January 24, 2005

10 CFR 54

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop: OWFN P1-35
Washington, D.C. 20555-0001

Gentlemen:

In the Matter of	)	Docket Nos. 50-259
Tennessee Valley Authority	)	50-260
		50-296

BROWNS FERRY NUCLEAR PLANT (BFN) – UNITS 1, 2, AND 3 LICENSE RENEWAL APPLICATION (LRA) – LRA SECTION 2.4 – REQUEST FOR ADDITONAL INFORMATION (RAI) (TAC NOS. MC1704, MC1705, AND MC1706)

By letter dated December 31, 2003, TVA submitted, for NRC review, an application pursuant to 10 CFR 54, to renew the operating licenses for the Browns Ferry Nuclear Plant, Units 1, 2, and 3. As part of its review of TVA's license renewal application, the NRC staff, by letter dated December 20, 2004, identified an area where additional information is needed to complete its review.

The specific area requiring a request for additional information (RAI) is related to the Civil Section 2.4 of the LRA.

The enclosure to this letter contains the specific NRC requests for additional information and the corresponding TVA response.

If you have any questions regarding this information, please contact Ken Brune, Browns Ferry License Renewal Project Manager, at (423) 751-8421.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 24th day of January, 2005.

Sincerely,

Original Signed by

T. E. Abney
Manager of Licensing
and Industry Affairs

Enclosure:
cc: See page 3

Enclosure
cc (Enclosure):
State Health Officer
Alabama Department of Public Health
RSA Tower - Administration
Suite 1552
P.O. Box 303017
Montgomery, Alabama 36130-3017

Chairman
Limestone County Commission
310 West Washington Street
Athens, Alabama 35611

(Via NRC Electronic Distribution)
Enclosure
cc (Enclosure):
U.S. Nuclear Regulatory Commission
Region II
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW, Suite 23T85
Atlanta, Georgia 30303-8931

Mr. Stephen J. Cahill, Branch Chief
U.S. Nuclear Regulatory Commission
Region II
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW, Suite 23T85
Atlanta, Georgia 30303-8931

NRC Senior Resident Inspector
Browns Ferry Nuclear Plant
10833 Shaw Road
Athens, Alabama 35611-6970

NRC Unit 1 Restart Senior Resident Inspector
Browns Ferry Nuclear Plant
10833 Shaw Road
Athens, Alabama 35611-6970

cc: continued page 4

cc: (Enclosure)
Margaret Chernoff, Project Manager
U.S. Nuclear Regulatory Commission
(MS 08G9)
One White Flint, North
11555 Rockville Pike
Rockville, Maryland 20852-2739

Eva A. Brown, Project Manager
U.S. Nuclear Regulatory Commission
(MS 08G9)
One White Flint, North
11555 Rockville Pike
Rockville, Maryland 20852-2739

Yoira K. Diaz-Sanabria, Project Manager
U.S. Nuclear Regulatory Commission
(MS 011F1)
One White Flint, North
11555 Rockville Pike
Rockville, Maryland 20852-2739

Ramachandran Subbaratnam, Project Manager
U.S. Nuclear Regulatory Commission
(MS 011F1)
One White Flint, North
11555 Rockville Pike
Rockville, Maryland 20852-2739

ENCLOSURE

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT (BFN)
UNITS 1, 2, AND 3
LICENSE RENEWAL APPLICATION (LRA),

RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION (RAI),
RELATED TO THE CIVIL SECTION 2.4

(SEE ATTACHED)

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT (BFN)
UNITS 1, 2, AND 3
LICENSE RENEWAL APPLICATION (LRA),

RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION (RAI), RELATED TO THE CIVIL SECTION 2.4

By letter dated December 31, 2003, TVA submitted, for NRC review, an application pursuant to 10 CFR 54, to renew the operating licenses for the Browns Ferry Nuclear Plant, Units 1, 2, and 3. As part of its review of TVA's license renewal application, the NRC staff, by letter dated December 20, 2004, identified an area where additional information is needed to complete its review.

The specific area requiring a request for additional information (RAI) is related to the Civil Section 2.4 of the LRA.

Listed below are the specific NRC requests for additional information and the corresponding TVA responses.

NRC RAI 2.4-1

BFN LRA Drawing No. 0-10E201-01-LR, "License Renewal Screening for Information Only Location of Structures" identifies structures that are not in scope of license renewal. These structures include East Access Facility, Isolation Valve Pits, Rad waste Building, South Access Retaining Walls, Water and Oil Storage Building, part of Gate Structure No.2 adjacent to Diesel HPFP House, Raw Water Treatment Facility, structural elements within the Transformer Yard and other miscellaneous buildings. It is not obvious to the staff that all of the above listed structures serve no intended function as defined in 54.4(a)(1). The staff cannot evaluate whether these structures are correctly excluded from the license renewal scope. Additional descriptive information is needed for the above listed structures before a determination can be made. Therefore, the applicant is requested to submit a more detailed description of these structures, define their function, and describe the technical bases for exclusion from the license renewal scope. Also verify that none of these structures serve a seismic II/I intended function as defined in 54.4(a)(2).

TVA response to NRC RAI 2.4-1

These five (5) structures; East Access Facility, Radwaste Building, Water and Oil Storage Building, part of Gate Structure No.2 adjacent to Diesel High Pressure Fire Pump (HPFP) House, and Raw Water Treatment Facility are groups of Class II (non-safety-related) structures and major civil features that do not satisfy the requirements of 10 CFR 54.4(a). These five structures provide structural support and anchorage for non-safety related equipment and equipment that is not required to support regulated events (ATWS, FP, EQ, and SBO). None of the five structures and major components in these structural groups serves a seismic II/I intended function. This was the technical basis for exclusion from the license renewal scope. A more detailed description and functions is provided below for each of the five structures. A more detailed description of the South Access Retaining Walls, the Isolation Valve Pits, and the structural elements within the Transformer Yard and other miscellaneous buildings is also provided below.

East Access Facility

This facility is a set of two temporary Class II (non-safety-related) buildings built originally to support the recovery of BFN unit 3. One building provides office space and shop area for site maintenance personnel. The other building provides access for site personnel, plant material and plant equipment into the powerhouse (through the unit 3 Turbine Building) and a radiation control point for same entering or exiting the unit 3 Turbine Building.

Isolation Valve Pits

These Class II (non-safety-related) structures are manholes that provide structural support and shelter protection for the hardened wetwell vent piping and components. Upon further review, it has been noted that the hardened wetwell vent is in scope for license renewal per section 2.3.2.1, Containment System (064). The hardened wetwell vent was a commitment to GL 89-16. These Isolation Valve Pits are Class II (non-safety-related) structures and since they provide an intended function for an in-scope mechanical system (54.4(a)(2)), they should be included within the scope of the LRA. Refer to Attachment 1 for the affected sections of the application with the required scoping, screening and aging management review results for these structures (manholes).

Radwaste Building

The Radwaste Building is a Class II (non-safety-related) structure per UFSAR section 12.2.5. The Radwaste Building is a cellular box-type concrete structure extending approximately 20 feet below grade and 30 feet above grade and is supported by steel H-piles driven to bedrock. This building houses common services to all three units. The concrete structure provides shelter/protection and non-safety related structural support for equipment and components that support the processing of radwaste generated as a result of plant operation.

South Access Retaining Walls

These retaining walls are safety-related structural features that maintain the stability of the safety-related Earth Berm. The retaining walls provide retention of the Earth Berm and allows for removal of a portion of the Earth Berm to construct a temporary personnel access building. This temporary personnel access building provides access for site personnel into the unit 1 Reactor Building and a radiation control point for same entering or exiting the unit 1 Reactor Building during unit 1 recovery. These Retaining Walls are safety-related structural features and should be included in the LRA. Refer to Attachment 2 for the affected sections of the application with the required scoping, screening and aging management review results for this structural feature.

Water and Oil Storage Building

The Water and Oil Storage Building is a Class II (non-safety-related) of light commercial construction housing non-safety-related electrical components and equipment for the non-safety related water and oil storage tanks located east of this building.

