

November 16, 2000

MEMORANDUM TO: Christopher I. Grimes, Chief
License Renewal and Standardization Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

FROM: Eric W. Weiss, Section Chief **/RA/**
Fire Protection Engineering and Special Projects Section
Plant Systems Branch
Division of Systems Safety and Analysis
Office of Nuclear Reactor Regulation

SUBJECT: SAFETY EVALUATION REPORT (SER) INPUT FOR SECTIONS 2.4.3
THRU 2.4.7 OF THE LICENSE RENEWAL APPLICATION FOR
ARKANSAS NUCLEAR ONE, UNIT 1 (ANO1) REGARDING
STRUCTURES AND STRUCTURAL COMPONENTS
(TAC NO. MA8054)

Attached is a safety evaluation report (SER) input for the subject sections of the license renewal application (LRA) for the ANO1 plant. The staff has reviewed the structures and structural components presented in Sections 2.4.3 thru 2.4.7 of the LRA that are within the scope of license renewal in accordance with the requirements of 10 CFR 54.4. As a result of this review, the staff has concluded that the applicant has appropriately identified the structures and components for the auxiliary building, intake structure, earthen embankments, yard structures, and bulk commodities that are within the scope and subject to an AMR for license renewal. However, the applicant did not include the turbine building in Section 2.4 of the LRA as a subsection. The components of the turbine building subject to an AMR need to be further verified for its completeness during the scope inspection in December 2000. The staff's review of the applicant's submittals is addressed in the attached SER.

Docket No.: 50-313

Attachment: As stated

CONTACT: Jin-Sien Guo, SPLB/DSSA/NRR
301-415-1816

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SAFETY EVALUATION REPORT INPUT
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DIVISION OF SYSTEMS SAFETY AND ANALYSIS
ARKANSAS NUCLEAR ONE-UNIT 1
LICENSE RENEWAL APPLICATION
DOCKET NO. 50-313

2.4 STRUCTURES AND STRUCTURAL COMPONENTS SCOPING AND SCREENING

2.4.0 RAIs

The following summarizes the requests for additional information (RAIs) addressed in Sections 2.4.3 thru 2.4.7 of this report during its initial review:

OI-2.4-4: As stated in Section 2.4.3 of the LRA, one of the intended function of the auxiliary building and its structural components is to serve as missile barriers. Table 3.6-4 only listed missile shield doors and walls. Are there any missile protective devices for the internal missiles should be listed in the table, such as the barriers for protecting safety-related SSCs from pipe whipping or jet forces due to main steam line break or pressure relief valve failures.

OI-2.4-5: Section 2.4.3 of the LRA states that the turbine building itself is not within the scope of license renewal, some fire doors and fire walls and the slab within the turbine building are in scope and subject to an AMR. These are addressed along with those for the auxiliary building. However, these in-scope components in the turbine building provided a rated fire barrier to confine a fire from spreading to adjacent areas of the plant. The turbine building must be added to the scope of license renewal because it contains components that are subject to an AMR. Also, verify if there is any safety-related piping or cabling routed through the turbine building basement that need to be protected or sheltered.

OI-2.4-6: Section 2.4.3 of the LRA states that for the material group elastomers, none of the components or unique commodities are subject to an AMR and there are no components or unique commodities associated with the material groups earthen structures or Teflon. However, some of the components or commodities associated with the elastomers or Teflon group in the auxiliary building are listed in Table 3.6-8 of the LRA as the bulk commodities that are subject to an AMR. Provide an explanation for these differences.

OI-2.4-7: Section 2.4.4 of the LRA states that Category 2 structures in the intake structure are not within the scope of license renewal. Some of these structures provide functional support to non-safety-related equipment whose failure could directly prevent satisfactory accomplishment of safety-related functions. Verifies and explains why the Category 2 structures do not require to meet the intent of 10 CFR 54.4(a)(2).

