, EQ, and SBO). None of the major components in this structure presents a seismic II/I situation. This structures is adjacent to, but separate from, the power block structures. Refer to LR Drawing LR-36444.
Plant Control and Cable Spreading Structure (Section 2.4.12)	PAB	Yes	
Primary Containment (Section 2.4.13)	PCT	Yes	

Table 2.2-1 Plant Level Scoping Results

Description	System or Structure Code	Within Scope of License Renewal?	Comments
Radioactive Waste Building (Section 2.4.14)	RWB	Yes	
Reactor Building (Section 2.4.15)	RXB	Yes	
Scale Inhibitor Building	SIB	No	This structure provides support and anchorage for non-safety related equipment and equipment that is not required to support regulated events (ATWS, Fire Protection, EQ, and SBO). None of the major components in this structure presents a seismic II/I situation. This structures is adjacent to, but separate from, the power block structures. Refer to LR Drawing LR-36444.
Screen House	SCH	No	This structure provides support and anchorage for non-safety related equipment and equipment that is not required to support regulated events (ATWS, Fire Protection, EQ, and SBO). None of the major components in this structure presents a seismic II/I situation. This structures is adjacent to, but separate from, the power block structures. Refer to LR Drawing LR-36444.

Table 2.2-1 Plant Level Scoping Results

Description	System or Structure Code	Within Scope of License Renewal?	Comments
Sodium Hypochlorite Building	SHB	No	This structure provides support and anchorage for non-safety related equipment and equipment that is not required to support regulated events (ATWS, Fire Protection, EQ, and SBO). None of the major components in this structure presents a seismic II/I situation. This structures is adjacent to, but separate from, the power block structures. Refer to LR Drawing LR-36444.
Structures Affecting Safety (Section 2.4.16)	SAS	Yes	Includes the Heating Boiler Building, Hot Machine Shop, Non-1E Electric Equipment Room, Radioactive Storage and New Shipping Building, Recombiner Building, and Turbine Building Addition.
Turbine Building (Section 2.4.17)	TGB	Yes	
Underground Duct Bank (Section 2.4.18)	UDB	Yes	
SRP Evaluation Group: Electrical and Instrumentation and Controls			
480V Station Auxiliary (Section 2.5.1.1)	480	Yes	
4.16kV Station Auxiliary (Section 2.5.1.2)	4kV	Yes	
Alternate Shutdown (Section 2.5.1.3)	ASD	Yes	
Annunciators (Section 2.5.1.4)	ANN	Yes	

Table 2.2-1 Plant Level Scoping Results

Description	System or Structure Code	Within Scope of License Renewal?	Comments
Cathodic Protection	CAT	No	System does not satisfy any license renewal scoping criteria.
Communications (Section 2.5.1.5)	COM	Yes	
Computer	CMP	No	System does not satisfy any license renewal scoping criteria.
DC Battery (Section 2.5.1.6)	DCC	Yes	Includes 24 V, 125 V, and 250 V DC subsystems.
Electrical Penetrations Commodity Group (Section 2.5.2.1)	EPA	Yes	
Fuse Holders Commodity Group (Section 2.5.2.2)	FSC	Yes	
Lighting (Section 2.5.1.7)	LTG	Yes	
Meteorology	MET	No	System does not satisfy any license renewal scoping criteria.
Neutron Monitoring (Section 2.5.1.8)	NMS	Yes	Includes Power Range and Startup Range Monitoring systems.
Non-EQ Cables and Connections Commodity Group (Section 2.5.2.3)	CBL	Yes	
Non-Essential Diesel Generator	NDG	No	System does not satisfy any license renewal scoping criteria.
Off Site Power (Section 2.5.1.9)	OSP	Yes	Includes 115, 230, and 345 kV systems.
Off Site Power/SBO Recovery Path Commodity Group (Section 2.5.2.4)	SBO	Yes	Includes components in the SBO recovery path which includes Off Site Power, 4.16kV Station Auxiliary, and 480V Station Auxiliary.

Table 2.2-1 Plant Level Scoping Results

Description	System or Structure Code	Within Scope of License Renewal?	Comments
Plant Protection (Section 2.5.1.10)	PPS	Yes	Includes Plant Protection and Reactor Protection Power Supply systems.
Radiation Monitoring (Section 2.5.1.11)	RMS	Yes	Includes Area Radiation Monitors and Process Radiation Monitors.
Reactor Level Control (Section 2.5.1.12)	RLC	Yes	
Reactor Manual Control	RMC	No	System does not satisfy any license renewal scoping criteria.
Rod Position Information	RPI	No	System does not satisfy any license renewal scoping criteria.
Rod Worth Minimizer	RWM	No	System does not satisfy any license renewal scoping criteria.
Security	SEC	No	Includes all Security systems. Does not satisfy any license renewal scoping criteria.
Seismic Monitoring	SMC	No	System does not satisfy any license renewal scoping criteria.
Traversing Incore Probe	TIP	No	The mechanical portion of the Traversing In-Core Probe system supporting primary containment isolation is included in the Primary Containment Mechanical system. Electrical subsystem does not satisfy any license renewal scoping criteria.
Uninterruptible AC (Section 2.5.1.13)	UAC	Yes	

2.3 Scoping and Screening Results: Mechanical Systems

2.3.1 Reactor Vessel, Internals, and Reactor Coolant System

The following systems are addressed in this section:

- Reactor Head Vent System (Section 2.3.1.1)
- Reactor Pressure Vessel (Section 2.3.1.2)
- Reactor Pressure Vessel Internals (Section 2.3.1.3)
- Reactor Recirculation System (Section 2.3.1.4)
- Reactor Vessel Instrumentation (Section 2.3.1.5)

2.3.1.1 Reactor Head Vent System

System Description

The Reactor Head Vent System maintains the reactor pressure boundary. The Reactor Head Vent System provides a means to:

1. Permit venting the reactor pressure vessel during filling for hydrostatic test.
2. Permit remote venting of non-condensable gases which may accumulate in the vessel head space during reactor cool down after the main steam lines have been flooded.
3. Permit venting of non-condensable disassociated gases which might accumulate in the vessel head space during reactor operation to one of the main steam lines.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1).

The portions of the Reactor Head Vent System containing components subject to an AMR extend from the reactor vessel nozzle to the connection to Reactor Vessel Instrumentation System, to the boundary valves discharging to radwaste, and to the boundary valves discharging to the Main Steam System, and includes piping and valve bodies.

System Function Listing

A comprehensive listing of functions associated with the Reactor Head Vent System, or specific components contained in the system, is provided in the summary below.

Code: RHV-01 Provides a path for venting non-condensable gases from inside the reactor head.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: None.

Code: RHV-02 Maintain Pressure Boundary. Portions of the RHV system are connected to, and part of, the reactor coolant pressure boundary during plant operation.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: None.

USAR Reference

None.

License Renewal Drawings

The license renewal drawings for the Reactor Head Vent System are listed below:

LR-36241 LR-36242

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.1-1 along with each Component Group's intended function(s).

Table 2.3.1-1 Reactor Head Vent System

Component Group	Intended Function
FASTENERS/BOLTING	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.1.2 Reactor Pressure Vessel

System Description

The Reactor Pressure Vessel (RPV) System consists of the reactor pressure vessel top head enclosure, vessel shell, nozzles, nozzle safe ends, penetrations, bottom head, and support skirt and attachment welds. RPV internals are included in the Reactor Internals (RIT) system. The RPV serves as a high integrity barrier against leakage of radioactive materials to the drywell.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). In addition, some SCs are in-scope due to Anticipated Transients Without Scram, Fire Protection, and Station Blackout in accordance with 10 CFR 54.4(a)(3).

System Function Listing

A comprehensive listing of functions associated with the Reactor Pressure Vessel System, or specific components contained in the system, is provided in the summary below.

Code: RPV-01	Cri 1	Cri 2	Cri 3				
The RPV contains and supports the reactor core, the reactor internals, jet pumps, and the reactor core coolant moderator, and maintains proper alignment of the reactor core, control rods and control rod drives.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: RPV-02	Cri 1	Cri 2	Cri 3				
Maintain Pressure Boundary. Portions of the RPV System are connected to, and part of, the reactor coolant pressure boundary during plant operation.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: RPV-03	Cri 1	Cri 2	Cri 3				
The vessel provides fission product retention capability.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: RPV-04	Cri 1	Cri 2	Cri 3				
The reactor pressure vessel contains and provides steam for direct use in the turbine generator.			FP	EQ	PTS	AT	SB

Comment: None.

Code: RPV-05	Cri 1	Cri 2	Cri 3				
The reactor pressure vessel contains and provides steam for direct use by the ECCS turbine driven pumps.			FP	EQ	PTS	AT	SB
	X						

Comment: This steam facilitates the safe shutdown of the reactor by providing the energy source for HPC steam turbine.

Code: RPV-AT	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Anticipated Transients Without Scram.			FP	EQ	PTS	AT	SB
						X	

Comment: None.

Code: RPV-FP	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: None.

Code: RPV-SB	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of all AC power).			FP	EQ	PTS	AT	SB
							X

Comment: None.

USAR Reference

Additional Reactor Pressure Vessel details are provided in Section 4.2 of the USAR.

License Renewal Drawings

The license renewal drawings for the Reactor Pressure Vessel are listed below:

LR-36241	LR-36249
LR-36241-1	LR-36250
LR-36242	LR-36251
LR-36242-1	LR-36252
LR-36246	LR-36253
LR-36247	LR-91197
LR-36248	LR-96042-1

Subcomponents Subject to an Aging Management Review

The subcomponents of the Reactor Pressure Vessel that require aging management review are addressed in Table 2.3.1-2 along with each subcomponent's intended function(s).

Table 2.3.1-2 Reactor Pressure Vessel

Subcomponent	Intended Function
BOTTOM HEAD COMPONENTS - BOTTOM HEAD DOLLAR PLATE BOTTOM HEAD TORUS	PRESSURE BOUNDARY
NOZZLE SAFE ENDS - CONTROL ROD DRIVE RETURN LINE CAP	PRESSURE BOUNDARY
NOZZLE SAFE ENDS - CORE SPRAY	PRESSURE BOUNDARY
NOZZLE SAFE ENDS - FW NOZZLE	PRESSURE BOUNDARY
NOZZLE SAFE ENDS - INSTRUMENT & SBLC	PRESSURE BOUNDARY
NOZZLE SAFE ENDS - JET PUMP INSTRUMENT	PRESSURE BOUNDARY
NOZZLE SAFE ENDS - MAIN STEAM	PRESSURE BOUNDARY
NOZZLE SAFE ENDS - RECIRCULATING WATER	PRESSURE BOUNDARY

Table 2.3.1-2 Reactor Pressure Vessel

Subcomponent	Intended Function
NOZZLE SAFE ENDS AND FLANGES - INSTRUMENT	PRESSURE BOUNDARY
NOZZLES - CONTROL ROD DRIVE RETURN LINE	PRESSURE BOUNDARY
NOZZLES - FEEDWATER	PRESSURE BOUNDARY
NOZZLES - MAIN STEAM	PRESSURE BOUNDARY
NOZZLES - RECIRCULATION OUTLET RECIRCULATION INLET CORE SPRAY JET PUMP INSTRUMENT INSTRUMENT & SBLC	PRESSURE BOUNDARY
PENETRATION - BOTTOM HEAD DRAIN LINE	PRESSURE BOUNDARY
PENETRATION - CONTROL ROD DRIVE STUB TUBES	PRESSURE BOUNDARY
PENETRATION - FLUX MONITOR	PRESSURE BOUNDARY

Table 2.3.1-2 Reactor Pressure Vessel

Subcomponent	Intended Function
PENETRATION - INSTRUMENT	PRESSURE BOUNDARY
REACTOR PRESSURE VESSEL EXTERNAL SURFACE	PRESSURE BOUNDARY
SUPPORT SKIRT AND ATTACHMENT WELDS	STRUCTURAL SUPPORT
TOP HEAD ENCLOSURE - CLOSURE STUDS & NUTS	PRESSURE BOUNDARY
TOP HEAD ENCLOSURE - HEAD SPRAY CAP	PRESSURE BOUNDARY
TOP HEAD ENCLOSURE - INSTRUMENT NOZZLE (HEAD SPARE)	PRESSURE BOUNDARY
TOP HEAD ENCLOSURE - INSTRUMENT NOZZLE FLANGE (HEAD SPARE)	PRESSURE BOUNDARY
TOP HEAD ENCLOSURE - TOP HEAD DOLLAR PLATE	PRESSURE BOUNDARY
TOP HEAD ENCLOSURE - TOP HEAD FLANGE	PRESSURE BOUNDARY
TOP HEAD ENCLOSURE - TOP HEAD TORUS	PRESSURE BOUNDARY
TOP HEAD ENCLOSURE - VENT NOZZLE	PRESSURE BOUNDARY

Table 2.3.1-2 Reactor Pressure Vessel

Subcomponent	Intended Function
VESSEL SHELL ATTACHMENT WELDS	STRUCTURAL SUPPORT
VESSEL SHELL - UPPER INTERMEDIATE SHELL LOWER INTERMEDIATE SHELL LOWER SHELL BELTLINE WELDS	PRESSURE BOUNDARY
VESSEL SHELL - VESSEL FLANGE UPPER SHELL	PRESSURE BOUNDARY

2.3.1.3 Reactor Pressure Vessel Internals

System Description

The Reactor Pressure Vessel Internals consists of all the structures and components within the reactor vessel that provide support for the core, control rod system support, instrumentation support, steam quality enhancement and that direct coolant flow.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some SCs in the Reactor Vessel Internals are non-safety related and their failure could affect the capability of SR SCs to perform their intended safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some SCs are in-scope due to Anticipated Transients Without Scram, Fire Protection, and Station Blackout in accordance with 10 CFR 54.4(a)(3).

The portions of the Reactor Pressure Vessel Internals containing components subject to an AMR include the core shroud and core plate; top guide; core spray lines and spargers; jet pump assemblies; fuel support and CRD assemblies; and instrumentation. The nuclear fuel is in the RIT System, although it does not require aging management since the fuel is periodically replaced thereby making it short-lived.

System Function Listing

A comprehensive listing of functions associated with the Reactor Pressure Vessel Internals, or specific components contained in the system, is provided in the summary below.

Code: RIT-01	Cri 1	Cri 2	Cri 3				
Provides support to maintain core geometry.			FP	EQ	PTS	AT	SB
	X						

Comment: The proper geometry facilitates adequate core cooling.

Code: RIT-02	Cri 1	Cri 2	Cri 3				
Provides control rod guidance and support.			FP	EQ	PTS	AT	SB
	X						

Comment: The control rod guide tubes provide mechanical guidance of the control rods.

Code: RIT-03	Cri 1	Cri 2	Cri 3				
Provides support for inner vessel instrumentation.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: RIT-04	Cri 1	Cri 2	Cri 3				
Enhances the quality of steam prior to steam line.			FP	EQ	PTS	AT	SB

Comment: None.

Code: RIT-05	Cri 1	Cri 2	Cri 3				
Fuel cladding serves as a fission product barrier.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: RIT-AT	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Anticipated Transients Without Scram.			FP	EQ	PTS	AT	SB
						X	

Comment: None.

Code: RIT-FP The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: Provides process monitoring function to support post-fire safe shutdown.

Code: RIT-NSAS Non-safety related structures and/or components that could affect safety related SCs must maintain sufficient integrity such that the intended function of the safety related SCs is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: None.

Code: RIT-SB The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of all AC power).	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: Provides pressure boundary for reactor coolant. Provides HPC initiation signal, Reactor level signal, and HPC high level trip.

USAR Reference

Additional Reactor Pressure Vessel Internals details are provided in Section 3.6 of the USAR.

License Renewal Drawings

None.

Subcomponents Subject to an Aging Management Review

The subcomponents of the Reactor Pressure Vessel Internals that require aging management review are addressed in Table 2.3.1-3 along with each subcomponent’s intended function(s).

Table 2.3.1-3 Reactor Pressure Vessel Internals

Subcomponent	Intended Function
ACCESS HOLE COVERS	STRUCTURAL SUPPORT
CONTROL ROD DRIVE HOUSING	STRUCTURAL SUPPORT

Table 2.3.1-3 Reactor Pressure Vessel Internals

Subcomponent	Intended Function
CONTROL ROD GUIDE TUBE (CRGT)	STRUCTURAL SUPPORT
CONTROL ROD GUIDE TUBE BASE	STRUCTURAL SUPPORT
CORE PLATE	STRUCTURAL SUPPORT
CORE PLATE BOLTS	STRUCTURAL SUPPORT
CORE SHROUD (UPPER, CENTRAL, LOWER)	STRUCTURAL SUPPORT
CORE SPRAY LINES AND SPARGERS PIPING SUPPORTS CLAMP MODIFICATION CORE SPRAY LINES (HEADERS) SPRAY RINGS SPRAY NOZZLES THERMAL SLEEVES	PRESSURE BOUNDARY
INTERMEDIATE RANGE MONITOR DRY TUBES SOURCE RANGE MONITOR DRY TUBES INCORE FLUX MONITOR GUIDE TUBES LOW POWER RANGE MONITOR (LPRM) DRY TUBES	PRESSURE BOUNDARY
JET PUMP ASSEMBLY - RISER PIPE	PRESSURE BOUNDARY

Table 2.3.1-3 Reactor Pressure Vessel Internals

Subcomponent	Intended Function
JET PUMP ASSEMBLIES - CASTINGS: ELBOW, COLLAR, FLARE, FLANGE, TRANSITION PIECE	PRESSURE BOUNDARY
JET PUMP ASSEMBLIES - DIFFUSER	PRESSURE BOUNDARY
JET PUMP ASSEMBLIES - HOLDDOWN BEAMS	PRESSURE BOUNDARY
JET PUMP ASSEMBLIES - INLET ELBOW	PRESSURE BOUNDARY
JET PUMP ASSEMBLIES - INLET HEADER	PRESSURE BOUNDARY
JET PUMP ASSEMBLIES - MIXING ASSEMBLY	PRESSURE BOUNDARY
JET PUMP ASSEMBLIES - RISER BRACE ARM	STRUCTURAL SUPPORT
JET PUMP ASSEMBLIES - THERMAL SLEEVES	PRESSURE BOUNDARY
LOW POWER RANGE MONITOR (LPRM) DRY TUBES	PRESSURE BOUNDARY
ORIFICED FUEL SUPPORT	STRUCTURAL SUPPORT

Table 2.3.1-3 Reactor Pressure Vessel Internals

Subcomponent	Intended Function
SHROUD SUPPORT STRUCTURE (SHROUD SUPPORT CYLINDER, SHROUD SUPPORT PLATE, SHROUD SUPPORT LEGS)	STRUCTURAL SUPPORT
STANDBY LIQUID CONTROL DISTRIBUTION PIPE	PRESSURE BOUNDARY
STEAM DRYER	STRUCTURAL SUPPORT
TOP GUIDE	STRUCTURAL SUPPORT

2.3.1.4 **Reactor Recirculation System**

System Description

The Reactor Recirculation (REC) System includes the Recirculation Flow Control (RFC) Subsystem for LR purposes.

The REC System forces water through the reactor core to provide forced convection cooling of the reactor core. The system consists of two recirculation pump loops outside the vessel and twenty jet pumps inside the vessel.

The jet pumps are part of the Reactor Pressure Vessel Internals (RIT) System.

Each REC System loop outside the vessel consists of a motor-driven recirculation pump, two motor operated gate valves for pump isolation, piping, and required recirculation flow measurement devices. Jet pump flow instrumentation outside the reactor vessel is included within the LR boundary of the REC System.

The REC System (via the Recirculation Flow Control Subsystem) also functions as a method of controlling the reactor power level. This is done by varying the recirculating water flow rate through the reactor. Recirculating water flow rate is controlled by varying the speed of the recirculating water pumps. Each pump is directly connected electrically to a separate variable-frequency Motor-Generator (MG) set which provides the variable frequency power supply speed regulation.

The REC System pumps, motors and loop piping are located in the drywell outside the biological shield. The MG sets are located in the Reactor Building outside secondary containment.

REC piping is connected to the reactor vessel and is part of the reactor coolant pressure boundary. As such, REC System pressure-retaining components, including REC pump casings, valve bodies, piping, etc., are safety related and in-scope of LR. Also, the REC System provides flow paths for RHR LPCI, which is safety related.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some SCs in the Reactor Recirculation System are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some SCs are in-scope due to Environmental Qualification and Anticipated Transients Without Scram in accordance with 10 CFR 54.4(a)(3).

The portions of the Reactor Recirculation System containing components subject to an AMR include two recirculation pump loops outside the vessel consisting of piping, pump casings, flow measurement devices, and valve bodies.

System Function Listing

A comprehensive listing of functions associated with the Reactor Recirculation System, or specific components contained in the system, is provided in the summary below.

Code: REC-01	Cri 1	Cri 2	Cri 3				
Provide variable drive flow for circulation of reactor water through the reactor core. The Reactor Recirculating Flow Control Subsystem controls reactor power over a limited range by varying the reactor core flow rate of the recirculating reactor water.			FP	EQ	PTS	AT	SB

Comment: The Recirc Pump function to provide variable drive flow is not safety related and is not required to mitigate design basis events.

Code: REC-02	Cri 1	Cri 2	Cri 3				
Maintain pressure boundary. Portions of the REC system are connected to, and part of, the reactor coolant pressure boundary during plant operation.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: REC-03	Cri 1	Cri 2	Cri 3				
Primary Containment Isolation. Provides primary containment isolation for those portions of the system that interface with the primary containment (valves and piping).			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: REC-04	Cri 1	Cri 2	Cri 3				
Provide flow paths for RHR LPCI.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: REC-05	Cri 1	Cri 2	Cri 3				
Provide flow path for the Reactor Water Cleanup (RWC) System.			FP	EQ	PTS	AT	SB

Comment: The RWC System uses REC System piping to accomplish its functions, but RWC is not safety related and is not required to mitigate any design basis events.

Code: REC-AT	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Anticipated Transients Without Scram.			FP	EQ	PTS	AT	SB
						X	

Comment: None.

Code: REC-EQ	Cri 1	Cri 2	Cri 3				
The system contains components which perform functions credited in the current licensing basis for Environmental Qualification.			FP	EQ	PTS	AT	SB
				X			

Comment: None.

Code: REC-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: None.

USAR Reference

Additional Reactor Recirculation System details are provided in Section 4.3.1.1 of the USAR.

License Renewal Drawings

The license renewal drawings for the Reactor Recirculation System are listed below:

LR-36041	LR-36243-1
LR-36242-1	LR-36244
LR-36243	LR-96042-1

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.1-4 along with each Component Group's intended function(s).

Table 2.3.1-4 Reactor Recirculation System

Component Group	Intended Function
FASTENERS/BOLTING	PRESSURE BOUNDARY
FILTERS/STRAINERS	PRESSURE BOUNDARY
HEAT EXCHANGERS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.1.5 Reactor Vessel Instrumentation

System Description

The Reactor Vessel Instrumentation (RVI) System is designed to fulfill a number of requirements pertaining to the vessel itself or the reactor core; the instrumentation must:

a. Provide the operator with sufficient information in the control room to protect the vessel from undue stresses.

b. Provide information which can be used to assure that the reactor core remains covered with water and that the steam separators are not flooded.

c. Provide redundant, reliable inputs to the reactor protection system to shut the reactor down when fuel damage limits are approached.

d. Provide a method of detecting leakage from the reactor vessel head flange.

The RVI System also includes the Reference Leg Backfill subsystem. This subsystem provides a constant backfill of water from the CRD System's charging water header to the safeguards and feedwater reference legs to flush any gas-laden water through the condensate chambers and back to the reactor vessel to eliminate level errors due to the degassing phenomenon.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some SCs in the Reactor Vessel Instrumentation System are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some SCs are in-scope due to ATWS, Environmental Qualification, Fire Protection, and Station Blackout in accordance with 10 CFR 54.4(a)(3).

The portions of the Reactor Vessel Instrumentation System containing components subject to an AMR include reactor coolant pressure boundary components from the nozzles on the reactor vessel, to the connection to the Reactor Head Vent line, to the flow limiting check valves which supply the REC jet pump flow transmitters, and to the CRD, CSP, and SLC system interfaces. Included also is the reactor vessel flange leak detection piping up to where it discharges to Clean Radwaste.

System Function Listing

A comprehensive listing of functions associated with the Reactor Vessel Instrumentation System, or specific components contained in the system, is provided in the summary below.

Code: RVI-01	Cri 1	Cri 2	Cri 3				
Provides reactor pressure and level indications during operation and post accident conditions.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: RVI-02	Cri 1	Cri 2	Cri 3				
Maintain Pressure Boundary. Portions of the RVI system are connected to, and part of, the reactor coolant pressure boundary during plant operation.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: RVI-03	Cri 1	Cri 2	Cri 3				
Primary Containment Isolation. Provides primary containment isolation for those portions of the system that interface with the primary containment (valves and piping).			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: RVI-04	Cri 1	Cri 2	Cri 3				
Provides indication of the inner reactor head flange o-ring seal leakage.			FP	EQ	PTS	AT	SB

Comment: None.

Code: RVI-AT	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Anticipated Transients Without Scram.			FP	EQ	PTS	AT	SB
						X	

Comment: Provides ATWS-RPT and ARI actuation logic instrumentation.

Code: RVI-EQ	Cri 1	Cri 2	Cri 3				
The system contains components which perform functions credited in the current licensing basis for Environmental Qualification.			FP	EQ	PTS	AT	SB
				X			

Comment: None.

Code: RVI-FP	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.			X				

Comment: None.

Code: RVI-NSAS	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety-related SSCs is not adversely affected.		X					

Comment: None.

Code: RVI-SB	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of all AC power).							X

Comment: Provides pressure boundary for reactor coolant. Provides HPC initiation signal, Reactor level and pressure signal, and HPC high level trip.

USAR Reference

Additional Reactor Vessel Instrumentation System details are provided in Section 7.4 of the USAR.

License Renewal Drawings

The license renewal drawings for the Reactor Vessel Instrumentation System are listed below:

LR-36242
LR-36242-1
LR-36241
LR-36241-1

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.1-5 along with each Component Group’s intended function(s).

Table 2.3.1-5 Reactor Vessel Instrumentation

Component Group	Intended Function
FASTENERS/BOLTING	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	FLOW RESTRICTION PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.2 Engineered Safety Features

The following systems are addressed in this section:

- Automatic Pressure Relief (Section 2.3.2.1)
- Combustible Gas Control (Section 2.3.2.2)
- Core Spray System (Section 2.3.2.3)
- High Pressure Coolant Injection (Section 2.3.2.4)
- Primary Containment Mechanical (Section 2.3.2.5)
- Reactor Core Isolation Cooling (Section 2.3.2.6)
- Residual Heat Removal (Section 2.3.2.7)
- Secondary Containment (Section 2.3.2.8)

2.3.2.1 Automatic Pressure Relief System

System Description

The Automatic Pressure Relief (APR) System is designed to prevent overpressurization and provide depressurization of the reactor vessel during design basis events. Two Safety Relief Valves (SRVs) on each of the four steam lines are equipped to operate by automatic or manual initiation to blow down the reactor. Steam is passed through the valves, down a tailpipe, and through the Torus vent headers to discharge underwater through T-quenchers in the event of SRV activation. The Automatic Depressurization System (ADS) is an APR subsystem that provides backup to the HPC System and is designed to reduce reactor vessel pressure to a range suitable for low pressure Emergency Core Cooling pumps to operate. The Low-Low Set system is an APR subsystem designed to control post shutdown over-pressure with progressive SRV pressure release setpoints. The Alternate Shutdown System (ASDS) panel provides for manual operation of four APR System SRVs. The APR System is credited in Environmental Qualification (EQ), safe shutdown following Station Blackout (SBO) events and some plant fires (Fire Protection).

The APR System is also used to implement the Alternate Shutdown Cooling Method (ASCM). To use the ASCM, the reactor is depressurized using the Automatic Depressurization subsystem of the APR System. When the reactor is depressurized to below the shutoff head of the pump, a core spray pump or an RHR pump (in the LPCI mode) is then used to flood the vessel. Safety/relief valves are then used to discharge the heated reactor water to the suppression pool. The safety/relief valves and discharge piping have been evaluated for this mode of operation and have been found to be acceptable. Water discharged to the torus is cooled with the suppression pool cooling mode of the RHR System. (See USAR Section 6.2.3.3.4.)

The in-scope portion of the APR System consists of the SRVs and the associated solenoid valves, the SRV tailpipes and associated vacuum breaker valves, T-quenchers, the pressure sensing lines and associated valves, and the differential pressure transmitters.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). In addition, some SCs are in-scope due to Environmental Qualification, Fire Protection, and Station Blackout in accordance with 10 CFR 54.4(a)(3).

The portions of the Automatic Pressure Relief System containing components subject to an AMR extend from the main steam lines to the suppression pool T-quenchers and the associated tailpipe pressure sensing lines. These sensing lines penetrate the primary containment and are listed, with the excess flow check valves, as containment barriers in USAR Section 5.2.

System Function Listing

A comprehensive listing of functions associated with the Automatic Pressure Relief System, or specific components contained in the system, is provided in the summary below.

Code: APR-01	Cri 1	Cri 2	Cri 3				
Overpressure Protection. The Automatic Pressure Relief System shall prevent over pressurization of the reactor coolant system. The valves shall open (self-activated) to limit the pressure rise.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: APR-02	Cri 1	Cri 2	Cri 3				
Pressure Relief. Shall provide a backup to the HPC system, in the event of HPC malfunction, for automatically depressurizing the reactor vessel for small breaks in the reactor coolant system in time for LPCI or Core Spray to prevent fuel clad melting.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: APR-03	Cri 1	Cri 2	Cri 3				
SRV Control. Low-Low Set System logic shall automatically function to minimize the possibility of a SRV reopening with an elevated water leg in its discharge line.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: APR-04	Cri 1	Cri 2	Cri 3				
The SRVs shall be used to discharge heated reactor water to the torus in support of the Alternate Shutdown Cooling Method. This supports comparison of MNGP to the guidelines of Regulatory Guide 1.139.			FP	EQ	PTS	AT	SB
	X						

Comment: The APR System is used to implement the Alternate Shutdown Cooling Method (ASCM). To use the ASCM, the reactor is depressurized using the Automatic Depressurization subsystem of the APR System. When the reactor is depressurized to below the shutoff head of the pump, a core spray pump or an RHR pump (in the LPCI mode) is then used to flood the vessel. Safety/relief valves are then used to discharge the heated reactor water to the suppression pool. The safety/relief valves and discharge piping have been evaluated for this mode of operation and have been found to be acceptable. Water discharged to the torus is cooled with the suppression pool cooling mode of the RHR System. (See USAR Section 6.2.3.3.4.)

Code: APR-05	Cri 1	Cri 2	Cri 3				
Pressure Relief. Provides manual means of effecting reactor coolant system depressurization. This function provides access to the suppression pool as a heat sink for decay heat following reactor shut down in the event the main condenser is not available.			FP	EQ	PTS	AT	SB

Comment: Operator manual SRV activations are not credited in any design basis events.

Code: APR-06	Cri 1	Cri 2	Cri 3				
Maintain Pressure Boundary. Portions of the Automatic Pressure Relief System are connected to, and part of, the reactor coolant pressure boundary during plant operation.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: APR-EQ	Cri 1	Cri 2	Cri 3				
The system contains components which perform functions credited in the current licensing basis for Environmental Qualification.			FP	EQ	PTS	AT	SB
				X			

Comment: None.

Code: APR-FP The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: None.

Code: APR-SB The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of all AC power).	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: None.

USAR Reference

Additional Automatic Pressure Relief System details are provided in Section 4.4 of the USAR.

License Renewal Drawings

The license renewal drawings for the Automatic Pressure Relief System are listed below:

LR-36241
LR-36241-1
LR-36049-12

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.2-1 along with each Component Group's intended function(s).

Table 2.3.2-1 Automatic Pressure Relief System

Component Group	Intended Function
ACCUMULATORS	PRESSURE BOUNDARY
FASTENERS/BOLTING	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY

Table 2.3.2-1 Automatic Pressure Relief System

Component Group	Intended Function
VALVE BODIES	PRESSURE BOUNDARY

2.3.2.2 Combustible Gas Control System

System Description

The Combustible Gas Control (CGC) System is designed to maintain primary containment oxygen concentrations resulting from long-term radiolytic decomposition of coolant and corrosion of metals below the flammability limit of oxygen/hydrogen mixtures following a loss of coolant accident. The system accomplishes this by utilizing hydrogen/oxygen recombiners, which cause the H2 and O2 to combine to form water, thereby reducing their concentration within containment. This standby system consists of two trains. The bulk of the CGC equipment resides on two separate skids in the Reactor Building. Upon activation the CGC System draws drywell atmosphere into the recombiner for recombination of hydrogen and oxygen, and then mixes the hot exhaust gas with water supplied by the Residual Heat Removal (RHR) System before discharging the mixture to the suppression pool. The CGC System primary containment isolation valves are supplied pneumatic power by the RHR Service Water (ESW System) auxiliary air compressors.

Amendment No.138 to Facility Operating License No. DPR-22 for the MNGP eliminates requirements for hydrogen recombiners. The CGC System, and the related plant procedures for controlling O2 concentrations in the primary containment, are available for use until the CGC System is deactivated by cutting and capping process lines connecting to interfacing systems during the 2005 refueling outage.

Each CGC skid contains a fan blower, heater, reactor chamber, spray cooler, water strainer, and associated valves and piping. A recirculation line from the water separator to the fan blower intake allows for controlling the rate of reaction if excessive temperature builds in the reactor chamber. Skid piping is stainless steel while the influent and effluent piping, and much of the water supply piping, is carbon steel.

Under the amended operating license, the in-scope portion of the CGC System consists of the piping from the drywell and from the suppression pool up to, and including, their respective isolation valves. Also, the piping interfacing with the

Residual Heat Removal (RHR) system up to, and including, the first valve isolating the two systems.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). In addition, some SCs are in-scope due to Environmental Qualification in accordance with 10 CFR 54.4(a)(3).

The portions of the CGC System containing components subject to an AMR extend from the drywell atmosphere intake header, the return header terminating at the suppression pool, and the lines providing coolant from the RHR system, to their respective points of isolation.

System Function Listing

A comprehensive listing of functions associated with the Combustible Gas Control System, or specific components contained in the system, is provided in the summary below.

Code: CGC-01	Cri 1	Cri 2	Cri 3				
The Combustible Gas Control System maintains the concentration of oxygen in the post-accident containment to non-combustible levels.			FP	EQ	PTS	AT	SB

Comment: Amendment No.138 to Facility Operating License No. DPR-22 for the Monticello Nuclear Generating Plant eliminates requirements for hydrogen recombiners. However, the CGC System and the related plant procedures for controlling O2 concentrations in the primary containment using the system will be retained until the CGC System is abandoned in place during the 2005 refueling outage.

Code: CGC-02	Cri 1	Cri 2	Cri 3				
Primary Containment Isolation. Provides primary containment isolation for those portions of the system that interface with the primary containment (valves and piping).			FP	EQ	PTS	AT	SB
	X						

Comment: None

Code: CGC-EQ	Cri 1	Cri 2	Cri 3				
The system contains components which perform functions credited in the current licensing basis for Environmental Qualification.			FP	EQ	PTS	AT	SB
				X			

Comment: None.

USAR Reference

Additional Combustible Gas Control System details are provided in Section 5.2.1.5 and Section 5.2.2.9 of the USAR.

License Renewal Drawings

The license renewal drawings for the Combustible Gas Control System are listed below:

LR-36246	LR-94896
LR-36247	LR-94897
LR-36258	

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.2-2 along with each Component Group's intended function(s).

Table 2.3.2-2 Combustible Gas Control System

Component Group	Intended Function
FASTENERS/BOLTING	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.2.3 Core Spray System

System Description

The Core Spray (CSP) System restores and maintains the coolant in the reactor pressure vessel in combination with other Emergency Core Cooling Systems (ECCS) such that the core is adequately cooled to preclude fuel damage. Two independent CSP System loops are provided for use under Loss-of-Coolant Accident (LOCA) conditions associated with large pipe breaks and reactor vessel depressurization. Suction water is normally supplied from the suppression pool, but can also be supplied by the condensate storage tank. The CSP System also provides for Primary Containment isolation.

Suction water from the pressure suppression pool to the pumps is taken from a common ring header that has four suction lines connected to strainer assemblies located in the torus (suction strainers and ring header are addressed with the RHR System. The torus penetrations and the strainer assemblies are positioned above the bottom of the suppression pool and below the pool surface to minimize the risk of plugging from debris. Plant procedures provide the necessary guidance to minimize the potential, mitigate the consequences, and/or compensate for suction strainer fouling. The suction strainers have been designed to screen out particles capable of plugging the CSP System nozzles. The post-LOCA long-term operability of the CSP System pumps is enhanced by the use of Nukon insulation inside the drywell to ensure that displaced insulation does not collect at the pump inlet debris screens and impede the positive suction head of the pumps. Sufficient flow area is available to meet the flow requirements of the combined use of the CSP System and RHR Low Pressure Coolant Injection (LPCI) subsystem with debris loading.

The CSP System provides adequate cooling along with LPCI for intermediate and large line break sizes up to and including the design basis double-ended recirculation line break, without assistance from any other Emergency Core Cooling System. In conjunction with the LPCI mode of the RHR System, the High Pressure Core Injection System, and the Automatic Pressure Relief (APR), the CSP System can act automatically (in response to signals indicative of a LOCA) to reflood the reactor core and maintain core cooling following a LOCA event.

Initiation of the CSP System occurs on signals indicating: 1) reactor low-low water level coincident with low reactor pressure or, 2) sustained reactor low-low water level or, 3) high drywell pressure. The reactor low-low water level signal or the high drywell pressure signal also initiate starting of the Emergency Diesel Generators.

Cooling water to the CSP System pump motor coolers is supplied by the Emergency Service Water (ESW) System. The power source for each CSP System is located on separate emergency buses. Power for these emergency buses can be supplied from the diesel generators. The piping of each CSP System is fabricated of both stainless and carbon steel from the suppression chamber to the manual isolation valve in the drywell. The core structure supporting the spray spargers and spray nozzles are fabricated of stainless steel. The CSP System pumps are located in the corner rooms at the basement level of the Reactor Building. The CSP System is a standby system during normal plant operation with the exception of routine surveillance testing.

The in-scope portion of the CSP System consists of the main loops, including the pumps, piping and valves. The majority of the components for the CSP System are located in the Reactor Building, with additional piping and valves located in the Primary Containment. The major in-scope components for the CSP System include two CSP pumps and the associated valves, piping and instrumentation.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some components in the CSP System are non-safety related and their failure could affect the capability of SR components to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some SCs are in-scope due to Environmental Qualification, Fire Protection, and Station Blackout in accordance with 10 CFR 54.4(a)(3).

The portions of the Core Spray System containing components subject to an AMR extend from the CSP pumps, piping and valves in the Reactor Building to the connecting piping and valves in the Primary Containment up to, but not including the reactor pressure vessel nozzles.

System Function Listing

A comprehensive listing of functions associated with the Core Spray System, or specific components contained in the system, is provided in the summary below.

Code: CSP-01	Cri 1	Cri 2	Cri 3				
Core Cooling. Restore and maintain coolant in the reactor vessel, in combination with other Emergency Core Cooling Systems (ECCS), such that the core is adequately cooled to prevent fuel damage.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: CSP-02	Cri 1	Cri 2	Cri 3				
Core Cooling. Reflood the vessel and maintain inventory, in order to proceed to cold shutdown, as part of the Alternate Shutdown Cooling Method.			FP	EQ	PTS	AT	SB
	X						

Comment: The CSP System is used to implement the Alternate Shutdown Cooling Method (ASCM). To use the ASCM, the reactor is depressurized using the Automatic Depressurization subsystem of the APR System. When the reactor is depressurized to below the shutoff head of the pump, a core spray pump or an RHR pump (in the LPCI mode) is then used to flood the vessel. Safety/relief valves are then used to discharge the heated reactor water to the suppression pool. The safety/relief valves and discharge piping have been evaluated for this mode of operation and have been found to be acceptable. Water discharged to the torus is cooled with the suppression pool cooling mode of the RHR System. (See USAR Section 6.2.3.3.4.)

Code: CSP-03	Cri 1	Cri 2	Cri 3				
ECCS Logic Control. Portions of the Core Spray System relay logic control operation of other ECCS and supporting systems.			FP	EQ	PTS	AT	SB
	X						

Comment: Specific examples of logic control include a RHR service water pump start inhibit (to prevent inadvertent overload of the EDGs), a logic permissive for ADS operation after the Core Spray System pump is running (delivering output pressure), and other logic interlocks to prevent EDG overload.

Code: CSP-04	Cri 1	Cri 2	Cri 3				
Maintain Pressure Boundary. Portions of the Core Spray System are connected to, and part of, the reactor coolant pressure boundary during plant operation.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: CSP-05	Cri 1	Cri 2	Cri 3				
Primary Containment Isolation. Provides primary containment isolation for those portions of the system that interface with primary containment (valves and piping).			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: CSP-EQ	Cri 1	Cri 2	Cri 3				
The CSP System contains components which perform functions credited in the current licensing basis for Environmental Qualification.			FP	EQ	PTS	AT	SB
				X			

Comment: None.

Code: CSP-FP	Cri 1	Cri 2	Cri 3				
The CSP System contains structures and/or components, which perform functions credited in the current licensing basis for Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: This mode of operation was evaluated as part of a comparison to Regulatory Guide 1.139 and in support of 10 CFR 50, Appendix R events (see CSP-02).

Code: CSP-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: None.

Code: CSP-SB The CSP System contains structures and/or components, which perform functions credited in the current licensing basis for Station Blackout (Loss of all AC power).	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: The CSP System is AC powered and unavailable for a postulated Station Blackout event. However, portions of the system relay logic are DC powered and support initiation of an SBO credited system.

USAR Reference

Additional Core Spray System details are provided in Section 6.2.2 of the USAR.

License Renewal Drawings

The license renewal drawings for the Core Spray System are listed below:

LR-36242-1
LR-36248
LR-36664

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.2-3 along with each Component Group's intended function(s).

Table 2.3.2-3 Core Spray System

Component Group	Intended Function
FASTENERS/BOLTING	PRESSURE BOUNDARY
GAUGES (FLOW, LEVEL AND SIGHT)	PRESSURE BOUNDARY
HEAT EXCHANGERS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY

Table 2.3.2-3   Core Spray System

Component Group	Intended Function
RESTRICTING ORIFICES	FLOW RESTRICTION PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.2.4 **High Pressure Coolant Injection System**

System Description

The High Pressure Coolant Injection (HPC) System is part of the Emergency Core Cooling System (ECCS). The ECCS provides for continuity of reactor core cooling over the entire range of postulated breaks in the reactor primary system. The HPC System provides adequate core cooling for all break sizes less than those sizes for which the Low Pressure Coolant Injection (LPCI) subsystem or Core Spray (CSP) System can adequately protect the core, without assistance from other safeguards systems. The HPC System performs this function without reliance on off-site power or a water source for the injection. The HPC System can pump water into the reactor pressure vessel (RPV) under loss-of-coolant accident (LOCA) conditions that do not result in rapid depressurization of the RPV. The HPC System provides for Primary Containment isolation and is credited for use in Environmental Qualification (EQ) and Station Blackout (SBO) regulated events.

The HPC System is a high-head, low-flow system that pumps water into the RPV when the reactor primary system is at high pressure. If the HPC System fails to deliver the required flow of cooling water to the RPV, the automatic depressurization feature of the reactor Automatic Pressure Relief (APR) System functions to reduce system pressure such that the LPCI subsystem can operate to inject water into the RPV. The HPC turbine trips when the turbine steam supply pressure has decreased to the isolation setpoint. All these operations are performed automatically. The HPC turbine is driven with steam from the RPV. Two sources of water are available for the HPC System. Normally, water is supplied to the suction of the HPC pump from the two condensate storage tanks (CST). When the level in either CST falls to the predetermined setpoint, the pump suction is automatically transferred to the suppression pool. Water from either the CST or the suppression pool is pumped into the RPV through the feedwater line and flow is distributed within the RPV through the feedwater sparger to obtain mixing with the hot water in the RPV. The HPC-to-feedwater connection is not jeopardized by thermal shock and consequently there is no thermal sleeve installed in this connection. Water leaving the RPV through a line break, drains by gravity back to the suppression pool. The RHR System is required for cooling of the suppression pool after several hours of HPC System operation.

The in-scope portion of the HPC System consists of the main cooling loop, including the pumps, heat exchangers, accumulator, piping and valves. The major in-scope components include: the main pump, booster pump, and drive turbine; gland seal condenser, blower, and condensate pump; manual and power operated valves and actuators, water-side and steam-side piping, lube oil cooler, and the associated piping, valves and instrumentation.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some SCs in the HPC System are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some SCs are in-scope due to Environmental Qualification and Station Blackout in accordance with 10 CFR 54.4(a)(3).

That portion of the HPC System containing components subject to an AMR extends from the HPC pump/turbine, piping, and valves in the HPB to the connecting piping and valves in the Reactor Building and Primary Containment.

System Function Listing

A comprehensive listing of functions associated with the High Pressure Coolant Injection System, or specific components contained in the system, is provided in the summary below.

Code: HPC-01	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Core Cooling. Restores and maintains reactor coolant level following postulated design basis events.	X						

Comment: None.

Code: HPC-02 Operate in the “Reactor Vessel Level Control” or “Reactor Vessel Pressure Control” mode as required.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This function is a manually initiated operation that is allowed by plant EOPs and abnormal procedures. The function can be used by Operations on an as-needed basis during emergency or abnormal conditions and is not in-scope of LR.

Code: HPC-03 Maintain Pressure Boundary. Portions of the HPC System are connected to, and part of, the reactor coolant pressure boundary during plant operation.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: HPC-04 Primary Containment Isolation. Provides primary containment isolation for those portions of the system that interface with the primary containment (valves and piping).	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: HPC-05 HPC Steam Supply Line Isolation. Detects HPC steam supply line breaks and provides a signal to automatically close supply line isolation valves on high steam flow or area temperature.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: HPC-EQ The HPC System contains components, which perform functions credited in the current licensing basis for Environmental Qualification.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
				X			

Comment: None.

Code: HPC-NSAS Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: None.

Code: HPC-SB	Cri 1	Cri 2	Cri 3				
The HPC System contains structures and/or components, which perform functions credited in the current licensing basis for Station Blackout (Loss of all AC power).			FP	EQ	PTS	AT	SB
							X

Comment: None.

USAR Reference

Additional High Pressure Coolant Injection System details are provided in Section 6.2.4 of the USAR.

License Renewal Drawings

The license renewal drawings for the High Pressure Coolant Injection System are listed below:

LR-36241
LR-36249
LR-36249-1
LR-36250
LR-36254

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.2-4 along with each Component Group's intended function(s).

Table 2.3.2-4 High Pressure Coolant Injection System

Component Group	Intended Function
FAN/BLOWER/HOUSINGS	PRESSURE BOUNDARY
FASTENERS/BOLTING	PRESSURE BOUNDARY
FILTERS/HOUSINGS	FILTRATION PRESSURE BOUNDARY
GAUGES (FLOW, LEVEL AND SIGHT)	PRESSURE BOUNDARY
HEAT EXCHANGERS	HEAT TRANSFER PRESSURE BOUNDARY

Table 2.3.2-4 High Pressure Coolant Injection System

Component Group	Intended Function
MANIFOLDS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY THERMAL INSULATION
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	FLOW RESTRICTION PRESSURE BOUNDARY
STEAM TRAPS	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
TURBINES	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.2.5 **Primary Containment Mechanical System**

System Description

The Primary Containment Mechanical (PCM) System includes the Containment Atmosphere Control and Nitrogen Control components, the Hydrogen-Oxygen Analyzing (HOA), the Post Accident Sampling (PAS) and the Hard Pipe Vent (HPV) subsystems. The Primary Containment Mechanical (PCM) System was created to separate out the mechanical components of the Primary Containment (PCT) System for LR evaluation purposes. The mechanical components, and also the associated electrical and I&C components, were transferred from the PCT System to the PCM System. (The resulting PCT System contains only the structural components of the primary containment system). For License Renewal evaluations, the PCM System also includes the portions of the mechanical containment penetration assemblies that are extensions of the mechanical piping; these are the flued heads and guard pipes of the mechanical containment penetration assemblies. The other components of the containment penetration assemblies (e.g., the sleeves) are evaluated in the PCT System.

During power operation, the primary containment atmosphere is inerted with nitrogen to reduce the oxygen content to less than 4% by volume. Inerting prevents the combustion of hydrogen that can be generated following a postulated LOCA and water-metal reaction of zirconium used to clad the fuel.