Part of Gate Structure No. 2 adjacent to Diesel HPFP House

Gate Structure No. 2 is part of the Auxiliary Condenser Cooling Water System as shown on UFSAR Figure 12.2-72a (TVA drawing 0-31E400-1). The system consists of waterways, control structures (i.e., Discharge Control Structure and Gate Structure No. 2) and cooling towers to permit helper system operation. They are seismically unclassified and were designed for normal applicable dead, live, and surcharge loads with appropriate load factors. The Diesel HPFP House is also a Class II structure and was determined to be in-scope for LR because it houses

mechanical and electrical components that support the regulated event 50.48. Consequently seismic events do not have to be considered to occur with the regulated event 50.48.

Raw Water Treatment Facility

The Raw Water Treatment Facility is a Class II (non-safety-related) prefabricated facility housing non-safety-related equipment and tanks for chemical injection into the raw cooling and service water systems. The function of the facility is to provide shelter/protection and non-safety-related structural support for the equipment and components in this facility. A small office space for transit personnel is provided in one of the buildings.

Structural Elements within the Transformer Yard and other miscellaneous buildings

The Transformer Yard is in the scope of license renewal based on the criteria of 54.4(a)(3) for Station Blackout. See LRA section 2.4.7.4 for Transformer Yard scoping and screening results. Note that the 161 kV Switchyard (LRA section 2.4.7.5) and the 500 kV Switchyard (LRA section 2.4.7.6) are also in the scope of license renewal based on the criteria of 54.4(a)(3) for Station Blackout. There are no permanent buildings within the license renewal boundary diagram for Transformer Yard or 161 kV Switchyard or 500 kV Switchyard.

NRC RAI 2.4-2

LRA Section 2.4.1.1 discusses the scoping and screening results for the Primary Containment Structure. It is the staff's understanding that this section of the LRA addresses not only the primary containment (drywell, pressure suppression chamber, and the vent system connecting the two structures), but also all the structures inside the primary containment, all attachments to the containment, and the containment supports. LRA Table 2.4.1.1 identifies the primary containment component types requiring aging management review and the associated component intended function(s). Since LRA Table 2.4.1.1 combines many components under a single component type, the staff requests that the applicant identify, as appropriate, which component type is intended to cover the specific components listed in (a) through (k) below, or identify the location in the LRA where these specific components are addressed. If these specific components are not considered to be within the scope of license renewal, please provide the technical bases for their exclusion.

(a) Reactor Vessel to Biological Shield Stabilizers

(b) Biological Shield to Containment Stabilizer

(c) RPV Male Stabilizer Attached to Outside of Drywell Shell

(d) RPV Female Stabilizer and Anchor Rods (also referred to as Gib) embedded in Reactor Building concrete wall

(e) Biological Shield Wall and Anchor Bolts

(f) Reactor Vessel Support Skirt and Anchor bolts

(g) Reactor Vessel Support Ring Girder and Anchor Bolts

(h) Reactor Vessel Support Pedestal

(i) Drywell internal steel shear ring

(j) Drywell steel support skirt and anchor bolts

(k) The drywell head closure bolts and double gasket, tongue-and-groove seal arrangement

TVA response to NRC RAI 2.4-2

The Primary Containment Structure scoping and screening results are presented in BFN LRA Section 2.4.1.1. The Reactor Vessel scoping and screening results are presented in BFN LRA Section 2.3.1.1. The Structures and Component Supports Commodity Group scoping and screening results are presented in BFN LRA Section 2.4.8.1. The following list of components roll-up to the listed component groups:

(a) Reactor Vessel to Biological Shield Stabilizers:

- Table 2.4.8.1, ASME Equivalent Supports and Components;
- Table 3.5.2.26, ASME Equivalent Supports and Components;
- Table 2.3.1.1, Stabilizer Bracket;
- Table 3.1.2.1, Stabilizer Bracket; and
- LRA Section 3.1.2.2.16.1 BWRVIP-74-A Table 4-1 Items.

- NOTE: This biological shield wall is internal to the Drywell.

(b) Biological Shield to Containment Stabilizer:

- Table 2.4.1.1, Steel Containment Elements; and
- Table 3.5.2.1, Steel Containment Elements.
- NOTE: This biological shield wall is internal to the Drywell.

(c) RPV Male Stabilizer Bracket Attached to Outside of Drywell Shell:

- There is no RPV male stabilizer bracket attached to the outside of the Drywell shell at BFN. There is a stabilizer from the internal biological shield wall to the inside containment shell that is a subset of biological shield to containment stabilizer noted in (b) above.

(d) RPV Female Stabilizer and Anchor Rods (also referred to as Gib) embedded in Reactor Building concrete wall:

- There is no RPV female stabilizer and anchor rods (also referred to as Gib) embedded in Reactor Building concrete wall at BFN. There is a female stabilizer and anchor rods assembly embedded in Reactor Building concrete wall (also a biological shield wall external to Drywell) and is a subset of biological shield to containment stabilizer noted in (b) above.

(e) Biological Shield Wall and Anchor Bolts:

- Table 2.4.1.1, High Density Shielding Concrete;
- Table 3.5.2.1, High Density Shielding Concrete (Un-reinforced shielding concrete is encased between steel plates and is inaccessible. The steel plates are included with structural steel internal to drywell);
- Table 2.4.1.1, Structural Steel Beams, Columns, Plates, Trusses; and
- Table 3.5.2.1, Structural Steel Beams, Columns, Plates, Trusses.
- NOTE: This biological shield wall is internal to the Drywell.

(f) Reactor Vessel Support Skirt and Anchor Bolts:

- Table 2.3.1.1, Support Skirt and Attachment Welds;
- Table 3.1.2.1, Reactor Vessel Support Skirt and Attachment Welds;
- LRA Section 3.1.2.2.16.1 BWRVIP-74-A Table 4-1 Items,
- Table 2.4.8.1, ASME Equivalent Supports and Components; and
- Table 3.5.2.26, ASME Equivalent Supports and Components (includes anchor bolts).

(g) Reactor Vessel Support Ring Girder and Anchor Bolts:

- Table 2.4.8.1, ASME Equivalent Supports and Components; and
- Table 3.5.2.26, ASME Equivalent Supports and Components (includes anchor bolts).

(h) Reactor Vessel Support Pedestal:

- Table 2.4.1.1, Reinforced Concrete Beams, Columns, Walls, and Slabs; and
- Table 3.5.2.1, Reinforced Concrete Beams, Columns, Walls, and Slabs.

(i) Drywell Internal Steel Shear Ring:

- BFN does not have a "Drywell Internal Steel Shear Ring"

(j) Drywell Steel Support Skirt and Anchor Bolts:

- Table 2.4.1.1, Steel Containment Elements; and
- Table 3.5.2.1, Steel Containment Elements (Drywell steel support skirt is part of the Class MC drywell support and the skirt and anchor bolts are encased in concrete, therefore they are inaccessible.)

(k) The Drywell Head Closure Bolts and Double Gasket, Tongue- and Groove Seal Arrangement:

- Table 2.4.1.1, Steel Containment Elements;
- Table 3.5.2.1, Steel Containment Elements (Includes drywell head closure bolts);

- Table 2.4.1.1, Compressible Joints & Seals; and
- Table 3.5.2.1, Compressible Joints & Seals.

NRC RAI 2.4-3

Leakage through the refueling seals located at the top of the drywell potentially exposes the carbon steel drywell shell inner and outer surfaces to loss of material due to corrosion. This is a particular concern for the embedded portion of the drywell shell. Corrosion detected on the outer shell surface in the sand pocket region in a number of Mark I steel containments has been attributed to leakage past the drywell-to-reactor building refueling seal, coupled with clogging of the sand pocket drains. Leakage into the drywell, past the reactor vessel-to-drywell refueling seal, creates the potential for corrosion of the inaccessible portion of the inner surface of the drywell shell, embedded in the concrete floor.

From the information contained in the LRA, it is not clear to the staff (1) whether the refueling seals have been included in the license renewal scope, and (2) if included, how aging management is being addressed. Therefore, the applicant is requested to verify that the BFN plants' refueling seals are included in a component type that require an aging management review (AMR), or a detailed explanation for their exclusion. Also, provide a detailed description of the plant-specific operating experience for the refueling seals in all three (3) units, including incidences of degradation, method of detection, root cause, corrective actions, and current inspection procedures.