OI-2.4-8: Table 3.3-6 of the LRA listed the emergency cooling pond, intake and discharge canals as the components of the earthen embankments that are subject to an AMR. These are the nature soil embankment constructions. Explain why the structures in the earth embankments, such as spillway, weir, canal inlet and outlet structures, are not listed in the table for an AMR.

OI-2.4-9: Section 2.4.6.1 of the LRA describes the aboveground and underground yard structures and trenches. However, there is no supporting information or document that can be used to verify the content of this section. Provide a drawing or sketch that shows the location of the yard structures and trenches and highlight the components that are within the scope of license renewal.

2.4.3 Auxiliary Building

In Section 2.4.3, "Auxiliary Building," of the LRA, the applicant described the auxiliary building and identified the structures and components in the auxiliary building that are within the scope of license renewal and subject to an AMR. The design of the auxiliary building is described in Sections 5.1 and 5.3.2 of the ANO1 USAR.

2.4.3.1 Technical Information in the Application

The auxiliary building, located adjacent to the reactor building and turbine building, houses the safety-related systems, structures, and components that support normal operation, shutdown, and accident conditions. It is a free-standing reinforced concrete structure founded on bedrock. The structure and structural components of the auxiliary building are designed as seismic Category 1. Seismic Category 1 structures are the structures that are designed to prevent uncontrolled release of radioactivity and withstand all loading without loss of function. The applicant has determined that seismic Category 1 structures meet the intent of 10 CFR 54.4(a)(1).

Several structural components within the auxiliary building (i.e., the liner plate within the spent fuel pool area and the small pipe chase at elevation 341') are classified as seismic Category 2 structures. The seismic Category 2 structures are those structures whose limited damage would not result in a release of radioactivity and would permit a controlled plant shutdown but could interrupt power generation. The applicant has determined that seismic Category 2 structures meet the intent of 10 CFR 54.4(a)(2).

The applicant also determined that some areas in the auxiliary building (i.e., areas with 10 CFR 50.48-required fire barriers) are within the scope of 10 CFR 54.4(a)(3). The fire barriers and fire doors are grouped as the steel components, while fire walls and slabs are grouped as the concrete components. In Section 2.4.3 of the LRA, the applicant stated that the turbine building itself is not within the scope of license renewal, but the fire doors and fire walls and slabs within the turbine building are in-scope and subject to an AMR for license renewal. These are addressed along with those for the auxiliary building.

The auxiliary building was built partially below grade. The construction joints of the exterior concrete wall contain water-stops at the joints below the plant's design flood level that are subject to an AMR. The boron holdup tank vault is located below grade and is structurally connected to the auxiliary building. The borated water storage tank sits on top of the vault. The post-accident sampling system building is anchored to the top of the ANO1 and ANO2 tank vaults. The building and vaults are designed to seismic Category 1 criteria. These below grade structures and components are within the scope of 10 CFR 54.4(a)(1).

The applicant listed the passive, long-lived components and unique commodities of the auxiliary building in Table 3.6-4 of the LRA for an AMR. The structures and structural components in the auxiliary building that meet one of the criteria in 10 CFR 54.4-(a)1, -(a)2, or -(a)(3) are within the scope of license renewal because they perform at least one of the following intended functions, as noted in the table:

- provide essentially leak tight barriers to prevent uncontrolled release of radioactivity
- provide structural support or function support to safety-related equipment
- provide rated fire barriers to confine or retard a fire from spreading to or from adjacent areas
- serve as missile (internal or external) barriers
- provide structural or functional support to non-safety-related equipment, failure of which could directly prevent satisfactory accomplishment of required safety-related functions
- provide protective barriers for internal and external flood events
- provide for storage of spent fuel assemblies

Some of the components in the auxiliary building are common in many other buildings that are listed as the bulk commodities in Table 3.6-8 of the LRA. The bulk commodities have been reviewed by the applicant in Section 2.4.6.2 of the LRA. The components and commodities in the auxiliary building are subject to an AMR because they perform the intended functions without moving parts or without change in configuration or properties and are not subject to periodical replacement based on qualified life or specified time limit.