In the event of a LOCA inside the drywell, reactor water and steam would be released into the drywell atmosphere. The resulting rise in drywell pressure forces the mixture of air, nitrogen, steam, and water through the vents into the suppression pool water in the wetwell (torus). The steam is condensed rapidly and completely in the wetwell pool, resulting in a rapid pressure reduction in the drywell. Vacuum relief valves between the wetwell and drywell relieve the pressure of non-condensable gases forced into the wetwell with the steam and water mixture and prevent wetwell pressurization and the accompanying back flow of water from the wetwell to the drywell. Eight vacuum breakers are provided to equalize the pressure between the wetwell and drywell to prevent a backflow of water from the wetwell into the vent header system. Each vacuum breaker is an 18-inch check valve with an air operator for testing purposes and duel position switches. There is one vacuum breaker located at each of the vent-to-vent header positions.

For redundancy, two Hydrogen-Oxygen Analyzing subsystems have been installed. Each subsystem has four sample lines: one from the upper area of the drywell, one from the torus, and one each from the Combustible Gas Control (CGC) System recombiner inlet and outlet. Sample return is to the torus.

The PAS subsystem consists of a liquid and gas sample station located outside the secondary containment in the Turbine Building near the control room access door. The system is designed to provide samples under all conditions ranging from normal shutdown and power operation to the design basis LOCA. Area radiation monitors are provided to inform the operator of the ambient radiation level. The PAS subsystem has no safety function. PAS subsystem equipment remains installed per an NRC Commitment to develop a contingency plan for obtaining and analyzing highly radioactive samples from the Reactor Coolant System, suppression pool, and containment atmosphere.

The HPV subsystem provides a vent path from the pressure suppression chamber (wetwell) vapor space to a release point above the Reactor Building. The vent path is comprised of an 8-in. penetration in the top of the suppression chamber, two pneumatically operated primary containment isolation valves, a rupture disc, a radiation monitor, and piping routed from the primary containment penetration through secondary containment and up the outside of the Reactor Building to a point above the roof. Controls and indication for the HPV are located on or near the Alternate Shutdown System (ASDS) panel.

It is noted that the PCM System does not include the containment isolation valves of every plant system. It includes only the PCM System containment isolation valves (i.e., those in HOA, PAS, HPV, and Atmosphere Control and Nitrogen Control subsystems, which are part of the PCM System). The Traversing In-core Probe System containment isolation valves are also included in the PCM System. All other mechanical systems that have containment isolation valves have a separate containment isolation function, and the containment isolation valves are included in those systems.

The flued heads and guard pipes of all mechanical containment penetration assemblies are included in the PCM System. These components are extensions of the mechanical piping and are included in the PCM System, rather than accounting for them in each mechanical system that has containment isolation valves. It is noted that the flued heads and guard pipes were assigned to the PCM System rather than the PCT System because the welds are part of the Class 2 ISI boundary and not part of the Class MC (containment) ISI boundary. The primary containment penetrations, themselves, such as X-128, X-240, etc., are included in the PCT System. The mechanical system process piping to flued head interface is at the piping to flued head welds.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some SCs in the PCM System are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some SCs are in-scope due to Environmental Qualification, Fire Protection and Station Blackout in accordance with 10 CFR 54.4(a)(3).

The portions of the Primary Containment Mechanical System containing components subject to an AMR include: 1) the containment isolation valves and associated piping, 2) vacuum relief to secondary containment, 3) primary containment fill and purge, 4) torus drains, and 5) non-safety related components associated with vacuum relief, primary containment fill and purge, and PAS subsystem. All these components are located either outside primary containment in the Reactor Building or inside primary containment (e.g., vacuum breakers).

System Function Listing

A comprehensive listing of functions associated with the Primary Containment Mechanical System, or specific components contained in the system, is provided in the summary below.

Code: PCM-01	Cri 1	Cri 2	Cri 3				
Provide vacuum relief between the torus and drywell, and between the torus and Reactor Building, to limit the negative pressure in either the torus or drywell to less than the design pressure of negative 2 psid.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: PCM-02	Cri 1	Cri 2	Cri 3				
Provide inerting and nitrogen makeup of primary containment.			FP	EQ	PTS	AT	SB

Comment: During power operation the primary containment is inerted with nitrogen to reduce the oxygen content to less than 4% by volume. Also, nitrogen is supplied to the drywell instrument air line during power operation to ensure that any instrument air line leaks do not increase oxygen levels inside containment. The inerting and nitrogen makeup components including the LN2 tank and vaporizer are non-safety related and not credited in the mitigation of any design basis events.

Code: PCM-03	Cri 1	Cri 2	Cri 3				
Provide purge air supply to containment.			FP	EQ	PTS	AT	SB

Comment: This function supports normal plant shutdowns.

Code: PCM-04	Cri 1	Cri 2	Cri 3				
Vent containment through the Hard Pipe Vent during severe accident (beyond design basis accident) conditions.			FP	EQ	PTS	AT	SB

Comment: HPV containment isolation valves are in-scope of LR (see Function PCM-08).

Code: PCM-05	Cri 1	Cri 2	Cri 3				
Monitor hydrogen and oxygen concentrations in primary containment during accident conditions.			FP	EQ	PTS	AT	SB

Comment: Per USAR Section 5.2.2.7: “10CFR50.44 no longer defines a design-basis LOCA hydrogen release, and eliminates requirements for hydrogen control systems to mitigate such a release. The hydrogen monitors are required to assess the degree of core damage during a beyond design-basis accident.”

Code: PCM-06	Cri 1	Cri 2	Cri 3				
Obtain representative RPV & torus liquid, and PCT & SCT gas samples for chemical and radiochemical analysis in association with a LOCA (per NUREG-0578).			FP	EQ	PTS	AT	SB

Comment: The Post Accident Sampling (PAS) Subsystem provides operators with post-accident sampling capability. The PAS Subsystem has no safety function. Technical Specification requirements for PAS were eliminated per License Amendment. PAS Subsystem equipment remains installed per an NRC Commitment.

Code: PCM-07	Cri 1	Cri 2	Cri 3				
Provide capability to drain torus.			FP	EQ	PTS	AT	SB

Comment: This function supports normal plant operations/shutdowns.

Code: PCM-08	Cri 1	Cri 2	Cri 3				
Primary Containment Isolation. Provides primary containment isolation for those portions of the system that interface with the primary containment (valves and piping).			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: PCM-09	Cri 1	Cri 2	Cri 3				
Provides drywell, torus, and select isolation valve position and other parameter signals for indication and control.			FP	EQ	PTS	AT	SB
	X						

Comment: Includes torus temperature, level, and pressure; drywell wide range pressure; and various valve position indicators.

Code: PCM-10	Cri 1	Cri 2	Cri 3				
Provide venting of primary containment.			FP	EQ	PTS	AT	SB

Comment: This function supports normal plant operations/shutdowns.

Code: PCM-11	Cri 1	Cri 2	Cri 3				
Monitor oxygen concentration in the primary containment during normal operation.			FP	EQ	PTS	AT	SB

Comment: An oxygen analyzing system (Hays analyzer) is provided to monitor the oxygen concentration in the primary containment during normal operation.

Code: PCM-12 Provide secondary containment integrity for the Hard Pipe Vent.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: A portion of the Hard Pipe Vent piping downstream of the rupture disc is functionally safety related and in scope of LR because a breach of the vent piping pressure boundary could cause a breach of secondary containment.

Code: PCM-EQ The system contains components which perform functions credited in the current licensing basis for Environmental Qualification.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
				X			

Comment: None.

Code: PCM-FP The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: None.

Code: PCM-NSAS Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: None.

Code: PCM-SB The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of all AC power).	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: None.

USAR Reference

Additional Primary Containment Mechanical System details are provided in Section 5.2.1.3, Section 5.2.2.3, Section 5.2.2.7, Section 5.2.2.10, Section 5.2.3.11, and Section 10.3.10.1 of the USAR.

License Renewal Drawings

The license renewal drawings for the Primary Containment Mechanical System are listed below:

LR-36049-14	LR-91197
LR-36246	LR-94896
LR-36247	LR-94897
LR-36258	LR-96042-1
LR-36267	LR-116629
LR-46162	LR-161004

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.2-5 along with each Component Group's intended function(s).

Table 2.3.2-5 Primary Containment Mechanical System

Component Group	Intended Function
ACCUMULATORS	PRESSURE BOUNDARY
FASTENERS/BOLTING	PRESSURE BOUNDARY
FILTERS/STRAINERS	FILTRATION
FLOW ELEMENT	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY PRESSURE BOUNDARY/ FISSION PRODUCT RETENTION
RUPTURE DISKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.2.6 Reactor Core Isolation Cooling System

System Description

The Reactor Core Isolation Cooling (RCI) System is not an ESF system per the MNGP licensing basis. The Reactor Core Isolation Cooling System has been included within this section, and the related aging management section, for consistency with NUREG-1800 and NUREG-1801.

The RCI System uses a steam-driven turbine to drive a pump to inject water into the reactor vessel such that the core is not uncovered in the event of a loss of feedwater. While the system is not credited in the SBO analysis for mitigating loss of offsite power (LOOP) events, the system may be used to cope with such events. The RCI pump is supplied demineralized makeup water from the condensate storage tank and can use the suppression pool as an alternate safety related source of water. All components necessary for the initiation and operation of the RCI System are completely independent of any auxiliary AC power, plant service air and external cooling water systems, requiring only DC control and instrument power from the plant batteries. The RCI System also provides for Primary Containment isolation. The RCI System contains components that are required per 10 CFR 50.49 (Environmental Qualification).

The makeup water from the RCI System pump is delivered into the reactor vessel through a feedwater line and distributed through the reactor feedwater system spargers. The pumping capacity of the RCI system is sufficient to maintain the water level above the core without any other makeup water system in operation. The turbine is driven with steam from the reactor vessel, and exhausts the steam to the suppression pool through a condensing sparger, submerged in the torus water.

The in-scope portion of the RCI System consists of the steam supply and return line, steam turbine, steam drain lines, the pump, suction and discharge piping, valves and a barometric steam condenser. The majority of the components for the RCI System are located in the Reactor Building with additional piping and valves located in the Primary Containment and torus. The piping of the RCI System is fabricated of both stainless and carbon steel. The steam drain piping is stainless steel. The RCI System pump is located in the RCI room at the basement level of the Reactor Building. The RCI System is a standby system during normal plant operation with the exception of routine surveillance testing.

The description above results in some SCs for this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some components in the RCI System are non-safety related and their failure could affect the capability of SR components to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some components are in-scope due to Environmental Qualification in accordance with 10 CFR 54.4(a)(3).

The portions of the Reactor Core Isolation Cooling System containing components subject to an AMR extend from the main steam line supply piping tap to the RCI turbine and exhaust to the suppression pool, the suction piping from the CST and suppression pool to the RCI system pump and discharge piping up to the feedwater pipe junction, the steam drain lines and the piping/valves associated with the barometric condenser.

System Function Listing

A comprehensive listing of functions associated with the Reactor Core Isolation Cooling System, or specific components contained in the system, is provided in the summary below.

Code: RCI-01 Maintain sufficient coolant in the reactor vessel so that the core is not uncovered in the event of loss of feedwater event.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: RCI-02 Operate in the “Reactor Vessel Level Control” or “Reactor Vessel Pressure Control” mode as required.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This function is a manually initiated operation that is allowed by plant EOPs and abnormal procedures. The function can be used by Operations on an as-needed basis during emergency or abnormal conditions and is not in-scope of LR.

Code: RCI-03 Maintain Pressure Boundary. Portions of the RCI System are connected to, and part of, the reactor coolant pressure boundary during plant operation.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: RCI-04 Primary Containment Isolation. Provides primary containment isolation for those portions of the system that interface with the primary containment (valves and piping).	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: RCI-05	Cri 1	Cri 2	Cri 3				
RCI steam supply line isolation. Detects RCI steam supply line breaks and provides a signal to automatically close supply line isolation valves on high steam flow or area temperature.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: RCI-EQ	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components required by the current licensing basis for Environmental Qualification.			FP	EQ	PTS	AT	SB
				X			

Comment: None.

Code: RCI-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: None.

USAR Reference

Additional Reactor Core Isolation Cooling System details are provided in Section 10.2.5 of the USAR.

License Renewal Drawings

The license renewal drawings for the Reactor Core Isolation Cooling System are listed below:

LR-36241
LR-36251
LR-36252
LR-36254

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.2-6 along with each Component Group's intended function(s).

Table 2.3.2-6 Reactor Core Isolation Cooling System

Component Group	Intended Function
FASTENERS/BOLTING	PRESSURE BOUNDARY

Table 2.3.2-6 Reactor Core Isolation Cooling System

Component Group	Intended Function
FILTERS/STRAINERS	FILTRATION PRESSURE BOUNDARY
HEAT EXCHANGERS	HEAT TRANSFER PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	FLOW RESTRICTION PRESSURE BOUNDARY
STEAM TRAPS	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
TURBINES	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.2.7 Residual Heat Removal System

System Description

The Residual Heat Removal (RHR) System restores and maintains the reactor coolant inventory in the reactor core such that the reactor core is adequately cooled after depressurization during a loss-of-coolant accident (LOCA). The RHR System also provides cooling for the suppression pool such that condensation of the steam resulting from the blowdown due to the design basis LOCA is ensured. The RHR System further extends the redundancy of the Emergency Core Cooling Systems (ECCS) by providing for Primary Containment spray/cooling. Additionally, the RHR System also provides for

Primary Containment isolation. The RHR System is credited for use in the Fire Protection (FP), Environmental Qualification (EQ) and Station Blackout (SBO) regulated events.

The RHR System is designed for essentially three modes of operation. These modes are 1) Low Pressure Coolant Injection (LPCI), 2) Containment Spray/Cooling, and 3) Reactor Shutdown Cooling. The Shutdown Cooling subsystem is used for routine operations.

The LPCI subsystem is an integral part of the RHR System. It operates to restore and maintain the reactor coolant inventory in the reactor core after a LOCA such that the core is sufficiently cooled. The LPCI subsystem operates in conjunction with the High Pressure Coolant Injection (HPC) System, the Automatic Pressure Relief (APR) System, and the Core Spray (CSP) System to achieve this goal.

During LPCI operation, the RHR pumps take suction from the suppression pool and discharge into the reactor core region through one of the recirculation loops of the Reactor Recirculation (REC) System. Plant procedures provide the necessary guidance to minimize the potential, mitigate the consequences, and/or compensate for suction strainer fouling. The post LOCA long-term operability of the RHR System pumps is enhanced by the installation of large suction strainers and the use of Nukon insulation inside the drywell to assure that displaced insulation does not collect at the pump inlet debris screens and impede the positive suction head of the pumps. The RHR System is filled and maintained by the Condensate Storage (CST) System.

The RHR System also provides cooling for the suppression pool so that condensation of the steam resulting from the blowdown due to the design basis LOCA is ensured. The RHR System further extends the redundancy of the ECCS by provision for containment spray/cooling.

The RHR System provides a means to remove decay heat and residual heat from the reactor so that refueling and reactor systems servicing can be performed. In addition, the RHR System provides the means to supplement the Spent Fuel Pool Cooling System when necessary to provide additional cooling capacity.

Provision is also made for emergency supply of cooling water to the core from the river via the RHR Service Water (RSW) subsystem (LR System ESW). It is also possible to supply emergency cooling water to the reactor core from the river via the diesel fire pump. The Fire (FIR) System connects with the RSW cooling water line to provide this alternate source of water. Additionally, the RHR System provides cooling water to the Combustible Gas Control (CGC) System. The RHR pump seal coolers are cooled by the Reactor Building

Closed Cooling Water (RBC) System. The RHR equipment is designed in accordance with Class I seismic criteria.

The in-scope portion of the RHR System consists of the main cooling loops, including the pumps, heat exchangers, piping and valves. The majority of the components for the RHR System are located in the Reactor Building with additional piping and valves located in the Primary Containment. The major in-scope components include: two heat exchangers, four RHR pumps, and the associated valves, piping and instrumentation. The four RSW subsystem pumps are addressed in Emergency Service Water System.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some SCs in the RHR System are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some SCs are in-scope due to Environmental Qualification, Fire Protection, and Station Blackout in accordance with 10 CFR 54.4(a)(3).

The portions of the Residual Heat Removal System containing components subject to an AMR extend from the RHR pumps, heat exchangers, piping and valves in the Reactor Building to the connecting piping and valves in the Primary Containment.

System Function Listing

A comprehensive listing of functions associated with the Residual Heat Removal System, or specific components contained in the system, is provided in the summary below.

Code: RHR-01	Cri 1	Cri 2	Cri 3				
Automatically inject water into the reactor vessel in LPCI cooling mode after depressurization following a LOCA.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: RHR-02	Cri 1	Cri 2	Cri 3				
Provide containment spray/cooling to drywell and torus as an augmented means of removing heat after a LOCA (Containment Spray/Cooling mode) and maintain suppression pool temperature below that required to condense steam after a LOCA.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: RHR-03 Supply cooling water to the Combustible Gas Control System (CGCS).	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Amendment No.138 to Facility Operating License No. DPR-22 for the Monticello Nuclear Generating Plant eliminates requirements for hydrogen recombiners. However, the CGC System and the related plant procedures for controlling O2 concentrations in the primary containment using the system will be retained until the CGC System is abandoned in place during the 2005 refueling outage.

Code: RHR-04 Provide shutdown cooling.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: None.

Code: RHR-05 Supplement the heat removal capability of the Fuel Pool Cooling and Cleanup (FPC) System, if required.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: None.

Code: RHR-06 Provide a means of draining the suppression pool water to the Radwaste System.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: None.

Code: RHR-07 Maintain suppression pool temperature below that which is required to assure condensation of steam resulting from a blowdown.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This is a normal operation function. Function RHR-02 covers post-accident suppression pool cooling.

Code: RHR-08 Primary Containment Isolation. Provides primary containment isolation for those portions of the system that interface with the primary containment (valves and piping).	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: RHR-09 Maintain Pressure Boundary. Portions of the RHR system are connected to, and part of, the reactor coolant pressure boundary during plant operation.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: RHR-EQ	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Environmental Qualification.			FP	EQ	PTS	AT	SB
				X			

Comment: None.

Code: RHR-FP	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: The RHR system has FP functions of suppression pool cooling and RHR Auxiliary Air. The RHR System is used to implement the Alternate Shutdown Cooling Method (ASCM). To use the ASCM, the reactor is depressurized using the Automatic Depressurization subsystem of the APR System. When the reactor is depressurized to below the shutoff head of the pump, a core spray pump or an RHR pump (in the LPCI mode) is then used to flood the vessel. Safety/relief valves are then used to discharge the heated reactor water to the suppression pool. The safety/relief valves and discharge piping have been evaluated for this mode of operation and have been found to be acceptable. Water discharged to the torus is cooled with the suppression pool cooling mode of the RHR System. (See USAR Section 6.2.3.3.4.)

Code: RHR-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: None.

Code: RHR-SB	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of all AC power).			FP	EQ	PTS	AT	SB
							X

Comment: Portions of the system relay logic are DC-powered and support initiation of an SBO-credited system.

USAR Reference

Additional Residual Heat Removal System details are provided in Section 6.2.3 of the USAR.

License Renewal Drawings

The license renewal drawings for the Residual Heat Removal System are listed below:

LR-36042-2
LR-36049-13
LR-36243
LR-36246
LR-36247
LR-36248
LR-36256
LR-36664
LR-96042-1

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.2-7 along with each Component Group's intended function(s).

Table 2.3.2-7 Residual Heat Removal System

Component Group	Intended Function
ACCUMULATORS	PRESSURE BOUNDARY
FASTENERS/BOLTING	PRESSURE BOUNDARY
FILTERS/STRAINERS	FILTRATION PRESSURE BOUNDARY
HEAT EXCHANGERS	HEAT TRANSFER PRESSURE BOUNDARY THERMAL INSULATION
MANIFOLDS	PRESSURE BOUNDARY
NOZZLES	FLOW RESTRICTION PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY

Table 2.3.2-7 Residual Heat Removal System

Component Group	Intended Function
RESTRICTING ORIFICES	FLOW RESTRICTION PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.2.8 Secondary Containment System

System Description

The Secondary Containment (SCT) System completely encloses the reactor and its pressure suppression primary containment. The secondary containment enclosure structure provides secondary containment when the primary containment is closed and in service, and primary containment when the primary containment is open, as during refueling. The Reactor Building houses the refueling and reactor servicing equipment, new and spent fuel storage facilities and other reactor auxiliary systems or service equipment. The primary purposes for the secondary containment are to minimize ground level release of airborne radioactive materials to the environs, and to provide means for a controlled elevated release of the building atmosphere if an accident should occur.

The Standby Gas Treatment System (SGTS) is a subsystem of the SCT System and is provided to maintain, whenever secondary containment isolation conditions exist, a small negative pressure to minimize ground level escape of airborne radioactivity. Filters are provided in the system to remove radioactive particulates, and charcoal adsorbers are provided to remove radioactive halogens. All flow from the standby gas treatment system is released through the elevated off-gas vent stack and continuously monitored by the stack gas monitoring system.

The mechanical portion of the Secondary Containment System containing components in-scope and subject to an AMR includes isolation dampers on the Reactor Building HVAC supply and the primary containment vent air discharge lines to the Main Exhaust Plenum Room, isolation dampers in the Reactor Building air supply units, isolation dampers in the Secondary Containment to

Standby Gas Treatment System Room HVAC ducting, the air intake line from the Primary Containment Purge & Vent, and lines leading up to the discharge of the Off-Gas Dilution Fans.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). In addition, some SCs are in-scope due to Environmental Qualification in accordance with 10 CFR 54.4(a)(3).

System Function Listing

A comprehensive listing of functions associated with the Secondary Containment System, or specific components contained in the system, is provided in the summary below.

Code: SCT-01	Cri 1	Cri 2	Cri 3				
Minimizes the ground level release of radioactive materials, in support of a controlled elevated release of the containment atmosphere during a design basis LOCA or Refueling Accident. This includes using the Standby Gas Treatment System (SGTS).			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: SCT-02	Cri 1	Cri 2	Cri 3				
Minimizes air in-leakage during normal operation allowing the Reactor Building normal HVAC system to maintain a negative pressure within SCT and monitor releases through the Reactor Building vent.			FP	EQ	PTS	AT	SB

Comment: None.

Code: SCT-EQ	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Environmental Qualification.			FP	EQ	PTS	AT	SB
				X			

Comment: None.

USAR Reference

Additional Secondary Containment System details are provided in Section 5.3 of the USAR.

License Renewal Drawings

The license renewal drawings for the Secondary Containment System are listed below:

LR-36159
LR-36258
LR-36266
LR-36267
LR-36267-3
LR-36807
LR-36808
LR-36881
LR-51142-1

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.2-8 along with each Component Group's intended function(s).

Table 2.3.2-8 Secondary Containment System

Component Group	Intended Function
DAMPER HOUSINGS	PRESSURE BOUNDARY
DUCTWORK	PRESSURE BOUNDARY
FAN/BLOWER/HOUSINGS	PRESSURE BOUNDARY
FASTENERS/BOLTING	PRESSURE BOUNDARY
FILTERS/HOUSINGS	PRESSURE BOUNDARY
FLOW ELEMENT	FLOW RESTRICTION PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	FLOW RESTRICTION PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

Table 2.3.2-8 Secondary Containment System

Component Group	Intended Function
VENTILATION SEAL	PRESSURE BOUNDARY

2.3.3 Auxiliary Systems

The following systems are addressed in this section:

- Alternate Nitrogen System (Section 2.3.3.1)
- Chemistry Sampling System (Section 2.3.3.2)
- Circulating Water System (Section 2.3.3.3)
- Control Rod Drive System (Section 2.3.3.4)
- Demineralized Water System (Section 2.3.3.5)
- Emergency Diesel Generators System (Section 2.3.3.6)
- Emergency Filtration Train System (Section 2.3.3.7)
- Emergency Service Water System (Section 2.3.3.8)
- Fire System (Section 2.3.3.9)
- Fuel Pool Cooling and Cleanup System (Section 2.3.3.10)
- Heating and Ventilation System (Section 2.3.3.11)
- Instrument and Service Air System (Section 2.3.3.12)
- Radwaste Solid and Liquid System (Section 2.3.3.13)
- Reactor Building Closed Cooling Water System (Section 2.3.3.14)
- Reactor Water Cleanup System (Section 2.3.3.15)
- Service and Seal Water System (Section 2.3.3.16)
- Standby Liquid Control System (Section 2.3.3.17)
- Wells and Domestic Water System (Section 2.3.3.18)

2.3.3.1 Alternate Nitrogen System

System Description

The Alternate Nitrogen System (AN2) consists of two separate safety related trains providing a safety related back-up pneumatic source from nitrogen bottle racks located in the Turbine Building. The AN2 System interfaces with the Instrument and Service Air (AIR) system through a check valve with the nitrogen side held at a slightly lower pressure to allow the AIR system to be used during normal operation. In the event of an accident, which also disables the AIR system, the AN2 system would automatically supply the required pneumatic loads.

Train A provides backup pneumatic supply to the T-ring seals of the inboard Primary Containment Atmospheric Control System purge and vent valves, the T-ring seals and actuators of the Reactor Building to suppression chamber vacuum breakers, and safety relief valves RV-2-71A, RV-2-71B, and RV-2-71E. Train B provides backup pneumatic supply to the T-ring seals of the outboard Primary Containment Atmospheric Control System purge and vent valves, the inboard main steam isolation valves AO-2-80A, AO-2-80B, AO-2-80C, and AO-2-80D, and safety relief valves RV-2-71C, RV-2-71F, and RV-2-71H. Train B also provides the sole pneumatic supply to the Primary Containment Hard Pipe Vent System. Manifold and system pressures of each train are monitored by pressure switches, which give control room annunciation on low pressure.

The AN2 System is entirely in-scope of license renewal with the exception of lines serving the locked-shut hard pipe vent. The boundary for the supply to the Automatic Pressure Relief (APR) system extends up to the solenoid valve controlling the Safety Relief Valves. The boundary for the supply to the Main Steam Isolation Valves extends up to the AN2 side of the MST check valves upstream of the MSIV pneumatic control consoles. The in-scope portion of the AN2 lines to the T-Ring seals extends to the check valve upstream of the accumulators serving each seal. The accumulators and seals are scoped as components in the Primary Containment Mechanical (PCM) System.

The above description results in components in the AN2 System being in-scope in accordance with 10 CFR 54.4(a)(1). In addition, components are in-scope due to supporting the Fire Protection (FP), Environmental Qualification (EQ), and Station Blackout (SBO) regulated events in accordance with 10 CFR 54.4(a)(3).

The portions of the AN2 System containing components subject to an AMR extend from the above mentioned pneumatically served components in the drywell and at the primary containment boundary, back to the nitrogen supply bottles in the Turbine Building.

System Function Listing

A comprehensive listing of functions associated with the Alternate Nitrogen System, or specific components contained in the system, is provided in the summary below.

Code: AN2-01	Cri 1	Cri 2	Cri 3				
Pneumatic Supply. Provides the pneumatic supply to six SRVs during accident scenarios when the non-safety related pneumatic supplies may be unavailable.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: AN2-02	Cri 1	Cri 2	Cri 3				
Provide a pneumatic source for the Hard Pipe Vent System isolation valves and rupture disc.			FP	EQ	PTS	AT	SB

Comment: The hard pipe vent valves are closed and are not required to open during any design basis event. Any such challenge to the primary containment requiring use of the hard pipe vent extends beyond the analyzed design basis of the plant.

Code: AN2-03	Cri 1	Cri 2	Cri 3				
Pneumatic Supply. Provides the pneumatic supply to the inboard MSIVs as a source of sealing force margin.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: AN2-04	Cri 1	Cri 2	Cri 3				
Pneumatic Supply. Provides containment vent and purge valves, and Reactor Building to suppression pool vacuum breaker valves with a nitrogen supply.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: AN2-05	Cri 1	Cri 2	Cri 3				
Primary Containment Isolation. Provides primary containment isolation for those portions of the system that interface with the primary containment (valves and piping).			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: AN2-EQ	Cri 1	Cri 2	Cri 3				
The system contains components which perform functions credited in the current licensing basis for Environmental Qualification.			FP	EQ	PTS	AT	SB
				X			

Comment: None.

Code: AN2-FP	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: The AN2 System is used to implement the Alternate Shutdown Cooling Method (ASCM). To use the ASCM, the reactor is depressurized using the Automatic Depressurization subsystem of the APR System. When the reactor is depressurized to below the shutoff head of the pump, a core spray pump or an RHR pump (in the LPCI mode) is then used to flood the vessel. Safety/relief valves are then used to discharge the heated reactor water to the suppression pool. The safety/relief valves and discharge piping have been evaluated for this mode of operation and have been found to be acceptable. Water discharged to the torus is cooled with the suppression pool cooling mode of the RHR System. (See USAR Section 6.2.3.3.4.)

Code: AN2-SB	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of all AC power).			FP	EQ	PTS	AT	SB
							X

Comment: None.

USAR Reference

Additional Alternate Nitrogen System details are provided in Section 10.3.4.2.3 of the USAR.

License Renewal Drawings

The license renewal drawings for the Alternate Nitrogen System are listed below:

LR-36049-10
LR-36049-14
LR-36241-1

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.3-1 along with each Component Group's intended function(s).

Table 2.3.3-1 Alternate Nitrogen System

Component Group	Intended Function
FASTENERS/BOLTING	PRESSURE BOUNDARY
FLEXIBLE CONNECTIONS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.2 Chemistry Sampling System

System Description

The Chemistry Sampling (CHM) System provides for sampling the process fluid of various systems to obtain representative data from which the performance of the plant systems and equipment can be evaluated. The sampling locations are chosen to ensure that representative samples can be obtained. The sample streams are routed by the shortest route to a common sample collection area.

There is a collective sample station for each building in the plant: Radwaste Building Sample Station, located in the Radwaste Building; Reactor Building Sample Station, located in the Reactor Building; and Turbine Building Sample Station, located in the Turbine Building. The stations are provided with closed loop process lines that discharge to the equipment drain tanks and then to the waste collector tank for reprocessing. Each sample station typically consists of a sample rack with sample shutoff valves; sample coolers; sample chillers; sample modules; instrumentation for conductivity, pH, dissolved oxygen, dissolved hydrogen, total organic carbon; and a local data acquisition system panel. There is a ventilated fume hood for collection of grab samples adjacent to the sample rack.

The in-scope portion of the Chemistry Sampling System consists of the piping and valves from the sample points for the various interfacing systems to the Reactor Building Sample Station and Turbine Building Sample Station, as applicable. The major in-scope components include piping, valves and instrumentation located at the Reactor Building Sample Station and Turbine

Building Sample Station and portions of the system for cooling the process samples (sample coolers and sample chillers).

Components in the Chemistry Sampling System are non-safety related and their failure could affect the capability of safety related SSCs to perform their safety function; therefore, they are in-scope in accordance with 54.4(a)(2).

The portions of the Chemistry Sampling System containing components subject to an AMR extend from the sample points for the various interfacing systems to the Reactor Building Sample Station and Turbine Building Sample Station, as applicable.

System Function Listing

A comprehensive listing of functions associated with the Chemistry Sampling System, or specific components contained in the system, is provided in the summary below.

Code: CHM-01	Cri 1	Cri 2	Cri 3				
Obtains samples from various plant process locations for monitoring the operation of plant equipment, use in making operational decisions, and monitoring radioactive effluent.			FP	EQ	PTS	AT	SB

Comment: Sampling point locations are listed in USAR Table 10.3-1. The Chemistry Sampling System (CHM) does not include the post accident sampling subsystem (PAS). PAS is addressed as part of the Primary Containment Mechanical System (PCM). Safety related isolation valves, flow restrictors, or other devices that serve to isolate the non-safety related CHM System from its sample points are included as part of the respective safety related systems.

Code: CHM-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: None.

USAR Reference

Additional Chemistry Sampling System details are provided in Section 10.3.7 of the USAR.

License Renewal Drawings

The license renewal drawings for the Chemistry Sampling System are listed below:

LR-36042	LR-36829
LR-36243	LR-36908

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.3-2 along with each Component Group's intended function(s).

Table 2.3.3-2 Chemistry Sampling System

Component Group	Intended Function
CHILLERS	PRESSURE BOUNDARY
FASTENERS/BOLTING	PRESSURE BOUNDARY
FILTERS/HOUSINGS	PRESSURE BOUNDARY
FLOW ELEMENT	PRESSURE BOUNDARY
HEAT EXCHANGERS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.3 Circulating Water System

System Description

The Circulating Water (CWT) System removes the heat from the main condenser that is rejected by the turbine or turbine bypass system over the full range of operating loads.

The CWT System is a flexible multi-cycle system with the capability of once-through circulation of river water, recirculation in a closed cycle with Cooling Towers, and several variations of these basic modes. Selection of the operating mode will be determined by the prevailing river flow rate and river temperature to provide economic plant operation and conformance with restrictions on river water use.

The system is equipped with two half-capacity Circulating Water Pumps located at the intake structure. The pumps are designed to circulate cooling water through the Main Condenser. Effluent from the condenser, and the plant's Service Water System, is piped to the Discharge Structure. During open cycle operation, the circulating water flows through the Discharge Structure to an open canal, which conveys it to the river downstream of the intake.

Two half-capacity Cooling Tower Pumps, located at the Discharge Structure, are used during Cooling Tower operation. The pumps are designed to operate in series with the Circulating Water Pumps, discharging flow to each of two induced draft Cooling Towers. During closed cycle, when the river is isolated by control gates, effluent from the Cooling Towers flows by gravity from the Cooling Tower Basins to the suction chambers of the Circulating Water Pumps. Blowdown overflows through weirs at the Cooling Tower Basins and is piped from there to the Discharge Canal. Make-up water and microbiological growth inhibitor are added at the intake structure.

The in-scope portion of the Circulating Water System consists of the main cooling loops, including the Circulating Water Pumps, piping and valves from the pumps to the main condenser, piping and valves from the main condenser to the exit point from the Turbine Building, as well as pumps, piping and valves associated with water box scavenging. In addition is a portion of piping and valves associated with Sodium Hypochlorite injection.

Components in the Circulating Water System are non-safety related and their failure could affect the capability of safety related SSCs to perform their safety function; therefore, they are in-scope in accordance with 54.4(a)(2).

System Function Listing

A comprehensive listing of functions associated with the Circulating Water System, or specific components contained in the system, is provided in the summary below.

Code: CWT-01	Cri 1	Cri 2	Cri 3				
The CWT System removes heat energy from the main condenser and dissipates this energy to the river or to the atmosphere via the Cooling Towers.			FP	EQ	PTS	AT	SB

Comment: None.

Code: CWT-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: None.

USAR Reference

Additional Circulating Water System details are provided in Section 11.5 of the USAR.

License Renewal Drawings

The license renewal drawings for the Circulating Water System are listed below:

LR-36489
LR-36667
LR-36666

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.3-3 along with each Component Group's intended function(s).

Table 2.3.3-3 Circulating Water System

Component Group	Intended Function
CONDENSER WATER BOX	PRESSURE BOUNDARY

Table 2.3.3-3 Circulating Water System

Component Group	Intended Function
EXPANSION JOINTS	PRESSURE BOUNDARY
FASTENERS/BOLTING	PRESSURE BOUNDARY
FILTERS/STRAINERS	PRESSURE BOUNDARY
GAUGES (FLOW, LEVEL AND SIGHT)	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.4 Control Rod Drive System

System Description

The Control Rod Drive (CRD) System is designed to allow control rod withdrawal or insertion at a limited rate, one control rod at a time, for power level control and flux shaping during reactor operation. Stored energy available from gas-charged accumulators and/or from reactor pressure provides hydraulic power for rapid simultaneous insertion of all control rods for rapid (scram) reactor shutdown. Each control rod has its own separate drive mechanism, control, and scram devices.

The Control Rod Drive System is designed so that sufficient energy is available to force the control rods into the core under conditions associated with abnormal operational transients and accidents. Control rod insertion speed is sufficient to prevent fuel damage as a result of any abnormal operational transient.

The CRD System also supplies water to the RVI Reference Leg Backfill subsystem. This subsystem provides a constant backfill of water from the CRD System's charging water header to the safeguards and feedwater reference legs to flush any gas-laden water through the condensate chambers and back to the reactor vessel to eliminate level errors due to the degassing phenomenon.

The hydraulic control unit, the control rod drive mechanisms, piping, and the scram valves retain reactor coolant following a scram. Portions of the Reference Leg Backfill subsystem are also reactor coolant pressure boundaries.

Portions of the CRD system are required to support primary containment isolation. Containment isolation of the CRD hydraulic control lines is provided by double seals within each control rod drive mechanism, and check valves and normally closed valves within each hydraulic control unit.

The in-scope portion of the CRD System includes the pumps, heat exchangers, tanks, and associated piping, valves and instrumentation from the CRD pumps suction to and including the CRD hydraulic control units as well as the RVI Reference Leg Back Fill subsystem. The control rod drive mechanisms and control rod blades are also in-scope for License Renewal.

The description above results in some SCs in the CRD System being in-scope in accordance with 10CFR54.4(a)(1). Since some SCs in the Control Rod Drive System are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10CFR54.4(a)(2). In addition, some SCs are in-scope due to Anticipated Transients without Scram, Environmental Qualification, Fire Protection, and Station Blackout in accordance with 10CFR54.4(a)(3).

The major portion of the CRD System containing components subject to an AMR extends from the CRD pumps suction to the CRD hydraulic control units and includes the RVI Reference Leg Back Fill subsystem. The piping connecting to the control rod drive mechanisms is in the CRD System. The control rod drive mechanisms along with the control blades are in the CRD System, although they do not require aging management. The control rod drive mechanisms are active and control rod blades are short lived and periodically replaced.

System Function Listing

A comprehensive listing of functions associated with the Control Rod Drive System, or specific components contained in the system, is provided in the summary below.

Code: CRD-01	Cri 1	Cri 2	Cri 3				
Reactivity Control. The CRD System is required to rapidly insert withdrawn neutron absorbing control rods into the core (scram) in response to automatic signals from the Reactor Protection System.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: CRD-02	Cri 1	Cri 2	Cri 3				
The CRD System is required to incrementally position neutron absorbing control rods within the reactor core in response to manual control signals.			FP	EQ	PTS	AT	SB

Comment: This function satisfies an operational requirement to configure the rod positions as necessary for a controlled core burnup.

Code: CRD-03	Cri 1	Cri 2	Cri 3				
The CRD System supplies water to the Recirc pump seal injection subsystem.			FP	EQ	PTS	AT	SB

Comment: None.

Code: CRD-04	Cri 1	Cri 2	Cri 3				
The CRD System supplies water to the RVI Reference Leg Backfill subsystem.			FP	EQ	PTS	AT	SB

Comment: None.

Code: CRD-05	Cri 1	Cri 2	Cri 3				
The CRD System may also supply water to the RPV via the normally closed flow path to the RWC System.			FP	EQ	PTS	AT	SB

Comment: This alternate reactor coolant supply is not credited in any design basis events.

Code: CRD-06	Cri 1	Cri 2	Cri 3				
The CRD System can be used to inject boron into the RPV if the SLC System becomes inoperable.			FP	EQ	PTS	AT	SB

Comment: The use of the CRD system in this manner is outside the current licensing basis.

Code: CRD-07	Cri 1	Cri 2	Cri 3				
Maintain Pressure Boundary. Portions of the CRD System are connected to, and part of, the reactor coolant pressure boundary during plant operation.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: CRD-08	Cri 1	Cri 2	Cri 3				
Primary Containment Isolation. Provides primary containment isolation for those portions of the system that interface with the primary containment (valves and piping).			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: CRD-AT	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Anticipated Transients Without Scram.			FP	EQ	PTS	AT	SB
						X	

Comment: None.

Code: CRD-EQ	Cri 1	Cri 2	Cri 3				
The system contains components which perform functions credited in the current licensing basis for Environmental Qualification.			FP	EQ	PTS	AT	SB
				X			

Comment: None.

Code: CRD-FP	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: Provides reactor scram to support post-fire safe shutdown.

Code: CRD-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: None.

Code: CRD-SB	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of all AC power).			FP	EQ	PTS	AT	SB
							X

Comment: None.

USAR Reference

Additional Control Rod Drive System details are provided in Section 3.5.3 of the USAR.

License Renewal Drawings

The license renewal drawings for the Control Rod Drive System are listed below:

LR-36036	LR-36242-1
LR-36039	LR-36242-2
LR-36043	LR-36244
LR-36044	LR-36245
LR-36242	LR-36254

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.3-4 along with each Component Group's intended function(s).

Table 2.3.3-4 Control Rod Drive System

Component Group	Intended Function
ACCUMULATORS	PRESSURE BOUNDARY
FASTENERS/BOLTING	PRESSURE BOUNDARY
FILTERS/STRAINERS	PRESSURE BOUNDARY
FLOW ELEMENT	PRESSURE BOUNDARY
GAUGES (FLOW, LEVEL AND SIGHT)	PRESSURE BOUNDARY
HEAT EXCHANGERS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY

Table 2.3.3-4 Control Rod Drive System

Component Group	Intended Function
SPEED INCREASER ASSEMBLY	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.5 Demineralized Water System

System Description

The Demineralized Water System (DWS) provides for storage and distribution of high quality, non-radioactive demineralized water for use as makeup to the Condensate Storage System (CST) and other systems requiring high quality demineralized water. The DWS is non-safety related and is not required during or following design basis events. The DWS System includes the Makeup Demineralizer (MUD) Subsystem. The MUD Subsystem is a double-pass reverse osmosis system used to purify and demineralize well water. This demineralized water is used for various plant services where quality water is required to (1) minimize damage to components due to chemical and corrosive attack; (2) minimize the fouling of heat transfer surfaces and mechanical parts; and (3) minimize impurities available for activation in neutron flux zones. The MUD Subsystem is also non-safety related and is not required during or following design basis events. The DWS provides for Primary Containment isolation.

The in-scope portion of the Demineralized Water System consists of MUD filters, softeners, reverse osmosis units, heater, deionization units, a reverse osmosis cleaning subsystem, a heat exchanger, two transfer pumps, and the associated piping and instrumentation.

The description above results in components for this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since components in the Demineralized Water System are non-safety related, and their failure could affect the capability of SR components to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2).

That portion of the Demineralized Water System containing components subject to an AMR includes the Primary Containment isolation valves in the Reactor Building, the DWS supply to the SLC System, and miscellaneous piping and valves.

System Function Listing

A comprehensive listing of functions associated with the Demineralized Water System, or specific components contained in the system, is provided in the summary below.

Code: DWS-01	Cri 1	Cri 2	Cri 3				
Provides for storage and distribution of high quality, non-radioactive demineralized water for use as makeup to the Condensate Storage System and other systems requiring high quality demineralized water.			FP	EQ	PTS	AT	SB

Comment: The DWS System is non-safety related and not required to mitigate design basis events.

Code: DWS-02	Cri 1	Cri 2	Cri 3				
The Makeup Demineralizer (MUD) subsystem purifies the well water supply to produce demineralized water.			FP	EQ	PTS	AT	SB

Comment: The MUD subsystem is non-safety related and not required to mitigate design basis events.

Code: DWS-03	Cri 1	Cri 2	Cri 3				
Primary Containment Isolation. Provides primary containment isolation for those portions of the system that interface with the primary containment (valves and piping).			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: DWS-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: None.

USAR Reference

Additional Demineralized Water System details are provided in Section 10.3.3 and Table 5.2-3a of the USAR.

License Renewal Drawings

The license renewal drawings for the Demineralized Water System are listed below:

LR-36036	LR-36042
LR-36038-2	LR-36253
LR-36039	LR-36261
LR-36040	LR-36664
LR-36041	LR-36881

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.3-5 along with each Component Group's intended function(s).

Table 2.3.3-5 Demineralized Water System

Component Group	Intended Function
FASTENERS/BOLTING	PRESSURE BOUNDARY
FILTERS/HOUSINGS	PRESSURE BOUNDARY
FLOW ELEMENT	PRESSURE BOUNDARY
HEAT EXCHANGERS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
UV LIGHT HOUSINGS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.6 Emergency Diesel Generators System

System Description

The Emergency Diesel Generators (DGN) System provides a dependable on-site power source capable of automatically starting and supplying the loads necessary to safely shutdown the plant and maintain it in a safe shutdown condition upon the loss of off-site power simultaneous with a design basis accident. The emergency diesel generators are normally in the standby mode of operation and remain in this mode unless called upon to start by receipt of appropriate automatic signals or by a manual start.

The DGN System is comprised of two identical diesel generators. Each diesel generator supplies 4160Vac power to its respective emergency bus. Each diesel generator is an Electro-Motive, turbocharged, 20-cylinder, diesel engine.

The following subsystems within the DGN system support operation of the emergency diesel generators: an engine fuel oil system, an engine lubricating oil system, a starting air system, a closed cycle engine cooling water system, and an air intake and exhaust system.

The engine fuel oil system provides clean, water-free fuel oil to the diesel cylinders. Each diesel generator has a local fuel tank located under the auxiliary section of the local skid called the base tank that supplies fuel oil to the engine. Each diesel unit has two electric fuel oil transfer pumps, powered by transformers from the generator output, to fill the base tank from its local day tank.

The engine lubricating oil system provides filtered lubricating oil to the diesel engine to ensure adequate lubrication during engine startup and operation. When the engine is shutdown, engine coolant warmed by an immersion heater flows through the lubricating oil cooler by thermo-syphon action. The lubricating oil cooler then operates as a lubricating oil heater, and warm oil is continuously supplied to the turbocharger and the engine sump for fast starting. An auxiliary oil system is provided to supply warmed oil to the turbocharger and the engine sump when the engine is not operating. The auxiliary oil system operates continuously and upon engine shutdown, maintains engine oil temperature and lubrication for fast starting. The system also provides cooling oil to remove residual heat from the turbocharger bearings after shutdown.

The starting air system consists of two independent air-starting systems for each diesel that provide the motive force to initially put the diesel engine in motion and begin the diesel cycle. The starting air system is separate from the Instrument & Service Air (AIR) System and supports only the DGN System. In-scope components are located between the air compressor discharge check valves and the diesel engine air start motors. The air compressors and dryers are not in-scope of LR because they are not required to start the diesel engine. The diesel engine is started by compressed air stored in the starting air system receiver tanks.

The closed cycle engine cooling water system provides cooling to the diesel cylinders and heads and the aftercooler of the turbocharger via two engine-driven centrifugal pumps. With the engine in standby, the cooling water system uses an immersion heater (as noted above) to keep the diesel engine and the cooling water system warm in preparation for a fast startup. During diesel engine operation, the EDG Emergency Service Water Subsystem (part of the Emergency Service Water System) removes heat from the closed cycle cooling water system.

The EDG air intake and exhaust system removes exhaust gases from the diesel cylinders and supplies fresh air for the combustion process.

Each diesel engine, generator, engine control panel, and auxiliaries are mounted on a common base. Each unit and its associated electrical control panel are enclosed in a seismically designated Class I structure for protection against tornadic winds or missiles.

The DGN System includes the Diesel Oil (DOL) System as a subsystem for LR purposes. The DOL subsystem provides for the storage and distribution of fuel oil used in the operation of the plant Emergency Diesel Generators, Diesel Fire Pump, and heating boiler. The subsystem is comprised of two positive displacement pumps, two centrifugal pumps, eight tanks and associated distribution piping and instrumentation. Portions of the DOL subsystem, such as the Heating Boiler Oil Storage Tank and the associated day tank, are not in-scope of LR.

The pumps in the diesel generator portion of the system are the Diesel Oil Service Pump and the Diesel Oil Transfer Pump. Both are located in the Diesel Oil Pump House. The Diesel Oil Service Pump normally operates continuously to supply about equal flows to each of the Emergency Diesel Generator Day Tanks. Overflow lines near the top of each of these day tanks allow any fuel not needed to fill the tanks to flow back to the Diesel Oil Storage Tank. This arrangement keeps both day tanks continuously full to the overflow mark to ensure that eight hours of fuel is available in the local tanks (base tank and day tank). The Fuel Oil Storage Tank provides fuel for one week of full load operation of one emergency diesel generator.

The emergency diesel generators and the support systems described above are in-scope of LR for their safety related function. The Diesel Fire Pump Day Tank is part of the DGN System and is in-scope of LR because it supports operation of the Diesel Fire Pump, but the Diesel Fire Pump is part of the Fire (FIR) System.

There are also components in the DGN System whose failure could affect the capability of safety related SSCs to perform their safety function. These are classified as Non-Safety Affecting Safety (NSAS) components.

The description above results in SCs for this system being in-scope in accordance with 10 CFR 54.4(a)(1) and 10 CFR 54.4(a)(2). In addition, SCs are in-scope due to Fire Protection in accordance with 10 CFR 54.4(a)(3).

System Function Listing

A comprehensive listing of functions associated with the Emergency Diesel Generators System, or specific components contained in the system, is provided in the summary below.

Code: DGN-01	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Provide 4.16 kV power to Essential Buses #15 and #16, when normal sources (2R and 1R) are not available.	X						

Comment: None.