TVA response to NRC RAI 2.4-3

BFN does not include the refueling seals at the top of the drywell in the scope of license renewal.

The performance of the drywell-to-reactor building refueling seal is not considered a safety-related function. The drywell-to-reactor building refueling seal and the reactor pressure vessel (RPV)-to-drywell refueling seal, in conjunction with the refueling bulkhead, provides a watertight barrier to permit flooding above the RPV flange while preventing water from entering the drywell. Providing a watertight barrier to permit flooding above the RPV flange in support of refueling operations is not a safety-related function.

Additionally, the performance of the drywell-to-reactor building refueling seal is not considered a II over I issue. 10 CFR 54.4(a)(2) states, "All nonsafety-related systems, structures, and components whose failure could prevent satisfactory accomplishment of any of the functions identified in paragraphs (a)(1)(i), (ii), or (iii) of this section." A postulated failure of the drywell-to-reactor building refueling seal can result in water intrusion into the annulus space around the drywell. This leakage can occur only during refueling outages when the reactor cavity is flooded to allow movement of fuel between the reactor and the fuel pool. However, water intrusion does not cause failure of the drywell's intended function. Any water leakage resulting from a postulated failure of the drywell-to-reactor building refueling seal could not remain suspended in the annulus region for an indefinite period of time and would eventually be routed to the sandpocket area drains or would evaporate due to the heat generated in the drywell during operation.

NRC RAI 2.4-4

LRA Table 2.4.2.1, Reactor Building Structure presents a list of component types that are part of the reactor building, the auxiliary and emergency systems of the nuclear steam supply system, the biological shield, the spent fuel pool, the steam dryer/moisture separator storage pool, the reactor cavity reactor auxiliary equipment, the steel superstructure with metal siding and the built-up roof, etc. The applicant is requested to provide a description of the "Neutron-Absorbing Sheets" used for BFN spent fuel storage racks and confirm that they are part of the spent fuel storage racks listed in Table 2.4.2.1.

TVA response to NRC RAI 2.4-4

Neutron-Absorbing Sheets

NUREG 1801, Section VII.A2.1-b, identifies "Spent Fuel Storage Racks – neutron absorbing sheets" as a component type. In BFN LRA Section 2.3.3.27 "Fuel Handling and Storage System (079)", it states that the spent fuel pool components are evaluated as structural components in Section 2.4.2.1 "Reactor Building Structure". BFN LRA Table 2.4.2.1 "Reactor Building Structure" identifies "Spent Fuel Storage Racks (includes new fuel storage racks)" as a component requiring aging management. The "Neutron Absorbing Sheet" is a component of the BFN spent fuel storage rack container tube wall and is comprised of Boral sandwiched within the stainless steel wall of each container tube.

NRC RAI 2.4-5

Referring to Section 2.4.2.1, Reactor Buildings of the LRA, clarify if BFN's reactor buildings are designed to maintain an internal negative pressure under neutral wind conditions in order to serve as the secondary containment whose primary purpose is to minimize the ground level release of airborne radioactive materials and to provide for a controlled, elevated release of the building atmosphere under accident conditions. If yes, are BFN's Reactor Building pipe penetrations provided with some type of silicone rubber seals that allow pipe movement while providing a seal between the pipe and the Reactor Buildings and maintain the negative internal pressure. As applicable, confirm that these penetration seals are designated as within the scope of AMR and are included in Table 2.4.2.1 of the LRA.

TVA response to NRC RAI 2.4-5

With the exception of the Control Room, the Reactor Building is designed to maintain an internal negative pressure under neutral wind conditions in order to serve as the secondary containment whose primary purpose is to minimize the ground level release of airborne radioactive materials and to provide for a controlled, elevated release of the building atmosphere under accident conditions. The Control Room and portions of the Control Bay that are contained within the Reactor Building are maintained at a positive pressure to prevent the introduction of fission products during design basis events. Piping that is not anchored within a reinforced concrete wall is sealed with caulking or sealants. The reinforced concrete wall, and caulking and sealants are identified as component type "Reinforced Concrete Beams, Columns, Walls, and Slabs" and "Caulking & Sealants" respectively in Table 2.4.2.1 as requiring aging management review with a press boundary (PB) intended function.

NRC RAI 2.4-6

Referring to Section 2.4.4.5, "South Dike of Cool Water Channel between Gate Structure Nos. 2 and 3," the paragraph at the end of the "Description" (page 2.4-37) states that the portion of the structure that contains components requiring an AMR is the portion above the Residual Heat Removal Service Water (RHRSW) System discharge piping. Clarify if the entire "South Dike of Cooling Water Channel between Gate Structure Nos. 2 and 3" or only the portion as indicated in the above paragraph is

designated to be within the scope requiring an AMR. Also, if only portion of the South Dike structure requires an AMR, discuss BFN's basis for defining the specific geometric boundary of the portion requiring an AMR.

TVA response to NRC RAI 2.4-6

Only the portion of the South Dike of the Cool Water Channel between Gate Structure Nos. 2 and 3 above the RHRSW discharge piping system plus approximately 30 feet on either side of the piping is within the scope of License Renewal and requires an AMR. The earthen dike provides a structural support (SS) intended function as noted in Table 2.4.4.5 for the RHRSW discharge piping system and that portion of the dike has been qualified for a seismic event.

NRC RAI 2.4-7

Section 2.4.5.2 of the LRA discusses the screening results of BFN's Containment Atmosphere Dilution Storage Tank's Foundations. With respect to Table 2.4.5.2, besides the single item listed therein, as appropriate, identify other items such as structural steel embedments; carbon steel boltings; reinforced concrete slabs and foundation footings, and grouted concrete that require an AMR.

TVA response to NRC RAI 2.4-7

The reinforced concrete foundation slab for the Containment Atmosphere Dilution (CAD) Storage Tank's Foundation is included as part of the "Equipment Supports and Foundation" component type in Table 2.4.5.2. CAD Storage Tank's Foundation is a reinforced concrete foundation slab on grade that provides structural support for the tank of the CAD system.

The following components are also located on the CAD Storage Tank Foundation and are evaluated as part of the Structures and Component Supports Commodity Group in LRA Section 2.4.8:

- Electrical Panels, Racks, Cabinets, and Other Enclosures
- Conduits and Supports
- Non-ASME Equivalent Supports and Components
- Instrument Racks, Frames, Panels, & Enclosures
- NOTE: For in-scope components evaluated in LRA Section 2.4.8, the components also include support structural members, welds, bolting, anchorage and

building concrete at anchorage (including base plate and grout) to the structure.

NRC RAI 2.4-8

Section 2.4.3.1, Diesel Generator Buildings of the LRA refers to Units 1 and 2 Diesel Generator Building and Unit 3 Diesel Generator Building. The license Renewal drawing No. 0-10E201-01-LR shows a diesel generator building at the west side of the reactor building and another diesel generator building at the east side of the same without a stipulation as to which diesel generator building is designated for Units 1 and 2 shutdown function and the other building is intended for shutdown of the Unit 3 reactor. Please clarify this ambiguity and explain why the four separate Unit 3 Shutdown boards are located in Unit 3 Diesel Generator Building, whereas, the other four shared Units 1 and 2 shutdown boards are located in the Reactor Buildings. Also regarding Table 2.4.3.1, as appropriate, identify other items such as structural steel embedments; carbon steel boltings; reinforced concrete foundation footings; grouted concrete; and water proofing membrane materials that require an AMR.

TVA response to NRC RAI 2.4-8

The original layout for Browns Ferry was a two unit site with a common Diesel Generator Building (DGB). Unit 3 was added after the initial design and provided with its own Diesel Generator Building and shutdown board rooms within the DGB. The following components are also located in the Units 1 and 2 Diesel Generator Building and Unit 3 Diesel Generator Building and are evaluated as Structures and Component Supports commodities in LRA section 2.4.8:

- ASME Equivalent Supports and Components
- Cable Trays and Supports
- Conduit and Supports
- Electrical Panels, Racks, Cabinets, and Other Enclosures
- Equipment Supports and Foundations
- HVAC Duct Supports
- Instrument Line Supports
- Instrument Racks, Frames, Panels, & Enclosures
- Non-ASME Equivalent Supports and Components
- Stairs, Platforms, Grating Supports
- Tube Track

- NOTE: For in-scope components evaluated in LRA Section 2.4.8, the components also include support structural members, welds, bolting, anchorage and building concrete at anchorage (including base plate and grout) to the structure.