2.4.3.2 Staff Evaluation

The staff reviewed Section 2.4.3 of the LRA and the supporting information in ANO1 USAR to determine whether there is reasonable assurance that the structural components and commodities comprising the auxiliary building have been properly identified as being within the scope of license renewal and subject to an AMR. After completing its initial review, the staff issued RAs in a letter dated April 18, 2000, regarding the information provided in the submittal. The applicant responded to the staff's questions by a letter dated August 30, 2000.

The applicant listed the passive components and unique commodities of the auxiliary building in Table 3.6-4 of the LRA and the bulk commodities in Table 3.6-8 of the LRA. The applicant further combined these components and commodities into three groups based on their construction materials, i.e., (1) steel (including welds), (2) threaded fasteners (including structural bolts, expansion anchors and undercut anchors), and (3) concrete (including non-shrink grout, epoxy grout, and embedment, and reinforcement, but not including prestressed concrete). The staff reviewed the component groupings in Table 3.6-4 to determine whether these components are part of the auxiliary building or if there were any other components in the

auxiliary building that were not included in the table for an AMR. As a result of this review, the staff identified the following as the open items:

- As stated in Section 2.4.3 of the LRA, one of the intended functions of the auxiliary building and its structural components is to serve as missile barriers. In Table 3.6-4, only the missile shield doors and walls are listed. The staff asked whether any missile protective devices for resisting internal missiles are installed in the auxiliary building, such as the barriers for protecting safety-related systems and equipment from pipe whipping or jet forces due to main steam line ruptures or pressure relief valve failures. This was identified as an open item (OI-2.4-4).

In its response to OI-2.4-4, the applicant stated that there are other missile protective devices in the auxiliary building in addition to missile-shield doors and walls. In Table 3.6-4, the control room extension substructure is a missile barrier. As stated in Section 2.4.3, the commodities considered common to the auxiliary building and other in-scope structures are listed as the bulk commodities in Table 3.6-8 of the LRA. These includes missile-protected hatches that are under the commodity grouping “hatch frames/covers” for steel or under the commodity grouping “hatch covers/plugs” for concrete. Piping whip restraints and impingement barriers are also addressed in Table 3.6-8 of the LRA. The staff’s review found that the applicant has included the missile barriers in the scope that are subject to an AMR for license renewal. Therefore, OI-2.4-4 is closed.

- Section 2.4.3 of the LRA states that the turbine building itself is not within the scope of license renewal, some fire doors, fire walls, and slabs within the turbine building are in scope and subject to an AMR. These components are addressed along with those for the auxiliary building. The staff considers that these in-scope components of the turbine building provide a rated fire barrier to confine a fire from spreading to adjacent areas of the plant. The turbine building must be added to the scope of license renewal because it contains components that were subject to an AMR. The staff asked why is it that the turbine building is not considered to be in scope but its components perform an intended function. The staff also requested the applicant to identify any safety-related piping or cable routed through the basement of the turbine building that need to be sheltered or protected. This was identified as an open item (OI-2.4-5)

In its response to OI-2.4-5, the applicant stated that there are no safety-related pipes or cables in the turbine building. The turbine building has been included in the scope of license renewal as identified in Sections 2.4.3 and 2.4.6.2 of the LRA. In a letter dated October 3, 2000, the applicant further clarified that Section 2.4 of the LRA should have included the turbine building within the scope of license renewal because it contains 10 CFR 50.48-required components and commodities that are subject to an AMR. The staff reviewed the applicant’s response and found that the applicant should correct the statement in Section 2.4.3 of the LRA (as stated “although the turbine building itself is not within the scope of license renewal”) to make it consistent with the response. Because there is no place in Section 2.4 of the LRA that describes the turbine building, the staff does not have the required information to conduct this review. The staff is unable to determine whether there is reasonable assurance that the applicant has identified all the components in the turbine building that require an AMR. Therefore, a scope inspection is required to verify whether the applicant failed to identify any other components or commodities in the turbine building (in addition to the fire doors, fire walls, and slabs) that should be subject to an AMR. This is a confirmatory item.