Code: DGN-02	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Diesel Oil subsystem provides for the storage and distribution of fuel oil used in the operation of the Emergency Diesel Generators.	X						

Comment: None.

Code: DGN-FP	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.			X				

Comment: Provides onsite power and diesel oil to equipment relied on to achieve post-fire safe shutdown.

Code: DGN-NSAS	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.		X					

Comment: None.

USAR Reference

Additional Emergency Diesel Generators System details are provided in Section 8.4.1 of the USAR.

License Renewal Drawings

The license renewal drawings for the Emergency Diesel Generators System are listed below:

LR-36051
LR-36051-1
LR-36664

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.3-6 along with each Component Group's intended function(s).

Table 2.3.3-6 Emergency Diesel Generators System

Component Group	Intended Function
FASTENERS/BOLTING	PRESSURE BOUNDARY
FILTERS/HOUSINGS	PRESSURE BOUNDARY
FILTERS/STRAINERS	FILTRATION PRESSURE BOUNDARY
FLAME ARRESTORS	PRESSURE BOUNDARY
FLOW ELEMENT	PRESSURE BOUNDARY
GAUGES (FLOW, LEVEL AND SIGHT)	PRESSURE BOUNDARY
HEAT EXCHANGERS	HEAT TRANSFER PRESSURE BOUNDARY
HEATERS/COOLERS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY

Table 2.3.3-6 Emergency Diesel Generators System

Component Group	Intended Function
PIPING AND FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
SILENCER	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.7 Emergency Filtration Train System

System Description

The Emergency Filtration Train (EFT) System is an ESF system per the MNGP licensing basis. The EFT System has been included within this section, and the related aging management section, for consistency with NUREG-1800 and NUREG-1801.

The heating, ventilating and air conditioning system that serves the Main Control Room (MCR) and Emergency Filtration Train (EFT) Building is designed to provide cool air in the summer and warm air for heating in the winter. Ductwork is used to distribute air. The air flow in the MCR and portions of the EFT Building is normally recirculated with return air arranged to pass back to the air conditioning unit while supplemental outside air is drawn through filtration units. The EFT System will serve the MCR and EFT Building during normal or emergency conditions. An emergency condition is defined as that due to a high radiation or detection of toxic chemical vapors in the outside air. The air handling units are self-contained package units complete with electric coils for heating and cooling coils for air conditioning. In the normal operating mode, the MCR and EFT Building first and second floors, excluding the battery room, are served by one of the redundant Seismic Class I air conditioning units. Filtered outside air from an emergency filtration train is available on demand.

Under high radiation emergency conditions, a filtration train will automatically start to provide filtered outside air to the MCR and portions of the EFT Building. The EFT System will be manually placed in 100% recirculation, which isolates outside air intake, if toxic chemical vapors are sensed in the Control Room air. During high radiation conditions, HEPA/charcoal filtered outside air will be supplied to pressurize the serviced area so that contaminated air will not infiltrate. This arrangement is typical of those provided for BWRs with high off-gas stacks. The outside air supply through the non-filtered supply ducts is blocked by permanent blanking plates, to prevent injection of contaminated air such as would result from leakage which bypasses secondary containment following a LOCA or a steam line break outside containment. The EFT System operates in the recirculation mode from off-site AC power. If off-site power is not available, the system will be automatically supplied by the diesel generators.

All major components of the EFT System are within the LR boundary. This includes the packaged air conditioning units and HEPA/charcoal filtration units, complete with their supply air fans, the tornado dampers and all sections of the air distribution ductwork.

The description above results in SCs for this system being in-scope in accordance with 10 CFR 54.4(a)(1). In addition, certain components are in-scope due to Fire Protection requirements, in accordance with 10 CFR 54.4(a)(3).

System Function Listing

A comprehensive listing of functions associated with the Emergency Filtration Train System, or specific components contained in the system, is provided in the summary below.

Code: EFT-01	Cri 1	Cri 2	Cri 3				
Maintain Habitability and Controlled Environment.			FP	EQ	PTS	AT	SB
The Emergency Filtration Train System provides a habitable environment for control room operators during post accident conditions and supports safety related equipment performance.	X						

Comment: None.

Code: EFT-02	Cri 1	Cri 2	Cri 3				
The system under all conditions shall limit			FP	EQ	PTS	AT	SB
hydrogen accumulation to the Div. II 250Vdc Battery Room, and the concentration shall be below the combustible limit.							

Comment: None.

Code: EFT-03 The system shall provide the Main Control Room with a controlled environment for the comfort of the personnel during normal modes of plant operation.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: None.

Code: EFT-04 The system shall provide a controlled environment for all equipment located within the Main Control Room and the EFT Building boundaries during normal plant modes of operation.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: None.

Code: EFT-FP The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: None.

USAR Reference

Additional Emergency Filtration Train System details are provided in Section 6.7 of the USAR.

License Renewal Drawings

The license renewal drawings for the Emergency Filtration Train System are listed below:

LR-36041 LR-170037

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.3-7 along with each Component Group's intended function(s).

Table 2.3.3-7 Emergency Filtration Train System

Component Group	Intended Function
CHILLERS	HEAT TRANSFER PRESSURE BOUNDARY

Table 2.3.3-7 Emergency Filtration Train System

Component Group	Intended Function
DAMPER HOUSINGS	PRESSURE BOUNDARY
DUCTWORK	PRESSURE BOUNDARY
FAN/BLOWER/HOUSINGS	PRESSURE BOUNDARY
FASTENERS/BOLTING	PRESSURE BOUNDARY
FILTERS/HOUSINGS	COMPONENT STRUCTURAL SUPPORT PRESSURE BOUNDARY
HEAT EXCHANGERS	HEAT TRANSFER PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY
VENTILATION SEAL	PRESSURE BOUNDARY

2.3.3.8 Emergency Service Water System

System Description

The Emergency Service Water System (ESW) includes the following three plant subsystems: Emergency Diesel Generator-Emergency Service Water subsystem, Emergency Service Water subsystem, and RHR Service Water subsystem. These subsystems are combined into the Emergency Service Water System for License Renewal purposes. A brief description of each of the three subsystems is provided below.

The Emergency Diesel Generator Emergency Service Water subsystem consists of two separate and independent emergency cooling water loops that provide cooling water to the Emergency Diesel Generators. The loops are capable of providing cooling water during a loss of offsite power and during accident conditions. Each loop contains one full capacity pump that supplies strained cooling water to one of the Emergency Diesel Generators.

Cross-connect capability exists between the two loops. One of the two divisions is capable of being controlled from the ASDS panel for an Appendix R event. Each loop has a separate alternate supply from the plant Service & Seal Water System (SSW).

The Emergency Service Water subsystem consists of two separate and independent emergency cooling water loops that provide cooling water to the ECCS pump motor coolers, ECCS room coolers and the Emergency Filtration Train. Each loop is capable of providing cooling water during a loss of off-site power and/or a loss of normal Service Water. Each loop contains one full capacity pump that supplies strained cooling water to the cooling loads. One of the two divisions is capable of being controlled from the ASDS panel for an Appendix R event. The Service & Seal Water System (SSW) is cross connected to the Emergency Service Water subsystem. Cooling water from the SSW System normally flows to the cooling loads during normal plant operation, except that only one EFT train is normally in service.

The RHR Service Water subsystem (RSW) consists of two separate and independent emergency cooling water loops that provide cooling water to the RHR Heat Exchangers. Each loop is capable of providing cooling water during a loss of off-site power and during accident conditions. Each loop contains two pumps that supply strained cooling water through the tubes of the RHR Heat Exchangers. The “B” train is capable of being controlled from the ASDS panel for an Appendix R event. The RHR Service Water subsystem is cross-connected to the SSW System, and to the Fire System and the opposite loop of the RHR Service Water subsystem, through a 1-inch pressurizing cross-tie line. The RSW lines are pressurized during RSW operation to maintain the pressure in the RHR heat exchanger tubes at a pressure greater than the pressure in the shell side.

The RHR Auxiliary Air Compressors are included in the RHR Service Water subsystem. The RHR Auxiliary Air Compressors provide a safety related back-up air supply to the RHR heat exchanger RSW outlet control valves, and the Combustible Gas Control System isolation valves upon occurrence of low pressure in the Instrument & Service Air (AIR) System. The RHR Auxiliary Air Compressors are normally in standby mode of operation.

The description above results in SCs for this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some SCs in the Emergency Service Water System are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, SCs are in-scope due to Fire Protection and Environmental Qualification, in accordance with 10 CFR 54.4(a)(3).

The portions of the Emergency Service Water System containing components subject to an AMR includes: 1) the ESW System pumps and cooling water loops, and 2) the RHR Auxiliary Air Compressors and associated components. All these components are located in the intake structure, Turbine Building, Reactor Building, Diesel Generator Building or EFT Building.

System Function Listing

A comprehensive listing of functions associated with the Emergency Service Water System, or specific components contained in the system, is provided in the summary below.

Code: ESW-01	Cri 1	Cri 2	Cri 3				
Remove Heat and Provide Cooling. The ESW System provides essential cooling for operation of Engineered Safety Features, the Emergency Diesel Generators, and removal of decay heat through the RHR Heat Exchangers to achieve cold shutdown.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: ESW-02	Cri 1	Cri 2	Cri 3				
Provide an inexhaustible supply of cooling water through RHR System piping to cool the reactor core and/or to flood primary containment to the reactor vessel flange.			FP	EQ	PTS	AT	SB

Comment: This contingency/emergency mode assumes failure of both trains of RHR pumps which is beyond the current licensing basis.

Code: ESW-03	Cri 1	Cri 2	Cri 3				
During a postulated degraded core severe accident event, the RSW subsystem shall be capable of providing a flow path from the Fire Protection System to the RHR System.			FP	EQ	PTS	AT	SB

Comment: This contingency/emergency mode assumes failure of both trains of RHR pumps which is beyond the current licensing basis.

Code: ESW-04	Cri 1	Cri 2	Cri 3				
Provide air from the RHR auxiliary air compressors to the RSW control valves and Combustible Gas Control System isolation valves upon occurrence of low pressure in the Instrument and Service Air System.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: ESW-05	Cri 1	Cri 2	Cri 3				
During operation of the RHR service water, maintain a higher pressure on the service water side of the RHR HXs than the process fluid side.			FP	EQ	PTS	AT	SB
	X						

Comment: This function prevents RHR process fluid leaks from being discharged via an operating RSW subsystem (USAR Section 10.4.2.3).

Code: ESW-EQ	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Environmental Qualification.			FP	EQ	PTS	AT	SB
				X			

Comment: None.

Code: ESW-FP	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: The ESW System supports the performance of the Alternate Shutdown Cooling Method (ASCM) by providing cooling water to various components. To perform the ASCM, the reactor is depressurized using the Automatic Depressurization subsystem of the APR System. When the reactor is depressurized to below the shutoff head of the pump, a core spray pump or an RHR pump (in the LPCI mode) is then used to flood the vessel. Safety/relief valves are then used to discharge the heated reactor water to the suppression pool. The water in the suppression pool is then cooled with the suppression pool cooling mode of the RHR System. (See USAR Section 6.2.3.3.4.)

Code: ESW-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: None.

USAR Reference

Additional Emergency Service Water System details are provided in Section 10.4.2 and Section 10.4.4 of the USAR.

License Renewal Drawings

The license renewal drawings for the Emergency Service Water System are listed below:

LR-36041
LR-36246
LR-36247
LR-36248
LR-36664
LR-36665
LR-36807

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.3-8 along with each Component Group's intended function(s).

Table 2.3.3-8 Emergency Service Water System

Component Group	Intended Function
FASTENERS/BOLTING	PRESSURE BOUNDARY
FILTERS/HOUSINGS	FILTRATION PRESSURE BOUNDARY
FILTERS/STRAINERS	FILTRATION PRESSURE BOUNDARY
FLOW ELEMENT	FLOW RESTRICTION PRESSURE BOUNDARY
HEAT EXCHANGERS	HEAT TRANSFER PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY

Table 2.3.3-8 Emergency Service Water System

Component Group	Intended Function
RESTRICTING ORIFICES	FLOW RESTRICTION PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.9 Fire System

System Description

The Fire System provides assurance, through defense-in-depth design, that a fire will not prevent the performance of necessary safe-shutdown functions or significantly increase the risk of radioactive release to the environment during a postulated fire. The Fire System provides fire suppression by fixed water spray and sprinkler systems, fixed gas (Halon 1301) systems, hose stations, and portable extinguishers located in various areas of the MNGP site. MNGP has a fire detection and alarm system that alarms locally in selected areas of the plant and transmits various alarm, supervisory, and trouble signals to the Control Room. The Fire System ensures compliance with the regulated event for Fire Protection. The Fire System receives its water supply from the Mississippi River.

The Fire System also provides alternate sources of water to other plant systems. The fire protection water supply subsystem can provide water to the Service and Seal Water (SSW) System (Administrative Building computer room chillers), RHR Service Water (RSW) subsystem, and can also provide makeup water to the spent fuel pool, if additional makeup is required. These secondary functions of the Fire System do not prohibit the system from performing its primary functions.

Three vertical centrifugal pumps supply the fire suppression water subsystem. Two of these pumps are motor-driven and one is diesel-driven. One of the motor-driven pumps normally supplies the screen wash system and is designated the screen wash/fire pump. Transfer from screen wash duty to fire duty occurs automatically. All pumps are started automatically by instrumentation sensing header pressure. Any two pumps are capable of supplying all fire fighting water requirements in safety related areas of the plant. The principal components of the Fire System are the main firewater loop, three fire pumps, jockey pump, hose stations, hydrants, hoses, spray/sprinkler heads, nozzles, and the associated piping, valves, and instrumentation to support the system's intended functions. Also included are the fixed Halon 1301 gas suppression subsystems and the required gas cylinders, nozzles, and the associated piping, valves, and instrumentation to support the Halon subsystem's intended functions.

The Appendix R safe shutdown function applies to the Fire System components that provide for safe shutdown of the plant in the event of a severe fire. Appendix R components, not specifically residing within the Fire System, are addressed within the individual systems in which these components reside.

The Fire System components that (a) do not provide fire suppression capabilities for safety related equipment or for equipment relied on for compliance with the regulations identified in the 10 CFR 54 scoping criteria, or (b) whose failure will not prevent the satisfactory performance of a safety related function, are not included in the scope of License Renewal. This includes the Monticello Training Center complex that is excluded from the scope of License Renewal since it is outside the protected and owner controlled areas, is not connected to the main firewater loop, and is remote to the physical MNGP site.

Those structural commodities such as fire damper housings, fire doors, penetration seals, etc., are addressed in the structural section of the LRA. Additionally, fire detection and alarm devices are active components and are not evaluated.

The description above results in some SCs for this system being in-scope. Since some SCs in the FIR System are non-safety related and their failure could affect the capability of SR components to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, components are in-scope due to supporting Fire Protection in accordance with 10 CFR 54.4(a)(3).

The portions of the Fire System containing components subject to an AMR extend from the pump bays to the yard loops and include pumps, hose stations, hydrants, spray/sprinkler heads, nozzles, Halon gas cylinders, and associated piping, valves, and instrumentation. The fuel oil day-tank and fuel oil supply to the diesel-driven fire pump are addressed in Emergency Diesel Generators System, as well as the portable gasoline-driven fuel oil transfer pump that is stored in Warehouse 2 and ensures an alternate means of recirculating fuel oil from the Diesel Oil Storage Tank to either of the Emergency Diesel Generator day tanks during the Appendix R event.

System Function Listing

A comprehensive listing of functions associated with the Fire System, or specific components contained in the system, is provided in the summary below.

Code: FIR-01 Alternate supply of water to the reactor vessel via the Fire Protection System.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: None.

Code: FIR-FP The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: None.

Code: FIR-NSAS Non-safety related structures and/or components that could affect safety-related SSCs must maintain sufficient integrity such that the intended function of the safety-related SSCs is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: None.

USAR Reference

Additional Fire System details are provided in Section 10.3.1 of the USAR.

License Renewal Drawings

The license renewal drawings for the Fire System are listed below:

LR-36048
LR-36051
LR-36516
LR-36664
LR-36665-2
LR-36666
LR-170021
LR-170037

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.3-9 along with each Component Group's intended function(s).

Table 2.3.3-9 Fire System

Component Group	Intended Function
FASTENERS/BOLTING	PRESSURE BOUNDARY
FILTERS/STRAINERS	FILTRATION PRESSURE BOUNDARY
FIRE HYDRANTS	PRESSURE BOUNDARY
FLEXIBLE CONNECTIONS	PRESSURE BOUNDARY
GAUGES (FLOW, LEVEL AND SIGHT)	PRESSURE BOUNDARY
HEAT EXCHANGERS	HEAT TRANSFER PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
NOZZLES	FLOW RESTRICTION PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	FLOW RESTRICTION PRESSURE BOUNDARY
SPRINKLER HEADS	FLOW RESTRICTION PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.10 Fuel Pool Cooling and Cleanup System

Description

The Fuel Pool Cooling and Cleanup (FPC) System is designed to handle the spent fuel cooling load and to maintain pool water purity and clarity. The system provides sufficient filtering capacity to filter the entire spent fuel pool water volume every 12 hours. The fuel pool temperature is normally maintained at 125º F or less in order to maintain a reasonable working environment in the pool area, to keep the demineralizer at an operable temperature, and to maintain visual clarity of the air above the pool. However, operation at temperatures up to 140º F is acceptable in order to remove decay heat from the spent fuel.

The Fuel Pool Cooling and Cleanup System consists of circulating pumps, heat exchangers, filter/demineralizers, piping, valves and instrumentation. The pumps take suction from the skimmer surge tank, located at the top of the spent fuel storage pool water level, which continuously skims the water from the surface, and circulates the water to the heat exchangers, and filter/demineralizers before discharging the water through the diffusers at the bottom of the spent fuel pool. This arrangement of taking suction from the top and discharging to the bottom of the pool provides a cross flow which tends to sweep the pool and to carry off dirt and small particles.

This system may also be used to drain the steam-separator storage pool and the reactor well after refueling. The lines permit draining the water to either the Reactor Building equipment drain tank or to the Fuel Pool Cooling and Cleanup filter/demineralizers for processing, depending upon water condition. The Fuel Pool Cooling and Cleanup filter/demineralizers and the skimmer surge tank are shielded with concrete. Provision is made for connecting to the Residual Heat Removal System to provide for additional backup heat removal capacity. The Radwaste Solid and Liquid System has a connection to the Fuel Pool Cooling and Cleanup filter/demineralizers. The Fuel Pool Cooling and Cleanup filter/demineralizers can be used as needed as a back-up for processing liquid waste.

The in-scope portion of the Fuel Pool Cooling and Cleanup System consists of the main cooling loops, including the skimmer surge tanks, pumps, heat exchangers, piping and valves located within the secondary containment (Reactor Building); as well as, piping and valves to support draining of the dryer separator pool and reactor well. The Fuel Pool Cooling and Cleanup System filter/demineralizers and associated piping and valves located outside of the secondary containment (Reactor Building) are not within the scope of License Renewal.

Components in the Fuel Pool Cooling and Cleanup System are non-safety related and their failure could affect the capability of safety related SSCs to perform their safety function; therefore, they are in-scope in accordance with 10 CFR 54.4(a)(2).

System Function Listing

A comprehensive listing of functions associated with the Fuel Pool Cooling and Cleanup System, or specific components contained in the system, is provided in the summary below.

Code: FPC-1	Cri 1	Cri 2	Cri 3				
Maintain sufficient water level in the Spent Fuel Storage Pool to provide adequate radiation shielding and spent fuel cooling.			FP	EQ	PTS	AT	SB

Comment: Water make-up to the pool accounts for evaporation and potential minor leakage. This function does not mitigate design basis or regulated events.

Code: FPC-2	Cri 1	Cri 2	Cri 3				
Remove decay heat from the spent fuel and maintain an acceptable pool water temperature.			FP	EQ	PTS	AT	SB

Comment: Heat removal prevents pool temperature increases which lead to eventual boiling. This function helps maintain pool coolant inventory and avoids damaging temperature to the pool structure. Though required for heat removal, sufficient time is available to detect failures and restore cooling using a number of alternate methods as needed.

Code: FPC-3	Cri 1	Cri 2	Cri 3				
Maintain spent fuel pool water purity and clarity.			FP	EQ	PTS	AT	SB

Comment: Clear spent fuel pool water reduces area dose rates and provides adequate visibility for moving fuel or other components. This function does not mitigate design basis or regulated events.

Code: FPC-4	Cri 1	Cri 2	Cri 3				
Facilitate and optimize post-refueling reactor well and dryer/storage pool draindown.			FP	EQ	PTS	AT	SB

Comment: None.

Code: FPC-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety-related SSCs must maintain sufficient integrity such that the intended function of the safety-related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: None.

USAR Reference

Additional Fuel Pool Cooling and Cleanup System details are provided in Section 10.2.1 and Section 10.2.2 of the USAR.

License Renewal Drawings

The license renewal drawing for the Fuel Pool Cooling and Cleanup System is listed below:

LR-36256

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.3-10 along with each Component Group's intended function(s).

Table 2.3.3-10 Fuel Pool Cooling and Cleanup System

Component Group	Intended Function
FASTENERS/BOLTING	PRESSURE BOUNDARY
HEAT EXCHANGERS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.11 Heating and Ventilation System

Description

The Heating and Ventilation (HTV) System consists of the equipment required to affect and control the following space-air processes: supply and exhaust, distribution and recirculation (where applicable), differential and static pressure control, filtration, cooling and heating. It also includes sampling and fume hood exhausting and process tank venting. Reactor Building isolation is scoped under the Secondary Containment (SCT) system.

The portion of the HTV system serving the High Pressure Coolant Injection Building and the RHR/CSP corner rooms is in-scope; the equipment is designed to provide cool air during normal operation and design basis events. The cooling ventilation removes heat produced by equipment, piping and motors while not causing safety related equipment to become inoperable (i.e., water spray due to a coil leak). These air conditioning units are provided cooling water by the Emergency Service Water (ESW) system. The Reactor Building main supply units, also in-scope, are supplied coolant by an independent chilled water system, which in turn is cooled by the Service and Seal Water (SSW) system.

The Reactor Core Isolation Cooling System room cooler is also serviced by the SSW system with no provision for ESW cooling. The coil in this particular cooling unit, and the one in V-MZ-1, are in-scope for Non Safety Affecting Safety (NSAS) concerns.

Other room and equipment ventilation units in LR scope include the emergency diesel generator ventilation dampers and supply Fans. Secondary containment isolation dampers which close under secondary containment isolation conditions are included with the Secondary Containment System.

General plant heating is provided by a network of carbon steel pipes originating at the plant heating boiler and extending throughout most of the plant to supply heated water and/or steam to various unit heaters. Three notable locations not directly served are the drywell, Off-Gas Storage Building, and portions of the plant serviced by the Emergency Filtration Train (EFT) System.

The pressurized portions of the HTV system inside the Reactor Building and the Turbine Building are in-scope. However, the pressurized portion of components contained within a larger component is excluded from the license renewal boundary with regard to the NSAS considerations. Heat exchanger tubes are an example, with the shell constituting the NSAS boundary.

The description above results in SCs for this system being in-scope in accordance with 10 CFR 54.4(a)(1). Certain air conditioners, and many of the unit heaters with their associated steam and/or hot water supply lines, are in-scope for criteria cited in 10 CFR 54.4(a)(2). In addition, certain air handling units and exhaust fans are in-scope due to Fire Protection and Environmental Qualification in accordance with 10 CFR 54.4(a)(3).

System Function Listing

A comprehensive listing of functions associated with the Heating and Ventilation System, or specific components contained in the system, is provided in the summary below.

Code: HTV-01	Cri 1	Cri 2	Cri 3				
Provides appropriate ambient environmental conditions for plant safety related equipment.			FP	EQ	PTS	AT	SB
	X						

Comment: The Core Spray / RHR, HPC and EDG rooms require ventilation for air supply and temperature control during design basis events.

Code: HTV-02	Cri 1	Cri 2	Cri 3				
Provide for controlled flow direction and release of radioactive gases during non-accident conditions.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: HTV-EQ	Cri 1	Cri 2	Cri 3				
The system contains components which perform functions credited in the current licensing basis for Environmental Qualification.			FP	EQ	PTS	AT	SB
				X			

Comment: None.

Code: HTV-FP	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: This system provides necessary room ambient conditions to support operation of fire protection equipment and fulfill ventilation requirements.

Code: HTV-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety-related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: None.

USAR Reference

Additional Heating and Ventilation System details are provided in Section 5.3.4 and Section 10.3.1.3.2 of the USAR.

License Renewal Drawings

The license renewal drawings for the Heating and Ventilation System are listed below:

LR-36041
LR-36259
LR-36259-1
LR-36260
LR-36261
LR-36263
LR-36267
LR-36267-3
LR-36348
LR-36664
LR-36776
LR-36807
LR-36808
LR-46162
LR-51142-1

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.3-11 along with each Component Group's intended function(s).

Table 2.3.3-11 Heating and Ventilation System

Component Group	Intended Function
CHILLERS	PRESSURE BOUNDARY
DAMPER/HOUSINGS	PRESSURE BOUNDARY
DUCTWORK	PRESSURE BOUNDARY
FAN/BLOWER/HOUSINGS	PRESSURE BOUNDARY
FASTENERS/BOLTING	PRESSURE BOUNDARY
FILTERS/STRAINERS	FILTRATION PRESSURE BOUNDARY
GAUGES (FLOW, LEVEL AND SIGHT)	PRESSURE BOUNDARY
HEATERS/COOLERS	PRESSURE BOUNDARY
HVAC UNITS	HEAT TRANSFER PRESSURE BOUNDARY

Table 2.3.3-11 Heating and Ventilation System

Component Group	Intended Function
INSTRUMENTATION	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
STEAM TRAPS	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.12 Instrument and Service Air System

System Description

The Instrument and Service Air (AIR) System is designed to provide the plant with a continuous supply of oil-free compressed air. The instrument air portion of the System supplies dried compressed air for most of the pneumatic instruments and controls in the plant. The service air portion of the System supplies un-dried service air to plant components that do not require dry air and to hose stations throughout the plant, for miscellaneous use by maintenance and operations personnel.

The AIR System includes three non-lubricated air compressors that discharge to air receivers through after coolers with moisture separator/traps. Two compressors are cooled with service water (SSW System) and the third is cooled by an ethylene glycol closed cooling subsystem. The air receivers supply both the instrument air dryer and the service air subsystem. The instrument air dryer is a twin bed desiccant type air dryer installed between a pre-filter and an after-filter, and supplies dried air to the instrument air subsystem. The AIR System is normally in continuous operation during normal plant operation and shutdown.

In addition to the AIR System, there are other pneumatic systems in the plant. The other pneumatic systems include an outboard main steam isolation valve (MSIV) air supply which is part of the Main Steam (MST) System, an Alternate N2 (AN2) System which is a separate mechanical system, an instrument nitrogen supply to containment which is part of the Primary Containment

Mechanical (PCM) System, and the control room breathing air system which is part of the EFT System. The outboard MSIV air supply provides a source of high-pressure air (nominal 280 psig) to open and maintain open the outboard MSIVs. The safety related AN2 System provides an alternate pressure source to equipment required during or following an accident. The instrument nitrogen supply to containment is provided, in lieu of instrument air, to instruments, controls, and equipment located in the drywell for the purpose of eliminating a source of oxygen build-up during normal operation in containment through in-leakage. The control room breathing air system is a backup system that can be used in the event of a toxic gas spill, and consists of bottled air tanks connected to hose connections in the main control room. Also, a separate air system, the Service Air Blower (SAB) System, is furnished to meet the resin transfer air requirements of the condensate demineralizers.

The AN2 System interfaces with the AIR System through a check valve, with the nitrogen side held at a slightly lower pressure to allow the AIR System to be used during normal operation. In the event of an accident, which also disables the AIR System, the AN2 System would automatically pick up the required pneumatic loads.

The AIR System is not a safety related system since equipment requiring compressed air for operation during or immediately subsequent to an accident receive air supplied from local accumulators, other air sources, or the Alternate Nitrogen (AN2) System.

Components in other plant systems that rely on AIR System instrument air, such as air-operated valves and associated air solenoid valves, are evaluated in their respective system.

The description above results in some SCs for this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since components in the Instrument and Service Air System are non-safety related and their failure could affect the capability of SR components to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some SCs are in-scope due to Environmental Qualification in accordance with 10 CFR 54.4(a)(3).

The portions of the Instrument and Service Air System containing components subject to an AMR include the containment isolation valves on service air lines and instrument air lines that penetrate containment, valves on the service air line to the containment air lock, and instrument and service air compressor components that receive cooling water. All these components are located either in the Reactor Building or Turbine Building.

System Function Listing

A comprehensive listing of functions associated with the Instrument and Service Air System, or specific components contained in the system, is provided in the summary below.

Code: AIR-01	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Instrument & Service Air System provides plant instruments and controls with a continuous supply of dry, oil-free compressed air, and also the plant hose stations with a continuous supply of undried, oil-free compressed air.							

Comment: The AIR System is non-safety related and not required during or following design basis events.

Code: AIR-02	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Primary Containment Isolation. Provides primary containment isolation for those portions of the system that interface with the primary containment (valves and piping).	X						

Comment: None.

Code: AIR-EQ	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The system contains components which perform functions credited in the current licensing basis for Environmental Qualification.				X			

Comment: None.

Code: AIR-NSAS	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.		X					

Comment: None.

USAR Reference

Additional Instrument and Service Air System details are provided in Section 10.3.4 of the USAR.

License Renewal Drawings

The license renewal drawings for the Instrument and Service Air System are listed below:

LR-36049-1	LR-36049-14
LR-36049-4	LR-36258
LR-36049-10	LR-161004
LR-36049-12	

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.3-12 along with each Component Group's intended function(s).

Table 2.3.3-12 Instrument and Service Air System

Component Group	Intended Function
FASTENERS/BOLTING	PRESSURE BOUNDARY
GAUGES (FLOW, LEVEL AND SIGHT)	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.13 Radwaste Solid and Liquid System

System Description

The Radwaste Solid and Liquid (RAD) System is comprised of the solid radwaste subsystem and the liquid radwaste subsystem. The solid radwaste system is designed to process, package, store, monitor, and provide shielded storage facilities for solid radioactive wastes to allow for radioactive decay and/or temporary storage prior to shipment for off-site disposal.

The liquid radwaste system is designed to collect, process and dispose of all radioactive liquid wastes generated during operation of the plant. The system is designed to accommodate the radioactive input resulting from the design basis maximum fuel leakage condition. Liquid wastes from various drains and discharges from the reactor process and auxiliary systems are processed through the liquid radwaste system. Liquid wastes are collected in sumps and drain tanks in the various buildings and then transferred to the appropriate subsystem collection tanks in the Radwaste Building for subsequent treatment and disposal.

In order to keep liquid radwaste releases to a minimum, modifications were made to the liquid radwaste system to allow reclaiming of floor drains as well as equipment drains. The modified system limits the release of liquid effluents to the minimum practicable amount to satisfy the Design Objectives of Appendix I to 10 CFR Part 50.

The radioactive and chemical contaminants are removed from the liquid waste streams by either filtration or filtration followed by mixed deep-bed demineralization. The filters remove insoluble particulate contaminants and the demineralizer is used to remove soluble materials. The filter and demineralizer sludge are back washed into receiving tanks, dewatered and packaged as solid waste for disposal off-site at NRC approved sites.

All Radwaste Solid and Liquid System components existing in either the Turbine or Reactor Buildings, and constituting a liquid pressure boundary, are in-scope. This includes piping, valve bodies, tanks, pump casings, orifices, drains, heat exchangers and fasteners.

The description above results in components for this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some components in the RAD System are non-safety related and their failure could affect the capability of SR components to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, components are in-scope due to supporting the Environmental Qualification regulated event in accordance with 10 CFR 54.4(a)(3).

System Function Listing

A comprehensive listing of functions associated with the Radwaste Solid and Liquid System, or specific components contained in the system, is provided in the summary below.

Code: RAD-01	Cri 1	Cri 2	Cri 3				
The solid radwaste subsystem shall package, store, and monitor solid radioactive wastes prior to shipment from the plant for off-site disposal.			FP	EQ	PTS	AT	SB

Comment: None.

Code: RAD-02	Cri 1	Cri 2	Cri 3				
The liquid radwaste subsystem shall collect, process, reclaim, or dispose of radioactive waste such that the discharge of the radioactive waste to the environment will be limited.			FP	EQ	PTS	AT	SB

Comment: None.

Code: RAD-03	Cri 1	Cri 2	Cri 3				
Primary Containment Isolation. Provides primary containment isolation for those portions of the system that interface with the primary containment (valves and piping).			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: RAD-EQ	Cri 1	Cri 2	Cri 3				
The system contains components which perform functions credited in the current licensing basis for Environmental Qualification.			FP	EQ	PTS	AT	SB
				X			

Comment: None.

Code: RAD-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety-related SSCs must maintain sufficient integrity such that the intended function of the safety-related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: None.

USAR Reference

Additional Radwaste Solid and Liquid System details are provided in Section 9.2 and Section 9.4 of the USAR.

License Renewal Drawings

The license renewal drawings for the Radwaste Solid and Liquid System are listed below:

LR-36043
LR-36044
LR-36045
LR-36046
LR-36047-1
LR-36241
LR-36248

Components Subject to an AMR

The Component Groups for this system that require aging management review are addressed in Table 2.3.3-13 along with each Component Group's intended function(s).

Table 2.3.3-13 Radwaste Solid and Liquid System

Component Group	Intended Function
FASTENERS/BOLTING	PRESSURE BOUNDARY
HEAT EXCHANGERS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY STRUCTURAL SUPPORT FOR NON-SAFETY RELATED
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	FLOW RESTRICTION PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.14 Reactor Building Closed Cooling Water System

System Description

The Reactor Building Closed Cooling Water (RBC) System is a treated water system designed to remove heat from the reactor auxiliary systems' equipment.

The RBC System consists of a closed cooling water loop containing two pumps and three heat exchangers in parallel, and the associated piping, valves and instrumentation. The system temperature is maintained by heat rejection from the RBC System heat exchangers to the Service and Seal Water System. The RBC System is monitored continuously for radioactivity by a process radiation monitor. An increase in the radiation level would indicate leakage of contaminated water into the RBC System. Leakage may also be indicated by a level change in the RBC System surge tank with no associated reactor power change, equipment change or makeup water addition. The RBC System contains components credited in the current licensing basis for Environmental Qualification. The RBC System is non-safety related with the exception of providing for Primary Containment isolation and is not required during or following any design basis events.

The RBC System surge tank is connected to the system return header providing positive suction head to the RBC pumps. The pumps discharge into a common header that supplies the three RBC heat exchangers. This flow is then distributed to the various reactor auxiliary systems' heat exchangers. A chemical feed tank is located between the discharge and suction side of the RBC pumps for the purpose of adding potassium chromate to reduce corrosion and fouling of the piping and various heat transfer surfaces.

Any potential leakage from the reactor auxiliary systems' equipment listed below is to the RBC System closed-loop where it is confined or isolated. The RBC System provides cooling water to the following components:

- Control Rod Drive System pump coolers
- Drywell coolers
- Fuel Pool Cooling and Cleanup System heat exchangers
- Primary Containment Mechanical System post accident sampling coolers
- Radwaste Solid and Liquid System drywell equipment drain sump heat exchanger
- Reactor Building and Turbine Building process system sample coolers and chillers
- Reactor Recirculation System pump motor and seal water coolers
- Reactor Water Cleanup System non-regenerative heat exchangers
- Residual Heat Removal System pump seal coolers

The in-scope portion of the RBC System consists of the pumps, heat exchangers, and associated piping and valves. The major components of the

RBC System are the two RBC pumps, three heat exchangers, and the associated piping, valves and instrumentation.

The description above results in components for this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some components in the RBC System are non-safety related and their failure could affect the capability of SR components to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, components are in-scope due to Environmental Qualification in accordance with 10 CFR 54.4(a)(3).

The portion of the Reactor Building Closed Cooling Water System containing components subject to AMR include the closed cooling loop; consisting of pumps, heat exchangers, and the connecting piping and valves, which supplies RBC water to heat exchangers in the interfacing systems.

System Function Listing

A comprehensive listing of functions associated with the Reactor Building Closed Cooling Water System, or specific components contained in the system, is provided in the summary below.

Code: RBC-01	Cri 1	Cri 2	Cri 3				
Remove heat from reactor auxiliary equipment under normal, startup and shutdown conditions. The system provides a means of isolating potentially radioactive leakage from reactor auxiliary systems which require cooling.			FP	EQ	PTS	AT	SB

Comment: The RBC System is non-safety related and not required during or following design basis events.

Code: RBC-02	Cri 1	Cri 2	Cri 3				
Primary Containment Isolation. Provides primary containment isolation for those portions of the system that interface with the primary containment (valves and piping).			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: RBC-EQ	Cri 1	Cri 2	Cri 3				
The system contains components which perform functions credited in the current licensing basis for Environmental Qualification.			FP	EQ	PTS	AT	SB
				X			

Comment: None.

Code: RBC-NSAS	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.		X					

Comment: None.

USAR Reference

Additional Reactor Building Closed Cooling Water System details are provided in Section 10.4.3 of the USAR.

License Renewal Drawings

The license renewal drawings for the Reactor Building Closed Cooling Water System are listed below:

LR-36042
LR-36042-2
LR-36243-1

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.3-14 along with each Component Group's intended function(s).

Table 2.3.3-14 Reactor Building Closed Cooling Water System

Component Group	Intended Function
FASTENERS/BOLTING	PRESSURE BOUNDARY
FLEXIBLE CONNECTIONS	PRESSURE BOUNDARY
FLOW ELEMENT	PRESSURE BOUNDARY
GAUGES (FLOW, LEVEL AND SIGHT)	PRESSURE BOUNDARY
HEAT EXCHANGERS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY

Table 2.3.3-14 Reactor Building Closed Cooling Water System

Component Group	Intended Function
PUMP CASINGS	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.15 Reactor Water Cleanup System

System Description

The Reactor Water Cleanup (RWC) System is a filtering and ion exchange system that maintains water purity in the reactor and recirculation lines during all modes of plant operation. This minimizes changes in the core heat transfer characteristics by reducing the deposition of impurities on fuel surfaces by reducing the amount of water-borne impurities in the reactor primary system. It also reduces sources of beta and gamma radiation by removing corrosion products, fission products, and impurities in the reactor primary system. The RWC System provides for Primary Containment isolation and is also isolated on initiation of the Standby Liquid Control (SLC) System.

The RWC System provides for continuous purification of a portion of the Reactor Recirculation (REC) System flow with a minimum of heat loss and water loss from the cycle. Water is normally removed at reactor pressure from one of the REC System loops and from the reactor pressure vessel (RPV) bottom head drain, and then cooled in the regenerative and non-regenerative heat exchangers, filtered, demineralized, and pumped through the shell side of the regenerative heat exchangers to raise the temperature before returning it to the RPV. The non-regenerative heat exchangers use cooling water from the Reactor Building Closed Cooling Water (RBC) System to cool the incoming water. System water may be directed to the main condenser or to the Radwaste Solid and Liquid (RAD) System. Spent RWC resins are not regenerated because of the radioactivity of the impurities removed from the reactor coolant. They are sluiced from the demineralizer vessels directly to the Radwaste Solid and Liquid (RAD) System for processing, storing, and eventual off-site disposal.

The in-scope portion of the RWC System consists of the recirculating pumps, heat exchangers, piping and valves. The RWC System filter/demineralizers and associated piping and valves located outside of the secondary containment (Reactor Building) are not within the scope of License Renewal. The major components of the RWC System are the two RWC recirculation pumps, three regenerative heat exchangers, two non-regenerative heat exchangers, two filter/demineralizers, and the associated piping, valves, and instrumentation. A precoat tank, resin addition tank, and precoat pump are provided to allow precoating of the filter/demineralizer with filter aid and ion exchange resin.

The description above results in some SCs for this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some components in the RWC System are non-safety related and their failure could affect the capability of SR components to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some components are in-scope due to supporting Environmental Qualification and Anticipated Transients Without Scram in accordance with 10 CFR 54.4(a)(3).

That portion of the RWC System containing components subject to an AMR includes the Primary Containment isolation valves in the Reactor Building and the Primary Containment, and the connecting piping. In addition, the regenerative heat exchangers, RWC recirculation pumps, non-regenerative heat exchanger and the associated piping, valves, and instrumentation located within the secondary containment (Reactor Building) are subject to AMR.

System Function Listing

A comprehensive listing of functions associated with the Reactor Water Cleanup System, or specific components contained in the system, is provided in the summary below.

Code: RWC-01	Cri 1	Cri 2	Cri 3				
The Reactor Water Cleanup System is a filtering and ion exchange system and shall maintain reactor water purity during all modes of plant operation.			FP	EQ	PTS	AT	SB

Comment: None.

Code: RWC-02	Cri 1	Cri 2	Cri 3				
Provide for alternate boron injection into the RPV per Emergency Operating Procedure.			FP	EQ	PTS	AT	SB

Comment: Provides for alternate boron injection into the RPV per plant emergency operating procedures. This function is beyond the current licensing basis.

Code: RWC-03	Cri 1	Cri 2	Cri 3				
Remove heat from the reactor coolant using the heat rejection mode of operation.			FP	EQ	PTS	AT	SB

Comment: This primary water cooling feature allows for an alternate means of heat rejection, in addition to normal RHR cooling, at low reactor temperatures. This function is not credited to mitigate any design basis events.

Code: RWC-04	Cri 1	Cri 2	Cri 3				
Divert excess reactor coolant by rejecting water to the condenser hotwell or radwaste.			FP	EQ	PTS	AT	SB

Comment: This function serves an operational process and does not mitigate design basis events.

Code: RWC-05	Cri 1	Cri 2	Cri 3				
Maintain Pressure Boundary. Portions of the RWC System are connected to, and part of, the reactor coolant pressure boundary.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: RWC-06	Cri 1	Cri 2	Cri 3				
Primary Containment Isolation. Provides primary containment isolation for those portions of the system that interface with the primary containment (valves and piping).			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: RWC-07	Cri 1	Cri 2	Cri 3				
RWC line isolation. Detects RWC line breaks and provides a signal to automatically close supply line isolation valves on high flow or room temperature.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: RWC-AT	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Anticipated Transients Without Scram.			FP	EQ	PTS	AT	SB
						X	

Comment: Isolates the supply and return lines to prevent diversion of Standby Liquid Control System injection from the reactor vessel.

Code: RWC-EQ	Cri 1	Cri 2	Cri 3				
The system contains components which perform functions credited in the current licensing basis for Environmental Qualification.			FP	EQ	PTS	AT	SB
				X			

Comment: None.

Code: RWC-NSAS Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: None.

USAR Reference

Additional Reactor Water Cleanup System details are provided in Section 10.2.3 of the USAR.

License Renewal Drawings

The license renewal drawings for the Reactor Water Cleanup System are listed below:

LR-36243 LR-36254

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.3-15 along with each Component Group's intended function(s).

Table 2.3.3-15 Reactor Water Cleanup System

Component Group	Intended Function
FASTENERS/BOLTING	PRESSURE BOUNDARY
FLOW ELEMENT	PRESSURE BOUNDARY
HEAT EXCHANGERS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY

Table 2.3.3-15 Reactor Water Cleanup System

Component Group	Intended Function
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.16 Service and Seal Water System

System Description

The Service and Seal Water (SSW) System supplies screened and strained cooling water (raw water from the Mississippi River) to various non-essential plant heat loads and services during all modes of operation. The service water portion of the SSW System consists of three 50% capacity service water pumps, an auto strainer, a bypass basket strainer and associated valves, piping and instrumentation. Normally two service water pumps are in operation and one service water pump is in auto-standby. However, during cold winter months only one service water pump is normally required.

The seal water portion of the SSW System provides filtered well water (service water serves as backup to the well water) to the shaft seals for various pumps including the service water pumps, RSW pumps, and the circulating water pumps. The seal water portion consists of two pumps, two filters, and associated valves, piping and instrumentation.

The SSW System lines have the potential for spatial interactions with safety related equipment. Also, portions of service water piping were upgraded to Class I Seismic requirements for internal flooding concerns. For the fire protection function, the SSW System is connected to the FIR System, and certain SSW System valves provide a pressure boundary to prevent backflow from the FIR System.

The service water pumps take suction from the pump suction bay in the intake structure and discharge to the Turbine Building through the Intake Structure access tunnel. Service water is used to remove heat from various heat exchangers and coolers located in the Reactor Building and Turbine Building. This equipment includes the Reactor Building Closed Cooling Water System heat exchangers, Condensate and Feedwater System pump lube oil and motor coolers, Turbine Generator System lube oil coolers, Reactor Recirculation System MG set oil coolers, Turbine Generator System stator winding and hydrogen coolers, and Reactor and Turbine Building air conditioning units.

Service water is used to keep the RSW Subsystem (part of the Emergency Service Water System) filled and pressurized during normal plant operation when the RSW pumps are not running (the RSW pumps are located in the intake structure), and serves as a backup supply for RSW motor thrust bearing oil coolers. The SSW System also supplies water to the Sodium Hypochlorite Subsystem (part of the Circulating Water System) and the Fire System jockey pump. Service water flow is returned to the river. The SSW System is normally in service during plant operation and shutdown.

The SSW System is not required during or immediately subsequent to a design basis accident and is therefore not safety related.

The description above results in SCs for this system being in-scope in accordance with 10 CFR 54.4(a)(2). In addition, SCs are in-scope due to Fire Protection, in accordance with 10 CFR 54.4(a)(3).

The portions of the Seal and Service Water System containing components subject to an AMR are: 1) the SSW System pumps and discharge lines, 2) SSW loop piping and associated components, 3) the service water discharge radiation monitor sample pump and associated components, 4) automatic strainer back flush line, and 5) SSW components in scope for FP. All these components are located in the Intake Structure, Turbine Building, or Reactor Building.

System Function Listing

A comprehensive listing of functions associated with the Service and Seal Water System, or specific components contained in the system, is provided in the summary below.

Code: SSW-01	Cri 1	Cri 2	Cri 3				
The SSW System supplies screened and strained river water to the Intake Structure, Turbine and Reactor Buildings for plant cooling purposes during all modes of operation.			FP	EQ	PTS	AT	SB

Comment: The SSW System is non-safety related and not required during or following design basis events.

Code: SSW-02	Cri 1	Cri 2	Cri 3				
The SSW System can supply an inexhaustible supply of river water to the condenser hotwell to maintain feedwater flow to the reactor in the event coolant is needed for flooding containment following a loss-of-coolant accident.			FP	EQ	PTS	AT	SB

Comment: The SSW System is non-safety related and not required during or following design basis events.

Code: SSW-03	Cri 1	Cri 2	Cri 3				
The SSW System supplies water to the Sodium Hypochlorite Subsystem (part of the Circulating Water System) and the Fire Protection System jockey pump.			FP	EQ	PTS	AT	SB

Comment: The SSW System is non-safety related and not required during or following design basis events. The Fire Jockey pump is operated to maintain the header pressure above the electric fire pump auto start setpoint, but it is not required after a fire when the larger capacity fire pumps are used.

Code: SSW-04	Cri 1	Cri 2	Cri 3				
The SSW System provides a backup water supply to the normal well water supply to the seal water system.			FP	EQ	PTS	AT	SB

Comment: The SSW System is non-safety related and not required during or following design basis events.

Code: SSW-05	Cri 1	Cri 2	Cri 3				
The SSW System pressurizes the RSW System while RHR Service Water is in standby.			FP	EQ	PTS	AT	SB

Comment: The SSW System is non-safety related and not required during or following design basis events.

Code: SSW-06	Cri 1	Cri 2	Cri 3				
The SSW System provides a backup water supply for the control room air conditioning units, ECCS system room coolers, ECCS pump motors, and EDG emergency service water.			FP	EQ	PTS	AT	SB

Comment: The SSW System is non-safety related and not required during or following design basis events.

Code: SSW-FP The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: The SSW System is connected to the FIR System, and certain SSW System valves provide a pressure boundary to prevent backflow from the FIR System.

Code: SSW-NSAS Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: None.

USAR Reference

Additional Service and Seal Water System details are provided in Section 10.4.1 of the USAR.

License Renewal Drawings

The license renewal drawings for the Service and Seal Water System are listed below:

LR-36041
LR-36041-2
LR-36048
LR-36664
LR-36665
LR-36665-2
LR-36666
LR-36807
LR-155483-1

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.3-16 along with each Component Group's intended function(s).