Water proofing membranes are not relied upon to support the intended functions of the structural components of the BFN structures.

NRC RAI 2.4-9

Section 2.4.3, Class 1 Group 3 Structures lists the following structures on page 2.4-12 of the LRA that are not shown in BFN Drawing No. 0-10E201-01-LR. Please provide more information regarding the following items:

(a) Clarify the reason why the three vent vaults shown in Drawing No. 0-10E201-01-LR do not indicate the specific systems or components contained or sheltered within them. Also, Section 2.4.3.3, Off-Gas Treatment Building is described to have only exterior walls and bottom slab, implying that there is no top slab for the building. Confirm that the building has no top slab and there are no component types (e.g., electrical and I & C penetrations, structural steel embedments; carbon steel boltings; reinforced concrete foundation footings; grouted concrete, and water proofing membrane materials, etc.) other than those listed in Table 2.4.3.3 that require an AMR.

(b) Describe the specific location of the Vacuum Pipe Building and confirm that there are no items such as structural steel embedments, carbon steel boltings; reinforced concrete foundation footings; grouted concrete, compressible joints and seals, water proofing membrane and caulking materials that require an AMR.

(c) Describe the specific location of the Residual Heat Removal Service Water Tunnels including their embedded boundaries in Drawing No. 0-10E201-01-LR. Also, as appropriate, identify items requiring an AMR that are part of the Service Water Tunnels, such as structural steel embedments, carbon steel boltings; reinforced concrete beams, walls, slabs, foundation footings; grouted concrete, mechanical penetrations, water proofing membrane and caulking materials.

(d) Describe the specific locations of the Electrical Cable Tunnel from the Intake Pumping Station to the Powerhouse including the portion running east-west under the southern portion of the Turbine Buildings. As appropriate, identify items such as structural steel embedments; carbon steel boltings; reinforced concrete beams, walls, slabs, foundation footings; grouted concrete, mechanical penetrations, water proofing membrane and caulking materials that require an AMR.

(e) List the BFN in-scope structures that have one or more of the Underground Concrete Encased Structures described in Section 2.4.3.7 of the LRA. As appropriate, identify items such as structural steel embedments, carbon steel boltings; reinforced concrete walls, slabs and foundation footings; grouted concrete, and water proofing membrane that require an AMR.

TVA response to NRC RAI 2.4-9

(a) Vent Vaults

The three Vent Vaults are open-top concrete structures located within the Earth Berm adjacent to its associated Reactor Building. The Vent Vaults contain components required for the Reactor Building Ventilation System supply, including the secondary containment isolation dampers. Other than the "Reinforced Concrete Beams, Columns, Walls and Slabs" noted on LRA Table 2.4.7.3, there are no other components that require an aging management review.

Off-Gas Treatment Building

Section 2.4.3.3 of the LRA identifies the Off-Gas Treatment Building as an underground structure. The Off-Gas Treatment Building is an underground structure with exterior walls, interior walls and slabs, bottom or foundation slab and a top slab. The exterior walls and bottom slab are designed and constructed to maintain their structural integrity during a partial collapse of the Reinforced Concrete Chimney during a design basis event (tornado) so that they will not permit water leakage into or out of the building below elevation 566.25 feet (Reference UFSAR 12.2.14). The top slab is not required for the intended function of preventing release of

radiation from the failure/collapse of the activated charcoal beds into the surrounding groundwater.

Other than the "Caulking and Sealants", "Penetrations, Mechanical" and the "Reinforced Concrete Beams, Columns, Walls and Slabs" components noted on LRA Table 2.4.3.3, there are no other components that require an aging management review.

(b) The Vacuum Pipe Building is an underground structure accessed through a manhole and contains the condenser circulating water system vacuum breaker components that prevent back flow from the warm water channel to the intake channel (Reference UFSAR 12.2.7.8.3). The Vacuum Pipe Building is an underground structure located south-east of the Plant Administration Building as depicted on TVA drawing 0-10E201-01 and LR drawing 0-10E201-01-LR.

The following components are also located in the Vacuum Pipe Building and are evaluated as Structures and Component Supports commodities in LRA section 2.4.8:

- Conduit and Supports
- Electrical Panels, Racks, Cabinets, and Other Enclosures
- Non-ASME Equivalent Supports and Components
- NOTE: For in-scope components evaluated in LRA Section 2.4.8, the components also include support structural members, welds, bolting, anchorage and building concrete at anchorage (including base plate and grout) to the structure.

Water proofing membranes are not relied upon to support the intended functions of the structural components of BFN structures.

(c) The Residual Heat Removal Service Water (RHRSW) Tunnels are underground multi-plate arch tunnels that are buried in the Earth Berm. The north end of the tunnel terminates at the south wall of the Reactor Building. The south end of the tunnel is open to the outside on the south end of the Earth Berm. There are two tunnels for each Reactor Building.

The following components are also located in the RHRSW Tunnels and are evaluated as Structures and Component Supports commodities in LRA section 2.4.8:

- ASME Equivalent Supports and Components
- Conduit and Supports
- Electrical Panels, Racks, Cabinets, and Other Enclosures
- Non-ASME Equivalent Supports and Components
- NOTE: For in-scope components evaluated in LRA Section 2.4.8, the components also include support structural members, welds, bolting, anchorage and building concrete at anchorage (including base plate and grout) to the structure.

Water proofing membranes are not relied upon to support the intended functions of the structural components of BFN structures.

(d) The Electrical Cable Tunnel is an underground concrete-encased tunnel that runs from the northwest corner of the Intake Pumping Station (IPS) to the southeast corner of the unit 3 Turbine Building and then east-west along the southern portion of the units 1, 2, and 3 Turbine Building.

The following components are also located in the Electrical Cable Tunnel and are evaluated as Structures and Component Supports commodities in LRA section 2.4.8:

- Cable Trays and Supports
- Conduit and Supports
- Electrical Panels, Racks, Cabinets, and Other Enclosures
- NOTE: For in-scope components evaluated in LRA Section 2.4.8, the components also include support structural members, welds, bolting, anchorage and building concrete at anchorage (including base plate and grout) to the structure.

Water proofing membranes are not relied upon to support the intended functions of the structural components of BFN structures.

(e) The in-scope structures described in LRA Section 2.4.3.7 include the following:

- Safety-related handhole (HH) No. 16, located in the yard area north-west of the Intake Pumping Structure (IPS) and safety-related handhole (HH) No. 26, located in the yard area north-east of the Unit 3 Diesel

Generator Building (DGB) and south of Condensate Storage Tanks Nos. 1, 2, and 3.

- Safety-related concrete duct bank (inaccessible) that spans from the Unit 1 & 2 Diesel Generator Building to the Standby Gas Treatment Building, safety-related concrete duct bank (inaccessible) that spans from the IPS to HH No. 16 to HH No. 26 and to the Electrical Cable Tunnel from the IPS to the Powerhouse, safety-related concrete duct bank (inaccessible) that spans from the unit 3 Diesel Generator Building to the Electrical Cable Tunnel from the IPS to the Powerhouse, and the safety-related concrete duct bank (inaccessible) that spans from the Containment Atmosphere Dilution Storage Tank's A and B foundations to the Reactor Building.

- Manholes A and B which provide access to the concrete tunnel located in the 161 kV and 500 kV Switchyards that support the 10 CFR 54.4(a)(3) SBO regulated event. NOTE: The concrete tunnel located in the 161 kV and 500 kV Switchyards is in-scope and identified in LRA sections 2.4.7.5 and 2.4.7.6 respectively as component type Tunnels.

- Handholes 1 – 13 and associated duct banks (inaccessible) located in the transformer yard on the north side of the Turbine Building that support the 10 CFR 54.4(a)(3) SBO regulated event.