- Section 2.4.3 of the LRA states that for the material group elastomers, none of the components or unique commodities are subject to an AMR and there are no components or unique commodities associated with the material groups earthen structures or Teflon. However, some of the components or commodities associated with the elastomers or Teflon group in the auxiliary building are listed in Table 3.6-8 of the LRA as the bulk commodities that are subject to an AMR. The staff asked that the applicant explain the inconsistency. This was identified as an open item (OI-2.4-6).

In its response to OI-2.4-6, the applicant stated that the commodities considered common to the auxiliary building are the bulk commodities discussed in Section 2.4.6.2 of the LRA. For the material group elastomers, none of the auxiliary building's elastometric components or "unique" commodities were subject to an AMR. In contrast, the water-stops as indicated in Table 3.6-8 of the LRA are subject to an AMR because they are common to other structures and are considered as the bulk commodity. For the material group Teflon, there are no components or unique commodities associated with this material group in the auxiliary building. However, there are several bulk commodities in the auxiliary building, as well as in other structures, constructed with polytetrafluoroethylene materials (Teflon) that are subject to an AMR. In the auxiliary building, there are no components, unique commodities or bulk commodities associated with the material group of the earthen structures. The applicant has clarified that, except the water stops and certain Teflon materials, no other elastometric components in the auxiliary building were subject to an AMR. Therefore, OI-2.4-6 is closed.

The staff has reviewed Section 2.4-3 of the LRA, the ANO1 USAR, and additional information submitted by the applicant in response to the staff's RAIs. The staff also examined the components and commodities listed in Tables 3.6-4 and 3.6-8 of the LRA to determine if they are the components subject to an AMR. Based on the above review, and subject to a satisfactory scope inspection of the turbine building, the staff did not find any omissions by the applicant. The staff should have reasonable assurance that the applicant has properly identified the structures and structural components in the auxiliary building (also the turbine building) that are within the scope and subject to an AMR for the license renewal.

2.4.3.3 Conclusions

On the basis of this review and subject to the scope inspection of the turbine building, the staff concludes that the applicant should have appropriately identified the portions of the auxiliary building (and the turbine building) that are within the scope of license renewal in accordance with 10 CFR 54.4(a) and identified those in-scope structural components that are subject to an AMR in accordance with 10 CFR 54.21(a)(1).

2.4.4 Intake Structure

In Section 2.4.4, "Intake Structure," of the LRA, the applicant described the intake structure and identified the structural components of the intake structure that are within the scope and subject to an AMR for license renewal. The staff reviewed Section 2.4.4 to determine if there is reasonable assurance that the applicant has identified and listed the structural components of the intake structure that are subject to an AMR. The design of the intake structure is described in Section 5.3.4 of the ANO1 USAR.

2.4.4.1 Technical Information in the Application

The intake structure (located at the end of the intake canal) houses the circulating water, fire, and service water pumps, motor control centers, and traveling screens. It is constructed primarily of reinforced concrete that is founded on bedrock. The steel trash racks and traveling screens at the entrance of the intake structure protect the condensers from foreign materials present in the bay water. The intake structure is divided into two sections: (1) the portion of the building area above grade elevation, and (2) the portion of the below grade pump bay area that is partially submerged in water. The ANO1 intake structure is integrally connected to the ANO2 intake structure with a shear key and additional reinforcing in the slab at the pump level. The intake structure gantry crane is shared between the ANO1 and ANO2 intake structures. The gantry crane is supported by steel rail and girders on reinforced concrete piers and is capable of traversing the entire length of the intake structure. It is normally parked at a safe distance from the intake structure.