Table 2.3.3-16 Service and Seal Water System

Component Group	Intended Function
EXPANSION JOINTS	PRESSURE BOUNDARY
FASTENERS/BOLTING	PRESSURE BOUNDARY

Table 2.3.3-16 Service and Seal Water System

Component Group	Intended Function
FILTERS/STRAINERS	PRESSURE BOUNDARY
GAUGES (FLOW, LEVEL AND SIGHT)	PRESSURE BOUNDARY
HEAT EXCHANGERS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	FLOW RESTRICTION PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.17 **Standby Liquid Control System**

System Description

The Standby Liquid Control (SLC) System is an ESF system per the MNGP licensing basis. The SLC system has been included within this section, and the related aging management section, for consistency with NUREG-1800 and NUREG-1801.

The SLC System provides a means of inserting negative reactivity into the reactor core by the injection of neutron absorbing boron in the form of liquid sodium pentaborate. A key lock switch that starts the SLC System pumps and opens the squib-operated valves provides control of injection. The boron solution is capable of shutting down the reactor and providing a sufficient shutdown margin to overcome void and temperature coefficients, as well as the effects of xenon, assuming that none of the withdrawn control rods can be inserted. Service Air and Demineralized Water are provided to the SLC Tank for mixing of the boron solution, as well as Instrument Air to various instrumentation. The SLC System also provides for Primary Containment isolation. The SLC System is credited for use in the Anticipated Transient Without Scram (ATWS) event.

The description above results in some SCs for this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some components in the SLC System are non-safety related and their failure could affect the capability of SR components to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, components are in-scope due to supporting Anticipated Transients Without Scram in accordance with 10 CFR 54.4(a)(3).

The portion of the SLC System containing components subject to an AMR extends from the SLC tank and test tank in the Reactor Building to the reactor vessel in the Primary Containment.

System Function Listing

A comprehensive listing of functions associated with the Standby Liquid Control System, or specific components contained in the system, is provided in the summary below.

Code: SLC-01	Cri 1	Cri 2	Cri 3				
The SLC System shall be designed to bring the reactor to a shutdown condition at any time in the reactor core life, even if any or all withdrawn control rods are unavailable for insertion.			FP	EQ	PTS	AT	SB

Comment: None.

Code: SLC-02	Cri 1	Cri 2	Cri 3				
Maintain Pressure Boundary. Portions of the SLC System are connected to, and part of, the reactor coolant pressure boundary during plant operation.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: SLC-03	Cri 1	Cri 2	Cri 3				
Primary Containment Isolation. Provides primary containment isolation for those portions of the system that interface with the primary containment (valves and piping).			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: SLC-AT	Cri 1	Cri 2	Cri 3				
The SLC System contains structures and/or components which perform functions credited in the current licensing basis for Anticipated Transients Without Scram.			FP	EQ	PTS	AT	SB
						X	

Comment: None.

Code: SLC-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: None.

USAR Reference

Additional Standby Liquid Control System details are provided in Section 6.6 of the USAR.

License Renewal Drawings

The license renewal drawings for the Standby Liquid Control System are listed below:

LR-36241
LR-36242-1
LR-36253

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.3-17 along with each Component Group's intended function(s).

Table 2.3.3-17 Standby Liquid Control System

Component Group	Intended Function
ACCUMULATORS	PRESSURE BOUNDARY
FASTENERS/BOLTING	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY

Table 2.3.3-17 Standby Liquid Control System

Component Group	Intended Function
VALVE BODIES	PRESSURE BOUNDARY

2.3.3.18 Wells and Domestic Water System

System Description

The Wells and Domestic Water (WDW) System includes the Domestic Water, Sanitary Sewer, Acid Drain, Storm Drain, and Turbine Building Normal Drain subsystems as described below.

The Domestic Water Subsystem supplies well water to the Demineralized Water System, the Service and Seal Water System, hot and/or cold water to lavatories, the laundry, showers, etc., throughout the plant's Protected Area.

The Sanitary Sewer Subsystem removes wastewater from lavatories, showers, sinks, etc., in the Protected Area, Site Administration Building, and warehouse No. 5. It carries the wastewater to the City of Monticello Sewage System.

The Acid Drain Subsystem removes water from such things as the Demineralized Water System area drain and heating boiler blowdown which is unfit for direct discharge to the river. Drainage from these sources is carried to the discharge retention basin where it is treated and monitored before release to the river.

The Storm Drain Subsystem carries water from building roofs and normal surface drainage to the river.

The Turbine Building Normal Drain Subsystem removes water from areas in the Turbine Building where there is no potential for radioactive contamination and transports it to the river.

The WDW System is in-scope for LR because of check valves and connected piping located in the floor drain lines of both EDG rooms. The valves are located below the surface of the floor and are accessible through bolted access covers located at floor level in the 11 EDG room. The valves and connected piping function to 1) prevent flooding in one EDG room from causing flooding in the other EDG room, 2) provide assurance that combustibles from one EDG room will not be transferred to the other EDG room, and 3) prevent Turbine Building normal waste sump discharge from flooding EDG rooms.

There are also components in the WDW System whose failure could affect the capability of safety related SCs to perform their safety function. Included in this category are roof drains and clean (non-radioactive) floor drains not buried in concrete or ground. Potentially radioactive floor drains are included in the Radwaste Solid and Liquid (RAD) System.

The description above results in SCs for this system being in-scope due to Fire Protection, in accordance with 10 CFR 54.4(a)(3). Since some SCs in the Wells and Domestic Water System are non-safety related and their failure could affect the capability of SR components to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2).

The portions of the Wells and Domestic Water System containing components subject to an AMR include the check valves and connected floor drain piping located in the EDG rooms, domestic water piping located in the Turbine Building, EFT Building and main control room; and roof drains and clean (non-radioactive) floor drains not buried in concrete or ground, located throughout the plant.

System Function Listing

A comprehensive listing of functions associated with the Wells and Domestic Water System, or specific components contained in the system, is provided in the summary below.

Code: WDW-01	Cri 1	Cri 2	Cri 3				
The function of the Domestic Water System is to provide a continuous supply of well water to the plant.			FP	EQ	PTS	AT	SB

Comment: Well water is used for normal plant operation and is not required for accident mitigation.

Code: WDW-02	Cri 1	Cri 2	Cri 3				
The function of Non-Radioactive Drains is to remove all non-radioactive liquid waste from the plant.			FP	EQ	PTS	AT	SB

Comment: Non-radioactive drains are used for normal plant operation and are not required for accident mitigation.

Code: WDW-FP	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: None.

Code: WDW-NSAS	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.		X					

Comment: None.

USAR Reference

Additional Wells and Domestic Water System details are provided in Section 10.3.5 and Section 10.3.6.2.4 of the USAR.

License Renewal Drawings

The license renewal drawings for the Wells and Domestic Water System are listed below:

LR-36044 LR-155483-1

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.3-18 along with each Component Group's intended function(s).

Table 2.3.3-18 Wells and Domestic Water System

Component Group	Intended Function
FASTENERS/BOLTING	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.4 Steam and Power Conversion System

The following systems are addressed in this section:

- Condensate Storage System (Section 2.3.4.1)
- Condensate and Feedwater System (Section 2.3.4.2)
- Main Condenser System (Section 2.3.4.3)
- Main Steam System (Section 2.3.4.4)
- Turbine Generator System (Section 2.3.4.5)

2.3.4.1 Condensate Storage System

System Description

The Condensate Storage System provides a large storage capacity of reactor quality water. The normal plant uses for condensate storage water are as follows:

1. Hotwell makeup and reject
2. Control rod drive supply
3. Fuel storage pool makeup
4. Demineralizer and radwaste processing
5. Filling the refueling wells
6. Miscellaneous plant flushing and decontamination services
7. Pressurizing RHR and Core Spray piping
8. Normal suction supply for High Pressure Coolant Injection and Reactor Core Isolation Cooling Systems

In addition to the above, the Condensate Storage System provides storage for reclaimed water from the Radwaste System.

The suppression pool is the safety related source of water for High Pressure Coolant Injection. No credit is taken for CST inventory. The High Pressure Coolant Injection pump is normally lined up to the condensate storage tanks. The suction is switched to the suppression pool upon low level being sensed in either condensate storage tank or high level in the suppression pool. The condensate storage tank and attached piping were originally designed as non-safety related and non-seismic. As part of the Seismic Category I Piping Review Program, the pump suction piping (from the High Pressure Coolant Injection pump suction to condensate storage tank suction isolation valve) was verified to be qualified to withstand a seismic event. This provides adequate assurance that the system can be isolated from the non-seismic, non-safety related condensate storage tank water source if necessary. The instrumentation associated with the automatic transfer from the condensate storage tank to the suppression pool has also been verified to be safety related and capable of withstanding a seismic event (USAR Section 6.2.4.2.11). Since the automatic transfer feature is safety related, these components are in-scope for license renewal in accordance with 10 CFR 54.4(a)(1).

The in-scope portion of the Condensate Storage System consists of piping and valves, which supply the fuel storage pool, High Pressure Coolant Injection, Reactor Core Isolation Cooling, Residual Heat Removal, Control Rod Drive, Condensate, Feedwater, Core Spray, Main Condenser, and Radwaste Systems.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some SCs in the Condensate Storage System are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some SCs are in-scope due to Environmental Qualification and Station Blackout in accordance with 10 CFR 54.4(a)(3).

The portions of the Condensate Storage System containing components subject to an AMR include the CST fasteners, filter housings, flow elements, heat exchangers, instrumentation, gauges, manifolds, pumps, piping, restricting orifices, and valves within the secondary containment (Reactor Building) and the Turbine Building.

System Function Listing

A comprehensive listing of functions associated with the Condensate Storage System, or specific components contained in the system, is provided in the summary below.

Code: CST-01	Cri 1	Cri 2	Cri 3				
The Condensate Storage System assures that an adequate quantity of condensate quality water is available for refueling and normal plant operations.			FP	EQ	PTS	AT	SB

Comment: None.

Code: CST-02	Cri 1	Cri 2	Cri 3				
Provide pressurizing stations for the Core Spray and RHR Systems to assure that the piping is maintained full of water.			FP	EQ	PTS	AT	SB
		X					

Comment: Maintaining the Core Spray and RHR Systems pressurized is needed to maintain CSP and RHR System operability.

Code: CST-03	Cri 1	Cri 2	Cri 3				
Provide inventory supply to HPC and RCI Systems.			FP	EQ	PTS	AT	SB

Comment: The condensate storage tanks (CSTs) are the normal and preferred source of water for HPC and RCI, but they are not safety related water sources (USAR Section 6.2.4.2.11). The safety related water source for HPC and RCI is the suppression pool.

Code: CST-04	Cri 1	Cri 2	Cri 3				
Maintain water temperature in condensate storage tanks.			FP	EQ	PTS	AT	SB

Comment: A heating steam heat exchanger and pump are provided to maintain the water temperature above the low temperature alarm during normal operation.

Code: CST-05	Cri 1	Cri 2	Cri 3				
Suction Valve Control. On low condensate storage tank level, provides a signal to automatically transfer HPC, or RCI, water supply from the condensate storage tanks to the suppression pool.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: CST-EQ	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Environmental Qualification.			FP	EQ	PTS	AT	SB
				X			

Comment: None.

Code: CST-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: None.

Code: CST-SB	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of all AC power).			FP	EQ	PTS	AT	SB
							X

Comment: The system provides CST tank level indication. No credit is taken for CST inventory in the SBO event.

USAR Reference

Additional Condensate Storage System details are provided in Section 6.2.4.2.11 of the USAR.

License Renewal Drawings

The license renewal drawings for the Condensate Storage System are listed below:

LR-36033	LR-36246
LR-36036	LR-36247
LR-36035-2	LR-36248
LR-36038-2	LR-36250
LR-36039	LR-36252
LR-36045	LR-36256
LR-36047-1	LR-36260
LR-36244	LR-85509

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.4-1 along with each Component Group's intended function(s).

Table 2.3.4-1 Condensate Storage System

Component Group	Intended Function
FASTENERS/BOLTING	PRESSURE BOUNDARY
FILTERS/HOUSINGS	PRESSURE BOUNDARY
FLOW ELEMENT	PRESSURE BOUNDARY
GAUGES (FLOW, LEVEL AND SIGHT)	PRESSURE BOUNDARY
HEAT EXCHANGERS	PRESSURE BOUNDARY
INSTRUMENTATION	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY

Table 2.3.4-1 Condensate Storage System

Component Group	Intended Function
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.4.2 Condensate and Feedwater System

System Description

The Condensate and Feedwater (CFW) System supplies condensate from the main condenser to the reactor vessel at an elevated temperature and pressure. The CFW System includes the Condensate Demineralizer (CDM), the Reactor Feedwater Pump Seal (FWS) and Zinc Injection Passivation (GZP) subsystems.

Two motor-driven condensate pumps pump condensate through the steam jet air ejector inter-condensers and the steam packing exhauster. After leaving the steam packing exhauster, condensate passes through the full-flow Condensate Demineralizer subsystem to ensure a supply of high purity water to the reactor. Demineralizer effluent is then split into two parallel paths, each with three stages of low-pressure feedwater heating, to the suction of the reactor feedwater pumps. The flow from each of the two motor-driven reactor feedwater pumps splits into two parallel paths, each with two stages of high pressure heating, and then to the reactor vessel.

Two feedwater lines penetrate the drywell through the Main Steam Tunnel. Check valves are provided on both sides of the Primary Containment to prevent backflow from the reactor through the feedwater lines. Once through the Primary Containment, the lines divide into four identical headers that penetrate the reactor vessel by four diametrically opposite, thermal sleeved nozzles, which supply the feedwater sparger ring. The feedwater nozzles are evaluated with the Reactor Pressure Vessel (Section 2.3.1.2). The High Pressure Coolant Injection, Reactor Core Isolation Cooling and Reactor Water Cleanup Systems also discharge into the feedwater lines upstream of the two Primary Containment isolation check valves. The feedwater lines from the RPV up to and including the six feedwater check valves are part of the reactor coolant pressure boundary. During a loss of offsite power, the CFW System is rendered inoperable but these same feedwater lines, from the RPV up to and including the six feedwater check valves, are used as part of the injection path for High Pressure Coolant Injection system. Feedwater flow, temperature, conductivity and pressure are indicated and recorded in the Main Control Room. The CFW System provides for Primary Containment isolation. Portions of the CFW System are also credited for use in the Station Blackout (SBO) regulated event.

The Condensate Demineralizer subsystem consists of five demineralizer vessels operating in parallel and sized for full condensate flow at reactor rated conditions. The demineralizer vessels are located in shielded cells. Wastes from an exhausted unit are transferred to the Radwaste (RAD) System for disposal.

The Reactor Feedwater Pump Seal subsystem supplies the inboard and outboard reactor feedwater pump seals. The normal seal water supply is demineralized condensate and the backup seal water supply is un-demineralized condensate. The backup supply is used during low feed flow or other abnormal conditions. Seal water drains by gravity to the seal drain tank. The water in the drain tank is returned to the main condenser via gravity drain (assisted by condenser vacuum during operation) or the drain pump.

The Zinc Injection Passivation (GZP) subsystem provides a zinc oxide suspension from a continuously stirred supply tank, which is diluted with demineralized water, and fed to one of two zinc injection pumps. The diluted suspension is continuously injected into the suction of the Reactor Feed Pump just downstream of the Reactor Feed Pump suction valves. Small concentrations of zinc in the reactor water results in a reduction in the amount of cobalt-incorporated into the oxide film established on stainless steel piping. This reduction in cobalt-60 incorporation provides substantial reductions in dose rates, particularly in primary containment.

The in-scope portion of the CFW System consists of pumps, demineralizers, heat exchangers, tanks, and associated piping, valves and instrumentation from the condensate pump suction to the feedwater injection nozzles. Portions of the system located in the Steam Jet Air Ejector Room are not in-scope for License Renewal.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some SCs in the Condensate and Feedwater System are non-safety related and their failure could affect the capability of SR components to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some SCs are in-scope due to supporting Station Blackout in accordance with 10 CFR 54.4(a)(3).

The portions of the CFW System containing components subject to an AMR include the Primary Containment isolation valves and connecting piping to the reactor pressure vessel that forms part of the reactor coolant pressure boundary, and various piping segments including the condensate pumps, reactor feed pumps and feedwater heaters, many of which have the potential for flooding or spraying on safety related equipment.

System Function Listing

A comprehensive listing of functions associated with the Condensate and Feedwater System, or specific components contained in the system, is provided in the summary below.

Code: CFW-01	Cri 1	Cri 2	Cri 3				
Allow for ECCS flow. The feedwater injection line is used for High Pressure Coolant Injection (HPC) flow into the reactor vessel for a number of design basis events.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: CFW-02	Cri 1	Cri 2	Cri 3				
Provide a regulated supply of feedwater (deaerated, pre-heated and demineralized water) to the reactor vessel during normal operation.			FP	EQ	PTS	AT	SB

Comment: None.

Code: CFW-03	Cri 1	Cri 2	Cri 3				
Provide common piping for Reactor Water Cleanup (RWC) flow to the reactor vessel during normal operation.			FP	EQ	PTS	AT	SB

Comment: None.

Code: CFW-04	Cri 1	Cri 2	Cri 3				
Provide clean water for the pump labyrinth seals, collect seal leakage and transport it back to the main condenser.			FP	EQ	PTS	AT	SB

Comment: None.

Code: CFW-05	Cri 1	Cri 2	Cri 3				
Maintain Pressure Boundary. Portions of the CFW System are connected to, and part of, the reactor coolant pressure boundary during plant operation.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: CFW-06	Cri 1	Cri 2	Cri 3				
Primary Containment Isolation. Provides primary containment isolation for those portions of the system that interface with the primary containment (valves and piping).			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: CFW-07	Cri 1	Cri 2	Cri 3				
Remove ionic and particulate materials from feedwater, so as to maintain a high reactor feedwater quality.			FP	EQ	PTS	AT	SB

Comment: None.

Code: CFW-08	Cri 1	Cri 2	Cri 3				
Protect the primary system from entry of foreign materials, such as could occur due to condenser tube leak.			FP	EQ	PTS	AT	SB

Comment: None.

Code: CFW-09	Cri 1	Cri 2	Cri 3				
Provide final polishing of makeup entering the primary system.			FP	EQ	PTS	AT	SB

Comment: None.

Code: CFW-10	Cri 1	Cri 2	Cri 3				
Maintain the purity of water rejected to condensate storage tank.			FP	EQ	PTS	AT	SB

Comment: None.

Code: CFW-11	Cri 1	Cri 2	Cri 3				
Injects a zinc oxide slurry into the reactor water via the Reactor Feedwater lines to reduce radiation levels due to cobalt depositions.			FP	EQ	PTS	AT	SB

Comment: None.

Code: CFW-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: None.

Code: CFW-SB	Cri 1	Cri 2	Cri 3				
The CFW System contains structures and/or components, which perform functions credited in the current licensing basis for Station Blackout (Loss of all AC power).			FP	EQ	PTS	AT	SB
							X

Comment: The feedwater injection line is used for High Pressure Coolant Injection (HPC) flow into the reactor vessel.

USAR Reference

Additional Condensate and Feedwater System details are provided in Section 4.7, Section 11.7 and Section 11.8 of the USAR.

License Renewal Drawings

The license renewal drawings for the Condensate and Feedwater System are listed below:

LR-36034
LR-36035
LR-36036
LR-36037
LR-36037-2
LR-36038
LR-36038-2
LR-36044
LR-36241
LR-85509
LR-119259

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.4-2 along with each Component Group's intended function(s).

Table 2.3.4-2 Condensate and Feedwater System

Component Group	Intended Function
EXPANSION JOINTS	PRESSURE BOUNDARY
FASTENERS/BOLTING	PRESSURE BOUNDARY
FILTERS/STRAINERS	PRESSURE BOUNDARY
FLOW ELEMENT	FLOW RESTRICTION PRESSURE BOUNDARY

Table 2.3.4-2 Condensate and Feedwater System

Component Group	Intended Function
GAUGES (FLOW, LEVEL AND SIGHT)	PRESSURE BOUNDARY
HEAT EXCHANGERS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	FLOW RESTRICTION PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.4.3 Main Condenser System

System Description

The Main Condenser (CDR) System provides a heat sink for the steam cycle, removes non-condensable gases, and serves as a central collection point for system drains. The system is non-safety related, but is credited for post-accident plate out and holdup of radioactive iodine in the Loss of Coolant Accident (LOCA) and Control Rod Drop Accident (CRDA) analyses per USAR Section 14.7.2.4.1 and Section 14.7.1.6, respectively. Also included in the NSAS function is the automatic closure of Mechanical Vacuum Pump (MVP) suction valves that isolate the condenser lines to the MVP on Primary Containment Isolation System (PCIS) Division I logic which includes detection of high activity in the main steam lines.

The CDR System consists principally of the main condenser, which condenses steam exhausted from the turbine and turbine bypass system (TGS System). The main condenser is a twin shell, dual pressure surface condenser. Each of the two low-pressure turbines exhausts into a condenser shell. The steam is distributed throughout the steam space of the shell and enters the tube bank where it comes in contact with the outer tube surface. Circulating raw water from the Mississippi River flowing inside the tubes keeps the tubes at a lower temperature than the saturation temperature of the steam. Because of the temperature difference, heat is transferred from the steam through the tube wall to the circulating water causing the steam to condense on the tubes. The series arrangement of the flow of circulating water through the condenser twin shell results in each shell operating at different pressures. The inlet (cold) water from the circulating water pumps passes through the first shell and then the same water (at an elevated temperature) is directed through the second shell. The colder water produces a lower turbine exhaust pressure in the first shell. The average turbine exhaust pressure is lower with the series circulating water arrangement than with the more conventional single pressure condenser with a parallel circulating water system. An additional improvement in the cycle performance is achieved by directing the condensate flow from the low-pressure (cold) shell to the high-pressure (hot) shell for reheating to the temperature corresponding to the saturation temperature in the high- pressure shell.

Condenser structural integrity is continuously demonstrated during normal operation when the condenser is required to maintain vacuum. Following a design basis accident, when the condenser is required to perform its intended function, the MSIVs will be closed and vacuum will be lost. The condenser will not be required to perform a pressure boundary function because atmospheric conditions will exist inside the condenser.

Since some SCs in the Main Condenser System are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2).

The portions of the Main Condenser System containing components subject to an AMR include the Low Pressure Turbine exhaust hoods, the main condenser, and associated components.

System Function Listing

A comprehensive listing of functions associated with the Main Condenser System, or specific components contained in the system, is provided in the summary below.

Code: CDR-01 Provides a heat sink for the steam cycle.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: None.

Code: CDR-02 Removes non-condensable gases, and serves as a central collection point for system drains.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: None.

Code: CDR-03 Provides an emergency source for condensate & feedwater via the service water system.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: The use of the service water system to transfer river water to the condenser hotwell is an emergency/contingency mode which is beyond current licensing basis.

Code: CDR-04 Provides a heat sink for bypass steam from the nuclear boiler.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: None.

Code: CDR-NSAS Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: The Main Condenser is non-safety related but is credited in USAR Section 14.7.2.4.1 and Section 14.7.1.6, respectively, for LOCA analysis and CRDA analysis for post accident iodine plate out and holdup.

USAR Reference

Additional Main Condenser System details are provided in Section 11.3, Section 14.7.2.4.1 and Section 14.7.1.6 of the USAR.

License Renewal Drawings

The license renewal drawings for the Main Condenser System are listed below:

LR-36033
LR-36034
LR-36035
LR-36035-2
LR-36036

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.4-3 along with each Component Group's intended function(s).

Table 2.3.4-3 Main Condenser System

Component Group	Intended Function
CONDENSER COMPLEX	PLATEOUT AND HOLDUP OF RADIOACTIVE MATERIAL
EXPANSION JOINTS	PLATEOUT AND HOLDUP OF RADIOACTIVE MATERIAL
FASTENERS/BOLTING	PLATEOUT AND HOLDUP OF RADIOACTIVE MATERIAL PRESSURE BOUNDARY
FILTERS/STRAINERS	PRESSURE BOUNDARY
GAUGES (FLOW, LEVEL AND SIGHT)	PRESSURE BOUNDARY
HEAT EXCHANGERS	PLATEOUT AND HOLDUP OF RADIOACTIVE MATERIAL PRESSURE BOUNDARY
LP TURBINE HOOD	PLATEOUT AND HOLDUP OF RADIOACTIVE MATERIAL
PIPING AND FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY

Table 2.3.4-3 Main Condenser System

Component Group	Intended Function
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.4.4 Main Steam System

System Description

The Main Steam (MST) System transports steam produced in the reactor to the main turbine for the production of electricity. This steam is supplied to the high pressure section of the turbine. Steam leaving the high pressure turbine is divided, the bulk of it passing through moisture separators prior to admission to the low pressure sections. A portion of the steam is extracted and is condensed as it is cascaded through feedwater heaters en route to the main condenser. Normally, the turbine uses all the steam being generated by the reactor. However, automatic pressure-controlled bypass valves are supplied, which can discharge excess steam directly to the condenser. The MST System, between the Main Steam Isolation Valves (MSIV) and the Turbine Stop Valves (TSV), consists of the piping necessary to direct steam to various systems and components such as the Main Turbine, Turbine Bypass Valves, Steam Jet Air Ejectors, Off Gas Recombiners, Turbine Steam Seals, and Condenser Deaerator. The MST System also supplies steam to the High Pressure Coolant Injection and Reactor Core Isolation Cooling turbines. The MST System includes an in-line flow restrictor for each of the four main steam lines. These flow restrictors minimize water losses and protect the fuel barrier prior to MSIV closure for steam line ruptures outside of primary containment. Drains are provided to remove condensate from the steam lines. MST System piping from the reactor pressure vessel (RPV) to the second isolation valve on that line constitutes a primary coolant pressure boundary. The main steam nozzles on the RPV are evaluated with the Reactor Pressure Vessel. Various non-safety related portions of piping in the MST System have failure modes including high-energy line breaks (HELB) that could prevent the satisfactory accomplishment of safety related functions and are therefore in-scope in accordance with 10 CFR 54.4(a)(2). The MSIV to main condenser drain pathway is also in-scope in accordance with 10 CFR 54.4(a)(2) for iodine plate-out during hypothetical design basis accidents. The MST System provides for Primary Containment isolation. Additionally, the MST System is credited for use in safe shutdown following some plant fires (Fire Protection) and also contains Environmentally Qualified (EQ) components.

The majority of the components for the MST System are located in the Turbine Building and Reactor Building Steam Chase, with additional piping and valves located in the Primary Containment. The majority of the system components are made of stainless steel and carbon steel although some CASS and copper alloy material is used. The MST System is normally operating continuously during normal plant operation for power generation.

The in-scope portion of the MST System consists primarily of piping and valves including the associated instrumentation. The major components are the main steam lines, MSIVs, and TSVs and the associated piping, valves and instrumentation for those components supplied with main steam.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some SCs in the Main Steam System are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some SCs are in-scope due to Environmental Qualification and Fire Protection in accordance with 10 CFR 54.4(a)(3).

The portions of the Main Steam System containing components subject to an AMR include the Primary Containment isolation valves and connecting piping to the reactor pressure vessel and various piping segments and valves, many of which have the potential for flooding or spraying on safety related equipment.

System Function Listing

A comprehensive listing of functions associated with the Main Steam System, or specific components contained in the system, is provided in the summary below.

Code: MST-01	Cri 1	Cri 2	Cri 3				
Provide a conduit for steam to the main turbine, turbine bypass valves, steam jet air ejectors, off gas recombiners, turbine steam seals, and condenser deaerator for power generation.			FP	EQ	PTS	AT	SB

Comment: None.

Code: MST-02	Cri 1	Cri 2	Cri 3				
Maintain Pressure Boundary. Portions of the MST System are connected to, and part of, the reactor coolant pressure boundary during plant operation.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: MST-03	Cri 1	Cri 2	Cri 3				
Primary Containment Isolation. Provides primary containment isolation for those portions of the system that interface with the primary containment (valves and piping).			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: MST-04	Cri 1	Cri 2	Cri 3				
Ventilation of non-condensable gases in the reactor vessel via the head vent system.			FP	EQ	PTS	AT	SB

Comment: None.

Code: MST-05	Cri 1	Cri 2	Cri 3				
Provides source of steam to power the HPC and RCI turbines.			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: MST-06	Cri 1	Cri 2	Cri 3				
Limit reactor vessel water loss in the case of a main steam line rupture outside primary containment.			FP	EQ	PTS	AT	SB
	X						

Comment: The MST System includes an in-line flow restrictor in each line to minimize water losses and protect the fuel barrier prior to MSIV closure for steam line ruptures outside primary containment.

Code: MST-EQ	Cri 1	Cri 2	Cri 3				
The MST System contains components, which perform functions credited in the current licensing basis for Environmental Qualification.			FP	EQ	PTS	AT	SB
				X			

Comment: None.

Code: MST-FP	Cri 1	Cri 2	Cri 3				
The MST System contains structures and/or components, which perform functions credited in the current licensing basis for Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: None.

Code: MST-NSAS	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.		X					

Comment: None.

USAR Reference

Additional Main Steam System details are provided in Section 6.3 and Section 11.1 of the USAR.

License Renewal Drawings

The license renewal drawings for the Main Steam System are listed below:

LR-36033
LR-36034
LR-36035-2
LR-36049-10
LR-36241
LR-36241-1
LR-36249
LR-54817-4

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.4-4 along with each Component Group's intended function(s).

Table 2.3.4-4 Main Steam System

Component Group	Intended Function
FASTENERS/BOLTING	PRESSURE BOUNDARY
FILTERS/STRAINERS	FILTRATION PRESSURE BOUNDARY
FLOW ELEMENT	FLOW RESTRICTION
MANIFOLDS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY

Table 2.3.4-4 Main Steam System

Component Group	Intended Function
RESTRICTING ORIFICES	FLOW RESTRICTION PRESSURE BOUNDARY
THERMOWELLS	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.3.4.5 Turbine Generator System

System Description

The Turbine Generator System includes the turbine generator unit and the required subsystems: the Steam Sealing, Turbine Lube Oil, Hydrogen Cooling, Hydrogen Seal Oil, and the Stator Cooling subsystems.

The function of the turbine is to convert the thermodynamic energy of the steam from the nuclear reactor into mechanical energy that drives the generator. The generator in turn converts that energy to an electrical output to the power grid.

The turbine consists of one single flow high-pressure section with two double-flow low-pressure sections of the non-reheat design on a single shaft. The generator consists of three major parts; the rotor, stator and exciter. The rotor is turned by the turbine shaft and is the source of the moving magnetic field. The stator consists of windings which form a conductive path for the current induced by the rotating magnetic field of the rotor. The exciter is a separate and smaller generator driven by the turbine to provide power for the main generator rotor magnetic field.

Turbine shaft seals are provided at each point where the shaft passes through the turbine casings. The Steam Sealing subsystem prevents steam leakage past the turbine shaft seals into the Turbine Building and limits air in-leakage to the turbine casings. During normal operation, steam from the high-pressure turbine seal leak-offs and from valve stem leak-offs supplies the low-pressure turbine seals. During startup, a regulated main steam supply furnishes sealing steam to all steam seals. An outer annulus of each shaft seal is connected to the steam packing exhauster. The steam packing exhauster maintains a slight negative pressure on the annulus to collect both air and steam that pass through the shaft seals. The collected gases are condensed and discharged to the condensate drip tank and the noncondensibles are discharged to the Off Gas Holdup and Recombiner System.

The turbine generator shaft is supported by 10 journal bearings. All bearing oil is supplied by the Turbine Lube Oil subsystem, which also provides high-pressure oil to the hydraulic turbine control mechanisms. During normal operation, a shaft driven oil pump supplies the required oil. The subsystem includes a series of backup motor driven pumps. Prior to startup and for some time after shutdown the turbine generator unit will be on the turning gear, with the rotors being turned slowly to maintain uniform temperatures and prevent shaft bowing. During this time, shaft lift pumps discharge high pressure oil to each bearing assuring that the shaft is suspended and floating above the bearing surfaces.

The hydrogen gas of the Hydrogen Cooling subsystem is contained within the generator casing. The Hydrogen Cooling subsystem is designed to reduce the heat generated from windage resistance and provide a good heat transfer medium for generator cooling. A fan blade on either end of the rotor circulates the hydrogen gas over the rotor and stator windings to remove heat. Four vertical tube-type heat exchangers are mounted in the casing to transfer the heat from the hydrogen gas to the Service Water System.

The Hydrogen Seal Oil subsystem supplies vacuum treated oil between the rotor shaft and the generator end housing hydrogen seals to prevent hydrogen from escaping into the Turbine Building. Vacuum treated seal oil is supplied by a combination of components including a vacuum storage tank, a Main and Emergency Seal Oil Pump, and a recirculation pump and spray header.

The Stator Cooling subsystem removes heat from the generator stator by circulating low conductivity water through the hollow metal bars forming the stator windings. The subsystem also supplies cooling water to the generator exciter rectifier banks. The Stator Cooling subsystem consists of a storage tank feeding two parallel pumps, two heat exchangers, a filter, and connecting piping with the generator stator. A deionization loop through a resin bed provides for continuous purification of a portion of the stator cooling water. Stator cooling water flows through the shell side of the heat exchangers, with Service Water flowing through the heat exchanger tube side to provide two-pass cooling.

The in-scope portion of the Turbine Generator System consists of the High Pressure Turbine casing, steam piping between the High Pressure Turbine and the Low Pressure Turbines, moisture separators, moisture separator drain tanks, extraction steam piping supplying the CFW system feedwater heaters, and associated valves and instrumentation. In addition, components in the

Steam Sealing, Turbine Lube Oil, Hydrogen Cooling, Hydrogen Seal Oil, and the Stator Cooling subsystems located in the Turbine Building are in-scope.

Components in the Turbine Generator System are non-safety related and their failure could affect the capability of SR SCs to perform their safety function; therefore, they are in-scope in accordance with 54.4(a)(2).

The portions of the Turbine Generator System containing components subject to an AMR include the heat exchangers, manifolds, pumps, piping, restricting orifices, valves and other pressure boundary components within the Turbine Building.

System Function Listing

A comprehensive listing of functions associated with the Turbine Generator System, or specific components contained in the system, is provided in the summary below.

Code: TGS-1	Cri 1	Cri 2	Cri 3				
Circulate low conductivity cooling water through the stator windings.			FP	EQ	PTS	AT	SB

Comment: None.

Code: TGS-2	Cri 1	Cri 2	Cri 3				
Provides cooling water to the exciter rectifier banks.			FP	EQ	PTS	AT	SB

Comment: None.

Code: TGS-3	Cri 1	Cri 2	Cri 3				
Provides a clean, low density medium in which to rotate the generator field while reducing the heat generated from windage resistance and provide a good heat transfer medium for generator cooling.			FP	EQ	PTS	AT	SB

Comment: None.

Code: TGS-4	Cri 1	Cri 2	Cri 3				
Provides a seal between the generator end housings and rotor shaft to maintain the pressurized hydrogen gas inside the generator; a trap-vent system prevents the release of hydrogen into the turbine generator lube oil system and building atmosphere.			FP	EQ	PTS	AT	SB

Comment: None.

Code: TGS-5	Cri 1	Cri 2	Cri 3				
The turbine shall convert the thermodynamic energy of the steam from the nuclear reactor into mechanical energy that drives the generator.			FP	EQ	PTS	AT	SB

Comment: None.

Code: TGS-6	Cri 1	Cri 2	Cri 3				
Bypass main steam from the turbine throttle inlet directly to the main condenser during all modes of operation.			FP	EQ	PTS	AT	SB

Comment: None.

Code: TGS-7	Cri 1	Cri 2	Cri 3				
The function of the entire system is to generate useful electrical power from the mechanical shaft power of the steam turbine and properly conduct it at desired voltages to the Distribution Grid via the 345kV Substation System.			FP	EQ	PTS	AT	SB

Comment: None.

Code: TGS-8	Cri 1	Cri 2	Cri 3				
The Pressure Control System shall operate the turbine control and bypass valves in a coordinated sequence to control reactor pressure and turbine speed.			FP	EQ	PTS	AT	SB

Comment: None.

Code: TGS-9	Cri 1	Cri 2	Cri 3				
The turbine-generator system control and instrumentation controls steam flow to the turbine and protects the turbine-generator from overpressure or excessive speed.			FP	EQ	PTS	AT	SB

Comment: None.

Code: TGS-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: None.

USAR Reference

Additional Turbine Generator System details are provided in Section 11.2 of the USAR.

License Renewal Drawings

The license renewal drawings for the Turbine Generator System are listed below:

LR-36033
LR-36034
LR-36035
LR-36036
LR-36037
LR-36050
LR-8435-34
LR-8435-35-1
LR-8435-196
LR-M8107L-087

Components Subject to an AMR

The component groups for this system that require aging management review are addressed in Table 2.3.4-5 along with each Component Group's intended function(s).

Table 2.3.4-5 Turbine Generator System

Component Group	Intended Function
EXPANSION JOINTS	PRESSURE BOUNDARY
FASTENERS/BOLTING	PRESSURE BOUNDARY
FILTERS/HOUSINGS	PRESSURE BOUNDARY
FILTERS/STRAINERS	PRESSURE BOUNDARY
GAUGES (FLOW, LEVEL AND SIGHT)	PRESSURE BOUNDARY
HEAT EXCHANGERS	PRESSURE BOUNDARY
MANIFOLDS	PRESSURE BOUNDARY
PIPING AND FITTINGS	PRESSURE BOUNDARY
PUMP CASINGS	PRESSURE BOUNDARY
RESTRICTING ORIFICES	PRESSURE BOUNDARY
STEAM TRAPS	PRESSURE BOUNDARY
TANKS	PRESSURE BOUNDARY

Table 2.3.4-5 Turbine Generator System

Component Group	Intended Function
THERMOWELLS	PRESSURE BOUNDARY
TURBINES	PRESSURE BOUNDARY
VALVE BODIES	PRESSURE BOUNDARY

2.4 Scoping and Screening Results: Containments, Structures, and Component Supports

The following structural components are addressed in this section:

- Cranes, Heavy Loads, Rigging (Section 2.4.1)
- Diesel Fuel Oil Transfer House (Section 2.4.2)
- Emergency Diesel Generator Building (Section 2.4.3)
- Emergency Filtration Train Building (Section 2.4.4)
- Fire Protection Barriers Commodity Group (Section 2.4.5)
- Hangers and Supports Commodity Group (Section 2.4.6)
- HPCI Building (Section 2.4.7)
- Intake Structure (Section 2.4.8)
- Miscellaneous SBO Yard Structures (Section 2.4.9)
- Off Gas Stack (Section 2.4.10)
- Off Gas Storage and Compressor Building (Section 2.4.11)
- Plant Control and Cable Spreading Structure (Section 2.4.12)
- Primary Containment (Section 2.4.13)
- Radioactive Waste Building (Section 2.4.14)
- Reactor Building (Section 2.4.15)
- Structures Affecting Safety (Section 2.4.16)
- Turbine Building (Section 2.4.17)
- Underground Duct Bank (Section 2.4.18)

2.4.1 Cranes, Heavy Loads, Rigging

Description

The Cranes, Heavy Loads and Rigging System consists of the Reactor Building and Turbine Building cranes, numerous hoists, lifting fixtures and devices, and other miscellaneous smaller cranes.

Included in this system are the Reactor Components Handling Equipment such as the refueling bridge, various tools, controls, lifting devices and fixtures. Also, the refueling rod block interlocks are included under the Reactor Manual Control (RMC) system.

Since all SCs in the Cranes, Heavy Loads, Rigging System are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2).

The portions of the Cranes, Heavy Loads, and Rigging System containing components subject to an AMR include the bridge and trolley structural beams, girders, and rails associated with NUREG-0612 heavy load cranes and the refueling bridge, lifting devices, and the fuel preparation machine.

System Function Listing

A comprehensive listing of functions associated with the Cranes, Heavy Loads, Rigging System, or specific components contained in the system, is provided in the summary below.

Code: CRN-01	Cri 1	Cri 2	Cri 3				
The refueling equipment shall provide a means for normal reactor disassembly, refueling operations, reactor assembly, new and spent fuel inspection, fuel shipping and for the refuel tool inspection and testing procedures.			FP	EQ	PTS	AT	SB

Comment: None.

Code: CRN-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: Use and handling of loads utilizing the plant cranes and other load handling equipment is not safety related. The failure of safety related equipment or a safety system actuation or a reactor scram could occur if a load were mishandled or a structural failure of a component occurred. Also, the refueling platform and fuel prep machines shall be structurally sound as to avoid collapse onto loaded fuel storage racks or the reactor core. Therefore, this function satisfies criterion 2.

USAR Reference

Limited Cranes, Heavy Loads, Rigging System details are provided in Section 10.2.1 and Section 12.2.5 of the USAR.

License Renewal Drawings

None.

Components/Commodities Subject to an AMR

The component groups for the Cranes, Heavy Loads, Rigging System that require aging management review are addressed in Table 2.4.1-1 along with each component group's intended function(s).

Table 2.4.1-1 Cranes, Heavy Loads, Rigging

Component Group	Intended Function
ALUMINUM IN AIR/GAS (FUEL PREPARATION MACHINE ALUMINUM FRAME)	NON-SAFETY SUPPORT
ALUMINUM IN TREATED WATER (FUEL PREPARATION MACHINE ALUMINUM FRAME)	NON-SAFETY SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (REACTOR BUILDING CRANE RAILS, TURBINE BUILDING CRANE RAILS, REFUELING PLATFORM RAILS)	NON-SAFETY SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (REACTOR BUILDING CRANE, TURBINE BUILDING CRANE, REFUELING PLATFORM, REACTOR VESSEL HEAD LIFTING DEVICE, DRYER AND STEAM SEPARATOR SLING LIFTING DEVICE AND HOOK BOX)	NON-SAFETY SUPPORT

2.4.2 Diesel Fuel Oil Transfer House

Description

The Diesel Fuel Oil Transfer House, located north of the Diesel Generator Building and west of the Intake Structure, is a reinforced concrete building on a mat foundation that provides protective enclosure to the safety related Diesel Oil Transfer Pump and the Diesel Oil Service Pump.

The description above results in some SCs in this structure being in-scope in accordance with 10 CFR 54.4(a)(1). Since some SCs in the Diesel Fuel Oil Transfer House are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some SCs are in-scope due to Fire Protection in accordance with 10 CFR 54.4(a)(3).

The portions of the Diesel Fuel Oil Transfer House containing components subject to an AMR include the structural steel, steel embeds, miscellaneous steel, door, foundation, walls and slabs.

System Function Listing

A comprehensive listing of functions associated with the Diesel Fuel Oil Transfer House, or specific components contained in the structure, is provided in the summary below.

Code: FOH-01	Cri 1	Cri 2	Cri 3				
The Diesel Fuel Oil Transfer House provides structural support, safe enclosure and protection for safety related components such as piping, mechanical, electrical, instrument and control equipment.			FP	EQ	PTS	AT	SB
	X						

Comment: Since this function pertains to safety related components, this function is safety related.

Code: FOH-02	Cri 1	Cri 2	Cri 3				
The Diesel Fuel Oil Transfer House provides structural support and protection for non-safety related components such as piping, mechanical, electrical, instrument and control equipment			FP	EQ	PTS	AT	SB

Comment: This function pertains to non-safety related SSCs.

Code: FOH-FP The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: This structure is not a credited fire barrier for 10 CFR 50 Appendix R events due to common area design. For postulated fires inside the structure, equipment would be prepared and/or alternate fuel oil pumping methods employed. This function is included as this structure provides support and protection for equipment relied upon for safe shutdown post fire event.

Code: FOH-NSAS Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: The Diesel Fuel Oil Transfer House is a Class II Structure analyzed to Class I requirements. The Diesel Fuel Oil Transfer House provides structural support, safe enclosure and protection for safety related components including the diesel fuel oil transfer pump, piping and associated equipment. The Diesel Fuel Oil Transfer House is relied upon for external flood protection.

USAR Reference

Additional Diesel Fuel Oil Transfer House details are provided in Section 10.3.1.5.1, Section 12.2.1.2, and Section 12.2.1.7.1 of the USAR.

License Renewal Drawings

The license renewal drawing for the Diesel Fuel Oil Transfer House is listed below:

LR-36444

Components/Commodities Subject to an AMR

The component groups for the Diesel Fuel Oil Transfer House that require aging management review are addressed in Table 2.4.2-1 along with each component group's intended function(s).

Table 2.4.2-1 Diesel Fuel Oil Transfer House

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (STRUCTURAL STEEL, STEEL EMBEDS, ETC.)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (SUPPORTS FOR MISCELLANEOUS STRUCTURES, I.E., MEMBERS, WELDS, BOLTED CONNECTIONS, SUPPORT ANCHORAGE FOR PLATFORMS, STAIRS, ETC.)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN ATMOSPHERE/WEATHER (DOOR)	SHELTER/PROTECTION
CONCRETE IN AIR/GAS (FOUNDATION, WALLS, SLABS)	FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CONCRETE IN AIR/GAS (FOUNDATION, WALLS, SLABS, GROUT)	FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT

Table 2.4.2-1 Diesel Fuel Oil Transfer House

Component Group	Intended Function
CONCRETE IN ATMOSPHERE/WEATHER (WALLS, SLAB)	FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER/PROTECTION
CONCRETE IN BELOW GRADE (FOUNDATION, WALLS)	FLOOD BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER/PROTECTION

2.4.3 Emergency Diesel Generator Building

Description

The principal function of the Emergency Diesel Generator Building is to provide a safe enclosure and protection for the standby diesel generators and portions of the power distribution systems enclosed therein.

The building is primarily a single story structure of reinforced concrete construction. A partial second story extends over a portion of the structure. Ground floor consists of a concrete slab which is independent of the building structure and placed on compacted select fill. Exterior walls are of reinforced concrete and support the lower roof and second story framing. The roof over the single story portion of the structure and over the penthouse consists of a thick reinforced concrete slab supported by structural steel framing. A north-south interior wall of reinforced concrete extends the full height of the structure providing physical separation of the diesel generator systems. The exterior and interior walls extend 6 feet below grade to form a continuous wall footing supported on select fill.

The standby diesel generators are located at grade and are supported on a 3 foot thick reinforced concrete mat which is physically independent of the ground floor slab and building structure.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some SCs in the Emergency Diesel Generator Building are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some SCs are in-scope due to Fire Protection in accordance with 10 CFR 54.4(a)(3).

The portions of the Emergency Diesel Generator Building containing components subject to an AMR include the structural steel, steel embeds, miscellaneous steel, doors, foundation, walls and slabs.

System Function Listing

A comprehensive listing of functions associated with the Emergency Diesel Generator Building, or specific components contained in the structure, is provided in the summary below.

Code: DGB-01	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Emergency Diesel Generator Building provides physical support and protection for safety related components including the Emergency Diesel Generators and supporting auxiliaries (e.g., day tanks, starting air systems, etc.).	X						

Comment: Since this function pertains to safety related components, this function is safety related.

Code: DGB-02	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Emergency Diesel Generator Building provides structural support and protection for non-safety related components such as piping, mechanical, electrical, HVAC, instrument and control equipment.							

Comment: This function pertains to non-safety related components.

Code: DGB-FP The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: This structure performs function(s) relied upon for 10 CFR 50.48, Fire Protection, specifically Physical Support and Protection. The DGB contains structures and components which perform functions credited in the current license basis for fire protection. In addition to protecting the enclosed EDGs, which are relied upon to support safe plant shutdown for fire events, internal features of the structure are credited as fire barriers to protect one EDG division should the fire occur inside the structure.

Code: DGB-NSAS Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: Some of the building components are non-safety related, i.e., stairs and platforms. Failure of these components could affect safety related components. The Emergency Diesel Generator Building is relied upon for external flood protection.

USAR Reference

Additional Emergency Diesel Generator Building details are provided in Section 10.3.1, Section 10.3.1.5.1, Section 12.2.1.2, Section 12.2.1.7.1, and Section 12.2.2.4 of the USAR.

License Renewal Drawings

The license renewal drawing for the Emergency Diesel Generator Building is listed below:

LR-36444

Components/Commodities Subject to an AMR

The component groups for the Emergency Diesel Generator Building that require aging management review are addressed in Table 2.4.3-1 along with each component group’s intended function(s).

Table 2.4.3-1 Emergency Diesel Generator Building

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (FIRE RATED DOORS)	FIRE BARRIER
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (STRUCTURAL STEEL, STEEL EMBEDS, ETC.)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (SUPPORTS FOR MISCELLANEOUS STRUCTURES, I.E., MEMBERS, WELDS, BOLTED CONNECTIONS, SUPPORT ANCHORAGE FOR PLATFORMS, STAIRS, ETC.)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN ATMOSPHERE/ WEATHER (DOORS, VENTILATION ASSEMBLIES)	NON-SAFETY SUPPORT SHELTER/PROTECTION
CONCRETE IN AIR/GAS (FOUNDATION, WALLS, SLABS)	FIRE BARRIER FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT

Table 2.4.3-1 Emergency Diesel Generator Building

Component Group	Intended Function
CONCRETE IN AIR/GAS (FOUNDATION, WALLS, SLABS, GROUT)	FIRE BARRIER FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CONCRETE IN AIR/GAS (WALLS, SLABS)	FIRE BARRIER
CONCRETE IN ATMOSPHERE/ WEATHER (WALLS, SLAB)	FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER/PROTECTION
CONCRETE IN BELOW GRADE (FOUNDATION, WALLS)	FLOOD BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER/PROTECTION
MASONRY WALLS IN AIR/GAS	FIRE BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT

2.4.4 Emergency Filtration Train Building

Description

The function of the Emergency Filtration Train (EFT) Building is to provide safe enclosure and protection for the main components of the main control room (MCR) air conditioning system (including the emergency filtration train units for the MCR air conditioning system) and for other safety related equipment as necessary.