- The following components are also located in the Underground Concrete Encased Structures and are evaluated as Structures and Component Supports commodities in LRA section 2.4.8:

    - Cable Trays and Supports
    - Conduit and Supports
    - Electrical Panels, Racks, Cabinets, and Other Enclosures
    - Non-ASME Equivalent Supports and Components
    - NOTE: For in-scope components evaluated in LRA Section 2.4.8, the components also include support structural members, welds, bolting, anchorage and building concrete at anchorage (including base plate and grout) to the structure.

Water proofing membranes are not relied upon to support the intended functions of the structural components of BFN structures.

NRC RAI 2.4-10

Provide additional information regarding the following Class I Group 6 Structures:

(a) With respect to the Intake Pumping Station, as appropriate, identify items such as hatches and plugs; structural steel embedments; carbon steel boltings; reinforced concrete foundation footings; grouted concrete; and water proofing membrane materials that require an AMR.

(b) Regarding the Condensate Water Storage Tank's Foundation and Trenches, confirm that the equipment supports and foundations as well as the trenches listed in Table 2.4.5.1 consist of reinforced concrete components. As appropriate, identify items such as structural steel embedments; carbon steel boltings; grouted concrete; and water proofing membrane materials that require an AMR.

TVA response NRC RAI 2.4-10

(a) The following components are also located in the Intake Pumping Station and are evaluated as Structures and Component Supports commodities in LRA section 2.4.8:

- ASME Equivalent Supports and Components
- Cable Trays and Supports
- Conduit and Supports
- Electrical Panels, Racks, Cabinets, and Other Enclosures
- Equipment Supports and Foundations
- Instrument Line Supports
- Non-ASME Equivalent Supports and Components
- Stairs, Platforms, Grating Supports
- Tube Track
- NOTE: For in-scope components evaluated in LRA Section 2.4.8, the components also include support structural members, welds, bolting, anchorage and building concrete at anchorage (including base plate and grout) to the structure.

Water proofing membranes are not relied upon to support the intended functions of the structural components of BFN structures.

(b) Regarding the Condensate Water Storage Tank's Foundation and Trenches, "Equipment Supports and Foundations" as well as "Trenches" components listed in Table 2.4.5.1 consist of reinforced concrete and this is confirmed in Table 3.5.2.17 of the LRA. Note that the Condensate Storage Tanks are supported on a reinforced concrete ring foundation and the earthen fill material (rock and sand) inside the ring is identified as Item 1 of Table 3.5.2.17.

The following components are also located on the Condensate Water Storage Tanks Foundations and Trenches and are evaluated as Structures and Component Supports commodities in LRA section 2.4.8:

- Conduit and Supports
- Electrical Panels, Racks, Cabinets, and Other Enclosures
- Instrument Racks, Frames, Panels, & Enclosures
- Non-ASME Equivalent Supports and Components
- NOTE: For in-scope components evaluated in LRA Section 2.4.8, the components also include support structural members, welds, bolting, anchorage and building concrete at anchorage (including base plate and grout) to the structure.

Water proofing membranes are not relied upon to support the intended functions of the structural components of BFN structures.

NRC RAI 2.4-11

Provide additional information regarding the following Non Class I Structures:

(a) With respect to the BFN Turbine Buildings, explain the basis for stating that masonry block utilized for Units 1 and 3 is not in scope for period of extended operation. Also identify, as appropriate, items such as structural steel embedments; carbon steel boltings; grouted concrete; metal sidings and water proofing membrane materials that require an AMR.

(b) Regarding the Diesel High Pressure Fire Pump House, Identify, as appropriate, items such as structural steel embedments; carbon steel boltings; grouted concrete, and water proofing membrane materials that require an AMR.

(c) With respect to BFN Vent vaults, identify, as appropriate, items such as structural steel embedments; carbon steel boltings; grouted concrete, and water proofing membrane materials that require an AMR.

(d) With respect to BFN's Transformer Yard, 161 kV Switchyard and 500 KV Switchyard, identify, as appropriate, items such as structural steel embedments; carbon steel plates and boltings; reinforced concrete pads and footings; grouted concrete; and water proofing membrane materials that require an AMR.

TVA response to NRC RAI 2.4-11

(a) The masonry wall in the unit 2 Turbine Building provides a structural Non-Safety-Related (NSR) support intended function for cable tray supports for cables required to support the off-site AC recovery for SBO requirements. The SBO cables are routed through the unit 2 Turbine Building in a cable gallery with walls constructed of masonry block, to the north end of the unit 2 Turbine Building, and then to a concrete tunnel buried in the yard north of the Turbine Building. The concrete tunnel provides access to the 161 kV and 500kV Switchyards. Only the unit 2 Turbine Building masonry walls are in scope due to the unique cable gallery to tunnel routing of the cables required to support the off-site AC recovery for SBO requirements for all units. This unique cable gallery does not exist in the unit 1 or 3 Turbine Buildings.

The following components are also located in the BFN Turbine Buildings and are evaluated as Structures and Component Supports commodities in LRA section 2.4.8:

- ASME Equivalent Supports and Components
- Cable Trays and Supports
- Conduit and Supports
- Electrical Panels, Racks, Cabinets, and Other Enclosures
- Equipment Supports and Foundations
- Instrument Racks, Frames, Panels, & Enclosures
- Non-ASME Equivalent Supports and Components

- Stairs, Platforms, Grating Supports
- NOTE: For in-scope components evaluated in LRA Section 2.4.8, the components also include support structural members, welds, bolting, anchorage and building concrete at anchorage (including base plate and grout) to the structure.

Water proofing membranes are not relied upon to support the intended functions of the structural components of BFN structures.

(b) The following components are also located in the Diesel High Pressure Fire Pump House and are evaluated as Structures and Component Supports commodities in LRA section 2.4.8:

- Conduit and Supports
- Electrical Panels, Racks, Cabinets, and Other Enclosures
- Equipment Supports and Foundations
- Non-ASME Equivalent Supports and Components
- NOTE: For in-scope components evaluated in LRA Section 2.4.8, the components also include support structural members, welds, bolting, anchorage and building concrete at anchorage (including base plate and grout) to the structure.

Water proofing membranes are not relied upon to support the intended functions of the structural components of BFN structures.

(c) There are no additional components located in the BFN Vent Vaults evaluated as Structures and Component Supports commodities in LRA section 2.4.8.

(d) The following components are also located in the BFN Transformer Yard, 161 kV Switchyard and 500 kV Switchyard and are evaluated as Structures and Component Supports commodities in LRA section 2.4.8:

- Equipment Supports and Foundations
- Cable Trays and Supports (161 kV and 500 kV Switchyards only)
- Conduit and Supports (161 kV and 500 kV Switchyards only)

- Electrical Panels, Racks, Cabinets, and Other Enclosures (161 kV and 500 kV Switchyards only)
- NOTE: For in-scope components evaluated in LRA Section 2.4.8, the components also include support structural members, welds, bolting, anchorage and building concrete at anchorage (including base plate and grout) to the structure.

Water proofing membranes are not relied upon to support the intended functions of the structural components of BFN structures.

NRC RAI 2.4-12

Based on information provided in LRA Section 2.4.2.1, Reactor Buildings; Section 2.4.2.2, Equipment Access Lock; Section 2.4.3.1, Diesel Generator Buildings; Section 2.4.4.1, Intake Pumping Station and Section 2.4.7.1, Turbine Buildings, it is unclear to the staff which cranes and hoists have been determined as within the scope of license renewal and which subset of the in-scope items have been screened in as items requiring an AMR.

The applicant is requested to clarify the treatment of cranes and hoists in the scoping and screening, and in the aging management review. Please submit the following information:

(a) A list of all cranes/hoists/rails and associated components in the scope of license renewal.

(b) Provide additional information to identify the location within the LRA where cranes/hoists/rails and associated components are addressed. If these specific components are not considered to be within the scope of license renewal, please provide the technical bases for their exclusion.

(c) A list of all cranes/hoists/rails and associated components requiring an aging management review (i.e., passive, long-lived).

(d) A list of all cranes/hoists/rails and associated components requiring aging management and/or TLAA.