The building portion of the intake structure above grade contains pump motors, valve motor actuators, and the related equipment. This building area has three predominant elevations, which are El 354', El 366', and El 378'. The HVAC equipment is located in the penthouse at El 378'. The pump motors and valve motor actuators are located at El 366', which is above the plant design flood level of El 361'. They are required to supply water for plant protection (i.e., fire water and service water). The remaining pump motors required for normal plant operation, such as the circulating water and screen wash pumps, are located at El 354'. The system components related to plant protection, which are not adversely affected by flood waters or which would not be required during a flood event (i.e., the lake emergency cooling pond sluice gate actuators), are also located at El 354'.

The below grade portion of the intake structure contains pump bays for various plant systems. The four circulating water system pump bays take suction directly from Lake Dardanelle. The three service water system pump bays are located directly behind the circulating water pump bays. There are sluice gates in the service water system pump bays that can be aligned so that the fire water and service water pumps can take suction directly from Lake Dardanelle or from the emergency cooling pond as needed.

The portions of the intake structure that provide support to service water system components are designed to seismic Category 1 criteria. The remainder of the intake structure are seismic Category 2 structures. The applicant has determined that the seismic Category 1 structures are within the scope of 10 CFR 54.4(a)(1). But the seismic Category 2 structures are not within the scope of 10 CFR 54.4(a)(2). The applicant listed the structural components and unique commodities of the intake structure in Table 3.6-5 of the LRA. These structural components are within the scope of license renewal because they contribute to at least one of the following intake structure intended functions, as noted in the table:

- provide structural support or functional support to safety-related equipment
- provide shelter or protection to safety-related equipment
- serve as missile (internal or external) barriers
- provide structural or functional support to non-safety-related equipment, failure of which

could directly prevent satisfactory accomplishment of required safety-related functions

- provide protection barriers for external flood event

The applicant determined that these passive, long-lived components and commodities are subject to an AMR as required by 10 CFR 54.21(a)(1).

2.4.4.2 Staff Evaluation

The staff reviewed Section 2.4.4 of the LRA and the ANO1 USAR to determine if the applicant has adequately implemented its methodologies such that there is reasonable assurance that the structural components and commodities comprising the intake structure have been properly identified as being within the scope of license renewal and subject to an AMR. After completing the initial review, the staff issued a RAI regarding the information presented in the submittal in a letter dated April 18, 2000. The applicant responded to the staff's question by a letter dated August 30, 2000.

The intake structure comprises various structural components and commodities that support in-scope systems, components, or equipment. The applicant listed the structural components and commodities in Table 3.6-5 of the LRA that are subject to an AMR. In the table, the applicant combined the structural components and unique commodities of the intake structure in three material groups, i.e., (1) steel (including welds), (2) threaded fasteners (including bolts, expansion anchors, and undercut anchors), and (3) concrete (including non-shrink grout, epoxy grout, embedment, and reinforcement). Certain components that are common in other buildings are grouped as the bulk commodities in Table 3.6-8 of the LRA that are reviewed in Section 2.4.7 of this report. There are 18 structural component groupings listed in Table 3.6-5 of the LRA and 24 bulk commodity groupings for the intake structure listed in Table 3.6-8 of the LRA. Some of the structural components that do not contribute to any of the intended functions of the intake structure are not listed in the tables. These structural components and commodities in the list are subject to an AMR because they are passive and are considered to be long-lived, unless specific justification is provide to the contrary.

Section 2.4.4 of the LRA states that the seismic Category 2 structures in the intake structure are not within the scope of 10 CFR 54.4(a)(2). However, some of the seismic Category 2 structures provide functional support to non-safety-related equipment whose failure could directly prevent satisfactory accomplishment of safety-related functions. The staff requested the applicant to verify and explain why the seismic Category 2 structural components within the intake structure are not within the scope of license renewal. This was identified as an open item (OI-2.4-7).