The EFT Building is an L-shaped reinforced concrete structure supported by a mat foundation. The west section is supported by two reinforced concrete caissons. The east section is three stories high, and the west section is two stories high.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some SCs in the EFT Building are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some SCs are in-scope due to ATWS, Fire Protection, and Station Blackout in accordance with 10 CFR 54.4(a)(3).

The portions of the Emergency Filtration Train Building containing components subject to an AMR include the structural steel, steel embeds, miscellaneous steel, doors, foundation, walls, slabs and seals.

System Function Listing

A comprehensive listing of functions associated with the EFT Building, or specific components contained in the structure, is provided in the summary below.

<table>
<tr><td rowspan="3">Code: EFB-01
The Emergency Filtration Train Building provides structural support, safe enclosure and protection for safety related components such as the main control room air conditioning, piping, mechanical, electrical, HVAC, instrument and control equipment.</td><td rowspan="2">Cri 1</td><td rowspan="2">Cri 2</td><td colspan="5">Cri 3</td></tr>
<tr><td>FP</td><td>EQ</td><td>PTS</td><td>AT</td><td>SB</td></tr>
<tr><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Comment: Since this function pertains to safety related components, this function is safety related.

<table>
<tr><td rowspan="3">Code: EFB-02
The Emergency Filtration Train Building shall provide an environmental boundary for the CRV-EFT system.</td><td rowspan="2">Cri 1</td><td rowspan="2">Cri 2</td><td colspan="5">Cri 3</td></tr>
<tr><td>FP</td><td>EQ</td><td>PTS</td><td>AT</td><td>SB</td></tr>
<tr><td>X</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Comment: This structure also provides shielding for operator dose reduction post accident.

Code: EFB-03	Cri 1	Cri 2	Cri 3				
The Emergency Filtration Train Building provides structural support and protection for non-safety related components such as piping, mechanical, electrical, HVAC, instrument and control equipment.			FP	EQ	PTS	AT	SB

Comment: This function pertains to non-safety related components.

Code: EFB-AT	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Anticipated Transients Without Scram.			FP	EQ	PTS	AT	SB
						X	

Comment: This system performs function(s) relied upon for 10 CFR 50.62, Anticipated Transients Without Scram (ATWS), specifically provides physical support and protection for components required by the current licensing basis for the ATWS regulated event.

Code: EFB-FP	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: This system performs function(s) relied upon for 10 CFR 50.48, Fire Protection, specifically provides physical support and protection for components required by the current licensing basis for the Fire Protection regulated event. The Emergency Filtration Train Building supports the protection of Appendix R safe shutdown equipment from a fire in redundant division areas.

Code: EFB-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: Some of the building components are non-safety related, i.e., stairs and platforms. Failure of these components could affect safety related components. The Emergency Filtration Train Building is relied upon for external flood protection.

Code: EFB-SB The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of all AC power).	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: This system performs function(s) relied upon for 10 CFR 50.63, Station Blackout (SBO), specifically provides physical support and protection for components required by the current licensing basis for the SBO regulated event.

USAR Reference

Additional EFT Building details are provided in Section 6.1.4.5, Section 6.7.1, Section 10.3.1, Section 12.2.1.2, Section 12.2.1.7.1, and Section 12.2.2.14 of the USAR.

License Renewal Drawings

The license renewal drawing for the EFT Building is listed below:

LR-36444

Components/Commodities Subject to an AMR

The component groups for the EFT Building that require aging management review are addressed in Table 2.4.4-1 along with each component group’s intended function(s).

Table 2.4.4-1 Emergency Filtration Train Building

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (FIRE RATED DOORS)	FIRE BARRIER
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (STRUCTURAL STEEL, STEEL EMBEDS, ETC.)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT

Table 2.4.4-1 Emergency Filtration Train Building

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (SUPPORTS FOR MISCELLANEOUS STRUCTURES, I.E., MEMBERS, WELDS, BOLTED CONNECTIONS, SUPPORT ANCHORAGE FOR PLATFORMS, STAIRS, ETC.)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CONCRETE IN AIR/GAS (FOUNDATION, WALLS, SLABS)	FIRE BARRIER FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CONCRETE IN AIR/GAS (FOUNDATION, WALLS, SLABS, GROUT)	FIRE BARRIER FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CONCRETE IN AIR/GAS (WALLS, SLABS)	FIRE BARRIER
CONCRETE IN ATMOSPHERE/ WEATHER (WALLS, SLAB)	FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER/PROTECTION

Table 2.4.4-1 Emergency Filtration Train Building

Component Group	Intended Function
CONCRETE IN ATMOSPHERE/ WEATHER (WALLS, SLAB)	FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER/PROTECTION
CONCRETE IN BELOW GRADE (FOUNDATION, WALLS)	FLOOD BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER/PROTECTION
ELASTOMER SEALANTS (RUBBER, NEOPRENE, SILICONE, ETC.) IN AIR/GAS (EFT CONTROL VOLUME SEALS)	SAFETY RELATED SUPPORT

2.4.5 Fire Protection Barriers Commodity Group

Description

The Fire Protection Barriers commodity group includes fire stop sealants, fireproofing and metallic such as aluminum and carbon steel credited in the Fire Protection Evaluation Report. Fire stop sealants, fireproofing and metallics can be used as fire protection barriers to stop the spread of fire to adjacent fire areas and can also be used to encapsulate structural steel or other metallic and non-metallic components located within a fire area to protect them from the effects of a fire.

Fire stop sealants, fireproofing, metallics and combinations thereof provide a fire resistance equivalent to the rating of the primary fire barrier in order to prevent the spread of fire to adjacent areas. Fire stop sealants, fireproofing and metallics are used to close openings in ceilings, floors and walls. These openings may be for penetrating electrical (e.g., cables, cable trays, conduits) or mechanical (e.g., pipes, instrument lines, ventilation ducts) components.

Cable tray fire protection barriers are a type of barrier that prevents the propagation of fire along the length of the cables.

Ventilation duct fire barrier housings, located between adjacent fire areas, are an integral part of the fire protection barrier and therefore are included with the Fire Protection Barriers.

Fire doors, curbs, dikes, concrete and masonry block walls are evaluated as part of the structure where they are located. Fire and alarm (e.g., smoke detectors), and fire suppression (e.g., automatic sprinklers, automatic halon systems) are evaluated in the Fire System (FIR). The diesel-driven fire pump is evaluated in both the Fire System and the Emergency Service Water System (ESW).

The SCs in the Fire Protection Barriers Commodity Group are in-scope due to Fire Protection in accordance with 10 CFR 54.4(a)(3).

The portions of the Fire Protection Barriers Commodity Group containing components subject to an AMR include cable tray covers, fire protection guard pipe, fire damper housings, fire stop sealants (silicone, silicone foam, caulk), cementitious (pyrocrete walls, etc.) fireproofing, fibrous wraps and rigid board (gypsum walls, etc.) fireproofing.

System Function Listing

A comprehensive listing of functions associated with the Fire Protection Barriers Commodity Group, or specific components contained in the group, is provided in the summary below.

Code: FPB-FP	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.			X				

Comment: The Fire Protection Barriers System contains components that are required per 10 CFR 50.48 and/or 10 CFR50 Appendix R, specifically, fireseals and fireproofing.

USAR Reference

Additional Fire Protection Barriers Commodity Group details are provided in Section 10.3.1.2.5 and Section 10.3.1.5.3 of the USAR.

License Renewal Drawings

None.

Components/Commodities Subject to an AMR

The component groups for the Fire Protection Barriers Commodity Group that require aging management review are addressed in Table 2.4.5-1 along with each component group's intended function(s).

Table 2.4.5-1 Fire Protection Barriers Commodity Group

Component Group	Intended Function
ALUMINUM IN AIR/GAS (CABLE TRAY COVER)	FIRE BARRIER
CARBON STEEL, LOW-ALLOY STEEL IN AIR/GAS (ACCESS TUNNEL FIRE PROTECTION GUARD PIPE, FIRE DAMPER HOUSINGS)	FIRE BARRIER
NON-METALLIC FIRE PROOFING IN AIR/GAS (CEMENTITIOUS FIREPROOFING FOR COATING STRUCTURAL STEEL AND MISCELLANEOUS COMPONENTS)	FIRE BARRIER
NON-METALLIC FIRE PROOFING IN AIR/GAS (FIBROUS FIRE WRAPS, CEMENTITIOUS FIREPROOFING (I.E., PYROCRETE, ETC.))	FIRE BARRIER

Table 2.4.5-1 Fire Protection Barriers Commodity Group

Component Group	Intended Function
NON-METALLIC FIRE PROOFING IN AIR/GAS (FIBROUS FIRE WRAPS, CEMENTITIOUS FIREPROOFING (I.E., PYROCRETE, ETC.), RIGID BOARD (I.E., GYPSUM BOARD, ETC.))	FIRE BARRIER
NON-METALLIC FIRE STOP SEALANTS IN AIR/GAS (FIRE STOP SEALANTS FOR EMERGENCY DIESEL GENERATOR BUILDING)	FIRE BARRIER
NON-METALLIC FIRE STOP SEALANTS IN AIR/GAS (FIRE STOP SEALANTS FOR INTAKE STRUCTURE)	FIRE BARRIER
NON-METALLIC FIRE STOP SEALANTS IN AIR/GAS (FIRE STOP SEALANTS FOR REACTOR BUILDING, EMERGENCY FILTRATION TRAIN BUILDING, PLANT CONTROL AND CABLE SPREADING STRUCTURE)	FIRE BARRIER
NON-METALLIC FIRE STOP SEALANTS IN AIR/GAS (FIRE STOP SEALANTS FOR TURBINE BUILDING)	FIRE BARRIER

2.4.6 Hangers and Supports Commodity Group

Description

The Component Supports Commodity Group contains component and equipment supports, pipe restraints, junction boxes, control panels (treated as), electrical raceways and electrical conduit associated with plant systems and equipment that are in-scope for license renewal or are located within structures containing safety related components. This commodity group includes the grout under the baseplate and fasteners used with the support or equipment anchorage.

Generally, supports provide the connection between a system's equipment or component and a plant structural member (e.g., wall, floor, ceiling, column, 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 - Includes all items used to support and/or restrain piping. The support boundary includes all the auxiliary steel back to the structure's surface, grout and anchor bolts.
- Equipment Supports - Includes structural steel, fasteners (e.g., bolts, studs, nuts) and vibration mounts that secure equipment to structures.
- 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 concealed 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.

The HGR commodity group excludes jet impingement barriers (e.g., High Energy Line Break barriers), pipe whip restraints, masonry wall supports and miscellaneous plant structures and their details (e.g., stairs, platforms, crane rails). These items were evaluated with the structure where they are located. The RPV support skirt is evaluated with the Reactor Pressure Vessel System.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some SCs in the Hangers and Supports commodity group are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some SCs are in-scope due to ATWS, Fire Protection, and Station Blackout in accordance with 10 CFR 54.4(a)(3).

The portions of the Hangers and Supports Commodity Group containing components subject to an AMR include electrical enclosures such as junction boxes, racks, panels, cabinets, cable trays, conduit and electrical enclosure supports, piping and component supports, mechanical equipment supports and ASME Class MC component supports.

System Function Listing

A comprehensive listing of functions associated with the Hangers and Supports Commodity Group, or specific components contained in the group, is provided in the summary below.

Code: HGR-01	Cri 1	Cri 2	Cri 3				
The Hangers and Supports System shall provide structural support for safety related components such as piping, mechanical, electrical, HVAC, instrument and control equipment.			FP	EQ	PTS	AT	SB
	X						

Comment: Since this function pertains to safety related components, this function is safety related.

Code: HGR-AT	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Anticipated Transients Without Scram.			FP	EQ	PTS	AT	SB
						X	

Comment: The Hangers and Supports System shall provide structural support for components required to function for this regulated event such as piping, mechanical, electrical, HVAC, instrument and control equipment.

Code: HGR-FP	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: The Hangers and Supports System shall provide structural support for components required to function for this regulated event such as piping, mechanical, electrical, HVAC, instrument and control equipment.

Code: HGR-NSAS The Hangers and Supports System shall provide structural support and safe enclosure for non-safety related components such as piping, mechanical, electrical, HVAC, instrument and control equipment.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: This function pertains to non-safety related components whose failure could impact safety-related equipment, primarily due to seismic events (e.g., Class II/I pipe supports). The Hangers and Supports System shall provide structural support for non-safety related components such as piping, mechanical, electrical, HVAC, instrument and control equipment.

Code: HGR-SB The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of all AC power).	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: The Hangers and Supports System shall provide structural support for components required to function for this regulated event such as piping, mechanical, electrical, HVAC, instrument and control equipment.

USAR Reference

Additional Hangers and Supports Commodity Group details are provided in Section 12.2.1.2 and Section 12.2.1.3 of the USAR.

License Renewal Drawings

None.

Components/Commodities Subject to an AMR

The component groups for the Hangers and Supports Commodity Group that require aging management review are addressed in Table 2.4.6-1 along with each component group's intended function(s).

Table 2.4.6-1 Hangers and Supports Commodity Group

Component Group	Intended Function
ALUMINUM IN AIR/GAS (ELECTRICAL JUNCTION BOXES)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT

Table 2.4.6-1 Hangers and Supports Commodity Group

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (ANCHORAGES OF LIGHTING FIXTURES AND JUNCTION BOXES INSIDE TORUS, INCLUDES SUPPORT MEMBERS, WELDS, BOLTED CONNECTIONS)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (ANCHORAGES OF RACKS, PANELS, CABINETS AND ENCLOSURES FOR ELECTRICAL EQUIPMENT AND INSTRUMENTATION; INCLUDES LIGHTING FIXTURES, JUNCTION BOXES, RACKS, PANELS, AND CABINETS OUTSIDE TORUS, INCLUDES SUPPORT MEMBERS, WELDS, BOLTED CONNECTIONS AND SUPPORT ANCHORAGE)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (CABLE TRAYS, CONDUIT, TUBE TRACK OUTSIDE TORUS)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (CONDUIT, LOCATED INSIDE TORUS)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (LIGHTING FIXTURES AND JUNCTION BOXES INSIDE TORUS)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT

Table 2.4.6-1   Hangers and Supports Commodity Group

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (RACKS, PANELS, CABINETS, LIGHTING FIXTURES, JUNCTION BOXES OUTSIDE TORUS)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (SUPPORTS FOR ASME CLASS 1 PIPING AND COMPONENTS INCLUDING RPV STABILIZERS, I.E., CONSTANT AND VARIABLE SPRING HANGERS, GUIDES, STOPS, ETC.)	SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (SUPPORTS FOR ASME CLASS 1 PIPING AND COMPONENTS INCLUDING RPV STABILIZERS, INCLUDES SUPPORT MEMBERS, WELDS, BOLTED CONNECTIONS AND SUPPORT ANCHORAGE)	SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (SUPPORTS FOR ASME CLASS 2 AND 3 PIPING AND COMPONENTS, I.E., CONSTANT AND VARIABLE SPRING HANGERS, GUIDES, STOPS, ETC.)	SAFETY RELATED SUPPORT

Table 2.4.6-1 Hangers and Supports Commodity Group

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (SUPPORTS FOR ASME CLASS 2 AND 3 PIPING AND COMPONENTS, INCLUDES SUPPORT MEMBERS, WELDS, BOLTED CONNECTIONS AND SUPPORT ANCHORAGE)	SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (SUPPORTS FOR ASME CLASS MC COMPONENTS, INCLUDES TORUS SEISMIC RESTRAINTS, DRYWELL MALE AND FEMALE STABILIZERS, SHIELD STABILIZERS, TORUS COLUMNS, TORUS SADDLES, VENT SYSTEM SUPPORTS, DOWNCOMER BRACING, INCLUDES SUPPORT MEMBERS, WELDS, BOLTED CONNECTIONS AND ANCHORAGES)	SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (SUPPORTS FOR CABLE TRAYS, CONDUIT, HVAC DUCTS, TUBE TRACK, INSTRUMENT TUBING AND NON-ASME PIPING OUTSIDE TORUS, INCLUDES SUPPORT MEMBERS, WELDS, BOLTED CONNECTIONS AND SUPPORT ANCHORAGE)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT

Table 2.4.6-1 Hangers and Supports Commodity Group

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (SUPPORTS FOR MECHANICAL EQUIPMENT SUCH AS THE EDG, HVAC COMPONENTS, PUMPS, FANS, MOTORS, TURBINES, ETC., INCLUDES THE SPLASH HOODS FOR THE ESW PUMPS AND THE GAS BOTTLE RACKS, INCLUDES SUPPORT MEMBERS, WELDS, BOLTED CONNECTIONS AND SUPPORT ANCHORAGE)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (SUPPORTS FOR NON-ASME PIPING, CONDUIT, AND COMPONENTS LOCATED INSIDE THE TORUS, INCLUDES SUPPORTS MEMBERS, WELDS, BOLTED CONNECTIONS)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN ATMOSPHERE/ WEATHER (CONDUIT FOR MISCELLANEOUS SBO YARD STRUCTURES, ETC.)	NON-SAFETY SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN ATMOSPHERE/ WEATHER (SUPPORTS FOR CONDUIT FOR MISCELLANEOUS SBO YARD STRUCTURES, ETC., INCLUDES SUPPORT MEMBERS, WELDS, BOLTED CONNECTIONS AND SUPPORT ANCHORAGE)	NON-SAFETY SUPPORT

Table 2.4.6-1 Hangers and Supports Commodity Group

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN ATMOSPHERE/ WEATHER (SUPPORTS FOR EFT TORNADO DAMPERS AND OTHER MISCELLANEOUS MECHANICAL EQUIPMENT, INCLUDES SUPPORT MEMBERS, WELDS, BOLTED CONNECTIONS AND ANCHORAGE)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN ATMOSPHERE/ WEATHER (SUPPORTS FOR NON-ASME PIPING, INCLUDES SUPPORT MEMBERS, WELDS, BOLTED CONNECTIONS AND SUPPORT ANCHORAGE)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN BELOW GRADE (CONDUIT FOR MISCELLANEOUS SBO YARD STRUCTURES, ETC.)	NON-SAFETY SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN BELOW GRADE (DIESEL FUEL OIL STORAGE TANK FLOOD TIE-DOWNS)	SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL EMBEDDED IN CONCRETE (DRYWELL SUPPORT SKIRT ANCHORAGE, RPV FEMALE STABILIZERS)	SAFETY RELATED SUPPORT

Table 2.4.6-1 Hangers and Supports Commodity Group

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL EMBEDDED IN CONCRETE (EMBEDDED CONDUIT)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN TREATED WATER (SUPPORTS FOR ASME CLASS MC COMPONENTS, I.E., VENT SYSTEM SUPPORTS, DOWNCOMER BRACING, INCLUDES SUPPORT MEMBERS, WELDS)	SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN TREATED WATER (SUPPORTS FOR NON-ASME PIPING AND COMPONENTS, I.E., HPC, RCI SPARGER SUPPORTS, SRV T-QUENCHER SUPPORT, ECCS SUCTION STRAINER SUPPORTS, ETC., INCLUDES SUPPORT MEMBERS, WELDS, BOLTED CONNECTIONS)	SAFETY RELATED SUPPORT
CONCRETE IN AIR/GAS (ANCHORAGE OF RACKS, PANELS, CABINETS AND ENCLOSURES FOR ELECTRICAL EQUIPMENT AND INSTRUMENTATION; BUILDING CONCRETE, GROUT PADS)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CONCRETE IN AIR/GAS (SUPPORTS FOR ASME CLASS 1 PIPING AND COMPONENTS; BUILDING CONCRETE AND GROUT PADS)	SAFETY RELATED SUPPORT

Table 2.4.6-1   Hangers and Supports Commodity Group

Component Group	Intended Function
CONCRETE IN AIR/GAS (SUPPORTS FOR ASME CLASS 2 AND 3 PIPING AND COMPONENTS; BUILDING CONCRETE, GROUT PADS)	SAFETY RELATED SUPPORT
CONCRETE IN AIR/GAS (SUPPORTS FOR ASME CLASS MC COMPONENTS; BUILDING CONCRETE, GROUT PADS)	SAFETY RELATED SUPPORT
CONCRETE IN AIR/GAS (SUPPORTS FOR CABLE TRAYS CONDUIT, HVAC DUCTS, TUBE TRACK, INSTRUMENT TUBING, NON-ASME PIPING AND COMPONENTS; BUILDING CONCRETE, GROUT PADS)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CONCRETE IN AIR/GAS (SUPPORTS FOR EDG, HVAC SYSTEM COMPONENTS AND OTHER MISCELLANEOUS MECHANICAL EQUIPMENT; BUILDING CONCRETE, GROUT PADS)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CONCRETE IN ATMOSPHERE/ WEATHER (SUPPORTS FOR CONDUIT FOR MISCELLANEOUS SBO YARD STRUCTURES, ETC.; BUILDING CONCRETE, GROUT PADS)	NON-SAFETY SUPPORT

Table 2.4.6-1 Hangers and Supports Commodity Group

Component Group	Intended Function
CONCRETE IN ATMOSPHERE/ WEATHER (SUPPORTS FOR EFT TORNADO DAMPERS AND OTHER MISCELLANEOUS MECHANICAL EQUIPMENT; BUILDING CONCRETE, GROUT PADS)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CONCRETE IN ATMOSPHERE/ WEATHER (SUPPORTS FOR NON-ASME PIPING AND COMPONENTS; BUILDING CONCRETE, GROUT PADS)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CONCRETE IN BELOW GRADE (DIESEL FUEL OIL STORAGE TANK DEADMEN)	SAFETY RELATED SUPPORT
ELASTOMER SEALANTS (RUBBER, NEOPRENE, SILICONE, ETC.) IN AIR/GAS (VIBRATION ISOLATION ELEMENTS FOR ASME CLASS 1 PIPING AND COMPONENTS)	SAFETY RELATED SUPPORT
ELASTOMER SEALANTS (RUBBER, NEOPRENE, SILICONE, ETC.) IN AIR/GAS (VIBRATION ISOLATION ELEMENTS FOR ASME CLASS 2 AND 3 PIPING AND COMPONENTS)	SAFETY RELATED SUPPORT

Table 2.4.6-1 Hangers and Supports Commodity Group

Component Group	Intended Function
ELASTOMER SEALANTS (RUBBER, NEOPRENE, SILICONE, ETC.) IN AIR/GAS (VIBRATION ISOLATION ELEMENTS FOR ASME CLASS MC COMPONENTS)	SAFETY RELATED SUPPORT
ELASTOMER SEALANTS (RUBBER, NEOPRENE, SILICONE, ETC.) IN AIR/GAS (VIBRATION ISOLATION ELEMENTS FOR EDG, HVAC SYSTEM COMPONENTS AND OTHER MISCELLANEOUS MECHANICAL EQUIPMENT)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
FIBERGLASS IN AIR/GAS (ELECTRICAL JUNCTION BOXES)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
LUBRITE IN AIR/GAS (SLIDING SURFACES FOR ASME CLASS 1 PIPING AND COMPONENTS)	SAFETY RELATED SUPPORT
LUBRITE IN AIR/GAS (SLIDING SURFACES FOR ASME CLASS 2 AND 3 PIPING AND COMPONENTS)	SAFETY RELATED SUPPORT
LUBRITE IN AIR/GAS (SLIDING SURFACES FOR TORUS SADDLES)	SAFETY RELATED SUPPORT
PLASTIC IN AIR/GAS (ELECTRICAL JUNCTION BOXES)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT

Table 2.4.6-1 Hangers and Supports Commodity Group

Component Group	Intended Function
STAINLESS STEEL IN AIR/GAS (SUPPORTS FOR ASME CLASS 1 PIPING AND COMPONENTS INCLUDING RPV STABILIZERS, CLAMPS ETC.)	SAFETY RELATED SUPPORT
STAINLESS STEEL IN AIR/GAS (SUPPORTS FOR ASME CLASS 2 AND 3 PIPING AND COMPONENTS, CLAMPS ETC.)	SAFETY RELATED SUPPORT
STAINLESS STEEL IN AIR/GAS (SUPPORTS FOR ASME CLASS MC COMPONENTS, I.E., VENT HEADER COLUMN SUPPORT PINS)	SAFETY RELATED SUPPORT
STAINLESS STEEL IN AIR/GAS (SUPPORTS FOR TUBE TRACK, INSTRUMENT TUBING, NON-ASME PIPING AND COMPONENTS; CLAMPS ETC.)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
STAINLESS STEEL IN TREATED WATER (SUPPORTS FOR ASME CLASS MC COMPONENTS, I.E., VENT HEADER COLUMN SUPPORT PINS)	SAFETY RELATED SUPPORT

2.4.7 HPCI Building

Description

The principal functions of the High Pressure Coolant Injection Building are to enclose the High Pressure Coolant Injection turbine and pumps and protect the equipment from weather, tornado and seismic effects. The building is a Class I structure and is part of the secondary containment of the Reactor Building.

The High Pressure Coolant Injection Building is a reinforced concrete structure constructed monolithically with the Reactor Building. The structure is supported by a reinforced concrete mat which is an extension of the Reactor Building mat.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some SCs in the High Pressure Coolant Injection Building are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some SCs are in-scope due to Station Blackout in accordance with 10 CFR 54.4(a)(3).

The portions of the High Pressure Coolant Injection Building containing components subject to an AMR include the roof hatch, structural steel, steel embeds, miscellaneous steel, foundation, walls, slabs and hatch seals.

System Function Listing

A comprehensive listing of functions associated with the High Pressure Coolant Injection Building, or specific components contained in the structure, is provided in the summary below.

Code: HPB-01	Cri 1	Cri 2	Cri 3				
The HPC Building provides structural support, safe enclosure and protection for safety related components such as piping, mechanical, electrical, HVAC, instrument and control equipment.			FP	EQ	PTS	AT	SB
	X						

Comment: Since this function pertains to safety related components, this function is safety related.

Code: HPB-02	Cri 1	Cri 2	Cri 3				
The HPC Building provides secondary containment when the primary containment is closed and in service.			FP	EQ	PTS	AT	SB
	X						

Comment: This function is required to minimize ground level release of airborne radioactive materials to the environs during postulated accidents such as a LOCA. The Reactor Building, Radioactive Waste Building, primary containment and SBGT System also support the secondary containment function.

Code: HPB-03	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The HPC Building provides primary containment when the primary containment is open.	X						

Comment: This function is required to minimize ground level release of airborne radioactive materials to the environs during postulated accidents such as a refueling accident. The Reactor Building, Radioactive Waste Building, primary containment and SBGT System also support the primary containment function.

Code: HPB-04	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The HPC Building provides structural support and protection for non-safety related components such as piping, mechanical, electrical, HVAC, instrument and control equipment.							

Comment: This function pertains to non-safety related components.

Code: HPB-05	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The HPC Building provides radiation shielding for plant personnel and equipment during normal operation.							

Comment: This function does not meet any of the criteria for safety related functions, failure of this function does not affect any safety related functions and this function does not support any of the regulated events.

Code: HPB-06	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The HPC Building provides secondary containment to assure that exfiltration from the building does not exceed the design basis during normal operation.							

Comment: This function is performed in combination with the Reactor Building HVAC system. This function is for normal air circulation in the HPC Building. This function does not meet any of the criteria for safety related functions, failure of this function does not affect any safety related functions and this function does not support any of the regulated events.

Code: HPB-07	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The HPC Building provides primary containment to assure that exfiltration from the building does not exceed the design basis during periods when the primary containment is open such as during refueling and maintenance operations.							

Comment: This function is performed in combination with the Reactor Building HVAC system. This function is for normal air circulation in the HPC Building. This function does not meet any of the criteria for safety related functions, failure of this function does not affect any safety related functions and this function does not support any of the regulated events. This function only applies during refueling when function HPB-03 does not apply, i.e., when no fuel movements are occurring.

Code: HPB-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: Some of the building components are non safety related, i.e., stairs and platforms. Failure of these components could affect safety related components. The HPC Building is relied upon for external flood protection.

Code: HPB-SB	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of all AC power).			FP	EQ	PTS	AT	SB
							X

Comment: The HPC Building provides physical support, and protection for components that are required per 10 CFR 50.63, namely the HPCI turbine.

USAR Reference

Additional High Pressure Coolant Injection Building details are provided in Section 1.3.3, Section 1.3.3.2, Section 1.3.9, Section 5.1, Section 5.3.1, Section 5.3.4, Section 5.3.5, Section 12.2.1.2, Section 12.2.1.4, Section 12.2.1.7.1, Section 12.2.1.9, and Section 12.2.2.2 of the USAR.

License Renewal Drawings

The license renewal drawing for the High Pressure Coolant Injection Building is listed below:

LR-36444

Components/Commodities Subject to an AMR

The component groups for the High Pressure Coolant Injection Building that require aging management review are addressed in Table 2.4.7-1 along with each component group’s intended function(s).

Table 2.4.7-1 HPCI Building

Component Group	Intended Function
ALUMINUM IN AIR/GAS (PLATFORMS)	NON-SAFETY SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (STRUCTURAL STEEL, STEEL EMBEDS, ETC.)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (SUPPORTS FOR MISCELLANEOUS STRUCTURES, I.E., MEMBERS, WELDS, BOLTED CONNECTIONS, SUPPORT ANCHORAGE FOR PLATFORMS, STAIRS, ETC.)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN ATMOSPHERE/ WEATHER (ROOF HATCH)	FLOOD BARRIER NON-SAFETY SUPPORT RADIATION SHIELDING SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN BELOW GRADE (PIPING PENETRATION SEAL PLATES)	FLOOD BARRIER PRESSURE BOUNDARY SHELTER/PROTECTION

Table 2.4.7-1 HPCI Building

Component Group	Intended Function
CONCRETE IN AIR/GAS (FOUNDATION, WALLS, SLAB)	FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT PRESSURE BOUNDARY RADIATION SHIELDING SAFETY RELATED SUPPORT
CONCRETE IN AIR/GAS (FOUNDATION, WALLS, SLAB, GROUT)	FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT PRESSURE BOUNDARY RADIATION SHIELDING SAFETY RELATED SUPPORT
CONCRETE IN ATMOSPHERE/ WEATHER (SLAB, ROOF HATCH)	FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT PRESSURE BOUNDARY RADIATION SHIELDING SAFETY RELATED SUPPORT SHELTER/PROTECTION

Table 2.4.7-1 HPCI Building

Component Group	Intended Function
CONCRETE IN BELOW GRADE (FOUNDATION, WALLS)	FLOOD BARRIER NON-SAFETY SUPPORT PRESSURE BOUNDARY RADIATION SHIELDING SAFETY RELATED SUPPORT SHELTER/PROTECTION
ELASTOMER SEALANTS (RUBBER, NEOPRENE, SILICONE, ETC.) IN AIR/GAS (ROOF HATCH SEALS)	FLOOD BARRIER PRESSURE BOUNDARY RADIATION SHIELDING SHELTER/PROTECTION
ELASTOMER SEALANTS (RUBBER, NEOPRENE, SILICONE, ETC.) IN ATMOSPHERE/ WEATHER (ROOF HATCH SEALS)	FLOOD BARRIER PRESSURE BOUNDARY RADIATION SHIELDING SHELTER/PROTECTION

2.4.8 Intake Structure

Description

The Intake Structure is basically a chambered box of reinforced concrete construction. The Intake Structure also includes the access tunnel between the Turbine Building and the Intake Structure as well as the diesel fire pump house which sits on top of the Intake Structure.

Essentially, the Intake Structure consists of four 13-foot 8-inch bays with an invert at the intake end which converges to a two section suction chamber at the discharge end. A circulating water pump is mounted over each suction chamber.

The roof of the structure is approximately 4-foot 3-inches above grade and consists of reinforced concrete beam and slab framing. The Intake Structure contains an operating floor on which the Emergency Diesel Generator-Emergency Service Water, Emergency Service Water, and RHR Service Water subsystem pumps are mounted.

Exterior and interior walls and slabs are constructed of reinforced concrete and provide support for the operating floor and roof framing. The structure is supported on a mat foundation 3-foot 6-inches in thickness that was placed on a lean concrete fill which overlays a layer of cemented sandstone.

The Intake Structure is a Class II structure. In addition the structure was analyzed for the criteria specified for Class II structures housing Class I equipment.

The underground tunnel between The Turbine Building (TGB) and Intake Structure, called the access tunnel, provides sheltered access from the Turbine Building to the operating floor of the Intake Structure. The tunnel is a box section in shape and of reinforced concrete construction. The tunnel is constructed on an earth foundation of select backfill. Portions of the ESW and RSW piping and controls are located in the access tunnel.

Structurally, the tunnel is physically separated at the Turbine Building and Intake Structure interfaces to minimize the effects of unequal settlements and dissimilar seismic response. A flexible water stop is provided in the expansion joint at each structure interface and in all construction joints. The tunnel is also completely enveloped with a waterproof membrane.

The tunnel is basically a Class II structure and was designed to comply with earthquake criteria for Class II structures. Since portions of Class I category systems are located herein the structure was also investigated for compliance with criteria for Class II structures housing Class I equipment. This later case was the governing condition for design.

The Diesel Fire Pump House is located on top of the Intake Structure at the east end. The Diesel Fire Pump House contains the Diesel Fire Pump and the Diesel Fire Pump Day Tank. The Diesel Fire Pump House is constructed of concrete masonry block walls with an insulated steel deck roof supported by structural steel beams.

Those portions of the Intake Structure and access tunnel which house Class I equipment were designed to resist the effects of tornado.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some SCs in the intake structure are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some SCs are in-scope due to Fire Protection in accordance with 10 CFR 54.4(a)(3).

The portions of the Intake Structure containing components subject to an AMR include the doors, structural steel, steel embeds, miscellaneous steel, inlet channel sheet piles, foundation, walls and slabs.

System Function Listing

A comprehensive listing of functions associated with the Intake Structure, or specific components contained in the structure, is provided in the summary below.

Code: INS-01	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Intake Structure provides structural support, safe enclosure and protection for safety related components such as piping, mechanical, electrical, HVAC, instrument and control equipment.	X						

Comment: Since this function pertains to safety related components, this function is safety related. The Intake Structure also provides water to safety related equipment.

Code: INS-02	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Intake Structure shall provide a means to allow open cycle, helper cycle, partial recirculation and closed cycle of cooling water.							

Comment: The purpose of this function is to provide water to the Circulating Water System to remove heat from the main condenser. This function is not relied upon to safely shutdown the plant or to mitigate the consequences of an accident. This function does not support a safety related function or any of the regulated events.

Code: INS-03	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Intake structure shall provide the flow path to allow the maximum permissible appropriation of river water directly into circulating pump bays.							

Comment: The purpose of this function is to provide water to the Circulating Water System to remove heat from the main condenser. This function is not relied upon to safely shutdown the plant or to mitigate the consequences of an accident. This function does not support a safety related function or any of the regulated events.

Code: INS-04	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Intake Structure provides structural support and protection for non-safety related components such as piping, mechanical, electrical, HVAC, instrument and control equipment.							

Comment: This function pertains to non-safety related components.

Code: INS-05	Cri 1	Cri 2	Cri 3				
The Intake Structure shall provide required river water supply to the fire protection system, normal service water pumps and RSW pumps for normal plant operation and normal plant shutdown.			FP	EQ	PTS	AT	SB

Comment: The purpose of this function is to provide water for the pumps for normal operation. This function is not relied upon to safely shutdown the plant or to mitigate the consequences of an accident. This function does not support a safety related function. See INS-01 for safety related function. See INS-FP for fire protection function.

Code: INS-06	Cri 1	Cri 2	Cri 3				
The Intake Structure shall provide severe accident condition water makeup capability for RSW, RHR and fire protection systems.			FP	EQ	PTS	AT	SB

Comment: See INS-FP for fire protection function.

Code: INS-FP	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: This structure performs function(s) relied upon for 10 CFR 50.48. The Intake Structure shall provide required river water supply to the fire protection system. The Intake Structure shall support the protection of Appendix R safe shutdown equipment from a fire in redundant division areas. The access tunnel contains structures and components (fire piping/supports) which perform functions credited in the current license basis for fire protection. The Diesel Fire Pump House also contains structures and components (Diesel Driven Fire Pump) which perform functions credited in the current license basis for fire protection.

Code: INS-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety-related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: The Intake Structure is a class II structure which supports class I equipment. Some of the building components are non-safety related, i.e., stairs and platforms. Failure of these components could affect safety related components. This structure is relied upon to provide external flood protection.

USAR Reference

Additional Intake Structure details are provided in Section 10.3.1.2.1, Section 11.5.2, Section 12.2.1.2, Section 12.2.1.3, Section 12.2.1.4, Section 12.2.1.7.1, Section 12.2.1.9, Section 12.2.2.7.1, and Section 12.2.2.7.2 of the USAR.

License Renewal Drawings

The license renewal drawing for the Intake Structure is listed below:

LR-36444

Components/Commodities Subject to an AMR

The component groups for the Intake Structure that require aging management review are addressed in Table 2.4.8-1 along with each component group's intended function(s).

Table 2.4.8-1 Intake Structure

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (DOORS, STRUCTURAL STEEL, STEEL EMBEDS, ETC.)	FLOOD BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (SUPPORTS FOR MISCELLANEOUS STRUCTURES, I.E., MEMBERS, WELDS, BOLTED CONNECTIONS, SUPPORT ANCHORAGE FOR PLATFORMS, STAIRS, ETC.)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN ATMOSPHERE/ WEATHER (STRUCTURAL STEEL, SHEET PILES, VENTILATION ASSEMBLIES)	COOLING WATER SOURCE FLOOD BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER/PROTECTION

Table 2.4.8-1 Intake Structure

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN BELOW GRADE (SHEET PILES)	COOLING WATER SOURCE NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN RAW WATER (STRUCTURAL STEEL, SHEET PILES)	COOLING WATER SOURCE NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN RAW WATER (SUPPORTS FOR MISCELLANEOUS STRUCTURES, I.E., MEMBERS, WELDS, BOLTED CONNECTIONS, SUPPORT ANCHORAGE FOR PLATFORMS, STAIRS, ETC.)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CONCRETE IN AIR/GAS (FOUNDATION, WALLS, SLABS)	COOLING WATER SOURCE FIRE BARRIER FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT

Table 2.4.8-1 Intake Structure

Component Group	Intended Function
CONCRETE IN AIR/GAS (FOUNDATION, WALLS, SLABS, GROUT)	COOLING WATER SOURCE FIRE BARRIER FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CONCRETE IN AIR/GAS (WALLS, SLABS)	FIRE BARRIER
CONCRETE IN ATMOSPHERE/ WEATHER (INTAKE STRUCTURE AND ACCESS TUNNEL ROOF SLABS)	COOLING WATER SOURCE FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER/PROTECTION
CONCRETE IN ATMOSPHERE/ WEATHER (WALLS, SLABS)	COOLING WATER SOURCE FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER/PROTECTION

Table 2.4.8-1 Intake Structure

Component Group	Intended Function
CONCRETE IN BELOW GRADE (FOUNDATION, WALLS, LEAN CONCRETE)	COOLING WATER SOURCE FLOOD BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER/PROTECTION
CONCRETE IN RAW WATER (FOUNDATION, WALLS, SLABS)	COOLING WATER SOURCE FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER/PROTECTION
MASONRY WALLS IN AIR/GAS	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
MASONRY WALLS IN ATMOSPHERE/WEATHER	NON-SAFETY SUPPORT

2.4.9 Miscellaneous SBO Yard Structures

Description

The Miscellaneous SBO Yard Structures are those yard structures that provide support for equipment relied upon for recovery from a Station Blackout. These structures are listed below:

- The foundations and transformer structures for 1R, 2R, 1AR and 2RS Transformers
- The 345kV control house
- The towers/foundation for the 1N2, 1N6, 5N5, 5N7, 8N4 and 8N11 breakers

- The towers/foundations for the bus bars between the 2RS transformer and the 8N4 and 8N11 breakers, this includes the tower/foundation for the 3N4 breaker 3N5 fused disconnect, the current limiting protector, and the towers/foundations to the 1ARS Motor Operated Disconnect (MOD).
- The towers/foundations for the bus bars for the 5N5 and 5N7 breakers. This includes the west four rows of columns and the beams that connect them together.
- The Trenwa trenches connecting the control house to the 115 kV ring bus.
- The Trenwa trenches connecting the control house to the 345 kV ring bus.
- The electrical duct bank from the 1N2 breaker to the 1AR Transformer.
- The tower/foundation for the Bus 1 115 kV Potential Transformer.
- The three 115 kV transmission towers along the west OCA fence between the switchyard and the 1R transformer and the first transmission tower northwest of the plant.
- The block walls surrounding the 1R and 2R transformers.

The SCs in the Miscellaneous SBO Yard Structures are in-scope due to Station Blackout in accordance with 10 CFR 54.4(a)(3).

The portions of the Miscellaneous SBO Yard Structures containing components subject to an AMR include the transmission towers, foundations, walls, slabs and trenches.

System Function Listing

A comprehensive listing of functions associated with the Miscellaneous SBO Yard Structures, or specific components contained in the structures, is provided in the summary below.

Code: MSS-01	Cri 1	Cri 2	Cri 3				
The Miscellaneous SBO Yard Structures provide structural support for non-safety related electrical components.			FP	EQ	PTS	AT	SB

Comment: This function pertains to non-safety related components. There are no safety related components within these structures. These structures are small in size and/or sufficiently far from safety related structures/components such that they will have no affect on any safety related structures/components.

Code: MSS-SB This system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of all AC power).	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: The Miscellaneous SBO Yard Structures contain components that are required per 10 CFR 50.63, specifically, transformers, disconnects, etc.

USAR Reference

Additional Miscellaneous SBO Yard Structures details are provided in Section 8.2, Section 12.2.1.2, and Section 12.2.1.3 of the USAR.

License Renewal Drawings

The license renewal drawing for the Miscellaneous SBO Yard Structures is listed below:

LR-36444

Components/Commodities Subject to an AMR

The component groups for the Miscellaneous SBO Yard Structures that require aging management review are addressed in Table 2.4.9-1 along with each component group's intended function(s).

Table 2.4.9-1 Miscellaneous SBO Yard Structures

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (345KV HOUSE STRUCTURAL STEEL)	NON-SAFETY SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (SUPPORTS FOR 345KV HOUSE MISCELLANEOUS STEEL, I.E., MEMBERS, WELDS, BOLTED CONNECTIONS, SUPPORT ANCHORAGE)	NON-SAFETY SUPPORT

Table 2.4.9-1 Miscellaneous SBO Yard Structures

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN ATMOSPHERE/ WEATHER (ANCHORAGES)	NON-SAFETY SUPPORT
CARBON STEEL, LOW-ALLOY STEEL IN ATMOSPHERE/ WEATHER (STRUCTURAL STEEL FOR 345KV HOUSE, SWITCHYARD AND TRANSMISSION TOWERS, ETC.)	NON-SAFETY SUPPORT
CONCRETE IN AIR/GAS (345KV HOUSE CONCRETE)	NON-SAFETY SUPPORT
CONCRETE IN ATMOSPHERE / WEATHER (345KV HOUSE CONCRETE, FOUNDATIONS)	NON-SAFETY SUPPORT
CONCRETE IN ATMOSPHERE / WEATHER (345KV HOUSE, FOUNDATIONS, TRENCHES, DUCT BANK, GROUT)	NON-SAFETY SUPPORT
CONCRETE IN BELOW GRADE (345KV HOUSE, FOUNDATIONS, TRENCHES, DUCT BANK)	NON-SAFETY SUPPORT
MASONRY WALLS IN ATMOSPHERE/ WEATHER	NON-SAFETY SUPPORT

2.4.10 **Off Gas Stack**

Description

The function of the Off Gas Stack is to provide for controlled release and dispersal of gaseous radioactive wastes.

The stack is a free-standing tapered, reinforced concrete structure which encloses and supports an independent gas flue. The overall height of the stack above adjacent grade is 328-feet. The internal diameter of the concrete shell is 7-feet at the top and 32-feet at the 946-foot 6-inch elevation, with thickness varying from 7 inches at the top to 10 inches at the 946-foot 6-inch elevation.

Below the 946-foot 6-inch elevation to the top of the foundation at the 932-foot 6-inch elevation, the stack shell is a polygon having a maximum inscribed diameter of 34-feet. The wall thickness varies in accordance with radiation shielding requirements.

The stack shell is supported on a 4-foot thick octagonal spread footing with a 1-foot 6-inch pedestal.

The independent gas flue is 18-inches in diameter reducing to 14-inches in diameter at the top.

The description above results in some SCs in the Off Gas Stack being in-scope in accordance with 10 CFR 54.4(a)(1). In addition, since some SCs in the Off Gas Stack are non-safety related, and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2).

The portions of the Off Gas Stack containing components subject to an AMR include structural steel, steel embeds, miscellaneous steel, doors, pedestal, walls and slabs.

System Function Listing

A comprehensive listing of functions associated with the Off Gas Stack, or specific components contained in the structure, is provided in the summary below.

Code: OGS-01	Cri 1	Cri 2	Cri 3				
The Off Gas Stack provides structural support, safe enclosure and protection for safety related components such as off gas stack liner dilution fans, piping, mechanical, electrical, HVAC, instrument and control equipment.			FP	EQ	PTS	AT	SB
	X						

Comment: Since this function pertains to safety related components, this function is safety related.

Code: OGS-02 The Off Gas Stack shall provide a means for elevated release and dispersal of gaseous radioactive wastes from the SBGT System.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: None.

Code: OGS-03 The Off Gas Stack shall provide radiation shielding to limit the radiation dose levels inside the fence and inside the building to acceptable levels.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This function is non-safety related. This function doesn't support any safety related functions. This function doesn't support any of the regulated events.

Code: OGS-04 The Off Gas Stack shall provide a means for elevated release and dispersal of gaseous radioactive wastes from the off gas system.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This function is non-safety related. This function doesn't support any safety related functions. This function doesn't support any of the regulated events.

Code: OGS-05 The Off Gas Stack provides structural support and protection for non-safety related components such as piping, mechanical, electrical, HVAC, instrument and control equipment.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This function pertains to non-safety related components.

Code: OGS-NSAS Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: Some of the building components are non-safety related, i.e., stairs and platforms. Failure of these components could affect safety related components.

USAR Reference

Additional Off Gas Stack details are provided in Section 1.3.3.2, Section 12.2.1.2, Section 12.2.1.7.1, and Section 12.2.2.6 of the USAR.

License Renewal Drawings

The license renewal drawing for the Off Gas Stack is listed below:

LR-36444

Components/Commodities Subject to an AMR

The component groups for the Off Gas Stack that require aging management review are addressed in Table 2.4.10-1 along with each component group's intended function(s).

Table 2.4.10-1 Off Gas Stack

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (STRUCTURAL STEEL, STEEL EMBEDS, ETC.)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (SUPPORTS FOR MISCELLANEOUS STRUCTURES, I.E., MEMBERS, WELDS, BOLTED CONNECTIONS, SUPPORT ANCHORAGE FOR PLATFORMS, STAIRS, ETC.)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN ATMOSPHERE/ WEATHER (DOORS)	SHELTER/PROTECTION
CONCRETE IN AIR/GAS (PEDESTAL, WALLS, SLABS)	FLOOD BARRIER GASEOUS DISCHARGE NON-SAFETY SUPPORT SAFETY RELATED SUPPORT

Table 2.4.10-1 Off Gas Stack

Component Group	Intended Function
CONCRETE IN AIR/GAS (PEDESTAL, WALLS, SLABS, GROUT)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CONCRETE IN ATMOSPHERE/ WEATHER (PEDESTAL, WALLS)	FLOOD BARRIER GASEOUS DISCHARGE NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER/PROTECTION
CONCRETE IN BELOW GRADE (PEDESTAL)	FLOOD BARRIER GASEOUS DISCHARGE NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER/PROTECTION
MASONRY WALLS IN AIR/GAS	NON-SAFETY SUPPORT RADIATION SHIELDING SAFETY RELATED SUPPORT
STAINLESS STEEL IN AIR/GAS (CAP)	GASEOUS DISCHARGE NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
STAINLESS STEEL IN ATMOSPHERE/ WEATHER (CAP)	GASEOUS DISCHARGE NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER/PROTECTION

2.4.11 **Off Gas Storage and Compressor Building**

Description

The Off Gas Storage Building except for the Fan and Foyer Room portions, was designed for Class I seismic conditions, flood conditions, and for tornado wind loads and missiles. The only portion of the off-gas storage system which currently has seismic design requirements are the storage tanks and the attached piping up to the first isolation valve. The building meets all Federal, State and local codes applicable to industrial process buildings. The building is constructed of reinforced concrete on a suitable foundation and is situated near the base of the off-gas stack. The Fan and Foyer Room portions of the Off-Gas Storage Building provide adequate Class I level protection for all external events in which the enclosed equipment is required to perform a safety related function. This includes Class I dead, live (snow and floor) and wind loads. It does not include seismic or tornado loads or tornado generated missiles.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some SCs in the Off Gas Storage and Compressor Building are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2).