TVA response to NRC RAI 2.4-12

The fuel handling and storage is addressed in Section 2.3.3.27 and the AMR results are contained in Table 3.3.2.27. The cranes and

hoists are addressed in the Application in Section 2.3.3.34 and the AMR results are contained in Table 3.3.2.34. This same question was asked as RAI 2.3.3.34-1 during scoping and screening review of mechanical systems. Refer to the TVA response to RAI 2.3.3.34-1 (TVA letter to NRC dated October 19, 2004) and the RAI and TVA response has been included below for reviewer convenience

Section 2.3.3.34 Cranes System

RAI 2.3.3.34-1

LRA Section 2.1.2.2, "Overhead Handling System," refers to cranes, monorails, hoists, and mobile A-frames. However, mobile A-frames are not mentioned in LRA Section 2.3.3.34 or in the UFSAR. LRA Section 2.3.3.34 states that the cranes system includes numerous plant load-handling devices that are used for maintenance of selected plant components. LRA Table 2.3.3.34 lists the components associated with the cranes system that are subject to an AMR.

However, no drawings are provided for this system. There is insufficient information for the staff to determine which cranes are in scope in accordance with 10 CFR 54.4 (a) (2). Indicate which cranes are within the scope of license renewal and subject to an AMR, and whether the mobile A-frames are within the scope of license renewal.

TVA Response to RAI 2.3.3.34-1:

The following buildings that contain non-safety-related cranes and monorails which could potentially prevent safety-related SSCs from performing their intended function(s) are: Reactor Building, Primary Containment, Diesel Generator Buildings, Intake Pumping Station, and Reinforced Concrete Chimney. All cranes and monorails in these buildings are in scope. The Mobile A-frames is a crane on wheels. The A-frame cranes are in scope since they could be used in a safety related building. This crane is subject to an AMR.

NRC RAI 2.4-13

Based on information provided in LRA Section 2.4.8.1, Structures and Component Supports Commodity Group, it is not clear to the staff that all component supports within the scope of license renewal are included in the component supports commodity group. Also, clarification is needed for several components listed in Table 2.4.8.1.

In order to complete the screening review for component supports, the staff requests the applicant to submit the following information:

(a) Clarify if the ASME Equivalent Supports and Components listed in Table 2.4.8.1 include the reactor vessel support skirt/support ring and reactor vessel upper lateral stabilizer support. If not, where are these supports addressed in the LRA? If not managed by ASME Section XI, Subsection IWF, submit the technical basis for crediting an alternate aging management program.

(b) Clarify if the ASME Equivalent Supports and Components of the Table 2.4.8.1 include the drywell lower ring support and the drywell upper lateral support. If not managed by ASME Section XI, Subsection IWF, submit the aging management review for the drywell supports, including the technical basis for this exception.

(c) Since LRA Section 2.4.8.1 is not referenced anywhere in LRA Sections 2.3 or 2.4, verify that all supports associated with components listed in LRA Sections 2.3 and 2.4.1 through 2.4.7 are included in the component types listed in Table 2.4.8.1. If not, identify the supports not included and submit the aging management review, including credited aging management programs.

(d) Confirm that the "Bolting and Fasteners" listed in Table 2.4.8.1 includes anchors directly installed into concrete.

TVA response to NRC RAI 2.4-13

(a) The reactor vessel support skirt, reactor vessel support ring girder and reactor vessel upper lateral stabilizer are included with "ASME Equivalent Supports and Components" component group as listed in LRA Table 2.4.8.1. See response to RAI 2.4-2 (f), RAI 2.4-2 (g) and 2.4-2 (a) for AMR results for these components respectfully.

(b) The ASME Equivalent Supports and Components of Table 2.4.8.1 do not include the drywell lower ring support and the drywell upper lateral support. Steel Containment Elements in Table 2.4.1.1 include the drywell lower ring support (drywell support skirt) and the drywell upper lateral supports. These components are classified as part of Class MC and BFN is not required to inspect MC supports in accordance with ASME Section XI. Refer to NRC RAIs B.2.1.33-1 and B.2.1.33-2 and TVA's responses to those RAIs for justification of why they are not inspected to ASME

Section XI, Subsection IWF. The drywell lower ring support is inaccessible (embedded in the Reactor Building concrete).

(c) BFN LRA Section 2.4.8, "Structures and Component Supports Commodities ", includes all supports associated with the components listed in LRA Sections 2.3 and 2.4.1 through 2.4.7, with one exception:

(1) Table 2.3.1.2 of LRA Section 2.3.1.2 identifies various components internal to the reactor vessel that provide support for other internal components. Aging management of reactor vessel internals components is presented in Table 3.1.2.2.

(d) In LRA Table 2.4.8.1, the component group "Bolting and Fasteners" was included in error and should be deleted from the table. Table 2.4.8.1 should read as shown below:

Table 2.4.8.1 - Structures and Component Supports

Component Type	Intended Functions
ASME Equivalent Supports and Components	SS
Cable Trays and Supports	SS, and/or SS(NSR)
Conduit and Supports	SP, SS, and/or SS(NSR)
Duct Banks, Manholes	SS
Electrical Panels, Racks, Cabinets, and Other Enclosures	SP, SS, and/or SS(NSR)
Equipment Supports and Foundations	SS, and/or SS(NSR)
HVAC Duct Supports	SS, and/or SS(NSR)
Instrument Line Supports	SS, and/or SS(NSR)
Instrument Racks, Frames, Panels & Enclosures	SP, SS, and/or SS(NSR)
Non-ASME Equivalent Supports and Components	SS, and/or SS(NSR)
Pipe Whip Restraints and Jet Impingement Shields	PW and/or HE/ME
Reinforced Concrete Beams, Columns, Walls, and Slabs	SS, and/or SS(NSR)
Stairs, Platforms, Grating Supports	SS, and/or SS(NSR)
Trenches	SS(NSR)
Tube Track	SS, and/or SS(NSR)
Tunnels	SS, and/or SS(NSR)

Each of the component support commodity groups identified in LRA section 2.4.8.1 includes bolting and anchors, including anchors installed into concrete. This information has been provided in the discussion for the five Structures and Component Supports Commodity Groups in LRA Section 2.4.8, pages 2.4-55 and 2.4-56.

NRC RAI 2.4-14

Based on information provided in LRA Section 2.4, the staff cannot identify the insulation and insulation jacketing included in the license renewal scope nor the specific subsets of

insulation and insulation jacketing that are included in Section 2.4 tables. It is also unclear whether insulation and jacketing on the reactor coolant system has been included.

In order to complete the screening review for insulation and insulation jacketing, the staff requests the applicant to submit the following information:

(a) Specifically identify the structures and structural components designated as within the license renewal scope that have insulation and/or insulation jacketing, and identify their location in the plant.

(b) List all insulation and insulation jacketing materials associated with the item (a) above that require an aging management review and the results of the aging management review for each.

(c) For insulation and insulation jacketing materials associated with the item (a) above that do not require aging management, submit the technical basis for this conclusion, including plant-specific operating experience.

(d) For insulation and insulation jacketing materials associated with the item (a) above that require aging management, identify the aging management program(s) credited to manage aging.

TVA response to NRC RAI 2.4-14

As stated in Section 2.1.7.2 of the Application, Insulation at BFN does not have an intended function within the scope of 10 CFR 54.4(a)(3).

2.4.7.7 ISOLATION VALVE PITS

Description

The Isolation Valve Pits provide structural support and shelter/protection for the hardened wetwell vent piping system. There is an Isolation Valve Pit for each unit. The Isolation Valve Pits are in the scope of 10 CFR 54 because they meet the following criteria of 10 CFR 54.4.

(a)(1)	(a)(2)	(a)(3) FP	(a)(3) EQ	(a)(3) ATWS	(a)(3) SBO
No	Yes	No	No	No	No

Isolation Valve Pits intended functions are:

- Provide structural support and shelter/protection for components of the hardened wetwell vent piping system.

The entire structure contains components requiring an AMR.

FSAR References

The Isolation Valve Pits are not described in the FSAR.

License Renewal Drawings

The license renewal drawing for the Isolation Valve Pits is listed below.

0-10E201-01-LR

Components Subject to AMR

The component types that require aging management review are indicated in Table 2.4.7.7, Isolation Valve Pits

The aging management review results for these component types are provided in Table **3.5.2.28**, Isolation Valve Pits - Summary of Aging Management Evaluation.