In its response to OI-2.4-7, the applicant stated that seismic Category 2 structures, systems, and equipment are those whose failure would not result in the uncontrolled release of radioactivity and would not prevent a safe reactor shutdown, but may interrupt power generation. Section 9.3.2.1 of the ANO1 USAR states that failure of seismic Category 2 equipment in the proximity of the in-scope service water system components will not impact the latter's integrity. Therefore, the portions of seismic Category 2 structures and components within the intake structure do not meet the criteria of 10 CFR 54.4(a)(2) for license renewal. The staff's review found that the Category 2 structures and components in the intake structure do not provide any functional support to non-safety-related equipment whose failure could

prevent satisfactory accomplishment of safety-related functions. It is not considered to be an omission of the applicant. Therefore, open item (OI-2.4-7) is closed.

Based on the above review, the staff did not find any omissions of structures or components that an AMR is required in accordance with the requirements of 10 CFR 54.21(a)(1).

2.4.4.3 Conclusion

The staff has reviewed the information presented in Section 2.4.4 of the LRA, the supporting information in ANO1 USAR, and the applicant's response to the staff's RAI. On the basis of this review, the staff concludes that there is reasonable assurance that the applicant has properly identified the structures and components that fall within the scope of license renewal and subject to an AMR, in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

2.4.5 Earthen Embankments

In Section 2.4.5, "Earthen Embankments," of the LRA, the applicant described the earthen embankments at the plant site and identified the structures within the earth embankments that are within the scope of license renewal. The structures within the scope of license renewal are (1) the emergency cooling pond and (2) the intake and discharge canals, which are the seismic Category 1 structures. The design of these structures are shown in the site drawings (figures No. 9-32, 9-33, and 9-35) of the ANO1 USAR.

2.4.5.1 Technical Information in the Application

The earthen embankment structures are submerged partially or totally in Lake Dardanelle and contained within their own boundaries. The applicant listed (1) emergency cooling pond, (2) intake canal, and (3) discharge canal in Table 3.6-6 of the LRA as the structures of the earthen embankments that are subject to an AMR. Their intended function is to provide a heat sink during a design-basis accident or station blackout.

The emergency cooling pond is a 14-acre kidney-shaped water pond located at northwest of the plant. It serves as a heat sink in the unlikely event of a loss of Lake Dardanelle water inventory. The water level of the pond is maintained between 5 to 6 feet by a spillway that discharges the overflow back to Lake Dardanelle. The emergency cooling pond receives hot discharge from the plant through a 100-ft long weir. The purpose of the weir is to promote a uniform flow distribution in the pond and direct the hot water to the surface for maximizing heat rejection. The supply and return lines are at opposite extremes to prevent any hydraulic vortices. The plant intake piping is at the lowest point of the pond. The pond is excavated in impervious clay strata with its bottom at about 4 to 16 feet above rock. The crest voids and the adjacent embankment voids at downstream of the spillway are pumped with an elastic type of grout to preclude undercutting by water flow over the spillway. The pond side slopes are protected against wave action with dumped rip-raps. A series of weirs are provided at the channel to the reservoir to control silt settlement.

The intake canal conveys water from Lake Dardanelle to the intake structure that supplies the reservoir water for an once-through cooling of the ANO1 plant. It is also used to supply the cooling tower makeup water and service water for the ANO2 plant. The intake canal is

approximately 4000-ft long with the width varies from 80-ft at the mouth to 135-ft at the intake structure and has an average depth of 14 feet. The discharge canal returns the used cooling water to the reservoir. The discharge canal is approximately 600-ft long with an average width of 165 feet and depth of 11 feet. Both canals are completely excavated and contain no section formed by dikes or in-fill. Bank slopes of the canals are planted with grass or protected with rip-raps to prevent erosion.

2.4.5.2 Staff Evaluation

The staff reviewed Section 2.4.5 of the LRA and the drawings in ANO1 USAR to determine if there is reasonable assurance that the components comprising the earthen embankments have been properly identified as being within the scope of license renewal and subject to an AMR.