The portions of the Off Gas Storage and Compressor Building containing components subject to an AMR include the structural steel, foundation, walls, and slabs.

System Function Listing

A comprehensive listing of functions associated with the Off Gas Storage and Compressor Building, or specific components contained in the structure, is provided in the summary below.

Code: OGB-01	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Off Gas Storage Building provides structural support, safe enclosure and protection for safety related components required to perform safety functions in support of the Standby Gas Treatment System operation.	X						

Comment: This system function only applies to the fan and foyer rooms which are designed to Class I loads and house safety related equipment.

Code: OGB-02	Cri 1	Cri 2	Cri 3				
The Off Gas Storage Building provides structural support and protection for non-safety related components such as piping, mechanical, electrical, HVAC, instrument and control equipment.			FP	EQ	PTS	AT	SB

Comment: This function pertains to non-safety related components.

Code: OGB-03	Cri 1	Cri 2	Cri 3				
The Off Gas Storage and Compressor Building provides shielding to limit the radiation dose levels inside the fence and inside the building to acceptable levels.			FP	EQ	PTS	AT	SB

Comment: This function is not safety related. This function doesn't support any safety related functions. This function doesn't support any of the regulated events.

Code: OGB-04	Cri 1	Cri 2	Cri 3				
The Off Gas Storage and Compressor Building provides a means for the storage and controlled release of gaseous radioactive wastes from the off gas system.			FP	EQ	PTS	AT	SB

Comment: This function is not safety related. This function doesn't support any safety related functions. This function doesn't support any of the regulated events.

Code: OGB-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety-related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: Except for the fan and foyer rooms, the OGSB is a class II structure. The fan and foyer rooms house Class I equipment. Therefore, the Class II portions of this structure must not adversely impact the fan and foyer rooms.

USAR Reference

Additional Off Gas Storage and Compressor Building details are provided in Section 12.2.1.3, Section 12.2.1.7.1, Section 12.2.1.9, and Section 12.2.2.8 of the USAR.

License Renewal Drawings

The license renewal drawing for the Off Gas Storage and Compressor Building is listed below:

LR-36444

Components/Commodities Subject to an AMR

The component groups for the Off Gas Storage and Compressor Building that require aging management review are addressed in Table 2.4.11-1 along with each component group's intended function(s).

Table 2.4.11-1 Off Gas Storage and Compressor Building

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (STRUCTURAL STEEL)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CONCRETE IN AIR/GAS (FOUNDATION, WALLS, SLABS)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CONCRETE IN AIR/GAS (FOUNDATION, WALLS, SLABS, GROUT)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CONCRETE IN ATMOSPHERE/ WEATHER (WALLS, SLABS)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CONCRETE IN BELOW GRADE (FOUNDATION, WALLS)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT

2.4.12 Plant Control and Cable Spreading Structure

Description

The primary functions of this structure are to provide, under all operating or postulated accident conditions, safe enclosure for those portions of the standby electrical power systems and instrumentation and controls systems vital to overall plant operation and safety which are located therein and an environment satisfactory for continuous occupancy by operating personnel.

The Plant Control and Cable Spreading Structure is located at the north end of the original office and control building. The main control room, cable spreading room, and battery room are located herein.

The Administration Building is located adjacent to the east side of the original office and control building. The original office and control building as well as the Administration Building constitute the Plant Control and Cable Spreading Structure.

The Administration Building provides a records storage area to meet the requirements of ANSI N45.2.9, training space, lockers and rest room facilities, an instrument shop, library space, a meeting room, shift supervisor's office, open office space, and private offices. Modifications to the shift supervisor's office have been made so that the office is part of the main control room for the purpose of meeting the NRC's requirement for the presence of a senior licensed operator in the control room at all times. The shift supervisor's office is located immediately adjacent to the main control room but outside the previously defined control room boundary.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some SCs in the Plant Control and Cable Spreading Structure are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some SCs are in-scope due to ATWS, Fire Protection, and Station Blackout in accordance with 10 CFR 54.4(a)(3).

The portions of the Plant Control and Cable Spreading Structure containing components subject to an AMR include the doors, structural steel, steel embeds, miscellaneous steel, walls, slabs, foundation and seals.

System Function Listing

A comprehensive listing of functions associated with the Plant Control and Cable Spreading Structure, or specific components contained in the structure, is provided in the summary below.

Code: PAB-01	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Plant Control and Cable Spreading Structure and Administration Bldg provide structural support, safe enclosure and protection for safety related components such as piping, mechanical, electrical, HVAC, instrument and control equipment.	X						

Comment: Since this function pertains to safety related components, this function is safety related. In addition to safety related equipment support and protection, the structure forms part of the pressurized boundary and provides shielding protection to minimize operator exposure to radiation in post accident conditions. Portions of the structure west wall also serve as a turbine missile shield for equipment and operator protection.

Code: PAB-02	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Plant Control and Cable Spreading Structure and Administration Bldg provide structural support, safe enclosure and protection for non-safety related components such as piping, mechanical, electrical, HVAC, instrument and control equipment.							

Comment: This function pertains to non-safety related components.

Code: PAB-03	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Plant Control and Cable Spreading Structure and Administration Bldg shall provide an environment satisfactory for continuous occupancy by operating personnel.							

Comment: This function is not safety related. This function doesn't support any safety related functions. This function doesn't support any of the regulated events.

Code: PAB-04	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Plant Control and Cable Spreading Structure and Administration Bldg shall provide an environmental boundary for the CRV-EFT System.	X						

Comment: None.

Code: PAB-AT	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Anticipated Transients Without Scram.			FP	EQ	PTS	AT	SB
						X	

Comment: The Plant Control and Cable Spreading Structure and Administration Bldg contain components that are required per 10 CFR 50.62. This structure provides physical support and protection for equipment required to mitigate the regulated event.

Code: PAB-FP	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: The Plant Control and Cable Spreading Structure and Administration Bldg contain components that are required per 10 CFR 50.48. The Plant Control and Cable Spreading Structure and Administration Bldg shall support the protection of Appendix R safe shutdown equipment from a fire in redundant division areas. This structure provides physical support and protection for equipment required to mitigate the regulated event.

Code: PAB-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety-related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: Class II portions of the Plant Control and Cable Spreading Structure and Administration Bldg shall not jeopardize the Class I SSCs. Some of the building components are non-safety related, i.e., stairs and platforms. Failure of these components could affect safety related components. The Plant Control and Cable Spreading Structure and Administration Bldg are relied upon for external flood protection.

Code: PAB-SB	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of AC power).			FP	EQ	PTS	AT	SB
							X

Comment: The Plant Control and Cable Spreading Structure and Administration Bldg contain components that are required per 10 CFR 50.63. This structure provides physical support and protection for equipment required to mitigate the regulated event.

USAR Reference

Additional Plant Control and Cable Spreading Building Structure details are provided in Section 6.1.4.5, Section 6.7.1, Section 10.3.1, Section 12.2.1.2, Section 12.2.1.3, Section 12.2.1.7.1, Section 12.2.1.9, Section 12.2.2.3, and Section 12.3.2.2.4 of the USAR.

License Renewal Drawings

The license renewal drawing for the Plant Control and Cable Spreading Structure is listed below:

LR-36444

Components/Commodities Subject to an AMR

The component groups for the Plant Control and Cable Spreading Structure that require aging management review are addressed in Table 2.4.12-1 along with each component group's intended function(s).

Table 2.4.12-1 Plant Control and Cable Spreading Building Structure

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (FIRE RATED DOORS)	FIRE BARRIER
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (STRUCTURAL STEEL, STEEL EMBEDS, ETC.)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (SUPPORTS FOR MISCELLANEOUS STRUCTURES, I.E., MEMBERS, WELDS, BOLTED CONNECTIONS, SUPPORT ANCHORAGE FOR PLATFORMS, STAIRS, ETC.)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT

Table 2.4.12-1 Plant Control and Cable Spreading Building Structure

Component Group	Intended Function
CONCRETE IN AIR/GAS (FOUNDATION, WALLS, SLABS)	FIRE BARRIER FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CONCRETE IN AIR/GAS (FOUNDATION, WALLS, SLABS, GROUT)	FIRE BARRIER FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CONCRETE IN AIR/GAS (WALLS, SLABS)	FIRE BARRIER
CONCRETE IN ATMOSPHERE/ WEATHER (WALLS, SLABS)	FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER/PROTECTION
CONCRETE IN BELOW GRADE (FOUNDATION, WALLS)	FLOOD BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER/PROTECTION

Table 2.4.12-1 Plant Control and Cable Spreading Building Structure

Component Group	Intended Function
ELASTOMER SEALANTS (RUBBER, NEOPRENE, SILICONE, ETC.) IN AIR/GAS (CONTROL ROOM SEALS)	SAFETY RELATED SUPPORT
MASONRY WALLS IN AIR/GAS	FIRE BARRIER FLOOD BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT

2.4.13 **Primary Containment**

Description

The Primary Containment (PCT) System includes the following structures: the drywell, the wetwell (torus), the primary containment penetrations, the bioshield wall, the RPV support pedestal the drywell/torus internal platforms and the torus external catwalk. The mechanical portion of the primary containment system is included in the Primary Containment Mechanical (PCM) System.

The Primary Containment System (PCT) provides a barrier to the release of fission products to the Secondary Containment (SCT) and rapidly reduces the pressure in Primary Containment after a loss-of-coolant accident.

The Primary Containment System consists of a light-bulb-shaped drywell, a torus-shaped wetwell, and a connecting vent system between the drywell and the wetwell. The system encloses the reactor vessel, the reactor coolant recirculation loops, and various branch connections of the reactor primary system.

A detailed description of the principal components of the Primary Containment System is provided below:

a. Drywell

The drywell is a steel pressure vessel with a spherical lower portion and a cylindrical upper portion. It is enclosed in reinforced concrete for shielding and to provide additional resistance to deformation and buckling over areas where the concrete backs up the steel shell. Above the foundation transition zone, the drywell is separated from the reinforced concrete by a gap of approximately 2 inches to allow for thermal expansion. Shielding over the top of the drywell is provided by a removable, segmented, reinforced concrete shield plug. The drywell vessel is provided with a removable hemispherical head to facilitate refueling. The head is held in place by bolts and sealed with a double gasket arrangement. The head is also provided with a 24-inch double-gasketed hatch. The hatch may be removed for inspection of the area under the head.

In addition to the drywell head, one double door personnel airlock, one large equipment hatch, and one small control rod drive hatch are provided for access to the drywell. The equipment hatch is provided with a 10-foot diameter hatch cover and shielded with a removable concrete plug.

b. Personnel Airlock

The personnel airlock provides an entrance to the drywell measuring 6-feet by 2.5-feet. The locking mechanism on each manually operated air lock door is designed so a door may be operated only if the other door is closed and latched with the equalizing valve shut. A mechanical interlock accomplishes this.

Hand wheels are provided on the drywell side, the Reactor Building side, and in the interior of the air lock to open or close either door. There are portable page unit connections and sound powered phone jacks located in the drywell. A telephone is located inside the airlock.

c. Wetwell

The wetwell is a steel pressure vessel in the shape of a torus located below and encircling the drywell. The wetwell is constructed of 16 mitered cylindrical sections to create the double curved torus shape.

The wetwell is held on supports, which transmit vertical and seismic loading to the reinforced concrete foundation slab of the Reactor Building.

Eight drywell-to-wetwell vent lines are connected to a vent header, also in the form of a torus, located within the wetwell air space. Projecting from the vent header are downcomer pipes, which terminate approximately three feet below the surface of the wetwell pool. Columns attached to the bottom of the wetwell resist upward reaction from downcomer flow following an accident. The columns are pinned top and bottom to accommodate the differential horizontal movement between the header and the wetwell.

Access from the Reactor Building to the wetwell is provided through two manholes with double-gasketed, bolted covers. These access ports are bolted closed when Primary Containment integrity is required.

The water in the wetwell is sized to absorb the energy release from a loss-of-coolant accident.

d. Containment Penetrations

Penetrations through the drywell and wetwell walls provide for passage of fluid piping and electrical cables. These penetrations are designed to withstand environmental conditions present during a LOCA and to maintain Primary Containment integrity for extended periods of time in a post-accident environment.

Piping penetrations consists of pipe segments welded into structurally enhanced containment shell plates. Piping penetrations are of two general types: sleeved, those which the process flow is not in contact with the original penetration pipe segments, and unsleeved, those which the process flow is in contact with the original penetration pipe segments.

Sleeved piping penetrations are of two general types: those which accommodate thermal expansion (hot), and those, which experience relatively little thermal expansion (cold). High temperature lines, such as the main steam lines and certain other reactor auxiliary and cooling system lines require hot fluid penetration assemblies, which are designed to accommodate the stresses associated with thermal expansion. These penetrations have a guard pipe between the hot line and the penetration nozzle, in addition to a double-seal arrangement. The penetration nozzle is welded to the drywell and extends through the biological shield where it is welded to a bellows, which in turn is welded to a guard pipe. The bellows accommodates the relative movement between the hot line and the containment shell. The cold piping penetration assemblies use a pipe sleeve, which attaches to the drywell. No bellows are required, since thermal stresses are minimal.

Only the pressure retaining portions of the penetrations are in the PCT System. For additional information regarding the mechanical portions, see the PCM System (Section 2.3.2.5) and for additional information regarding the electrical portions, see the Electrical Penetrations Commodity Group (Section 2.5.2.1).

The description above results in some SCs in this structure being in-scope in accordance with 10 CFR 54.4(a)(1). Since some SCs in the Primary Containment are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some SCs are in-scope due to ATWS, Fire Protection, and Station Blackout in accordance with 10 CFR 54.4(a)(3).

The portions of the Primary Containment containing components subject to an AMR include the drywell, torus, vent system, bellows assemblies, ECCS suction header, airlocks, hatches, torus catwalks, drywell interior platforms, bioshield wall, seals, gaskets, moisture barrier and thermowells.

System Function Listing

A comprehensive listing of functions associated with the Primary Containment, or specific components contained in the structure, is provided in the summary below.

Code: PCT-01	Cri 1	Cri 2	Cri 3				
The Primary Containment System shall provide a barrier which controls the release of fission products to the secondary containment.			FP	EQ	PTS	AT	SB
	X						

Comment: Credited in accident analyses.

Code: PCT-02	Cri 1	Cri 2	Cri 3				
The Primary Containment System provides structural support, safe enclosure and protection for safety related components such as piping, mechanical, electrical, HVAC, instrument and control equipment.			FP	EQ	PTS	AT	SB
	X						

Comment: Since this function pertains to safety related components, this function is safety related.

Code: PCT-03	Cri 1	Cri 2	Cri 3				
The Primary Containment System shall rapidly reduce the pressure in the containment resulting from a LOCA.			FP	EQ	PTS	AT	SB
	X						

Comment: Credited in accident analyses.

Code: PCT-04	Cri 1	Cri 2	Cri 3				
The Primary Containment System provides structural support and protection for non-safety related components such as piping, mechanical, electrical, HVAC, instrument and control equipment.			FP	EQ	PTS	AT	SB

Comment: This function pertains to non-safety related components.

Code: PCT-05	Cri 1	Cri 2	Cri 3				
The Primary Containment System provides a coolant supply for the RHR and CSP Systems and an alternate supply for the HPC and RCI Systems.			FP	EQ	PTS	AT	SB
	X						

Comment: Coolant supply is suppression chamber.

Code: PCT-06	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Primary Containment System provides a water seal for piping penetrations that terminate beneath the minimum water level of the suppression chamber.	X						

Comment: Piping penetrations that are sealed with water are not treated as potential leakage paths for containment atmosphere following a LOCA. Valves on these lines are not relied upon to perform a containment isolation function and their testing is not a requirement of 10 CFR50, Appendix J.

Code: PCT-07	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Primary Containment System provides penetration assemblies that maintain leak-tight integrity but allow process piping and instrumentation, electrical power and control cabling, and personnel and equipment to penetrate/enter and leave containment.	X						

Comment: Containment penetration assemblies are part of primary containment. They are designed to maintain primary containment integrity before, during and after design basis events. The containment penetrations are listed in Table 5.2-3 of the USAR.

Code: PCT-AT	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Primary Containment System contains structures and/or components which perform functions credited in the current licensing basis for Anticipated Transients Without Scram.						X	

Comment: Credited in regulated event. This structure performs functions relied upon for 10 CFR 50.62, specifically, equipment protection and support. Provides structural and/or functional support to equipment relied on for ATWS mitigation.

Code: PCT-FP	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Primary Containment System contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.			X				

Comment: This function supports mitigation of Appendix R fire events.

The Primary Containment System shall provide fire protection Appendix R mitigation support such as safety relief valve (SRV) blowdown heat sink, RPV coolant source and containment inerted atmosphere.

Code: PCT-NSAS Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: Includes internal and external catwalk, etc.

Code: PCT-SB The Primary Containment System contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of AC power).	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: Credited in regulated event. This structure performs functions relied upon for 10 CFR 50.63, specifically, equipment protection and support. Provides structural and/or functional support to equipment relied on for SBO mitigation.

USAR Reference

Additional Primary Containment details are provided in Section 1.3.3.1, Section 4.5, Section 5.2.1.1, Section 5.2.1.2.2, Section 5.2.2.1, Section 6.2.2.2.1, Section 6.2.3.2.2, Section 6.2.4.2.7, Section 8.12, Section 10.2.5.2, Section 12.2.1.2, Section 12.2.1.3, Section 12.2.1.9, and Table 5.2-3a of the USAR.

License Renewal Drawings

The license renewal drawing for the Primary Containment is listed below:

LR-36444

Components/Commodities Subject to an AMR

The component groups for the Primary Containment that require aging management review are addressed in Table 2.4.13-1 along with each component group's intended function(s).

Table 2.4.13-1 Primary Containment

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (DRYWELL PENETRATION SLEEVES, DRYWELL PENETRATION BELLOWS ASSEMBLIES, DRYWELL PENETRATIONS, TORUS PENETRATIONS)	FLOOD BARRIER HELB BARRIER MISSILE BARRIER PRESSURE BOUNDARY
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (DRYWELL, TORUS, DRYWELL HEAD, DRYWELL HEAD BOLTS, TORUS RING GIRDER, DOWNCOMERS, VENT LINES, VENT HEADER, BELLOWS ASSEMBLIES, ECCS SUCTION HEADER)	COOLING WATER SOURCE FLOOD BARRIER HEAT SINK HELB BARRIER MISSILE BARRIER NON-SAFETY SUPPORT PRESSURE BOUNDARY SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (DRYWELL, TORUS, DRYWELL HEAD, DRYWELL HEAD BOLTS, TORUS RING GIRDER, DOWNCOMERS, VENT LINES, VENT HEADER, BELLOWS ASSEMBLIES, VENT HEADER DEFLECTORS, ECCS SUCTION HEADER)	COOLING WATER SOURCE FLOOD BARRIER HEAT SINK HELB BARRIER MISSILE BARRIER NON-SAFETY SUPPORT PRESSURE BOUNDARY SAFETY RELATED SUPPORT

Table 2.4.13-1 Primary Containment

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (PERSONNEL AIRLOCK, EQUIPMENT HATCH, CRD HATCH, SEISMIC RESTRAINT, INSPECTION PORTS)	FLOOD BARRIER HELB BARRIER MISSILE BARRIER PRESSURE BOUNDARY
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (PERSONNEL AIRLOCK, EQUIPMENT HATCH, CRD HATCH, SEISMIC RESTRAINT, INSPECTION PORTS, INCLUDING LOCKS, HINGES AND CLOSURE MECHANISMS)	FLOOD BARRIER HELB BARRIER MISSILE BARRIER PRESSURE BOUNDARY
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (STRUCTURAL STEEL, I.E., TORUS EXTERNAL CATWALK, DRYWELL INTERIOR PLATFORMS, BIOSHIELD WALL LINERS, ETC.)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (STRUCTURAL STEEL INSIDE TORUS, I.E., TORUS INTERNAL CATWALK, ETC.)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT

Table 2.4.13-1 Primary Containment

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (SUPPORTS FOR MISCELLANEOUS STRUCTURES INCLUDING PLATFORMS, STAIRS, WHIP RESTRAINTS, ETC., I.E., MEMBERS, WELDS, BOLTED CONNECTIONS, SUPPORT ANCHORAGE TO BUILDING STRUCTURE)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT WHIP RESTRAINT
CARBON STEEL, LOW ALLOY STEEL EMBEDDED IN CONCRETE (DRYWELL SUPPORT SKIRT, EMBEDDED SHELL)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN TREATED WATER (STRUCTURAL STEEL)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN TREATED WATER (SUPPORT MEMBERS, WELDS, BOLTED CONNECTIONS, I.E., TORUS INTERNAL CATWALK SUPPORT COLUMNS)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN TREATED WATER (TORUS PENETRATIONS)	FLOOD BARRIER PRESSURE BOUNDARY

Table 2.4.13-1 Primary Containment

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN TREATED WATER (TORUS, TORUS RING GIRDER, DOWNCOMERS, ECCS SUCTION HEADER)	COOLING WATER SOURCE FLOOD BARRIER HEAT SINK MISSILE BARRIER NON-SAFETY SUPPORT PRESSURE BOUNDARY SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL, STAINLESS STEEL IN AIR/GAS (DRYWELL PENETRATION SLEEVES, DRYWELL PENETRATIONS)	FLOOD BARRIER HELB BARRIER MISSILE BARRIER PRESSURE BOUNDARY
CONCRETE IN AIR/GAS (BIOSHIELD WALL, DRYWELL EQUIPMENT FOUNDATION, RPV PEDESTAL)	NON-SAFETY SUPPORT RADIATION SHIELDING SAFETY RELATED SUPPORT
ELASTOMER SEALANTS (RUBBER, NEOPRENE, SILICONE, ETC.) IN AIR/GAS (MOISTURE BARRIERS)	PRESSURE BOUNDARY
ELASTOMER SEALANTS (RUBBER, NEOPRENE, SILICONE, ETC.) IN AIR/GAS (SEALS AND GASKETS)	HELB BARRIER PRESSURE BOUNDARY
INCONEL IN AIR/GAS (DRYWELL PENETRATION X-16B BELLOWS)	HELB BARRIER PRESSURE BOUNDARY

Table 2.4.13-1 Primary Containment

Component Group	Intended Function
LUBRITE IN AIR/GAS (DRYWELL HEAD, DOWNCOMERS)	HELB BARRIER MISSILE BARRIER PRESSURE BOUNDARY SAFETY RELATED SUPPORT
LUBRITE IN AIR/GAS (DRYWELL INTERIOR PLATFORM SLIDING PLATES)	SAFETY RELATED SUPPORT
LUBRITE IN TREATED WATER (DOWNCOMERS)	SAFETY RELATED SUPPORT
STAINLESS STEEL IN AIR/GAS (DRYWELL PENETRATION SLEEVES, DRYWELL PENETRATION BELLOWS)	FLOOD BARRIER HELB BARRIER PRESSURE BOUNDARY SAFETY RELATED SUPPORT
STAINLESS STEEL IN AIR/GAS (RPV TO DRYWELL REFUELING SEAL)	NON-SAFETY SUPPORT
STAINLESS STEEL IN AIR/GAS (VENT LINE BELLOWS)	FLOOD BARRIER PRESSURE BOUNDARY SAFETY RELATED SUPPORT
STAINLESS STEEL IN TREATED WATER (THERMOWELLS)	FLOOD BARRIER PRESSURE BOUNDARY SAFETY RELATED SUPPORT

2.4.14 Radioactive Waste Building

Description

The Radioactive Waste Building is located adjacent to the south side of the Reactor Building. The building is used for storage of contaminated materials, such as spent ion exchange resins; filters; anti-C clothing; and contaminated materials. The railroad car airlock and the airlock between the Reactor Building and the Radioactive Waste Building are part of secondary containment.

The Radioactive Waste Building is a reinforced concrete structure supported on a concrete slab. The Radioactive Waste Building was designed such that it would not fail during an earthquake. It is also designed to protect the Reactor Building from external floods.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). Since some SCs in the Radioactive Waste Building are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2).

The portions of the Radioactive Waste Building containing components subject to an AMR include the doors, structural steel, foundation, walls, slabs, seals and roofing.

System Function Listing

A comprehensive listing of functions associated with the Radioactive Waste Building, or specific components contained in the structure, is provided in the summary below.

Code: RWB-01	Cri 1	Cri 2	Cri 3				
The Radioactive Waste Building shall provide secondary containment when the primary containment is closed and in service.			FP	EQ	PTS	AT	SB
	X						

Comment: This is a secondary containment function. The USAR, Operations Manual, and the Technical Specifications do not describe the Radwaste Building as part of secondary containment. The USAR notes that the Radwaste Building exhaust fans are shut down for secondary containment testing. The secondary containment and Reactor Building DBDs indicate that the railroad bay airlock and the airlock to the Radwaste Building are part of secondary containment. This is a safety related function for the Reactor Building and, therefore, also a safety related function for the Radwaste Building.

This function is required to minimize ground level release of airborne radioactive materials to the environs during postulated accidents such as a LOCA

The Reactor Building, High Pressure Coolant Injection Building, primary containment and SBGT System also support the secondary containment function.

Portions of this building that provide secondary containment include the railroad bay, outer railroad bay air lock door, the personnel airlock block walls and the two personnel airlock doors. Also included are the associated floors and ceilings for these areas.

Code: RWB-02 The Radioactive Waste Building shall provide primary containment when the primary containment is open.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: This is a primary containment function. The USAR, Operations Manual and the Technical Specifications do not describe the Radwaste Building as part of secondary containment. The USAR notes that the radwaste building exhaust fans are shut down for secondary containment testing. The secondary containment and Reactor Building DBDs indicate that the railroad bay airlock and the airlock to the Radwaste Building are part of secondary containment. This is a safety related function for the Reactor Building and therefore is also a safety related function for the Radwaste Building.

This function is required to minimize ground level release of airborne radioactive materials to the environs during postulated accidents such as a LOCA.

The Reactor Building, High Pressure Coolant Injection Building, primary containment and SBGT System also support the secondary containment function.

Portions of this building that provide secondary containment include the railroad bay, outer railroad bay air lock door, the personnel airlock block walls and the two personnel airlock doors. Also included are the associated floors and ceilings for these areas.

Code: RWB-03 The Radioactive Waste Building supports normal operation ventilation and routing of reactor building ventilation.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: Portions of the Radioactive Waste Building support design exfiltration and ventilation routing requirements of the Reactor Building during normal operation and outages, when fuel movements are not in progress, to the Reactor Building exhaust plenum.

Code: RWB-04 The Radioactive Waste Building provides radiation shielding for plant personnel and equipment during normal operation.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This function is non-safety related.

Code: RWB-05 The Radioactive Waste Building provides structural support and protection for non-safety related components such as piping, mechanical, electrical, HVAC, instrument and control equipment.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This function pertains to non-safety related components.

Code: RWB-NSAS	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.		X					

Comment: The Radwaste Building is a class II structure. Failure of this structure may affect the ability of the Reactor Building to perform some of its intended functions. The Radioactive Waste Building provides structural support and protection for safety related components. The safety related components are the doors and walls required for secondary containment. The Radwaste Building serves as part of the external flood protection barrier.

USAR Reference

Additional Radioactive Waste Building details are provided in Section 5.3.6, Section 12.2.1.3, Section 12.2.1.7.1, Section 12.2.1.9, and Section 12.3.2.2.3 of the USAR.

License Renewal Drawings

The license renewal drawing for the Radioactive Waste Building is listed below:

LR-36444

Components/Commodities Subject to an AMR

The component groups for the Radioactive Waste Building that require aging management review are addressed in Table 2.4.14-1 along with each component group's intended function(s).

Table 2.4.14-1 Radioactive Waste Building

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (AIR LOCK AND RAILROAD DOORS)	HELB BARRIER PRESSURE BOUNDARY SHELTER/PROTECTION
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (STRUCTURAL STEEL)	SAFETY RELATED SUPPORT

Table 2.4.14-1 Radioactive Waste Building

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN ATMOSPHERE / WEATHER (RAILROAD DOOR)	HELB BARRIER PRESSURE BOUNDARY SHELTER/PROTECTION
CONCRETE IN AIR/GAS (FOUNDATION, WALLS, SLABS)	NON-SAFETY SUPPORT PRESSURE BOUNDARY RADIATION SHIELDING SAFETY RELATED SUPPORT
CONCRETE IN AIR/GAS (FOUNDATION, WALLS, SLABS, GROUT)	NON-SAFETY SUPPORT PRESSURE BOUNDARY RADIATION SHIELDING SAFETY RELATED SUPPORT
CONCRETE IN ATMOSPHERE / WEATHER (WALLS, SLABS)	FLOOD BARRIER NON-SAFETY SUPPORT RADIATION SHIELDING SAFETY RELATED SUPPORT SHELTER/PROTECTION
CONCRETE IN BELOW GRADE (FOUNDATION, WALLS)	FLOOD BARRIER NON-SAFETY SUPPORT RADIATION SHIELDING SAFETY RELATED SUPPORT SHELTER/PROTECTION

Table 2.4.14-1 Radioactive Waste Building

Component Group	Intended Function
ELASTOMER SEALANTS (RUBBER, NEOPRENE, SILICONE, ETC.) IN AIR/GAS (SECONDARY CONTAINMENT SEALS)	PRESSURE BOUNDARY
ELASTOMER SEALANTS (RUBBER, NEOPRENE, SILICONE, ETC.) IN ATMOSPHERE/ WEATHER (SECONDARY CONTAINMENT SEALS)	PRESSURE BOUNDARY
GLASS IN AIR/GAS (RAILROAD BAY DOOR VIEW PORT)	PRESSURE BOUNDARY
GLASS IN ATMOSPHERE/ WEATHER (RAILROAD BAY DOOR VIEW PORT)	PRESSURE BOUNDARY SHELTER/PROTECTION
MASONRY WALLS IN AIR/GAS	NON-SAFETY SUPPORT PRESSURE BOUNDARY SAFETY RELATED SUPPORT
ROOFING IN ATMOSPHERE/ WEATHER (RAILROAD BAY BUILT-UP ROOFING)	PRESSURE BOUNDARY SHELTER/PROTECTION

2.4.15 **Reactor Building**

Description

The principal functions of the Reactor Building are to support and protect enclosed systems and components and to provide secondary containment limiting the off site radiological consequences of accidents. The building provides necessary space for the equipment in a planned arrangement and provides for layout space for the equipment to be removed and replaced if necessary. Reactor internals and fuel can be moved and conveniently stored within the building.

The Reactor Building serves as the secondary containment. The secondary containment, in conjunction with other engineered safeguards and nuclear safety systems, limits the release of radioactive materials ensuring that site exposure resulting from a postulated design basis accident will remain below 10 CFR 100 guideline values.

The Reactor Building also provides secondary containment when the primary containment is in service, and provides primary containment during reactor refueling and maintenance operations when the primary containment system is open.

The Reactor Building is a seismic Class I structure completely enclosing the primary containment and auxiliary systems of the nuclear steam supply system. A major sub-structure within the Reactor Building is a reinforced concrete biological shield that surrounds the reactor and drywell portion of the primary containment. Additionally, the building houses the spent fuel pool, steam dryer/moisture separator storage pool, the new fuel storage vault, reactor cavity, reactor auxiliary equipment, refueling equipment and reactor servicing equipment. The Reactor Building consists of monolithic reinforced concrete floors and walls from its foundation to the refueling floor. Above this floor, the building superstructure consists of metal siding and roof decking supported on structural steel framework, providing secondary containment integrity. The foundation of the building consists of a reinforced concrete mat supported by medium sand with some gravel. This mat also supports the primary containment and its internals, including the reactor vessel pedestal. The exterior and most interior walls of the building above the foundation are cast-in-place concrete. Other interior walls are normal weight concrete block walls. The Reactor Building floor slabs are either cast in place concrete, cast in place concrete over pre-cast concrete T-beams, or composite construction with cast-in-place concrete over structural steel beams and metal floor deck. The thickness of walls and slabs were governed by structural requirements or shielding requirements.

Other structural components evaluated in this section include the Reactor Building penetrations and doors, vent stack, spent fuel pool, high density spent fuel racks and the new fuel storage vault with associated components.

Reactor Building structural items evaluated in other areas include the Reactor Building cranes and crane rails (evaluated with cranes, heavy loads, rigging), the drywell floor steel and the bioshield including the RPV pedestal (evaluated with the primary containment).

The description above results in some SCs in this structure being in-scope in accordance with 10 CFR 54.4(a)(1). Since some SCs in the Reactor Building are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some SCs are in-scope due to ATWS, Fire Protection, and Station Blackout in accordance with 10 CFR 54.4(a)(3).

The portions of the Reactor Building containing components subject to an AMR include the siding, new and spent fuel storage racks, doors, structural steel, steel embeds, miscellaneous steel, walls, slabs, foundation, seals, roofing and spent fuel pool liners.

System Function Listing

A comprehensive listing of functions associated with the Reactor Building, or specific components contained in the structure, is provided in the summary below.

Code: RXB-01	Cri 1	Cri 2	Cri 3				
The Reactor Building provides structural support, safe enclosure, protection and cooling for spent fuel and safety related components such as piping, mechanical, electrical, HVAC, instrument and control equipment.			FP	EQ	PTS	AT	SB
	X						

Comment: Since this function pertains to safety related components, this function is safety related. Spent Fuel is stored in the Spent Fuel Pool. The Spent Fuel Pool portion of the Reactor Building provides the necessary volume of water for shielding, cooling and reactivity control.

Code: RXB-02	Cri 1	Cri 2	Cri 3				
The Reactor Building provides secondary containment when the primary containment is closed and in service.			FP	EQ	PTS	AT	SB
	X						

Comment: This function is safety related. This function is required to minimize ground level release of airborne radioactive materials to the environs during postulated accidents such as a LOCA.

The Radioactive Waste Building, High Pressure Coolant Injection Building, primary containment and SBGT System also support the secondary containment function.

Code: RXB-03	Cri 1	Cri 2	Cri 3				
The Reactor Building provides primary containment when the primary containment is open and fuel movement is in progress.			FP	EQ	PTS	AT	SB
	X						

Comment: This function is safety related. This function is required to minimize ground level release of airborne radioactive materials to the environs during postulated accidents such as a refueling accident.

The Radioactive Waste Building, High Pressure Coolant Injection Building, primary containment and SBGT System also support the primary containment function.

Code: RXB-04	Cri 1	Cri 2	Cri 3				
The Reactor Building provides structural support and protection for non-safety related components such as piping, mechanical, electrical, HVAC, instrument and control equipment.			FP	EQ	PTS	AT	SB

Comment: This function pertains to non-safety related components.

Code: RXB-05	Cri 1	Cri 2	Cri 3				
The Reactor Building provides radiation shielding for plant personnel and equipment during normal operation and accident conditions.			FP	EQ	PTS	AT	SB
	X						

Comment: The Reactor Building provides radiation shielding for control room operators during post accident conditions.

Code: RXB-06	Cri 1	Cri 2	Cri 3				
The Reactor Building provides secondary containment to assure that exfiltration from the building does not exceed the design basis during normal operation.			FP	EQ	PTS	AT	SB

Comment: This function is non-safety related. This function is performed in combination with the Reactor Building HVAC system.

This function is for normal air circulation in the Reactor Building. This function does not meet any of the criteria for safety related functions, failure of this function does not affect any safety related functions and this function does not support any of the regulated events.

Code: RXB-07	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Reactor Building provides primary containment to assure that exfiltration from the building does not exceed the design basis during periods when the primary containment is open and fuel movements are not in progress.							

Comment: This function is non-safety related. This function is performed in combination with the Reactor Building HVAC system.

This function is for normal air circulation in the Reactor Building. This function does not meet any of the criteria for safety related functions, failure of this function does not affect any safety related functions and this function does not support any of the regulated events.

Code: RXB-08	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Reactivity Control, the Reactor Building maintains new and spent fuel in a subcritical configuration.		X					

Comment: The New Fuel Storage Vault provides space for 150 fuel assemblies in a sub-critical array, dry (K_{eff} = 0.90), flooded (K_{eff} = 0.95) or partially flooded. The racks are secured to guides imbedded in the concrete to preclude any movement which might shift fuel into a critical geometry. Fuel in the Spent Fuel Pool is stored in criticality-safe (K_{eff} = 0.95) storage racks.

Code: RXB-AT	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The system contains structures and/or components which perform functions credited in the current licensing basis for Anticipated Transients Without Scram.						X	

Comment: The Reactor Building performs functions relied upon for 10 CFR 50.62, specifically physical support and protection.

Code: RXB-FP	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Reactor Building provides physical support and protection for components required by the current licensing basis for the fire protection regulated event.			X				

Comment: The Reactor Building contains components that are required per 10 CFR 50.48. The Reactor Building supports the protection of Appendix R safe shutdown equipment from a fire in redundant division areas.

Code: RXB-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: The Reactor Building steel superstructure is class II. Reactor Building structural features, that are not otherwise safety-related, that were installed to provide ECCS room internal flooding protection are included in this function. Sump pumps, level switches and other pump controls are part of the Solid and Liquid Radwaste System. Floor sloping, sumps and other structural collection features are part of the Reactor Building. Structural features installed for vault drainage for the new fuel storage vault racks are also included. The vault racks themselves are addressed by function RXB-08.The Reactor Building is relied upon for external flood protection.

Code: RXB-SB	Cri 1	Cri 2	Cri 3				
The Reactor Building provides physical support and protection for components required by the current licensing basis for the SBO regulated event.			FP	EQ	PTS	AT	SB
							X

Comment: The Reactor Building contains components that are required per 10 CFR 50.63.

USAR Reference

Additional Reactor Building details are provided in Section 1.2.4.c, Section 1.2.9, Section 1.3.3, Section 1.3.3.2, Section 1.3.6, Section 1.3.9, Section 5.1, Section 5.3.1, Section 5.3.4, Section 5.3.5, Section 10.2.1, Section 10.3.1, Section 12.2.1.2, Section 12.2.1.4, Section 12.2.1.7.1, Section 12.2.1.9, Section 12.2.2.1, Section 12.2.2.1.1, and Section 12.3.2.2.1 of the USAR.

License Renewal Drawings

The license renewal drawing for the Reactor Building is listed below:

LR-36444

Components/Commodities Subject to an AMR

The component groups for the Reactor Building that require aging management review are addressed in Table 2.4.15-1 along with each component group's intended function(s).

Table 2.4.15-1 Reactor Building

Component Group	Intended Function
ALUMINUM IN AIR/GAS (NEW FUEL STORAGE RACKS)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
ALUMINUM IN AIR/GAS (SIDING)	PRESSURE BOUNDARY
ALUMINUM IN ATMOSPHERE/ WEATHER (SIDING, VENTILATION ASSEMBLIES)	NON-SAFETY SUPPORT PRESSURE BOUNDARY SHELTER/PROTECTION
ALUMINUM IN TREATED WATER (SPENT FUEL STORAGE RACKS)	RADIATION SHIELDING SAFETY RELATED SUPPORT
BORAL IN TREATED WATER (SPENT FUEL STORAGE RACKS NEUTRON-ABSORBING SHEETS)	ABSORB NEUTRONS RADIATION SHIELDING SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (DRYWELL TO REACTOR BUILDING REFUELING SEAL PLATES)	NON-SAFETY SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (FIRE RATED DOORS)	FIRE BARRIER
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (FIRE RATED, HELB AND SECONDARY CONTAINMENT DOORS)	FIRE BARRIER FLOOD BARRIER HELB BARRIER PRESSURE BOUNDARY

Table 2.4.15-1 Reactor Building

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (STRUCTURAL STEEL, STEEL EMBEDS, BLOWOUT PANELS, ETC.)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (SUPPORTS FOR MISCELLANEOUS STRUCTURES, I.E., MEMBERS, WELDS, BOLTED CONNECTIONS, SUPPORT ANCHORAGE FOR PLATFORMS, STAIRS, WHIP RESTRAINTS, MASONRY WALL SUPPORTS, ETC.)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT WHIP RESTRAINT
CARBON STEEL, LOW ALLOY STEEL IN ATMOSPHERE/ WEATHER (STRUCTURAL STEEL, VENTILATION ASSEMBLIES)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN TREATED WATER (DRYWELL TO REACTOR BUILDING REFUELING SEAL PLATES)	NON-SAFETY SUPPORT

Table 2.4.15-1 Reactor Building

Component Group	Intended Function
CONCRETE IN AIR/GAS (FOUNDATION, WALLS, SLABS)	FLOOD BARRIER HELB BARRIER MISSILE BARRIER NON-SAFETY SUPPORT PRESSURE BOUNDARY RADIATION SHIELDING SAFETY RELATED SUPPORT
CONCRETE IN AIR/GAS (FOUNDATION, WALLS, SLABS, GROUT)	FLOOD BARRIER HELB BARRIER MISSILE BARRIER NON-SAFETY SUPPORT PRESSURE BOUNDARY RADIATION SHIELDING SAFETY RELATED SUPPORT
CONCRETE IN AIR/GAS (WALLS, SLABS)	FIRE BARRIER
CONCRETE IN ATMOSPHERE/ WEATHER (WALLS, SLABS)	FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT PRESSURE BOUNDARY SAFETY RELATED SUPPORT SHELTER/ PROTECTION

Table 2.4.15-1 Reactor Building

Component Group	Intended Function
CONCRETE IN ATMOSPHERE/ WEATHER (WALLS, SLABS)	FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT PRESSURE BOUNDARY SAFETY RELATED SUPPORT SHELTER/ PROTECTION
CONCRETE IN BELOW GRADE (FOUNDATION, WALLS)	FLOOD BARRIER NON-SAFETY SUPPORT PRESSURE BOUNDARY SAFETY RELATED SUPPORT SHELTER/ PROTECTION
ELASTOMER SEALANTS (RUBBER, NEOPRENE, SILICONE, ETC.) IN AIR/ GAS (SECONDARY CONTAINMENT SEALS, SPENT FUEL POOL GATE SEALS AND HATCH SEALS)	FLOOD BARRIER PRESSURE BOUNDARY SHELTER/ PROTECTION
ELASTOMER SEALANTS (RUBBER, NEOPRENE, SILICONE, ETC.) IN ATMOSPHERE/ WEATHER (SECONDARY CONTAINMENT SEALS)	PRESSURE BOUNDARY SHELTER/ PROTECTION

Table 2.4.15-1 Reactor Building

Component Group	Intended Function
ELASTOMER SEALANTS (RUBBER, NEOPRENE, SILICONE, ETC.) IN TREATED WATER (SPENT FUEL POOL GATE SEALS)	FLOOD BARRIER
GLASS IN AIR/GAS (RAILROAD DOOR VIEW PORT)	PRESSURE BOUNDARY
MASONRY WALLS IN AIR/GAS	FIRE BARRIER
MASONRY WALLS IN AIR/GAS	FIRE BARRIER FLOOD BARRIER HELB BARRIER NON-SAFETY SUPPORT PRESSURE BOUNDARY RADIATION SHIELDING SAFETY RELATED SUPPORT
NON-METALLIC FIRE PROOFING IN AIR/GAS (GYPSUM BOARD WALLS)	FIRE BARRIER HELB BARRIER
ROOFING IN ATMOSPHERE/ WEATHER	PRESSURE BOUNDARY SHELTER/ PROTECTION

Table 2.4.15-1 Reactor Building

Component Group	Intended Function
STAINLESS STEEL IN AIR/GAS (METAL SIDING SCREWS, UPPER PORTION OF SPENT FUEL POOL, DRYER/ SEPARATOR STORAGE POOL, REACTOR WELL LINERS AND DRYWELL TO REACTOR BUILDING REFUELING SEAL BELLOWS)	FLOOD BARRIER NON-SAFETY SUPPORT PRESSURE BOUNDARY SAFETY RELATED SUPPORT SHELTER/ PROTECTION
STAINLESS STEEL IN ATMOSPHERE/WEATHER (METAL SIDING SCREWS)	PRESSURE BOUNDARY SHELTER/ PROTECTION
STAINLESS STEEL IN TREATED WATER (DRYER/SEPARATOR STORAGE POOL AND REACTOR WELL LINERS)	FLOOD BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
STAINLESS STEEL IN TREATED WATER (DRYWELL TO REACTOR BUILDING REFUELING SEAL BELLOWS)	FLOOD BARRIER NON-SAFETY SUPPORT
STAINLESS STEEL IN TREATED WATER (SPENT FUEL POOL, DRYER/ SEPARATOR STORAGE POOL AND REACTOR WELL LINERS)	FLOOD BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
STAINLESS STEEL IN TREATED WATER (SPENT FUEL POOL LINER)	FLOOD BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT

Table 2.4.15-1 Reactor Building

Component Group	Intended Function
STAINLESS STEEL IN TREATED WATER (SPENT FUEL STORAGE RACKS)	RADIATION SHIELDING SAFETY RELATED SUPPORT

2.4.16 Structures Affecting Safety

Description

The Structures Affecting Safety System pertains to plant structures that perform no safety function or regulated event function (except for the Heating Boiler Building) but could under certain failure scenarios, adversely affect buildings or equipment having such functions. These structures are listed below:

Heating Boiler House

The Heating Boiler Building is located along the east side of the Turbine Building. The Heating Boiler Building is a structural steel frame building with insulated metal siding and a steel deck roof. The structural steel columns sit on a reinforced concrete footing. The foundation walls are also of reinforced concrete. The floor consists of a reinforced concrete slab on grade.

The Heating Boiler Building is an unclassified structure (i.e., not class I or II) which is attached to the Turbine Building and adjacent to the EFT Building, both of which contain safety related components.

Non-1E Electrical Equipment Room

The Non-1E Electrical Equipment Room is located just east of the Turbine Building. The structure contains transformers and switchgear for non safety related portions of the 480Vac Power System. In addition, the non-safety related No. 17 - 250Vdc battery is located in the Non-1E Electrical Equipment Room.

The Non-1E Electrical Equipment Room is an unclassified structure (i.e., not class I or II) which is adjacent to the turbine building, which contains safety related components.

Hot Machine Shop

The Hot Machine Shop is located along side the Turbine Building at the east end of the north wall. The Hot Machine Shop is a structural steel frame building with insulated metal siding with a steel deck roof. The structural steel columns sit on a reinforced concrete footing. The foundation walls are also of reinforced concrete. The floor consists of a reinforced concrete slab on grade.

The Hot Machine Shop is an unclassified structure (i.e., not class I or II) which is adjacent to the Turbine Building, which contains safety related components.

Turbine Building Addition

The Turbine Building Addition is a class II structure and does not contain any class I equipment. The structure was designed in accordance with the Uniform Building Code. The primary function of the Turbine Building Addition is to provide a controlled environment for the condenser retubing effort.

The enclosure walls are insulated aluminum siding with steel liner panels over exposed interior frame built on a reinforced concrete slab. A minimum joint gap of 2 inches is provided between the Turbine Building Addition and existing class I buildings to eliminate structural interaction during a seismic event.

The Turbine Building Addition is a class II structure which is attached to the turbine building and adjacent to the Emergency Diesel Generator Building, the Intake Structure and the access tunnel, which all contain safety related components.

Recombiner Building

The Recombiner Building is a reinforced concrete structure utilizing heavy shear walls as a lateral force resisting system resting on a mat foundation. The building consists of two equipment bays, a shielded tunnel which houses the interconnecting piping, an instrument room and a pump room. Also, there is an enclosed walkway and access areas constructed of structural steel with insulated metal siding and insulated built up roofing.

Although the Recombiner Building was designed and built for Class I seismic conditions, the design criteria for this building has been downgraded to Class II in accordance with Regulatory Guide 1.143. The building meets all Federal, State, and local building codes applicable to industrial process buildings. The building is situated alongside the Turbine Building between the condensate storage tanks and the main power transformers.

The Recombiner Building is a class II structure adjacent to the Turbine Building, which contains safety related components.

Radwaste Storage and New Shipping Building

A Radwaste Storage Building is provided for the solid radwaste truck loading area. This sheet metal building is provided with shield walls, floor drains, heating and fire protection systems. An overhead crane is located in the building. The building is designed to enclose the radwaste shipping truck and to facilitate loading of the truck.