Table 2.4.7.7 Isolation Valve Pits

Component Types	Intended Functions
Caulking & Sealants	SP
Penetrations Electrical and I&C	SP, SS (NSR)
Penetrations Mechanical	SS (NSR)
Reinforced Concrete Beams, Columns, Walls, and Slabs	SP, SS (NSR)
Structural Steel Beams, Columns, Plates, Trusses	SP, SS (NSR)

3.5.2.1.28 ISOLATION VALVE PIT

Materials

The materials of construction for Isolation Valve Pit components are:

- Carbon and low alloy steel
- Elastomers
- Non-ferrous – aluminum and copper alloys
- Reinforced concrete

Environment

Isolation Valve Pit components are exposed to the following environments:

- Buried
- Embedded/encased
- Inside air
- Outside air

Aging Effects Requiring Management

The following aging effects associated with the Isolation Valve Pit require management:

- Cracking, loss of bond, loss of material (spalling, scaling) due to corrosion of embedded steel
- Cracks, distortion, increase in component stress level due to settlement
- Expansion and cracking due to reaction with aggregates
- Hardening, loss of strength due to elastomer degradation
- Increase in porosity and permeability, cracking, loss of material (spalling, scaling) due to aggressive chemical attack
- Increase in porosity and permeability, loss of strength due to leaching of calcium hydroxide
- Loss of material (spalling, scaling) and cracking due to freeze-thaw
- Loss of Material due to Crevice corrosion, General corrosion, Pitting corrosion.

Aging Management Programs

The following aging management program manages the aging effects for Isolation Valve Pit components.

- Structures Monitoring Program (B.2.1.36)

Table 3.5.2.28: Isolation Valve Pit - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG - 1801 Vol. 2 Item	Table 1 Item	Notes
Caulking and Sealants	SP	Elastomers	Inside Air	Hardening, loss of strength due to elastomer degradation.	Structures Monitoring Program (B.2.1.36)	None	None	J, 1
Penetrations, Electrical and I&C	SP, SS(NSR)	Carbon and Low Alloy Steel	Embedded/encased	None	None	III.A3.2-a	None	I, 2
Penetrations, Electrical and I&C	SP, SS(NSR)	Carbon and Low Alloy Steel	Inside Air	Loss of material due to general corrosion.	Structures Monitoring Program (B.2.1.36)	III.A3.2-a	3.5.1.20	A
Penetrations, Electrical and I&C	SP, SS(NSR	Non-ferrous - aluminum	Embedded/encased	None	None	None	None	J, 2
Penetrations, Electrical and I&C	SP, SS(NSR	Non-ferrous - aluminum	Inside Air	None	None	None	None	J, 2
Penetrations, Mechanical	SS(NSR)	Carbon and Low Alloy Steel	Embedded/encased	None	None	III.A3.2-a	None	I, 2
Penetrations, Mechanical	SS(NSR)	Carbon and Low Alloy Steel	Inside Air	Loss of material due to general corrosion.	Structures Monitoring Program (B.2.1.36)	III.A3.2-a	3.5.1.20	A
Reinforced Concrete Beams, Columns, Walls, and Slabs	SP, SS(NSR)	Reinforced Concrete	Buried	Loss of material (spalling, scalling), cracking due freeze-thaw.	Structures Monitoring Program (B.2.1.36)	III.A3.1-a	3.5.1.20	A
Reinforced Concrete Beams, Columns, Walls, and Slabs	SP, SS(NSR)	Reinforced Concrete	Buried	None	None	III.A3.1-b	None	I, 3
Reinforced Concrete Beams, Columns, Walls, and Slabs	SP, SS(NSR)	Reinforced Concrete	Buried	None	None	III.A3.1-c	None	I, 4

Table 3.5.2.28: Isolation Valve Pit - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG - 1801 Vol. 2 Item	Table 1 Item	Notes
Reinforced Concrete Beams, Columns, Walls, and Slabs	SP, SS(NSR)	Reinforced Concrete	Buried	None	None	III.A3.1-e	None	I, 5
Reinforced Concrete Beams, Columns, Walls, and Slabs	SP, SS(NSR)	Reinforced Concrete	Buried	None	None	III.A3.1-g	None	I, 6
Reinforced Concrete Beams, Columns, Walls, and Slabs	SP, SS(NSR)	Reinforced Concrete	Buried	Cracks, distortion, increase in component stress level due to settlement.	Structures Monitoring Program (B.2.1.36)	III.A3.1-h	3.5.1.25	A
Reinforced Concrete Beams, Columns, Walls, and Slabs	SP, SS(NSR)	Reinforced Concrete	Inside Air	Expansion and cracking due to reaction with aggregates.	Structures Monitoring Program (B.2.1.36)	III.A3.1-c	3.5.1.20	A
Reinforced Concrete Beams, Columns, Walls, and Slabs	SP, SS(NSR)	Reinforced Concrete	Inside Air	Cracking, loss of bond, loss of material (spalling, scaling) due to corrosion of embedded steel.	Structures Monitoring Program (B.2.1.36)	III.A3.1-d	3.5.1.20	A
Reinforced Concrete Beams, Columns, Walls, and Slabs	SP, SS(NSR)	Reinforced Concrete	Inside Air	Increase in porosity and permeability, cracking, loss of material (spalling, scaling) due to aggressive chemical attack.	Structures Monitoring Program (B.2.1.36)	III.A3.1-f	3.5.1.20	A
Reinforced Concrete Beams, Columns, Walls, and Slabs	SP, SS(NSR)	Reinforced Concrete	Inside Air	Cracks, distortion, increase in component stress level due to settlement.	Structures Monitoring Program (B.2.1.36)	III.A3.1-h	3.5.1.25	A
Reinforced Concrete Beams, Columns, Walls, and Slabs	SP, SS(NSR)	Reinforced Concrete	Inside Air	None	None	III.A3.1-j	None	I, 7

ATTACHMENT 1

Table 3.5.2.28: Isolation Valve Pit - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG - 1801 Vol. 2 Item	Table 1 Item	Notes
Reinforced Concrete Beams, Columns, Walls, and Slabs	SP, SS(NSR)	Reinforced Concrete	Outside Air	Loss of material (spalling, scaling) and cracking due to freeze-thaw.	Structures Monitoring Program (B.2.1.36)	III.A3.1-a	3.5.1.20	A
Reinforced Concrete Beams, Columns, Walls, and Slabs	SP, SS(NSR)	Reinforced Concrete	Outside Air	Increase in porosity and permeability, loss of strength due to leaching of calcium hydroxide.	Structures Monitoring Program (B.2.1.36)	III.A3.1-b	3.5.1.20	A
Reinforced Concrete Beams, Columns, Walls, and Slabs	SP, SS(NSR)	Reinforced Concrete	Outside Air	Expansion and cracking due to reaction with aggregates.	Structures Monitoring Program (B.2.1.36)	III.A3.1-c	3.5.1.20	A
Reinforced Concrete Beams, Columns, Walls, and Slabs	SP, SS(NSR)	Reinforced Concrete	Outside Air	Cracking, loss of bond, loss of material (spalling, scaling) due to corrosion of embedded steel.	Structures Monitoring Program (B.2.1.36)	III.A3.1-d	3.5.1.20	A
Reinforced Concrete Beams, Columns, Walls, and Slabs	SP, SS(NSR)	Reinforced Concrete	Outside Air	Increase in porosity and permeability, cracking, loss of material (spalling, scaling) due to aggressive chemical attack.	Structures Monitoring Program (B.2.1.36)	III.A3.1-f	3.5.1.20	A
Reinforced Concrete Beams, Columns, Walls, and Slabs	SP, SS(NSR)	Reinforced Concrete	Outside Air	Cracks, distortion, increase in component stress level due to settlement.	Structures Monitoring Program (B.2.1.36)	III.A3.1-h	3.5.1.25	A
Structural Steel Beams, Columns, Plates, Trusses	SP, SS(NSR)	Carbon and Low Alloy Steel	Inside Air	Loss of material due to general corrosion.	Structures Monitoring Program (B.2.1.36)	III.A3.2-a	3.5.1.20	A
Structural Steel Beams, Columns, Plates, Trusses	SP, SS(NSR)	Carbon and Low Alloy Steel	Outside Air	Loss of material due to crevice corrosion, general corrosion, pitting corrosion	Structures Monitoring Program (B.2.1.36)	III.A3.2-a	3.5.1.20	A

Table Notes:

Industry standard Notes:

Note A Consistent with NUREG-1801 item for component, material, environment, and aging effect. The AMP is consistent with NUREG-1801.