In addition, a Radwaste Shipping Building is erected along the west side of the Radwaste Storage Building. The building is a metal, steel framed building. The Radwaste Storage and New Shipping Building is attached to the Radwaste Building and the Reactor Building. The Reactor Building contains safety related components.

Since some SCs in the Structures Affecting Safety System are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some SCs are in-scope due to Fire Protection in accordance with 10 CFR 54.4(a)(3).

The portions of the Structures Affecting Safety System containing components subject to an AMR include the structural steel, foundations, walls, slabs and doors.

System Function Listing

A comprehensive listing of functions associated with the Structures Affecting Safety System, or specific components contained in the system, is provided in the summary below.

Code: SAS-01	Cri 1	Cri 2	Cri 3				
The Structures Affecting Safety provide structural support and protection for non-safety related components such as piping, mechanical, electrical, HVAC, instrument and control equipment.			FP	EQ	PTS	AT	SB

Comment: This function pertains to non-safety related components. There are no safety related components within these structures.

Code: SAS-FP	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: The Heating Boiler Building contains the Halon bottles for the fire suppression system for the Cable Spreading Room.

Code: SAS-NSAS	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.		X					

Comment: The Heating Boiler Building is an unclassified structure which is attached to the Turbine Building and adjacent to the EFT Building, both of which contain safety related components.

The Non-1E Electrical Equipment Room is an unclassified structure which is adjacent to the Turbine Building, which contains safety related components.

The Hot Machine Shop is an unclassified structure which is adjacent to the Turbine Building, which contains safety related components.

The Turbine Building Addition is a class II structure which is attached to the Turbine Building and adjacent to the Emergency Diesel Generator Building, the Intake Structure and the access tunnel, which all contain safety related components.

The Recombiner Building is a class II structure adjacent to the Turbine Building, which contains safety related components.

The Radwaste Storage and New Shipping Building is attached to the Radwaste Building and the Reactor Building.The Reactor Building contains safety related components.

USAR Reference

Additional Structures Affecting Safety details are provided in Section 8.3, Section 8.5.4, Section 9.4.2.3, Section 12.2.1.2, Section 12.2.1.3, Section 12.2.1.9, Section 12.2.2.9, and Section 12.2.2.15 of the USAR.

License Renewal Drawings

The license renewal drawing for the Structures Affecting Safety System is listed below:

LR-36444

Components/Commodities Subject to an AMR

The component groups for the Structures Affecting Safety System that require aging management review are addressed in Table 2.4.16-1 along with each component group’s intended function(s).

Table 2.4.16-1 Structures Affecting Safety

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (FIRE RATED DOORS)	FIRE BARRIER
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (STRUCTURAL STEEL)	NON-SAFETY SUPPORT
CONCRETE IN AIR/GAS (FOUNDATIONS, WALLS, SLABS)	NON-SAFETY SUPPORT
CONCRETE IN AIR/GAS (FOUNDATIONS, WALLS, SLABS, GROUT)	NON-SAFETY SUPPORT
CONCRETE IN ATMOSPHERE/ WEATHER (FOUNDATIONS, WALLS, SLABS)	NON-SAFETY SUPPORT
CONCRETE IN BELOW GRADE (FOUNDATIONS, WALLS)	NON-SAFETY SUPPORT

2.4.17 **Turbine Building**

Description

The Turbine Building (TGB) is a Class II structure; however, portions that support and protect electrical controls and instrumentation for Class I equipment were designed in accordance with criteria for design of portions of Class II structures enclosing and/or supporting Class I equipment. The primary function of the Turbine Building is to provide the necessary environment required for safe operation and maintenance of the turbine-generator and other components of the power conversion system.

The TGB is a combination of reinforced concrete and structural steel construction. The foundation is a reinforced concrete mat of variable thickness supported on undisturbed soil. The foundation supports the reinforced concrete turbine-generator pedestal as well as the building superstructure. The reinforced concrete portion of the superstructure extends from the top of the mat foundation to the turbine deck. The reinforced concrete floor slabs are supported by structural steel beam and girded framing. Interior reinforced concrete walls extending from the top of the mat up to the operating floor are oriented so as to protect personnel against radiation emanating from the turbine and auxiliary systems.

A structural steel framed super-structure is based at the turbine deck on reinforced concrete columns located within the exterior walls. The superstructure encloses the operating floor and also provides support and closure for a traveling bridge crane. A five-ply tar and felt insulated roof is supported by a metal roof deck which also acts as a diaphragm to transmit lateral forces to vertically braced end walls or shear frames.

The description above results in some SCs in this structure being in-scope in accordance with 10 CFR 54.4(a)(1). Since some SCs in the TGB are non-safety related and their failure could affect the capability of SR SCs to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, some SCs are in-scope due to ATWS, Fire Protection, and Station Blackout in accordance with 10 CFR 54.4(a)(3).

The portions of the TGB containing components subject to an AMR include the doors, structural steel, steel embeds, miscellaneous steel, foundation, walls and slabs.

System Function Listing

A comprehensive listing of functions associated with the TGB, or specific components contained in the structure, is provided in the summary below.

Code: TGB-01	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Turbine Building provides structural support, safe enclosure and protection for safety related components such as piping, mechanical, electrical, HVAC, instrument and control equipment.	X						

Comment: The Turbine Building is a class II structure which supports class I equipment. The Turbine Building provides structural support, safe enclosure and protection for safety related components such as piping, mechanical, electrical, HVAC, instrument and control equipment.

Code: TGB-02	Cri 1	Cri 2	Cri 3				
The Turbine Building provides structural support and protection for non-safety related components such as piping, mechanical, electrical, HVAC, instrument and control equipment.			FP	EQ	PTS	AT	SB

Comment: This function pertains to non-safety related components.

Code: TGB-03	Cri 1	Cri 2	Cri 3				
The Turbine Building shall provide radiation shielding to limit the radiation dose levels inside the building to acceptable levels to protect plant personnel and equipment during normal operation of the plant.			FP	EQ	PTS	AT	SB

Comment: This function is non-safety related.

Code: TGB-AT	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Anticipated Transients Without Scram.			FP	EQ	PTS	AT	SB
						X	

Comment: The Turbine Building performs function(s) relied upon for 10 CFR 50.62, specifically, physical support and protection. The Turbine Building provides structural and/or functional support to equipment relied upon for this regulated event.

Code: TGB-FP	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: The Turbine Building performs function(s) relied upon for 10 CFR 50.48, specifically, physical support and protection. The Turbine Building provides structural and/or functional support to equipment relied upon for this regulated event. The Turbine Building supports the protection of Appendix R safe shutdown equipment from a fire in redundant division areas.

Code: TGB-NSAS Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: Portions of the building are also a Class II structure adjacent to safety related structures for which minimum gap requirements were established. The building is required to support the west missile shield wall designed for turbine missile protection, provide external flood protection and provide internal flood protection to protect the 4kV Switchgear Rooms. Sump pumps, level switches and other pump control features in the Turbine Building relied upon for flood mitigation are included in the Liquid and Solid Radwaste System. Structural collection features that are part of the Turbine Building designed to route drainage are included in this function.

Code: TGB-SB The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of all AC power).	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: The Turbine Building performs function(s) relied upon for 10 CFR 50.63, specifically, physical support and protection. The Turbine Building provides structural and/or functional support to equipment relied upon for this regulated event.

USAR Reference

Additional Turbine Building details are provided in Section 1.3.9, Section 8.9, Section 10.3.1, Section 12.2.1.2, Section 12.2.1.3, Section 12.2.1.4, Section 12.2.1.7.1, Section 12.2.1.9, Section 12.2.2.5, and Section 12.3.2.2.2 of the USAR.

License Renewal Drawings

The license renewal drawing for the Turbine Building is listed below:

LR-36444

Components/Commodities Subject to an AMR

The component groups for the Turbine Building that require aging management review are addressed in Table 2.4.17-1 along with each component group's intended function(s).

Table 2.4.17-1 Turbine Building

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (FIRE RATED DOORS)	FIRE BARRIER
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (STRUCTURAL STEEL, STEEL EMBEDS, DOORS, ETC.)	FIRE BARRIER FLOOD BARRIER HELB BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (SUPPORTS FOR MISCELLANEOUS STRUCTURES, I.E., MEMBERS, WELDS, BOLTED CONNECTIONS, SUPPORT ANCHORAGE FOR PLATFORMS, STAIRS, WHIP RESTRAINTS, MASONRY WALL SUPPORTS, ETC.)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT WHIP RESTRAINT
CARBON STEEL, LOW ALLOY STEEL IN ATMOSPHERE / WEATHER (DOORS)	SHELTER/ PROTECTION

Table 2.4.17-1 Turbine Building

Component Group	Intended Function
CONCRETE IN AIR/GAS (FOUNDATION, WALLS, SLABS)	FIRE BARRIER FLOOD BARRIER HELB BARRIER MISSILE BARRIER NON-SAFETY SUPPORT RADIATION SHIELDING SAFETY RELATED SUPPORT
CONCRETE IN AIR/GAS (FOUNDATION, WALLS, SLABS, GROUT)	FIRE BARRIER FLOOD BARRIER HELB BARRIER MISSILE BARRIER NON-SAFETY SUPPORT RADIATION SHIELDING SAFETY RELATED SUPPORT
CONCRETE IN AIR/GAS (WALLS, SLABS)	FIRE BARRIER
CONCRETE IN ATMOSPHERE / WEATHER (WALLS NEAR RECOMBINER BUILDING)	FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER/ PROTECTION

Table 2.4.17-1 Turbine Building

Component Group	Intended Function
CONCRETE IN ATMOSPHERE / WEATHER (WALLS, SLABS)	FLOOD BARRIER MISSILE BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER/ PROTECTION
CONCRETE IN BELOW GRADE (FOUNDATION, WALLS)	FLOOD BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER/ PROTECTION
MASONRY WALLS IN AIR/GAS	FIRE BARRIER FLOOD BARRIER HELB BARRIER MISSILE BARRIER NON-SAFETY SUPPORT RADIATION SHIELDING SAFETY RELATED SUPPORT
NON-METALLIC FIREPROOFING IN AIR/GAS (CEMENTITIOUS FIREPROOFING, PYROCRETE WALLS)	FIRE BARRIER HELB BARRIER
NON-METALLIC FIREPROOFING IN AIR/GAS (GYPSUM BOARD WALLS)	FIRE BARRIER HELB BARRIER

2.4.18 **Underground Duct Bank**

Description

The Underground Duct Bank runs between the third floor of the Emergency Filtration Train Building and the Reactor Building. The primary function of the duct bank is to carry Division II safe shutdown cables outside of areas where fire damage could occur. The duct bank includes risers at each end with an underground section in between. The underground portion of the duct bank is 700 feet in length and is rectangular in cross section. It is constructed of reinforced concrete and contains sixteen 4-inch diameter raceways. Access to the duct bank is provided by four reinforced concrete manholes. Seismic joints occur at the manhole to duct bank interface and the riser to duct bank interface.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). In addition, some SCs are in-scope due to Fire Protection and Station Blackout in accordance with 10 CFR 54.4(a)(3).

The portions of the Underground Duct Bank containing components subject to an AMR include the structural steel, steel embeds, miscellaneous steel, manhole covers, foundation, walls and slabs.

System Function Listing

A comprehensive listing of functions associated with the Underground Duct Bank, or specific components contained in the structure, is provided in the summary below.

Code: UDB-01 The Underground Duct Bank shall provide structural support, safe enclosure, and protection for safety-related cables.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
	X						

Comment: Since this function pertains to safety related components, this function is safety related.

Code: UDB-02 The Underground Duct Bank shall provide structural support, safe enclosure and protection for non-safety related cables.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This function pertains to non-safety related components.

Code: UDB-FP The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: The Underground Duct Bank supports the protection of Appendix R safe shutdown equipment from a fire in redundant division areas.

Code: UDB-SB The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of all AC power).	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: This structure performs function(s) relied upon for 10 CFR 50.63, loss of all alternating current power, specifically, equipment support and protection. Provides structural and/or functional support to equipment relied upon for SBO mitigation.

USAR Reference

Additional Underground Duct Bank details are provided in Section 10.3.1, Section 12.2.1.2, and Section 12.2.2.16 of the USAR.

License Renewal Drawings

The license renewal drawing for the Underground Duct Bank is listed below:

LR-36444

Components/Commodities Subject to an AMR

The component groups for the Underground Duct Bank that require aging management review are addressed in Table 2.4.18-1 along with each component group's intended function(s).

Table 2.4.18-1 Underground Duct Bank

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (STRUCTURAL STEEL, STEEL EMBEDS, ETC.)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT

Table 2.4.18-1 Underground Duct Bank

Component Group	Intended Function
CARBON STEEL, LOW ALLOY STEEL IN AIR/GAS (SUPPORTS FOR MISCELLANEOUS STRUCTURES, I.E., MEMBERS, WELDS, BOLTED CONNECTIONS, SUPPORT ANCHORAGE FOR PLATFORMS, STAIRS, ETC.)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CARBON STEEL, LOW ALLOY STEEL IN ATMOSPHERE / WEATHER (MANHOLE COVERS/ SUPPORTS)	FLOOD BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER/PROTECTION
CARBON STEEL, LOW ALLOY STEEL IN BELOW GRADE (MANHOLE COVERS / SUPPORTS	FLOOD BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER/PROTECTION
CONCRETE IN AIR/GAS (FOUNDATION, WALLS, SLABS)	NON-SAFETY SUPPORT SAFETY RELATED SUPPORT
CONCRETE IN ATMOSPHERE / WEATHER (WALLS, SLABS)	FLOOD BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER / PROTECTION

Table 2.4.18-1 Underground Duct Bank

Component Group	Intended Function
CONCRETE IN BELOW GRADE (FOUNDATION, WALLS, SLABS, GROUT)	FLOOD BARRIER NON-SAFETY SUPPORT SAFETY RELATED SUPPORT SHELTER/PROTECTION

2.5 Scoping and Screening Results: Electrical and Instrumentation and Controls

The determination of electrical systems within the scope of license renewal is made by initially identifying Electrical and Instrumentation and Controls (I&C) Systems and their design functions. Each system is then reviewed to determine those that satisfy one or more of the criteria contained in 10 CFR 54.4. This process is described in Section 2.1.4 and the results of the Electrical and I&C Systems review are included in Section . Section 2.1 also provides the methodology for determining the components/commodities within the scope of 10 CFR 54.4 that meet the requirements contained in 10 CFR 54.21(a)(1). The components/commodities that meet these screening requirements are identified in this section. These identified components/commodities require an aging management review for license renewal.

The in-scope Electrical and I&C Systems are described in Section 2.5.1. Electrical commodities are described in Section 2.5.2. Supports for electrical cables, cable trays, conduits, cabinets, and enclosures are addressed in the Hangers and Supports Commodity Group (Section 2.4.6).

2.5.1 Electrical and Instrumentation and Controls Systems

The following systems are addressed in this section:

- 480V Station Auxiliary (Section 2.5.1.1)
- 4.16kV Station Auxiliary (Section 2.5.1.2)
- Alternate Shutdown (Section 2.5.1.3)
- Annunciators (Section 2.5.1.4)
- Communications (Section 2.5.1.5)
- DC Battery (Section 2.5.1.6)
- Lighting (Section 2.5.1.7)
- Neutron Monitoring (Section 2.5.1.8)
- Off Site Power (Section 2.5.1.9)
- Plant Protection (Section 2.5.1.10)
- Radiation Monitoring (Section 2.5.1.11)
- Reactor Level Control (Section 2.5.1.12)
- Uninterruptible AC (Section 2.5.1.13)

2.5.1.1 480 V Station Auxiliary

Description

The 480 V Station Auxiliary System consists of transformers, breakers, load centers, and motor control centers. Power is typically supplied to motors less than 250 HP and lighting transformers. It receives power from the 4.16 kV Station Auxiliary System through load center transformers. It distributes power through load center buses and motor control centers (MCCs).

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). In addition, some SCs are in-scope due to ATWS, Fire Protection, and Station Blackout in accordance with 10 CFR 54.4(a)(3).

System Function Listing

A comprehensive listing of functions associated with the 480 V Station Auxiliary System, or specific components contained in the system, is provided in the summary below.

Code: 480-01	Cri 1	Cri 2	Cri 3				
The 480 V Station Auxiliary System shall provide power to 480 VAC loads with safety related functions on Load Centers 103 and 104 and associated safety related MCCs (includes MCC 133A, 133B, 134, 142A, 143A, 143B, & 144).			FP	EQ	PTS	AT	SB
	X						

Comment: This function is safety related. The 480Vac system provides power to 480V ac loads with safety related functions during postulated design basis accidents, including LOCA and HELB.

Code: 480-02	Cri 1	Cri 2	Cri 3				
The 480 V Station Auxiliary System shall provide power to 480 VAC loads with non-safety related functions on Load Centers 103 and 104.			FP	EQ	PTS	AT	SB

Comment: This function is non-safety, and its failure will not prevent the performance of any safety related function. AC circuits are evaluated for proper coordination to prevent non-safety related portions of the system from adversely affecting safety related operations. The MCCs involved are 131, 132, 141, and 142B. Load Centers 103 & 104 also support safety-related functions (see 480-01 above).

Code: 480-03	Cri 1	Cri 2	Cri 3				
The 480 V Station Auxiliary System shall provide power to 480 VAC loads with non-safety related functions on Load Centers 101, 102, 105, 106, 107, 108, and 109.			FP	EQ	PTS	AT	SB

Comment: This function is non-safety and its failure will not prevent the performance of any safety related function. The MCCs involved are 111, 113, 115, 116, 121, 122, 124, and 125. Load Centers 105 and 106 power the cooling tower fans. Load Center 107 powers MCC 114 and bus B7. Load Center 108 powers panels P105, HP-31, and bus B8. Load Center 109 powers MCC-112, MCC-123, and the security system.

Code: 480-04	Cri 1	Cri 2	Cri 3				
Load Center 107 shall be capable of backfeeding loads to the 4 kV buses from the #13 Diesel Generator during emergency conditions.			FP	EQ	PTS	AT	SB

Comment: This function is non-safety but is available if necessary (but it is not credited in FIR or SBO evaluations).

Code: 480-AT	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Anticipated Transients Without Scram.			FP	EQ	PTS	AT	SB
						X	

Comment: This system performs functions relied upon for 10 CFR 50.62, Anticipated Transients Without Scram, specifically, provides AC power. 480 VAC power is required to support recovery from an ATWS event. MCCs 132, 133A, and 142A are credited as supporting an ATWS event.

Code: 480-FP	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: This system performs functions relied upon for 10 CFR 50.48, Fire Protection, specifically, provides AC power. 480 VAC power is required to support fire protection equipment. During an Appendix R event, the 480 VAC System provides adequate power to required 480 VAC loads relied on to support the fire protection analysis. MCCs 133A, 134, 142A, 143A, 144 and Panel B-44P are credited as supporting fire protection equipment.

Code: 480-NSAS Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
		X					

Comment: Load Centers 101 and 102, with associated transformers, MCCs 111, 121, 131, and 141, and Circuit Breakers required to power sump pumps P-26A and B and P-57A and B have been included in license renewal scope for Criterion 2. These components must function to power sump pumps credited as mitigative features for specific internal flooding events. Other components with Load Center 101 and 102 are outside LR scope and are addressed by function 480-03

Code: 480-SB The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of All AC Power).	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: This system performs functions relied upon for 10 CFR 50.63, Loss of All Alternating Current Power, specifically, the 480V Station Auxiliary System provides power to 480 VAC loads relied on to recover from a Station Blackout scenario. MCCs 134 and 144 are credited as supporting SBO recovery.

USAR Reference

Additional 480 V Station Auxiliary System details are provided in Section 8.3 of the USAR.

License Renewal Drawings

The license renewal drawings for the 480 V Station Auxiliary System are listed below:

LR-36298

Components Subject to an AMR

Electrical commodities for this system that are subject to AMR are evaluated in Section 2.5.2. Supports for electrical components are evaluated in Section 2.4.6. There are no other components subject to an AMR for this system.

2.5.1.2 4.16 kV Station Auxiliary

Description

All station power is supplied from the 4.16 kV Station Auxiliary System (4 kV) through distribution buses to various motors and step-down transformers. The 4.16 kV System is a three-phase grounded neutral distribution system.

The system uses eight 4.16 kV bus sections, each housed in metal clad assemblies. Six buses, 11, 12, 13, 14, 15 and 16, are located in the Turbine Building. The odd numbered buses are located on elevation 911' and the even are on 931'. Buses 15 and 16 are the essential safeguards buses. Buses 17 and 18 are located at the discharge structure to serve the cooling tower pumps.

The plant 4.16 kV buses may be supplied from either of two sources. The normal source is 2R Transformer supplied from the 345 kV Substation. The alternate source is 1R transformer supplied from the 115 kV Substation. Protective relaying, if activated, de-energizes 2R transformer, and initiates an open circuit transfer to 1R Transformer.

2R transformer and 1R transformer have two separate secondary windings designated as x and y. The x winding of each transformer supplies Bus 11 and Bus 12. The y winding of each transformer supplies Bus 13 and Bus 14.

Buses 13 and 14 normally supply buses 15 and 16, respectively. In the event of degraded or loss of voltage to Buses 15 and 16, an essential bus transfer separates the essential Buses from Buses 13 and 14 and switches them to an alternate source. Alternate sources include the 1AR transformer or the emergency diesel generators if 1AR is not available.

Air Circuit Breakers (ACBs) connect sources and loads to the buses. ACBs from 2R and 1R transformers are rated at 2000 amps frame size. All other ACBs are rated at 1200 amps frame size.

Control power to control the opening and closing of the plant breakers in the 4.16 kV System is supplied from two 125 Volt station batteries. Control power for discharge structure Buses17 and 18 is alternating current supplied from one of two control power transformers, one operating off of each bus.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). In addition, some SCs are in-scope due to ATWS, Fire Protection, and Station Blackout in accordance with 10 CFR 54.4(a)(3).

System Function Listing

A comprehensive listing of functions associated with the 4.16 kV Station Auxiliary System, or specific components contained in the system, is provided in the summary below.

Code: 4KV-01	Cri 1	Cri 2	Cri 3				
The 4.16 kV Station Auxiliary System provides AC electrical power to 4160 VAC loads with Safety-Related functions.			FP	EQ	PTS	AT	SB
	X						

Comment: Supplies power to the Essential Safeguards buses #15 and #16. This function is safety related

Code: 4KV-02	Cri 1	Cri 2	Cri 3				
The 4160 VAC system provides AC electrical power to 4160 VAC loads with Non-Safety Related functions.			FP	EQ	PTS	AT	SB

Comment: Provide 4.16 kV to loads on buses 11 and 12. This function is non-safety, the feedwater pumps and recirc pumps do not provide a safety function. Provide 4.16 kV to loads on buses 17 and 18. This function is non-safety. Buses 17 and 18 feed the cooling tower pumps. No regulated event is supported by this function.

Code: 4KV-AT	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Anticipated Transients Without Scram.			FP	EQ	PTS	AT	SB
						X	

Comment: The system performs functions relied upon for 10 CFR 50.62, Anticipated Transients Without Scram, specifically, provides AC power to equipment relied upon for ATWS mitigation.

Code: 4KV-FP	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: This system performs functions relied upon for 10 CFR 50.48 Fire Protection, specifically, provides AC power. The system provides power to fire protection equipment and equipment relied on to support post-fire safe shutdown.

Code: 4KV-SB	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of All AC Power).			FP	EQ	PTS	AT	SB
							X

Comment: The system performs functions relied upon for 10 CFR 50.63, Loss of All Alternating Current Power, specifically, it provides 4.16kV power to loads on Buses 13, 14, 15, and 16.

USAR Reference

Additional 4.16 kV Station Auxiliary System details are provided in Section 8 and Section 8.3 of the USAR.

License Renewal Drawings

The license renewal drawings for the 4.16 kV Station Auxiliary System are listed below:

LR-36298

Components Subject to an AMR

Electrical commodities for this system that are subject to AMR are evaluated in Section 2.5.2. Supports for electrical components are evaluated in Section 2.4.6. There are no other components subject to an AMR for this system.

2.5.1.3 Alternate Shutdown

Description

The Alternate Shutdown (ASD) System is designed to provide alternative shutdown capability as required by 10 CFR 50.48 and 10 CFR 50 Appendix R. This system assures safe shutdown in the event of a fire in the Control Room, Cable Spreading Room, or both. The ASD system performs the above by providing for a remote centralized location at which existing plant systems can be manually controlled. The system uses existing Division II systems and equipment. The ASD control panel is located on the third floor of the Emergency Filtration Building. This area is adjacent to the Turbine Building and the Control Room.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). In addition, some SCs are in-scope for Fire Protection and Station Blackout in accordance with 10 CFR 54.4(a)(3).

System Function Listing

A comprehensive listing of functions associated with the Alternate Shutdown System, or specific components contained in the system, is provided in the summary below.

Code: ASD-01	Cri 1	Cri 2	Cri 3				
Provide Support. The ASD Panel provides support to house and protect equipment mounted in and on the panel.			FP	EQ	PTS	AT	SB
	X						

Comment: The equipment mounted in or on the panel is only required to perform non safety related functions. However, USAR Section 10.3.1.5.4 states that the ASD panel is safety grade (Class 1E) and provides the controls, AC circuitry, and instrumentation readouts to safely shutdown the plant at a central location, assuming a fire in the control room or the cable spreading room.

Code: ASD-FP	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: This system performs function(s) relied upon for 10 CFR 50.48 fire protection, specifically, Alternate Shutdown Control. The ASD Panel and associated instrumentation and controls provides the equipment necessary to proceed to cold shutdown, as part of the alternate shutdown cooling method, from outside the control room (assuming a fire in the control or cable spreading rooms).

Code: ASD-SB	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of All AC Power).			FP	EQ	PTS	AT	SB
							X

Comment: This system performs function(s) relied upon for 10 CFR 50.63 Loss of All Alternating Current Power. Provides power for reactor and torus water level indication.

USAR Reference

Additional Alternate Shutdown System details are provided in Section 7.11.1 and Section 10.3.1.5.4 of the USAR.

License Renewal Drawings

None.

Components/Commodities Subject to an AMR

Electrical commodities for this system that are subject to AMR are evaluated in Section 2.5.2. Supports for electrical components are evaluated in Section 2.4.6. There are no other components subject to an AMR for this system.

2.5.1.4 Annunciators

Description

The plant annunciators consist of main Control Room panels and local panels for selected systems and associated plant instrumentation. They alert operators to off-normal conditions for monitored variables.

Some SCs in the Annunciators System are in-scope due to Non-Safety Affecting Safety in accordance with 10 CFR 54.4(a)(2), and Fire Protection and Station Blackout in accordance with 10 CFR 54.4(a)(3).

System Function Listing

A comprehensive listing of functions associated with the Annunciators System, or specific components contained in the system, is provided in the summary below.

Code: ANN-01	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
Provides Annunciation. The Annunciator System provides continuous monitoring of equipment status and process variables to alert the operators to conditions that require acknowledgement and/or action.							

Comment: The plant annunciator system is not described in the USAR. The system is non-safety related and failure will not impact any safety related function. The annunciator system is not addressed in the MNGP Q-list. In accordance with plant procedures, operators may initiate a number of actions as a result of annunciator operation (e.g., alarm response procedures, EOPs, etc.).

Code: ANN-FP	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: The plant Annunciators System is not described in the USAR. The system is non-safety related and its failure will not impact any safety related function. The Annunciators System is not addressed in the MNGP Q-list. However, there are fire alert annunciators (C-300) in the Control Room, which provide detection capabilities. Fire detection signals and fire equipment malfunctions are also annunciated on panels C-20 and C-242 in the MCR. Additional, fire protection equipment malfunctions are annunciated on windows in panel C-101. Based on the fire protection program requirement to rapidly detect, control and promptly extinguish those fires that do occur, these components scope in for LR.

Code: ANN-NSAS	Cri 1	Cri 2	Cri 3				
Non-safety related structures and/or components that could affect safety related SSCs must maintain sufficient integrity such that the intended function of the safety related SSCs is not adversely affected.			FP	EQ	PTS	AT	SB
		X					

Comment: The ANN System contains structures and/or components whose failure could cause the failure of safety related components due to spatial interactions. The ANN System contains annunciators which alert operators to possible flooding conditions in the circulating water pump pit and condenser hotwell area.

Code: ANN-SB	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of All AC Power).			FP	EQ	PTS	AT	SB
							X

Comment: This system performs function(s) relied upon for 10 CFR 50.63 Loss of All Alternating Current Power, specifically provides annunciation. Provides operators with indications for confirming station blackout and monitoring performance of the High Pressure Coolant Injection and Automatic Pressure Relief (APR) Systems.

USAR Reference

Additional Annunciators System details are provided in Section 7.6.1.2.5 and Table 7.9-1 of the USAR.

License Renewal Drawings

None.

Components/Commodities Subject to an AMR

Electrical commodities for this system that are subject to AMR are evaluated in Section 2.5.2. Supports for electrical components are evaluated in Section 2.4.6. There are no other components subject to an AMR for this system.

2.5.1.5 Communications

Description

The Communications System consists of the following five subsystems:

1. Telephone System
   The Plant Telephone System is the most widely used method of communication at MNGP and is centered around an AT&T programmable solid-state private branch exchange (PBX) switch. There is also a set of telephones located in the Control Room, TSC, and Training Center which are used solely to perform NRC notification. This system is called the FTS 2000 and uses dedicated circuits leased from commercial carriers to make direct connections to various branches/offices of the NRC. The design of this system provides independence from the normal telephone system and guarantees availability of commercial circuits in the event of heavy telephone use by the local community.
2. Site Public Address System
   The Site Public Address System (PA) is designed to provide general plant paging capability, and also provides a single party line channel between paging stations.
3. Sound Powered System
   The Sound Powered System is a series of hard-wired telephone jacks located at various places throughout the plant such that they can be used for maintenance and calibration activities.
4. Intercom System
   The Intercom System is a multi-channel system with push-button channel selection at the master stations located in the Control Room and Cable Spreading Room.
5. Plant Radio System
   The Plant Radio System is a Motorola repeater-based system with six separate channels.

Some SCs in the Communications System are in-scope due to Fire Protection in accordance with 10 CFR 54.4(a)(3).

System Function Listing

A comprehensive listing of functions associated with the Communications System, or specific components contained in the system, is provided in the summary below.

Code: COM-01 Provide operational communications between various plant buildings and locations.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: With the exception of the emergency communication system, which is powered from a Class 1E source and required for Fire Protection (see function COM-FP); this system is not safety related, cannot prevent the function(s) of safety related SSCs, is not within the scope of the EQ program, and is not required to support mitigation of license renewal regulated events.

Code: COM-FP The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: This system performs function(s) relied upon for 10 CFR 50.48 Fire Protection, specifically, Emergency Communications. This function is limited to the AC-powered radio/receiver unit located in the control room and the hand-held radio units stored in the fire brigade room. The hand-held units operate independently from the control room console unit and are not disabled by any failure of the console.

USAR Reference

Additional information on the Communications System is provided in Section 10.3.1.2.3, Section 10.3.1.5.4, and Section 10.3.8 of the USAR.

License Renewal Drawings

None.

Components Subject to an AMR

Electrical commodities for this system that are subject to AMR are evaluated in Section 2.5.2. Supports for electrical components are evaluated in Section 2.4.6. There are no other components subject to an AMR for this system.

2.5.1.6 DC Battery

Description

Two independent divisions of 24 Vdc batteries are provided. They include two battery systems which feed separate DC buses, and two battery chargers per division fed from different AC feeders and distributions panels. These 24 Vdc batteries provide power for the nuclear instrumentation, process radiation monitors, and H2/O2 analyzer isolation valve position indication.

Two independent divisions of 125 Vdc batteries are provided. They include two battery systems which feed separate DC buses and distributions panels. The 125 Vdc batteries provide highly reliable and independent control power for 4 kV switchgear, 480 Vac load centers, control boards, various control relays, annunciators, emergency lighting, etc. The batteries are provided with charging power from three battery chargers fed from different ac sources. One of the chargers is used as a swing charger in case either of the normal supply chargers fail.

The 250 Vdc System consists of essential and non-essential subsystems.

The essential system consists of two independent divisions of 250 Vdc batteries with center taps for 125 Vdc. It includes two battery systems which feed separate DC buses, three battery chargers per division (one is a spare) fed from separate AC feeders, distribution and alarm panels, and three DC MCCs. The 250 Vdc system supplies highly reliable power to large loads, such as motor driven pumps, valves, and uninterruptible power supplies. The 125 Vdc (250 Vdc center taps) provides control power for the DC MCCs and other loads requiring independence from the 125 Vdc system such as the LPCI swing bus breaker.

The non-essential system consists of one division of 250 Vdc batteries. It includes one battery system which is charged by rectifiers in the UPS and distribution panels. The system supplies power to uninterruptible power supply Y-91 on a loss of AC power, the Turbine Generator Emergency Bearing Oil Pump, and Main Generator Emergency Seal Oil Pump.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). In addition, some SCs are in-scope due to ATWS, Environmental Qualification, Fire Protection, and Station Blackout in accordance with 10 CFR 54.4(a)(3).

System Function Listing

A comprehensive listing of functions associated with the DC Battery System, or specific components contained in the system, is provided in the summary below.

Code: DCC-01	Cri 1	Cri 2	Cri 3				
Provides DC power. The 24 Vdc system continuously provides DC electrical power to the required connected Safety Related and Non-Safety Related loads during all modes of plant operation for the desired duration.			FP	EQ	PTS	AT	SB

Comment: This system is Non-Safety Related and its failure will not prevent the performance of any Safety Related function. The Quality Assurance Program Q-List does not include the 24 Vdc system. The Q-List does, however, include the Reactor Protection and Neutron Monitoring systems. The 24 Vdc system provides power to these systems, but is not required for them to provide their Safety Related function. The 24 Vdc system is not Safety Related.

Code: DCC-02	Cri 1	Cri 2	Cri 3				
Provides DC power. The 125 Vdc system continuously provides DC electrical power to the required connected safety related normal and emergency loads, and other operating loads, during all design basis events and/or loss of off-site power sources.			FP	EQ	PTS	AT	SB
	X						

Comment: The components which support this function are safety related.

Code: DCC-03	Cri 1	Cri 2	Cri 3				
Provides DC power. The 125 Vdc System continuously provides DC electrical power to the required connected non-safety related loads.			FP	EQ	PTS	AT	SB

Comment: This function is non-safety related. License Renewal regulated events that rely on this same function are identified separately. DC circuits are evaluated for proper coordination to prevent non safety related portions of the system from adversely affecting safety related operations.

Code: DCC-04	Cri 1	Cri 2	Cri 3				
Provides DC power. The 250 Vdc System provides DC electrical power from Batteries 13 & 16 to the required connected safety related normal and emergency loads, and other operating loads, during all design basis events and/or loss of off site power sources.			FP	EQ	PTS	AT	SB
	X						

Comment: The components which support this function are safety-related.

Code: DCC-05	Cri 1	Cri 2	Cri 3				
Provides DC power. The 250 Vdc System provides DC electrical power from Batteries 13 & 16 to the required connected non-safety related loads.			FP	EQ	PTS	AT	SB

Comment: This function is non-safety. The non-safety loads include the plant evacuation siren, the optical isolator supply, etc. This function does not support any regulated event. DC circuits are evaluated for proper coordination to prevent non safety related portions of the system from adversely affecting safety related operations.

Code: DCC-06	Cri 1	Cri 2	Cri 3				
Provides DC power. The non-1E 250 Vdc batteries provides DC electric power from Battery 17 to the required connected non-safety related loads.			FP	EQ	PTS	AT	SB

Comment: This function is non-safety. The load on battery 17 is designated for the emergency bearing and emergency seal oil pumps. This function does not support any of the regulated events.

Code: DCC-AT	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Anticipated Transients Without Scram.			FP	EQ	PTS	AT	SB
						X	

Comment: The 125 Vdc System performs functions relied upon for 10 CFR 50.62, Anticipated Transients Without Scram (ATWS), specifically, it provides DC electrical power to the required connected safety-related normal and emergency loads, and other operating loads, during all design basis events and/or loss of off-site power sources. Distribution panels D11 and D21 provide DC power to the Division I and II ATWS cabinets.

Code: DCC-EQ	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Environmental Qualification.			FP	EQ	PTS	AT	SB
				X			

Comment: This system contains equipment that is required to be qualified in accordance with 10 CFR 50.49, Environmental Qualification. Specifically, the system contains safety related electrical equipment (250 Vdc MCCs) required to support safety related functions in a potentially harsh environment.

Code: DCC-FP The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: The 125 Vdc System performs functions relied upon for 10 CFR 50.48, Fire Protection, specifically, it provides 125 Vdc and 250 Vdc electrical power to the required connected safety related normal and emergency loads, and other operating loads, to support fire protection and safe shutdown equipment. The 125 Vdc and 250 Vdc systems provide electrical power to fire protection equipment and equipment relied on to support safe shutdown (10 CFR 50.48 and 10 CFR 50 Appendix R).

Code: DCC-SB The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of All AC Power).	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: The 125 Vdc and 250 Vdc Systems perform functions relied upon for 10 CFR 50.63, Loss of All AC Power, specifically, the 125 Vdc and essential 250 Vdc systems provides DC electrical power to the required connected safety-related normal and emergency loads, and other operating loads, during all design basis events and/or loss of off-site power sources. The 250 Vdc system provides DC electrical power from Batteries 13 & 16 to the required connected safety related loads during loss of off site power sources.

USAR Reference

Additional DC Battery System details are provided in Section 7.6.2, Section 8.4.2, Section 8.5, Section 8.5.1, Section 8.5.2, Section 8.5.3, and Section 8.5.4 of the USAR.

License Renewal Drawings

The license renewal drawings for the DC Battery System are listed below:

LR-36298

Components Subject to an AMR

Electrical commodities for this system that are subject to AMR are evaluated in Section 2.5.2. Supports for electrical components are evaluated in Section 2.4.6. There are no other components subject to an AMR for this system.

2.5.1.7 Lighting

Description

The Lighting System provides light in all areas for safe, efficient operation of the plant.

Normal lighting is supplied by normal AC power. Several locations in the plant are supplied by normal lighting which is supplied from an essential lighting source. Essential lighting is supplied by a normal AC source, or by the diesel generators, or the 1AR Transformer during a loss of the normal AC source.

Emergency lighting is supplied by 125 V station battery #11 through panel L-40 during the loss of normal and essential AC sources. The emergency lighting system is independent of the AC system.

8-hour battery-powered emergency lighting units are also located throughout the plant. These units have individual batteries that are continuously charged from normal AC power sources. In the event normal AC power is lost, these units will illuminate. The 8-hour lighting units which are located in the Main Control Room, at the Alternate Shutdown Panel, along the pathway in between, the 11 diesel generator room, and the warehouse/cold shop equipment bay are required per Appendix R (see Basis for Scoping for listing of Appendix R required units).

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). In addition, some SCs are in-scope due to Fire Protection and Station Blackout in accordance with 10 CFR 54.4(a)(3).

System Function Listing

A comprehensive listing of functions associated with the Lighting System, or specific components contained in the system, is provided in the summary below.

Code: LTG-01 Normal Plant Lighting System provides light in all areas whenever its AC power source is available.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: The USAR states that normal lighting is energized from the primary station auxiliary transformer (2R). Portions of the normal lighting system (essential lighting) are arranged for backup supply from the diesel generator. The components in this system do not meet Criterion 1, 2 or 3.

Code: LTG-02	Cri 1	Cri 2	Cri 3				
Plant DC-Powered Emergency Lighting from Lighting Panel L40 provides lighting to vital areas of the plant in the event of a loss of normal lighting.			FP	EQ	PTS	AT	SB

Comment: The dc powered emergency lighting consists of lights powered from the #11 station battery, which provides emergency lighting for the Control Room, the battery rooms, the cable spreading room, the DG Building, and walkways/stairs between the Control Room and the DG Building. While these emergency lights are designed to provide lighting in the event of loss of normal lighting, they are not the 8 hour emergency lights credited in SBO or Fire Protection scenarios.

Code: LTG-03	Cri 1	Cri 2	Cri 3				
Provides power to panels B34P and B44P which provide power to the safety related 120V CAM/EFT equipment.			FP	EQ	PTS	AT	SB
	X						

Comment: Power panels B34P and B44P provide reliable power to the safety related CAM/EFT 120 Vac distribution system.

Code: LTG-FP	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: 10 CFR 50, Appendix R, Paragraph J, requires Emergency Lighting units with at least an 8-hour battery power supply shall be provided in all areas needed for operation of safe shutdown equipment and in access and egress routes thereto. MNGP complies with this requirement by providing an emergency lighting system which consists of lights powered by individual batteries which provide 8 hours of illumination.

Code: LTG-SB	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of All AC Power).			FP	EQ	PTS	AT	SB
							X

Comment: 10 CFR 50.63 requires the capability to cope with an SBO event for the specified duration. The emergency lighting system consists of lights powered by individual batteries which provide 8 hours of illumination for walkways, stairways, and safe shutdown areas.

USAR Reference

Additional Lighting System details are provided in Section 10.3.9 of the USAR.

License Renewal Drawings

None.

Components Subject to an AMR

Electrical commodities for this system that are subject to AMR are evaluated in Section 2.5.2. Supports for electrical components are evaluated in Section 2.4.6. There are no other components subject to an AMR for this system.

2.5.1.8 Neutron Monitoring

Description

The Local Power Range Monitor (LPRM) subsystem is designed to continuously monitor the neutron flux level in the reactor while in the power range. The LPRM subsystem signals must be available to permit demonstration of compliance with the critical power ratio limits. The individual LPRM output signals serve as input signals to the APRMs and RBM.

The Average Power Range Monitor (APRM) subsystem is designed to provide a continuous, accurate indication of the average core power.

The Rod Block Monitor (RBM) is an operational aid designed to prevent violation of the fuel integrity safety criteria during withdrawal of a single control blade. The RBM also provides a local relative power signal for operator evaluation during control blade movement.

The Startup Range Monitors consist of (12) twelve neutron flux monitoring channels. They are as follows:

- 4 Source Range Monitors (SRMs)
- 8 Intermediate Range Monitors (IRMs)

The Source Range Monitoring System is used to provide neutron flux information from subcritical to an intermediate flux level. The Intermediate Range Monitoring System is used to provide neutron flux information from the upper limit of the Source Range Monitors to the lower limit of the Power Range Monitors.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1).

System Function Listing

A comprehensive listing of functions associated with the Neutron Monitoring System, or specific components contained in the system, is provided in the summary below.

Code: NMS-01	Cri 1	Cri 2	Cri 3				
Reactor criticality control. For design basis events, portions of the Neutron Monitoring System provide neutron flux level inputs to the plant Protection System for reactor scram.			FP	EQ	PTS	AT	SB
	X						

Comment: Portions of the Neutron Monitoring System relied upon to perform this function include the IRMs, LPRMs, and APRMs. This function is safety-related. This function of the Neutron Monitoring System is not required for the regulated events. The reactor coolant boundary function of the various neutron detectors has been addressed in the Reactor Pressure Vessel Internals System (RIT).

Code: NMS-02	Cri 1	Cri 2	Cri 3				
Provides the necessary rod blocks if local power level limits are exceeded and also provides indication of relative local power levels.			FP	EQ	PTS	AT	SB

Comment: This function is non-safety. This function of the Neutron Monitoring System is not required for the regulated events.

Code: NMS-03	Cri 1	Cri 2	Cri 3				
The APRMs/LPRMs are intended to provide power level indication over the power range of the reactor.			FP	EQ	PTS	AT	SB

Comment: This function is non-safety related. The Neutron Monitoring System is not required for the regulated events. Per USAR Table 7.9-1, these detectors are used to satisfy Reg. Guide 1.97 post accident monitoring requirements for neutron flux.

Code: NMS-04	Cri 1	Cri 2	Cri 3				
SRMs are intended to provide the necessary inputs for rod blocks and power level indication from subcritical to intermediate neutron flux levels especially initial criticality.			FP	EQ	PTS	AT	SB

Comment: This function is not safety-related. The SRM and IRM detectors are withdrawn from the core during full power operation (USAR Section 7.3). The rod block function allows for optimum SRM/IRM placement and prevents inappropriate rod worth (reactivity) changes at very low power levels. No regulated event is supported by this function. Per USAR Table 7.9-1, these detectors are used to satisfy Reg. Guide 1.97 post accident monitoring requirements for neutron flux.

Code: NMS-05	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
IRMs are intended to provide the necessary inputs for rod blocks and power level indication from the upper limit of the SRMs to the lower limit of the Power Range Monitors.							

Comment: This function is not safety-related. The SRM and IRM detectors are withdrawn from the core during full power operation (USAR Section 7.3). The rod block function allows for optimum SRM/IRM placement and prevents inappropriate rod worth (reactivity) changes at very low power levels. No regulated event is supported by this function. Per USAR Table 7.9-1, these detectors are also used to satisfy Reg. Guide 1.97 post accident monitoring requirements for neutron flux.

USAR Reference

Additional Neutron Monitoring System details are provided in Section 7.3, Table 7.6-1, and Table 7.9-1 of the USAR.

License Renewal Drawings

None.

Components Subject to an AMR

Electrical commodities for this system that are subject to AMR are evaluated in Section 2.5.2. Supports for electrical components are evaluated in Section 2.4.6. There are no other components subject to an AMR for this system.

2.5.1.9 Off Site Power

Description

The 115 kV Substation contains buses, breakers, transformers, and associated equipment necessary to connect the MNGP 345 kV System to the Xcel Energy 115 kV Transmission System. The 1R and 1AR transformers are supplied power from the 115 kV Substation.

The 230 kV Substation contains buses, breakers, transformers, and associated equipment. It connects the Xcel 345 kV Transmission System to the Great River Energy (GRE) 230 kV Transmission System. No. 6 Transformer is included in the 230 kV Substation System.

The 345 kV Substation contains the buses, breakers, and associated equipment necessary to connect the Xcel 345 kV transmission system to the 2RS and 1ARS transformers.

Some SCs in the Off Site Power System are in-scope due to Station Blackout in accordance with 10 CFR 54.4(a)(3).

The portions of the Off Site Power System containing components subject to an AMR include non-segregated phase bus, switchyard bus, high voltage insulators, transmission conductors, 345 kV Bus 1, 115 kV Bus 1 and other components as listed in the site specific SBO recovery paths documented in Section 2.5.2.4, Off Site/SBO Recovery Path.

System Function Listing

A comprehensive listing of functions associated with the Off Site Power System, or specific components contained in the system, is provided in the summary below.

Code: OSP-01	Cri 1	Cri 2	Cri 3				
The 230 kV Substation provides an interconnection between the Xcel 345 kV Transmission System and the Great River Energy 230 kV Transmission System.			FP	EQ	PTS	AT	SB

Comment: This function is not safety-related (USAR Section 8.2) and failure will not prevent the performance of any safety-related function. The 230 kV path is not used to provide off-site power to the plant, and no regulated events are supported by this system.

Code: OSP-02	Cri 1	Cri 2	Cri 3				
The 230 kV Substation supplies power to the Cooling Tower Substation and the Training Center via No. 6 Transformer.			FP	EQ	PTS	AT	SB

Comment: This function is not safety related. No regulated event is supported by the 230 kV system.

Code: OSP-03	Cri 1	Cri 2	Cri 3				
The 345 kV system supplies the 1ARS transformer which can provide power to the Cooling Tower Substation.			FP	EQ	PTS	AT	SB

Comment: This function is non-safety related and failure will not affect the performance of any safety-related function. No regulated event is supported by this function.

Code: OSP-SB	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions relied upon for recovery from an SBO (10 CFR 50.63) event as required by ISG-02.			FP	EQ	PTS	AT	SB
							X

Comment: This system performs functions relied upon for recovery from an SBO (10 CFR 50.63) event as required by ISG-02. The recovery paths are the same as the normal plant alignment paths, as described in USAR Section 8.2.1.

USAR Reference

Additional Off Site Power System details are provided in Section 8.2 of the USAR.

License Renewal Drawings

The license renewal drawings for the Off Site Power System are listed below:

LR-36298

Components Subject to an AMR

Electrical commodities for this system that are subject to AMR are evaluated in Section 2.5.2. Supports for electrical components are evaluated in Section 2.4.6. There are no other components subject to an AMR for this system.

2.5.1.10 Plant Protection

Description

The Plant Protection System consists of the following three subsystems: Reactor Protection System, Anticipated Transient Without Scram (ATWS) System and Primary Containment Isolation System. The Reactor Protection System (RPS) includes the motor-generator power supplies' associated control and indicating equipment, sensors, relays, bypass circuitry, and switches that cause rapid insertion of control rods (scram) to shutdown the reactor. The ATWS system consists of two separately powered trip systems, each made up of two sub-channels. Each sub-channel receives an input from an independent sensor monitoring each of the ATWS trip parameters. A trip occurring in both sub-channels will cause an ATWS trip which opens both recirc motor generator (MG) set generator field breakers and causes control rod insertion by venting the scram air header. The Primary Containment Isolation System (PCIS) provides protection against the onset and consequences of accidents involving the gross release of radioactive materials from the Primary Containment. This protection is the automatic isolation of appropriate pipelines which penetrate the primary containment whenever certain monitored variables exceed their preselected operational limit.