Note I Aging effect in NUREG-1801 item for this component, material and environment combination is not applicable.

Note J Neither the component nor the material and environment combination is evaluated in NUREG-1801.

Plant Specific Notes:

1. The aging effects and AMP identified for this material/environment combination are consistent with industry guidance.

2. There are no applicable aging effects for this material/environment combination. This is consistent with industry guidance.

3. For increase in porosity and permeability, loss of strength due to leaching of calcium hydroxide of concrete in inaccessible areas, no plant specific aging management is required. See further evaluation in Section **3.5.2.2.2.1**.

4. For expansion and cracking due to reaction with aggregates of concrete in inaccessible areas, no aging management is required. See further evaluation in Section **3.5.2.2.2.1**.

5. For cracking, loss of bond, loss of material (spalling, scaling) due to corrosion of embedded steel in concrete for inaccessible areas, no plant specific aging management is required. See further evaluation in Section **3.5.2.2.2.2**.

6. For increase in porosity and permeability, cracking, loss of material (spalling, scaling) due to aggressive chemical attack of concrete for inaccessible areas, no plant specific aging management is required. See further evaluation in Section **3.5.2.2.2.2**.

7. Conditional requirements for elevated temperature are satisfied. Therefore, a plant specific aging management program is not required. See further evaluation in Section **3.5.2.2.2.1**.

2.4.3.9 SOUTH ACCESS RETAINING WALLS

Description

The South Access Retaining Walls are required to support the existing Earth Berm for the construction of a new temporary access building. This access building will allow unit 1 recovery personnel entry into the unit 1 Reactor Building during the recovery of unit 1. These retaining walls have been classified as safety-related to match the safety function of the Earth Berm. These retaining walls are located east of the Equipment Access Lock.

The South Access Retaining Walls are classified as a safety-related and are in the scope of 10 CFR 54 because it meets the following criteria of 10 CFR 54.4.

(a)(1)	(a)(2)	(a)(3) FP	(a)(3) EQ	(a)(3) ATWS	(a)(3) SBO
Yes	No	No	No	No	No

The South Access Retaining Walls intended functions are:

- Provide structural support for in-scope structures/features.

The entire structure contains components requiring an AMR.

FSAR References

The South Access Retaining Walls are not described in the UFSAR.

License Renewal Drawings

The license renewal drawing for the South Access Retaining Walls is listed below.

0-10E201-01-LR

Components Subject to AMR

The component types that require aging management review are indicated in Table 2.4.3.9, South Access Retaining Walls.

The aging management review results for these component types are provided in Table **3.5.2.27**, South Access Retaining Walls - Summary of Aging Management Evaluation.

Table 2.4.3.9 South Access Retaining Walls

Component/Commodity	Intended Functions
Reinforced Concrete Beams, Columns, Walls, and Slabs	SS

3.5.2.1.27 South Access Retaining Walls

Materials

The materials of construction for South Access Retaining Walls components are:

- Reinforced concrete

Environment

South Access Retaining Wall components are exposed to the following environments:

- Buried
- Outside air

Aging Effects Requiring Management

The following aging effects associated with the South Access Retaining Walls require management:

- Cracking, loss of bond, loss of material (spalling, scaling) due to corrosion of embedded steel
- Cracks, distortion, increase in component stress level due to settlement
- Expansion and cracking due to reaction with aggregates
- Increase in porosity and permeability, cracking, loss of material (spalling, scaling) due to aggressive chemical attack
- Increase in porosity and permeability, loss of strength due to leaching of calcium hydroxide
- Loss of material (spalling, scaling) and cracking due to freeze-thaw

Aging Management Programs

The following aging management programs manage the aging effects for South Access Retaining Walls components:

- Structures Monitoring Program (**B.2.1.36**)

ATTACHMENT 2

Table 3.5.2.27: South Access Retaining Walls - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Reinforced Concrete Beams, Columns, Walls, and Slabs	SS	Reinforced Concrete	Buried	Loss of material (spalling, scaling) and cracking due to freeze-thaw.	Structures Monitoring Program (B.2.1.36)	III.A3.1-a	3.5.1.20	A
Reinforced Concrete Beams, Columns, Walls, and Slabs	SS	Reinforced Concrete	Buried	None	None	III.A3.1-b	None	I, 1
Reinforced Concrete Beams, Columns, Walls, and Slabs	SS	Reinforced Concrete	Buried	None	None	III.A3.1-c	None	I, 2
Reinforced Concrete Beams, Columns, Walls, and Slabs	SS	Reinforced Concrete	Buried	None	None	III.A3.1-e	None	I, 3
Reinforced Concrete Beams, Columns, Walls, and Slabs	SS	Reinforced Concrete	Buried	None	None	III.A3.1-g	None	I, 4
Reinforced Concrete Beams, Columns, Walls, and Slabs	SS	Reinforced Concrete	Buried	Cracks, distortion, increase in component stress level due to settlement.	Structures Monitoring Program (B.2.1.36)	III.A3.1-h	3.5.1.25	A
Reinforced Concrete Beams, Columns, Walls, and Slabs	SS	Reinforced Concrete	Outside Air	Loss of material (spalling, scaling) and cracking due to freeze-thaw.	Structures Monitoring Program (B.2.1.36)	III.A3.1-a	3.5.1.20	A
Reinforced Concrete Beams, Columns, Walls, and Slabs	SS	Reinforced Concrete	Outside Air	Increase in porosity and permeability, loss of strength due to leaching of calcium hydroxide.	Structures Monitoring Program (B.2.1.36)	III.A3.1-b	3.5.1.20	A
Reinforced Concrete Beams, Columns, Walls, and Slabs	SS	Reinforced Concrete	Outside Air	Expansion and cracking due to reaction with aggregates.	Structures Monitoring Program (B.2.1.36)	III.A3.1-c	3.5.1.20	A
Reinforced Concrete Beams, Columns, Walls, and Slabs	SS	Reinforced Concrete	Outside Air	Cracking, loss of bond, loss of material (spalling, scaling) due to corrosion of embedded steel.	Structures Monitoring Program (B.2.1.36)	III.A3.1-d	3.5.1.20	A

ATTACHMENT 2

Table 3.5.2.27: South Access Retaining Walls - Summary of Aging Management Evaluation

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Reinforced Concrete Beams, Columns, Walls, and Slabs	SS	Reinforced Concrete	Outside Air	Increase in porosity and permeability, cracking, loss of material (spalling, scaling) due to aggressive chemical attack.	Structures Monitoring Program (B.2.1.36)	III.A3.1-f	3.5.1.20	A
Reinforced Concrete Beams, Columns, Walls, and Slabs	SS	Reinforced Concrete	Outside Air	Cracks, distortion, increase in component stress level due to settlement.	Structures Monitoring Program (B.2.1.36)	III.A3.1-h	3.5.1.25	A

ATTACHMENT 2

Table Notes:

Industry standard Notes:

Note A Consistent with NUREG-1801 item for component, material, environment, and aging effect. The AMP is consistent with NUREG-1801.

Note I Aging effect in NUREG-1801 item for this component, material and environment combination is not applicable.

Plant Specific Notes:

1. For increase in porosity and permeability, loss of strength due to leaching of calcium hydroxide of concrete in inaccessible areas, no plant specific aging management is required. See further evaluation in Section **3.5.2.2.2.1**.

2. For expansion and cracking due to reaction with aggregates of concrete in inaccessible areas, no aging management is required. See further evaluation in Section **3.5.2.2.2.1**.

3. For cracking, loss of bond, loss of material (spalling, scaling) due to corrosion of embedded steel in concrete for inaccessible areas, no plant specific aging management is required. See further evaluation in Section **3.5.2.2.2.2**.

4. For increase in porosity and permeability, cracking, loss of material (spalling, scaling) due to aggressive chemical attack of concrete for inaccessible areas, no plant specific aging management is required. See further evaluation in Section **3.5.2.2.2.2.**