Two RPS MG sets are designed to provide a continuous and reliable source of 120 VAC power for the operation of the RPS and other loads. MG sets A and B supply power distribution Panels Y50 and Y40 respectively. Transformer Y60 provides a 480 volt to 120 volt alternate source to the 2 panels. The power distribution panels supply power to the Reactor Protection Systems, Power Range Neutron Monitoring System, and to the off-gas and steam line radiation monitors. The Electrical Protection Assemblies (EPAs) monitor the electric power from each of the three sources of power - the two MG sets and the alternate. If abnormal electric power is detected by an EPA, its circuit breaker will open to disconnect the supplied loads from the abnormal power.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). In addition, some SCs are in-scope due to ATWS, Environmental Qualification, Fire Protection, and Station Blackout in accordance with 10 CFR 54.4(a)(3).

System Function Listing

A comprehensive listing of functions associated with the Plant Protection System, or specific components contained in the system, is provided in the summary below.

Code: PPS-01	Cri 1	Cri 2	Cri 3				
Initiate an automatic reactor shutdown (scram) if monitored system variables exceed pre-established limits.			FP	EQ	PTS	AT	SB
	X						

Comment: This function of the system is safety-related. USAR Section 7.6 discusses the RPS in detail, addressing the requirements, the separate inputs, and the scram settings.

Code: PPS-02	Cri 1	Cri 2	Cri 3				
Provide inputs to alarms, recorders, and computer points associated with its safety-related function.			FP	EQ	PTS	AT	SB

Comment: This function involves data output and is not safety-related. It cannot prevent the performance of any safety-related function and does not support any of the regulated events.

Code: PPS-03	Cri 1	Cri 2	Cri 3				
Provide for manual initiation of rapid control rod insertion - scram.			FP	EQ	PTS	AT	SB

Comment: This function involves the manual scram of the reactor. It is not safety-related, will not prevent the performance of any safety-related function, and does not support any of the regulated events. Manual scram is not relied upon for mitigation of accidents or transients.

Code: PPS-04	Cri 1	Cri 2	Cri 3				
Process information from sensors and initiate closure of containment isolation valves and isolate the RPV.			FP	EQ	PTS	AT	SB
	X						

Comment: This function of the system is safety-related. USAR Section 7.6 discusses the PCIS in detail, addressing the requirements, the separate inputs, and settings.

Code: PPS-05	Cri 1	Cri 2	Cri 3				
Provide logic for the main steam line high radiation trips to shut down the mechanical vacuum pump (MVP), close the MVP suction valve and shut down the MVP seal pump.			FP	EQ	PTS	AT	SB
	X						

Comment: The air operated valves, solenoid valves and hand switches associated with this function are color coded as functionally safety related. This function supports control of radioactive releases.

Code: PPS-06	Cri 1	Cri 2	Cri 3				
Provide stop signals for the drywell equipment drain sump pump and the drywell floor drain sump pump upon receipt of closure signals from their respective discharge valves.			FP	EQ	PTS	AT	SB

Comment: This function is not Safety Related and is provided only to prevent pump damage.

Code: PPS-07	Cri 1	Cri 2	Cri 3				
The EPAs shall provide protection to supplied loads from the non-safety related power sources.			FP	EQ	PTS	AT	SB
	X						

Comment: This function is Safety Related. The EPAs are classified Class 1E by the MNGP USAR, Section 8.6.2.2. The EPAs ensure power fluctuations will not prevent a reactor scram due to abnormal power fluctuations. Therefore the criteria of 10 CFR 54.4(a)(1) is met.

Code: PPS-08	Cri 1	Cri 2	Cri 3				
Provide a continuous reliable source of 120 VAC power to the reactor protection system, Power Range Neutron Monitoring System, and to the off-gas and steam line radiation monitors.			FP	EQ	PTS	AT	SB

Comment: This function is non-safety related, however could cause a scram or safety system actuation. Failure of this function does not prevent a scram or safety system actuation, because 1.) the devices utilizing this power de-energize to perform their function, and 2.) single failure criteria applies to the trip systems. The failure of this function does not prevent the satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1) and does not meet the criteria of 10 CFR 54.4(a)(2) per the USAR. This function does not meet the criteria of 10 CFR 54.4(a)(3).

Code: PPS-AT	Cri 1	Cri 2	Cri 3				
Initiate an automatic reactor shutdown (scram) if monitored system variables exceed pre-established limits.			FP	EQ	PTS	AT	SB
						X	

Comment: The ATWS alternate rod injection (ARI) function is associated with the PPS.

Code: PPS-EQ The system contains components which perform functions credited in the current licensing basis for Environmental Qualification.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
				X			

Comment: Components of the Plant Protection System are listed on the EQ Master list. These components must remain operable during plant operation and various safety system actuations. These components initiate an automatic reactor shutdown (scram) if monitored system variables exceed pre-established limit.

Code: PPS-FP The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: This system performs function(s) relied upon for 10 CFR 50.48, Fire Protection, specifically, reactivity control. The system provides a reactor scram signal for shutdown as part of regulated event mitigation.

Code: PPS-SB The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of All AC Power).	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: This system performs function(s) relied upon for 10 CFR 50.63, Loss of All Alternating Current Power, specifically, reactivity control. The system provides a reactor scram signal for shutdown as part of regulated event mitigation.

USAR Reference

Additional Plant Protection System details are provided in Section 7.1.1.1, Section 7.6, and Section 8.6.2.2 of the USAR.

License Renewal Drawings

None.

Components Subject to an AMR

Electrical commodities for this system that are subject to AMR are evaluated in Section 2.5.2. Supports for electrical components are evaluated in Section 2.4.6. There are no other components subject to an AMR for this system.

2.5.1.11 Radiation Monitoring

System Description

There are numerous Area Radiation Monitors located throughout the plant, Recombiner Building, and Off-Gas Storage Building. Each consists of a detector coupled to an indicator located either on Control Room Panels C-11 or C-252D. The indicators for the Containment High Range Monitors are located on Panels C-257 and C-258 in the Control Room. The Post Accident Sample System (PASS) indicators are on Pass Panel C-261. Two multipoint recorders, NR-18-55 and RR-7573, located on Panel C-02 and Panel C-252D, respectively, record the readings of all channels, except the high range channel (RI-7774) from the Off-Gas Storage Building, the drywell monitors, and the PASS monitor. All of the area radiation monitors use Geiger-Mueller (G-M) detectors, except for the Containment High Range monitors which are ION chambers. These units are X-ray and gamma sensing devices.

The Process Radiation Monitoring System consists of several subsystems which provide continuous monitoring of the radiation levels of liquid and gaseous processes throughout the plant which can release activity directly to the environment. These subsystems assist in controlling the release of radioactive by-products within the legally prescribed limits as set forth in the Technical Specifications. They also help provide for personnel safety by warning of abnormal radiation release levels and, in some cases, automatically terminating these releases.

The subsystems of the Process Radiation Monitoring System provide plant personnel with visual real time indication of process radiation levels, as well as a permanent record by means of strip chart recorders.

The Process Radiation Monitoring System consists of the following individual process systems and associated sampling systems:

Safety Related:

1. Control Room Heating and Ventilation and Emergency Filtration Train (2 channels)
2. Reactor Building Ventilation Plenum (2 channels)
3. Fuel Pool (2 channels)
4. Main Steam Line (4 monitors / 2 channels)
5. Steam Jet Air Ejector Off-gas (2 channels)

Non-Safety Related with no SSA:

6. Stack Noble Gas (2 channels)

7. Flux Tilt (1 channel)
8. Process Liquid:
   a. Radwaste Effluent (1 channel)
   b. Reactor Building Closed Cooling Water (1 channel)
   c. Service Water (1 channel)
   d. Discharge Canal (2 channels)
   e. Turbine Building Normal Waste Sump (2 channels)
9. Reactor Building Ventilation Noble Gas (2 channels)
10. Drywell Particulate (1 channel)
11. Sewer Lift Station (1 channel)
12. Hard Pipe Vent (1 channel)

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). In addition, some SCs are in-scope due to Environmental Qualification in accordance with 10 CFR 54.4(a)(3).

System Function Listing

A comprehensive listing of functions associated with the Radiation Monitoring System, or specific components contained in the system, is provided in the summary below.

Code: RMS-01	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
The Area Radiation Monitoring (ARM) System provides a continuous indication of gamma radiation levels at various selected locations throughout the plant buildings. (Non-EOP entry Area Radiation Monitors)							

Comment: The ARM system is not safety-related and will not fail such that the accomplishment of any safety related function is prevented. This function of the ARM system is not part of the EQ program and does not support any of the regulated events.

Code: RMS-02	Cri 1	Cri 2	Cri 3				
The Process Radiation Monitoring (PRM) provides continuous monitoring of radiation levels of liquid and gaseous processes and provides signals for automatic control and mitigation of radioactive releases.			FP	EQ	PTS	AT	SB
	X						

Comment: The monitors which support this function are the Control Room fresh air intake monitors for the Emergency Filtration Train System, the reactor building exhaust plenum and fuel pool monitors for Standby Gas Treatment System initiation, the Steam Jet Air Ejector Off-gas monitors for a trip signal to the offgas recombiners at pre-determined radiation levels, and the Main Steam Line Radiation monitors for condenser vacuum pump tripping and suction valve closure. The components of the PRM system which support this function are classified as safety-related.

Code: RMS-03	Cri 1	Cri 2	Cri 3				
The remaining portions of the Process Radiation Monitoring System (See comments) provide a continuous monitoring of the radioactivity of associated process lines.			FP	EQ	PTS	AT	SB

Comment: The following Process Radiation Monitoring Systems are Non-Safety Related with no SSA impact:

Stack Noble Gas, Flux Tilt, Process Liquid: (Radwaste Effluent, Reactor Building Closed Cooling Water, Service Water, Discharge Canal, Turbine Building Normal Waste Sump), Reactor Building Ventilation Noble Gas, Drywell Particulate, Sewer Lift Station, Hard Pipe Vent.

The associated functions are not safety-related and any component failure will not impact the performance of a safety-related function. This function does not support any of the regulated events.

Code: RMS-EQ	Cri 1	Cri 2	Cri 3				
The system contains components which perform functions credited in the current licensing basis for Environmental Qualification.			FP	EQ	PTS	AT	SB
				X			

Comment: The Area Radiation Monitoring System (ARM) contains components which provide the Control Room operating personnel with a continuous indication of gamma radiation levels at various selected locations throughout the plant buildings for possible EOP entry. The ARM system is not safety-related and will not fail such that the accomplishment of any safety-related function is prevented. ARM components RE-7860A,B are part of the EQ program.

USAR Reference

Additional Radiation Monitoring System details are provided in Section 7.5 and Table 7.9-1 of the USAR.

License Renewal Drawings

None.

Components Subject to an AMR

Electrical commodities for this system that are subject to AMR are evaluated in Section 2.5.2. Supports for electrical components are evaluated in Section 2.4.6. There are no other components subject to an AMR for this system.

2.5.1.12 Reactor Level Control

System Description

The Feedwater System consists of two constant speed motor driven feedwater pumps with throttling flow control that have a combined capacity of the total required flow to the reactor. The Reactor Level Control System automatically controls the flow of feedwater into the reactor vessel to maintain the water level in the vessel within a predetermined range during all modes of plant operations. The Reactor Level Control System employs water level, steam flow, and feedwater flow as a three-element control. Single-element control is also available employing water level only.

Some Reactor Level Control System SCs are in-scope due to Fire Protection and Station Blackout in accordance with 10 CFR 54.4(a)(3).

System Function Listing

A comprehensive listing of functions associated with the Reactor Level Control System, or specific components contained in the system, is provided in the summary below:.

Code: RLC-01 The Reactor Level Control System controls the flow of feedwater into the reactor vessel and maintains reactor water level within a predetermined operating range during all modes of plant operation.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This system does not perform a safety function, nor is it safety related. Failure of the system to perform this function will not prevent the satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1) and the system does not meet the criteria of 10 CFR 54.4(a)(2). The system is not relied upon in safety analyses to perform a function that demonstrates compliance with the Commission's regulations identified in 10 CFR 54.4(a))(3).

Code: RLC-03 Supply a feedwater flow signal to the Reactor Recirculation Pumps NPSH protection interlock circuit whenever the total feedwater flow rate is less that 20% of rated.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This is not a safety related function. Failure of the system to perform this function will not prevent the satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1) and the system does not meet the criteria of 10 CFR 54.4(a)(2). The system is not relied upon in safety analyses to perform a function that demonstrates compliance with the Commission's regulations identified in 10 CFR 54.4(a)(3).

Code: RLC-04 Supply a steam flow signal to the Rod Worth Minimizer System for 20% and 35% total steam flow.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This is not a safety function. This system does not perform a safety function, nor is it safety related and does not meet the criteria of 10 CFR 54.4(a)(1). Failure of the system to perform this function will not prevent the satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1) and the system does not meet the criteria of 10 CFR 54.4(a)(2).The system is not relied upon in safety analyses to perform a function that demonstrates compliance with the Commission's regulations identified in 10 CFR 54.4(a)(3).

Code: RLC-05 The system provides reactor vessel water level, feedwater flow, and steam flow in the control room. High and low reactor vessel water level are annunciated in the control room.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB

Comment: This system does not perform a safety function, nor is it safety related and does not meet the criteria of 10 CFR 54.4(a)(1). Failure of the system to perform this function will not prevent the satisfactory accomplishment of any of the functions identified in 10 CFR 54.4(a)(1) and the system does not meet the criteria of 10 CFR 54.4(a)(2). The system is not relied upon in safety analyses to perform a function that demonstrates compliance with the Commission's regulations identified in 10 CFR 54.4(a)(3).

Code: RLC-FP The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
			X				

Comment: This system performs function(s) relied upon for 10 CFR 50.48, Fire Protection, specifically, reactor vessel pressure indication.

Code: RLC-SB The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of all AC Power).	Cri 1	Cri 2	Cri 3				
			FP	EQ	PTS	AT	SB
							X

Comment: PY-7437B and PI-6-90B provide RX vessel pressure indication to control room and are credited in the SBO scenario. This function meets the criteria of 10 CFR 54.4(a)(3), Station Blackout.

USAR Reference

Additional Reactor Level Control System details are provided in Section 7.7.4 and Section 14.4.4 of the USAR.

License Renewal Drawings

None.

Components Subject to an AMR

Electrical commodities for this system that are subject to AMR are evaluated in Section 2.5.2. Supports for electrical components are evaluated in Section 2.4.6. There are no other components subject to an AMR for this system.

2.5.1.13 Uninterruptible AC

Description

Uninterruptible 120 Volt AC System

The Uninterruptible AC (UAC) System is composed of (2) Class 1E inverters that provide a Division 1 and a Division 2 120 VAC uninterruptible power source. The Division 1 inverter (Y-71) is supplied by Division 1 250 VDC distribution Panel D-31 with an alternate AC source to the static switch from essential MCC-134 through a step-down transformer. The Division 2 inverter (Y-81) is supplied by Division 2 250 VDC distribution Panel D-100 with an alternate AC source to the static switch from essential MCC-144 through a step-down transformer. Y-71 supplies Class 1E distribution Panel Y-70 and Non-1E distribution Panel Y-10. Y-81 supplies Class 1E distribution Panel Y-80 and Non-1E Panel Y-30.

Uninterruptible 480 Volt AC System

The 480 Volt AC System is composed of (1) Uninterruptible Power Supply (UPS) Y-91 which provides a reliable source of 480 Volt AC power. This system is not a Class 1E System. The normal source for Y-91 is from LC-108 through circuit breaker 52-804. The alternate source is through circuit breaker 52-704 on LC-107. The backup DC source is 250 VDC battery No. 17 via circuit breaker No. 1 on Panel D-71. Y-91 rectifier section provides the charging for No. 17 battery as well as being the normal supply for Y-91 inverter section.

Instrument AC System:

The instrument and control AC power provides AC power to plant AC instrument loads. Distribution Panel Y-20 is supplied from the plant auxiliary system. An automatic transfer to an alternate source within the plant auxiliary system occurs if the preferred source fails. This panel supplies noncritical instrument AC and control loads. Distribution Panels Y-25 and Y-26 supply mainly recombiner loads. The interruptible AC system consists of panels Y-20, Y-25 and Y-26.

Panel Y-20 is normally supplied from transformer 12 from MCC-143 with back up power supplied by transformer 11 from MCC-133. An automatic break before make transfer from the normal supply to the back up supply or vice versa will take place upon loss of potential at the panel. Panel Y-25 supplies recombiner train A controls and instrumentation as well as some instrumentation for transformers 1R and 2R. Its power source is MCC-125 through transformer XL-32. Panel Y-26 supplies recombiner train B controls and instrumentation. Its power source is MCC-116 through transformer XL-35.

USAR Section 8.7 defines the Class 1E and the non-Class 1E portions of the Uninterruptible AC system. The non-Class 1E portion is composed of a single module to provide an uninterruptible power source primarily to the VAX computer systems.

The description above results in some SCs in this system being in-scope in accordance with 10 CFR 54.4(a)(1). In addition, some SCs are in-scope due to ATWS, Fire Protection, and Station Blackout in accordance with 10 CFR 54.4(a)(3).

System Function Listing

A comprehensive listing of functions associated with the Uninterruptible AC System, or specific components contained in the system, is provided in the summary below.

Code: UAC-01	Cri 1	Cri 2	Cri 3				
The Uninterruptible 120 VAC Subsystems (Y71 and Y81) shall provide power to Class 1E distribution panels Y-70 and Y-80.			FP	EQ	PTS	AT	SB
	X						

Comment: This function is safety-related. Y-70 and Y-80 provide power to the ASDS, reactor protection system and various other safety related loads which are listed as Safety Related.

Code: UAC-02	Cri 1	Cri 2	Cri 3				
The Uninterruptible 120 VAC Subsystems (Y-10 and Y-30) shall provide power to the connected non-safety related loads.			FP	EQ	PTS	AT	SB

Comment: This function is non-safety and its failure will not prevent the performance of a safety-related function.

Code: UAC-03	Cri 1	Cri 2	Cri 3				
The 480 VAC Uninterruptible Power Supply Y-91 shall provide reliable power for the VAX Computer system via panel Y-94 and the 120/208 Vac Distribution Panel Y-90.			FP	EQ	PTS	AT	SB

Comment: This function is non-safety and its failure will not prevent the performance of a safety-related function. No regulated event is supported by this function.

Code: UAC-04	Cri 1	Cri 2	Cri 3				
The interruptible Instrument AC power shall provide power to the connected non-safety related loads via distribution panels Y-25 & Y-26.			FP	EQ	PTS	AT	SB

Comment: This function is non-safety and it failure will not prevent the performance of a safety related function. No regulated event is supported by this function.

Code: UAC-AT	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Anticipated Transients Without Scram.			FP	EQ	PTS	AT	SB
						X	

Comment: This system performs functions relied upon for 10 CFR 50.62, Anticipated Transients Without Scram (ATWS), specifically, provides power to Class 1E distribution panels Y-70 and Y-80. The ATWS circuits are powered from the Y70-13 and Y80-13 circuits.

Code: UAC-FP	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Fire Protection.			FP	EQ	PTS	AT	SB
			X				

Comment: This system performs functions relied upon for 10 CFR 50 Appendix R, specifically, provides power to the connected non-safety related loads via distribution panel Y-20.

Code: UAC-SB	Cri 1	Cri 2	Cri 3				
The system contains structures and/or components which perform functions credited in the current licensing basis for Station Blackout (Loss of All AC Power).			FP	EQ	PTS	AT	SB
							X

Comment: This system performs functions relied upon for 10 CFR 50.63, Loss of All Alternating Current Power, specifically, it provides power to Class 1E distribution panels Y-70 and Y-80 and Non-1E distribution panels Y-10 and Y-30. The Feedwater Control System 24 VDC Power Supply, fed from Y-10 and Y-30, provides power to PT-6-53B, PY-7437B and PI-6-90B, which provide RX vessel pressure indication to control room and are credited in the SBO scenario.

USAR Reference

Additional Uninterruptible AC System details are provided in Section 8.7 of the USAR.

License Renewal Drawings

None.

Components Subject to an AMR

Electrical commodities for this system that are subject to AMR are evaluated in Section 2.5.2. Supports for electrical components are evaluated in Section 2.4.6. There are no other components subject to an AMR for this system.

2.5.2 Electrical Commodities

This section presents the results of the screening process for electrical components evaluated as commodities. The list of electrical components subject to an AMR was determined on a plant-wide basis by compiling a list of all electrical component types installed in the plant, then applying the screening criteria of 10 CFR Part 54 to determine those component types subject to an AMR. All passive electrical components, which support a License Renewal intended function, were within the scope of license renewal. Individual circuits were not evaluated to determine whether they were in-scope. Furthermore, for many of the component types (e.g., cable), it was not possible to determine which system(s) applied to each component type. The resulting list is an encompassing list of component types, not individual components. For example, cable is listed as a component type. After applying the screening criteria discussed in Section 2.1.5.4, including the guidance in NEI 95-10, Appendix B, the following groups were identified:

- Electrical Penetrations (Section 2.5.2.1)
- Fuse Holders (Section 2.5.2.2)
- Non-EQ Cables and Connections (Section 2.5.2.3)
- Off Site Power/SBO Recovery Path (Section 2.5.2.4)

As noted in Section 2.1.5.3, Electrical and I&C components associated with the 10 CFR 50.49 program (EQ) are replaced on a specified interval based on a qualified life. Therefore, components in the EQ program do not meet the “long-lived” criteria of 10 CFR 54.21(a)(1)(ii). They are “short-lived” per the regulatory definition and are not subject to AMR.

2.5.2.1 Electrical Penetrations

Description

Electrical penetration assemblies consist of one or more electrical conductors and materials, which provide a pressure boundary between the inboard and outboard sides of the penetration. The penetration must be capable of maintaining the license renewal intended function of “electrical continuity” through the boundary. The cable and material associated with maintaining the license renewal intended function is the focus of this review. Portions and materials of the penetration assembly associated with the license renewal intended function “pressure boundary” (or essentially leak-tight containment barrier) are in Section 2.4.13.

For an Electrical Penetration to be within the scope of license renewal, it must support an intended function of one of the systems or components identified as in-scope of license renewal.

MNGP uses penetrations manufactured by General Electric (GE) and D.G. O'Brien.

There are 24 electrical penetrations at the MNGP. Nineteen of these are in use and five are spares.

There are six penetrations designated as requiring Environmental Qualification (EQ) and are addressed in the Section 4.0, Time Limited Aging Analysis (TLAA), of this report.

Of the remaining 13 penetrations, only four are in-scope for license renewal. The other nine penetrations do not contain cables which provide a license renewal safety related intended function, or are credited for any of the regulated events.

USAR Reference

None.

License Renewal Drawings

None.

Components/Commodities Subject to an AMR

The commodity groups for Electrical Penetrations that require aging management review are addressed in Table 2.5.2-1 along with each commodity group's intended function(s).

Table 2.5.2-1 Electrical Penetrations

Commodity Group	Intended Function
NON-EQ INSULATED CABLES AND CONNECTIONS	PROVIDE ELECTRICAL CONNECTIONS TO SPECIFIED SECTIONS OF AN ELECTRICAL CIRCUIT TO DELIVER VOLTAGE, CURRENT OR SIGNALS.

Table 2.5.2-1 Electrical Penetrations

Commodity Group	Intended Function
NON-EQ ELECTRICAL AND I&C PENETRATION ASSEMBLIES EXCEPT CABLE AND CONNECTIONS (ELECTRICAL COMPONENTS ONLY - POTTING COMPOUND, VAPOR BARRIER, AND SUPPORT)	PROVIDE ELECTRICAL CONNECTIONS TO SPECIFIED SECTIONS OF AN ELECTRICAL CIRCUIT TO DELIVER VOLTAGE, CURRENT, OR SIGNALS
NON-EQ ELECTRICAL CABLES USED IN INSTRUMENTATION CIRCUITS NOT SUBJECT TO 10 CFR 50.49 EQ REQUIREMENTS THAT ARE SENSITIVE TO REDUCTION IN CONDUCTOR INSULATION RESISTANCE	PROVIDE ELECTRICAL CONNECTIONS TO SPECIFIED SECTIONS OF AN ELECTRICAL CIRCUIT TO DELIVER VOLTAGE, CURRENT, OR SIGNALS

2.5.2.2 Fuse Holders

Description

For a fuse holder (block, clips, and connection points) to be within scope, it must support an intended function of one of the systems or components identified as in-scope of license renewal. Additionally, the review of fuse holders applies only to those that are not part of a larger assembly, but support safety related and non-safety related functions in which the failure of a fuse precludes a safety function from being accomplished. Fuse holders inside an enclosure of an active component, such as switchgear, load center, motor control center, distribution panel, power supply, power inverter, charger, converter, inverter, or circuit board, are parts of the larger assembly. Since piece parts and subcomponents, in such an enclosure, are inspected regularly and are maintained as part of the plant’s normal maintenance and surveillance activities, they are not subject to an Aging Management Review.

Since there is no all inclusive fuse database at MNGP, various databases, analysis/calculations and plant walk downs were used to identify those fuse holders meeting the above criteria.

Based on the above reviews of databases, analysis/calculations, and in-plant walk downs, it was determined that the majority of the fuse holders at MNGP are located inside an active device enclosure. For those fuse holders not located inside an active device enclosure, further evaluation was performed to determine if the fuse holder supported an intended function of systems or components identified as in-scope of License Renewal. Those fuse holders not supporting an intended function were scoped out and no further evaluations were performed. Those fuse holders that do support an intended function were scoped in and are subject to Aging Management Review.

USAR Reference

None.

License Renewal Drawings

None.

Components/Commodities Subject to an AMR

The commodity groups for Fuse Holders that require aging management review are addressed in Table 2.5.2-2 along with each commodity group's intended function(s).

Table 2.5.2-2 Fuse Holders

Commodity Group	Intended Function
FUSE HOLDERS	TO PROVIDE ELECTRICAL CONNECTIONS TO SPECIFIED SECTIONS OF AN ELECTRICAL CIRCUIT TO DELIVER VOLTAGE, CURRENT, OR SIGNALS.

2.5.2.3 Non-EQ Cables and Connections

Description

The components evaluated are non-EQ power, instrumentation and control insulated cables and connections (connections include connectors, splices, terminal blocks and fuse holders), and uninsulated (bare) ground conductors. Components that are part of the Environmental Qualification (EQ) Program are evaluated in the Time-Limited Aging Analysis (TLAA) section of the License Renewal Application (LRA) and are not evaluated here.

According to the Department of Energy (DOE) Cable AMG (SAND96-0344), an insulated cable is an assembly of a single electrical conductor (wire) with an insulation covering or a combination of conductors insulated from one another with overall coverings.

The intended function of non-EQ insulated cables and connections is to provide electrical connections to specified sections of an electrical circuit to deliver voltage, current or signals.

Based on the complexity of identifying whether or not an individual insulated cable or connection supports a license renewal intended function, MNGP elected to initially include all non-EQ insulated cable and connections in-scope, but excluded individual circuits (non-EQ cables and connections) on a case-by-case basis during the aging management review evaluation process.

There are approximately 13,000 installed cables at MNGP. Insulated cables and connections are treated as component groups (commodity groups), and include all cables and connections within the scope of license renewal.

Connections

Connections (or terminations) are used to connect the cable conductors to other cables or electrical devices.

There are several types of connections that were evaluated.

Plug-in connectors are one or more electrical contacts that plug or screw into a mating receptacle. They are useful where ease of separation of an electrical connection is desired, for ease of mating specific types of equipment and where multiple simultaneous electrical connections need to be made.

Section 3.3.2 of the DOE Cable AMG (SAND96-0344) also identifies compression and fusion as types of connections. Compression and fusion connections involve various types of metals and other inorganic materials, which have no aging effects that would result in the loss of intended function, but generally have splice insulation materials applied over the compression or fusion connection. Compression and fusion connections are therefore covered under splice insulation materials.

Splice insulation systems (heat shrink and tape) are insulation material generally applied over compression (i.e., bolted) or fusion connections and are used to seal and insulate cable or splice terminations or junctions from the surrounding environment.

Terminal blocks are an insulating base with fixed points for landing of wiring or connection of terminal (ring) lugs. Terminal blocks are installed in enclosures such as control boards, motor control centers, motors, terminal boxes or power panel boards for protection from both physical and environmental damage.

Fuse holders are addressed separately in Section 2.5.2.2 Fuse Holders and will not be addressed here.

Non-EQ Electrical Cables

The DOE Cable AMG (SAND96-0344) categorizes aging mechanisms as being either “significant” or “significant and observed.” The aging mechanisms listed below are identified in DOE Cable AMG as being “significant.”

The aging mechanisms for non-EQ cables and connections are due to a) corrosion of conductor, b) electrical stresses, c) water and humidity, d) temperature, e) radiation, f) mechanical stress (insulation damage during installation and vibration, g) chemical attacks, and h) cables subject to frequent manipulation (at connections and terminal blocks). Section 4.2 of the DOE Cable AMG emphasized that “the applicability of some aging mechanisms to actual cable systems (cables and connections) may be very limited or the frequency of their occurrence may be extremely low.” After a consideration of all of the stressors and the reported incidence of their effects in the industry, the DOE Cable AMG concluded “the likelihood of substantially increased effects or failure rate resulting from aging mechanisms currently categorized only as “significant” is considered low. This assessment, which is based on industry wide observations, provides reasonable assurance that these aging mechanisms will not cause a loss of intended function if left unmanaged during the period of extended operation.

Based on the DOE Cable AMG information, the “significant” aging mechanisms of corrosion of conductor, electrical stresses, except where applied to water treeing, mechanical stress, except where applied to the metallic portion of fuse holders, chemical attacks, and cable subject to frequent manipulation (at connections and terminal blocks) are not applicable.

The non-EQ insulated cable and splice conductor metal is protected by its insulation from environments that induce aging effects. Severe damage to the insulation barrier coupled with an adverse environment (chemical, moisture, etc.) is required to induce aging effects. Industry and MNGP operating experience does not support this mechanism as an aging effect requiring management. Therefore, electrochemical stress (i.e., corrosion) of non-EQ insulated cable and splice conductor metal is not considered an aging effect requiring management.

With the exception of medium voltage cables, Industry and MNGP operating experience does not support electrical stress as being a significant aging mechanism. Most insulated cables are typically not exposed to significant electrical fields, which could initiate electrical stress related aging effects. The concern related to electrical stress is primarily associated with its affects on cable insulation. Therefore, only medium voltage cables insulation will require electrical stress related aging management.

Mechanical stress failures resulting from vibration, frequent manipulation, and tensile stress have extremely low occurrences. Industry and MNGP operating experience does not support this mechanism as an aging effect requiring management. Additionally, degradation due to the above aging effects are considered to be either event driven, caused by a design deficiency, or are a result of human error or intervention. NRC letter from Grimes to Walters, dated June 5, 1998, “License Renewal Issue No. 98-0013, Degradation Induced Human Activities,” states that “the staff concludes that the issue of degradation induced by human activities need not be considered as a separate aging effect and should be excluded from aging management review.”

Ohmic heating and electrical transients are conditions that are accounted for in the initial design of a system. Adverse effects on the electrical cable and connections are experienced only if there is a design deficiency. Thermal cycling resulting from adverse atmospheric conditions are accounted for in the initial design of the plant. Thermal cycling resulting from energization and de energization of an electrical cable or connection is accounted for in the initial design based on acceptable current loading of the circuit. Industry and MNGP operating experience does not support thermal cycling, ohmic heating, and electrical transients as aging effects requiring management.

As supported by the DOE Cable AMG (SAND96-0344) and MNGP operating experience, the likelihood of substantially increased effects or failure rates resulting from the aging mechanisms of thermal cycling, ohmic heating, electrical transients, mechanical stress (vibration), chemical contamination, corrosion, oxidation and cable subject to frequent manipulation (at connections and terminal blocks) as applied to the metallic components of electrical cables and connections is considered low. Therefore, the above listed mechanisms are not considered aging effects requiring management.

Nuclear Instrumentation & Radiation Monitoring Cables

Specific Nuclear Instrumentation and Radiation Monitoring non-EQ cables and connections were also evaluated.

Low current, impedance sensitive neutron monitoring cables are particularly sensitive to a loss of insulation resistance (IR) resulting from prolonged exposure to elevated temperatures or high radiation levels. Therefore, those low current, impedance sensitive, neutron and radiation monitoring, circuits whose instrument cables may experience a reduction in IR due to their prolonged exposure to elevated temperatures or high radiation levels are within the scope of License Renewal.

The Neutron Monitoring System (NMS) is an in-core neutron monitoring system, which detects and monitors neutron flux in the reactor core. The NMS provides the capability to shut down the reactor via the Reactor Protection System (RPS) following a design basis event, and maintains it in a safe shutdown condition. The IRM and APRM circuits perform a system level intended function.

The Process Radiation Monitoring System provides continuous monitoring of the radiation levels of liquid and gaseous processes throughout the plant. These subsystems assist in controlling the release of radioactive by-products within the legally prescribed limits as set forth in the Technical Specifications. The monitors, which support system level intended functions, are the Control Room fresh air intake monitors for the Emergency Filtration Train System, the Reactor Building exhaust plenum and fuel pool monitors for Standby Gas Treatment System initiation, the main steam line radiation monitors for condenser vacuum pump tripping and closure of associated isolation valves and the Steam Jet Air Ejector Off-gas monitors for a trip signal to the off gas recombiners at pre-determined radiation levels.

The Drywell (DW) High Range Radiation Monitors provide post-accident monitoring of area radiation levels inside the Drywell. The DW High Range Radiation Monitors perform a system level intended function.

NMC will implement an aging management program to manage the aging effects of the in scope non-EQ Neutron Monitoring and Radiation Monitoring System insulated cables and connections.

Inaccessible Medium Voltage Cables

Most electrical cables in nuclear power plants are located in dry environments. However, some cables may be exposed to condensation and wetting in inaccessible locations, such as conduits, cable trenches, cable troughs, duct banks, underground vaults or direct buried installations.

Certain electrical cable insulations in these environments can experience a phenomenon known as “water treeing.” Water trees are a cable degradation mechanism that result from electrical stress and moisture. Due to the relatively slow rate of water tree growth and propagation, the effects of exposure to moisture may take several years to manifest itself. The growth and propagation of water trees in medium-voltage cables is somewhat unpredictable and erratic. These trees eventually result in the breakdown of the dielectric and ultimate failure. Water treeing is most often associated with XLPE or HMWPE insulations, although it has been documented in some medium-voltage cables with certain polyethylene insulations and EPR insulations. Water treeing has historically been more prevalent in higher voltage cables, with proportionally fewer occurrences being noted for cables below 15 kV. The cable must be exposed to all of the following conditions for water treeing to occur: 1) A cable insulation material void or impurity (inclusion, flaw) must be present in the cable insulation. 2) Within the medium voltage cable range (4kV-35kV). 3) The presence of an electrical field on “lightly loaded,” continuously energized cables. 4) The presence of continuous, long term, moisture. Water trees do not occur in low-voltage cables, due to the low electric field density and voltage gradient required for treeing to occur.

A review of cables susceptible to water treeing was performed. To provide reasonable assurance that the intended functions of inaccessible, in-scope non-EQ medium-voltage cables susceptible to aging effects caused by significant moisture simultaneously with significant voltage stress will be maintained consistent with the current licensing basis through the period of extended operation, identified cables will be included in an aging management program.

Un-insulated Ground Conductors

Un-insulated ground conductors are electrical conductors (e.g., bare copper cable, bare copper bar) that are used to make electrical equipment ground connections. Un-insulated ground conductors are used to connect equipment (i.e., motor housings, electrical enclosures, cable tray, and building structural steel) to the grounding grid. Un-insulated ground conductors are connected to interfacing equipment by compression or fusion welded connections. Un-insulated ground cables are installed to provide a low impedance equipment ground path. This grounding provides protection to site personnel by providing a low touch-potential voltage.

Un-insulated ground cables are not classified as safety related nor are they relied upon for safety related equipment to perform their intended function as identified in 10 CFR 54.4(a)(1). Failure of an un-insulated ground conductor will not prevent the satisfactory accomplishment of any functions identified in 10 CFR 54.4(a)(1). Un-insulated ground cables are not relied upon in safety analyses or plant calculations to perform a function related to any regulated events identified by 10 CFR 54.4(a)(3). The OE review did not show any significant adverse industry experience associated with un-insulated grounding cables.

Based on the above, un-insulated ground cables have been determined not to be within the scope of license renewal.

USAR Reference

None.

License Renewal Drawings

None.

Components/Commodities Subject to an AMR

The commodity groups for Non-EQ Cables and Connections that require aging management review are addressed in Table 2.5.2-3 along with each commodity group's intended function(s).

Table 2.5.2-3 Non-EQ Cables and Connections

Commodity Group	Intended Function
ELECTRICAL CABLES AND CONNECTIONS NOT SUBJECT TO 10 CFR 50.49 EQ REQUIREMENTS	PROVIDE ELECTRICAL CONNECTIONS TO SPECIFIED SECTIONS OF AN ELECTRICAL CIRCUIT TO DELIVER VOLTAGE, CURRENT OR SIGNALS.
ELECTRICAL CABLES USED IN INSTRUMENTATION CIRCUITS NOT SUBJECT TO 10 CFR 50.49 EQ REQUIREMENTS THAT ARE SENSITIVE TO REDUCTION IN CONDUCTOR INSULATION RESISTANCE	PROVIDE ELECTRICAL CONNECTIONS TO SPECIFIED SECTIONS OF AN ELECTRICAL CIRCUIT TO DELIVER VOLTAGE, CURRENT OR SIGNALS.
INACCESSIBLE MEDIUM VOLTAGE (2KV TO 34.5KV) CABLE AND CONNECTIONS (E.G., INSTALLED IN CONDUIT OR DIRECT BURIED) NOT SUBJECT TO 10 CFR 50.49 EQ REQUIREMENTS	PROVIDE ELECTRICAL CONNECTIONS TO SPECIFIED SECTIONS OF AN ELECTRICAL CIRCUIT TO DELIVER VOLTAGE, CURRENT OR SIGNALS.

2.5.2.4 Off Site Power/SBO Recovery Path

Description

The passive, long-lived, in-scope components comprising the Off Site Power/SBO Recovery Path subject to an aging management review include

Phase Bus, Switchyard Bus, High Voltage Insulators, Transmission Conductors, Non-EQ Cables and Connections, and Non-EQ Buried Cable. Additionally, the hardware used to secure or attach switchyard bus and transmission conductors to high-voltage insulators is included.

Phase Bus

Phase Bus is bus that is enclosed (either within its own enclosure or inside a vault) that is not part of an active component such as switchgear, load center or motor control center. There are four (4) types of phase bus: isolated-phase bus, non-segregated phase bus, phase bus enclosed in a vault, and segregated phase bus. MNGP has two (2) of the types of phase buses mentioned above. The non-segregated phase bus is within the scope of license renewal and requires an aging management review. The isolated-phase bus, which connects the main step-up transformer to the station generator, does not perform a license renewal intended function, and therefore is not in the scope of license renewal.

- Non-Segregated Phase Bus

  According to the IEEE a non-segregated phase bus is an electrical bus constructed with all phase conductors in a common metal enclosure without barriers (only air space) between the phases.

  A non-segregated phase bus connects two or more elements of an electrical power circuit and is normally used to connect active electrical components such as generators, breakers, and transformers. Bus and connections inside the generator, breaker or transformer enclosure are maintained along with other subcomponents and piece-parts inside the enclosure and are not included here. Non-segregated phase bus interfaces with structural supports are addressed in Section 2.4.9.

  The intended function of a non-segregated phase bus is to provide electrical connections to specified sections of an electrical circuit to deliver voltage, current or signals.

Switchyard Bus

A switchyard bus is an un-insulated, un-enclosed, rigid electrical conductor used in switchyards to connect two or more elements of an electrical power circuit, such as active disconnect (gang) switches and passive transmission conductors. Included with the switchyard bus is the hardware used to secure the bus to a high-voltage insulator or transmission conductor. Switchyard bus connections to an active component [e.g., disconnect (gang) switch, transformer, etc.] are inspected and maintained along with the active components [e.g., disconnect (gang) switch, transformer, etc.] and are not included here.

The intended function of a switchyard bus is to provide electrical connections to specified sections of an electrical circuit to deliver voltage, current or signals.

High Voltage Insulators

According to the IEEE an insulator is an insulating material in a form designed to (a) support a conductor physically and (b) separate the conductor electrically from another conductor or object. The insulators evaluated for license renewal are those used to support and insulate high voltage electrical components in switchyards, switching stations and transmissions lines, such as transmission conductors and switchyard buses. High-voltage insulators serve as an intermediate support between a supporting structure (such as a transmission tower or support pedestal) and the switchyard bus or transmission conductor. Transmission towers or support pedestals are addressed in Section 2.4.9.

The intended function of high-voltage insulators is to electrically insulate and support an electrical conductor.

Transmission Conductors

Transmission conductors are un-insulated, stranded electrical cables used to electrically connect two or more elements of an electrical power circuit. All station transmission and shield wire conductors are category ACSR (aluminum conductor steel reinforced). These conductors are constructed of stranded aluminum wire wound around a steel core. No organic materials are involved. Transmission conductors are supported by a passive structure such as a transmission tower via high-voltage strain or suspension insulators. The transmission conductors are secured to the insulators with specifically designed metal hardware.

The intended function of transmission conductors is to provide electrical connections to specified sections of an electrical circuit to deliver voltage, current, or signals.

Transmission towers are addressed in Section 2.4.9.

Site Specific Recovery Paths

The Nuclear Regulatory Commission (NRC) letter to Alan Nelson (Nuclear Energy Institute) and David Lochbaum (Union of Concerned Scientists), (Reference 3), states that “consistent with the requirements specified in 10 CFR 54.4(a)(3) and 10 CFR 50.63 (a)(1), the plant system portion of the offsite power system should be included within the scope of license renewal.”

As stated in the above referenced letter, “For purposes of the license renewal rule, the staff has determined that the plant system portion of the offsite power system that is used to connect the plant to the switchyard circuit breakers should be included within the scope of the rule. This path typically includes the switchyard circuit breakers that connect to the offsite power system transformers (startup transformers), the transformers themselves, the intervening overhead or underground circuits between the circuit breaker and transformer, and the transformer and onsite electrical distribution system, and associated control circuits and structures.”

This staff position requires that the “offsite power system passive, long-lived structures and components that are part of this circuit path,” required to support the “recovery” of offsite power, “are subject to an aging management review …”

Those applicable off site power system passive, long-lived structures and components required to support the descriptions of “recovery” from a SBO are addressed here. The passive, long-lived, in-scope components are described above. Structures associated with the “recovery” path are evaluated in Section 2.4.9.

The intended function of the Off Site Power System is to provide “recovery” power after a SBO event.

The Off Site Power System/Recovery Path boundary includes the 345 kV, 115 kV and 13.8 kV system components from the plant 4.16 kV buses out to the first switchyard breaker, which disconnects the plant from the 345 kV or 115 kV ring bus or the 13.8 kV system fed from the #10 Transformer.

Per USAR Section 8.2.1, Network Interconnections, transformers 2R and 1AR are treated as a single offsite source when 1AR is supplied from 345 kV Bus No. 1, as numerous common mode failures exist, which could cause simultaneous de-energization of both transformers. To minimize the potential for common mode failure, the normal alignment of off site sources to the plant is 2R transformer supplying plant load, 1R transformer energized in reserve, and 1AR transformer energized from 10 transformer, as a third distinct off site source to the essential buses.

- 345 kV Supply through 2R Transformer

  The specific path for the 345 kV offsite source is: the 4.16 kV Non-Segregated Phase Bus from the 4.16 kV Buses #13 and #14 to the 34.5 kV/4.16 kV 2R Transformer, the 34.5 kV/4.16 kV 2R Transformer, the 34.5 kV/ 4.16 kV 2R Transformer High Side Disconnect Switch, the 34.5 kV direct buried cable to the Current Limiting Protector (reactor) Low Side Disconnect Switch to the Switchyard bus, the Current Limiting Protector (reactor) in parallel with the 3N5 Fused Disconnect, 3N4 Breaker, 34.5 kV Bus to low side of 345 kV/34.5 kV 2RS Transformer, the 345 kV/34.5 kV 2RS Transformer, 2RS Motor Operated Disconnect switch, switchyard bus and disconnects up to and including Breakers 8N11 and 8N4.

- 115 kV Supply through 1R Transformer

  The specific path for the 115 kV offsite source is: The 4.16 kV Non-Segregated Phase Bus from the 4.16 kV #13 and #14 buses to the 115 kV/4.16 kv 1R Transformer, the 115 kV/4.16 kV 1R Transformer, the 115 kV overhead transmission line from the 115 kV/4.16 kV 1R Transformer to the 115 kV 1RT disconnect switch, the 115 kV Switchyard Bus from the disconnect switch up to and including Breakers 5N5 and 5N7.

- 13.8 kV Supply through the #10 Transformer

  The specific path for the 13.8 kV offsite source is: The buried cables from the 4.16 kV #15 and #16 Essential Buses to the 13.8 kV/4.16 kV 1AR Transformer, the 13.8 kV/4.16 kV 1AR Transformer, the 1AR Regulator, the 13.8 kV Switchyard Bus to and including the 1AR/10TR Disconnect Switch, the 13.8 kV direct buried cable from the 1AR/10TR Disconnect Switch up to and including the 1N2 Breaker.

- Control and Power Cables for Offsite Power

  Control and power requirements for the switchyard circuit breakers are supplied from battery sources located in the 345 kV/115 kV control houses. Cable leads from distribution cabinets are carried below ground in trenches and then direct buried to the circuit breakers.

USAR Reference

None.

License Renewal Drawings

The license renewal drawings for the Off Site Power/SBO Recovery Path Commodity Group are listed below:

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Components/Commodities Subject to an AMR

The commodity groups for the Off Site Power/SBO Recovery Path that require aging management review are addressed in Table 2.5.2-4 along with each commodity group’s intended function(s).

Table 2.5.2-4 Off Site Power/SBO Recovery Path

Commodity Group	Intended Function
NON-SEGREGATED PHASE BUS	PROVIDE ELECTRICAL CONNECTIONS TO SPECIFIED SECTIONS OF AN ELECTRICAL CIRCUIT TO DELIVER VOLTAGE, CURRENT, OR SIGNALS
HIGH-VOLTAGE INSULATORS	INSULATE AND SUPPORT AN ELECTRICAL CONDUCTOR
HIGH-VOLTAGE SWITCHYARD BUS	PROVIDE ELECTRICAL CONNECTIONS TO SPECIFIED SECTIONS OF AN ELECTRICAL CIRCUIT TO DELIVER VOLTAGE, CURRENT, OR SIGNALS
HIGH-VOLTAGE TRANSMISSION CONDUCTORS	PROVIDE ELECTRICAL CONNECTIONS TO SPECIFIED SECTIONS OF AN ELECTRICAL CIRCUIT TO DELIVER VOLTAGE, CURRENT, OR SIGNALS
ELECTRICAL CABLES AND CONNECTIONS NOT SUBJECT TO 10 CFR 50.49 EQ REQUIREMENTS	PROVIDE ELECTRICAL CONNECTIONS TO SPECIFIED SECTIONS OF AN ELECTRICAL CIRCUIT TO DELIVER VOLTAGE, CURRENT OR SIGNALS.
INACCESSIBLE MEDIUM VOLTAGE (2KV TO 34.5KV) CABLE (E.G., INSTALLED IN CONDUIT OR DIRECT BURIED) NOT SUBJECT TO 10 CFR 50.49 EQ REQUIREMENTS	PROVIDE ELECTRICAL CONNECTIONS TO SPECIFIED SECTIONS OF AN ELECTRICAL CIRCUIT TO DELIVER VOLTAGE, CURRENT, OR SIGNALS

Section 2.5 References

1. SAND96-0344, “Aging Management Guideline for Commercial Nuclear Power Plants - Electrical Cable and Terminations,” Prepared by Ogden Environmental and Energy Services under contract to Sandia National Laboratories for the U.S. Department of Energy, in cooperation with the Electric Power Research Institute.
2. IEEE 100-1984, “The IEEE Standard Dictionary of Electrical and Electronics Terms,” The Institute of Electrical and Electronic Engineers, Inc.
3. NRC letter to Alan Nelson (Nuclear Energy Institute) and David Lochbaum (Union of Concerned Scientists), “Staff Guidance on Scoping of Equipment Relied Upon to Meet the Requirements of The Station Blackout (SBO) Rule (10 CFR 50.63) For License Renewal (10 CFR 54.4(a)(3)),” dated April 1, 2002