The applicant identified and listed the structures within the earth embankments that are subject to an AMR in Table 3.3-6 of the LRA. As shown in the table, the emergency cooling pond and the intake and discharge canals are listed as the structures subject to an AMR. However, the structures associated with the earth embankments, such as spillway, weir, canal inlet and outlet structures, are not listed in the table as the components subject to an AMR for license renewal. The staff asked that the applicant explains the omissions. This was identified as an open item (OI-2.4-8).

In its response to OI-2.4-8, the applicant stated that the spillway and weir are the components of the emergency cooling pond. They are subject to an AMR along with the overall emergency cooling pond. The canal inlets and outlets are the components of the intake and discharge canals that are subject to an AMR as part of the intake and discharge canals. The staff's review found that these components are in-scope and subject to an AMR for the license renewal although they are not specifically identified in the table. The staff found no omissions by the applicant, therefore, OI-2.4-8 is closed.

The staff has completed its review of Section 2.4.5 of the LRA , ANO1 USAR, and the site drawings. As a result of this review, the staff found no omissions by the applicant. The applicant has properly identified the passive and long-lived structures subject to an AMR. These structures meet the criteria of 10 CFR 54.21(a)(1) because they perform the intended function without moving parts, or without a change in configuration or properties, and are not subject to replacement based on qualified life or specified time period.

2.4.5.3 Conclusions

On the basis of this review, the staff concludes that there is reasonable assurance that the applicant has properly identified the structures associated with the earth embankments that are within the scope of license renewal and subject to an AMR, in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

2.4.6 Yard Structures

In Section 2.4.6.1, "Aboveground/Underground Yard Structures," of the LRA, the applicant described the yard structures at the plant site and identified the structures and components of the yard structures that are within the scope of license renewal. The applicant also identified which of the in-scope structural components are subject to an AMR.

2.4.6.1.1 Technical Information in the Application

As described in Section 2.4.6.1 of the LRA, the following yard structures are within the scope of license renewal and subject to an AMR:

- Q-Condensate storage tank foundation
- Emergency diesel fuel oil storage tank vault
- Bulk fuel oil storage tank foundation
- Alternate AC diesel generator building foundation
- Electrical manholes
- Borated water storage tank foundation

The Q-condensate storage tank (Q-CST) foundation is a seismic Category 1 structure located at the west side of the ANO1 reactor building. It is an octagon-shaped reinforced concrete mat foundation supported by concrete piers that are embedded in bedrock. Two valve pits are located partially underneath and on opposite (i.e., north and south) sides of the mate foundation. The south valve pit is for ANO1 plant and the north valve pit is for ANO2 plant. The lower portion of the Q-CST is surrounded by a 5-ft high reinforced concrete wall for missile protection. The applicant determined that the Q-CST foundation is within the scope of 10 CFR 54.4(a)(1).

The emergency diesel fuel oil storage tank vault is a seismic Category 1 structure, which was designed as a reinforced concrete rigid-frame box. The vault is located at the northwest side of the reactor building that contains four diesel fuel storage tanks partitioned into separate rooms. The foundation of the vault is anchored in rock and the wall has ventilation openings above the flood elevation. The outside door of the vault is of watertight construction for flood protection. The applicant determined that the emergency diesel fuel oil storage tank vault is within the scope of 10 CFR 54.4(a)(1).

The bulk fuel oil storage tank foundation supports a 180,000-gallon fuel oil storage tank. It is a non-Q, seismic Category 2 reinforced concrete foundation. The applicant determined that the bulk fuel oil storage tank foundation is within the scope of 10 CFR 54.4(a)(2).

The alternate AC diesel generator (AACDG) building foundation is a seismic Category 2 structure designed to the Uniform Building Code requirements. The AACDG building is located at the north side berm of the bulk fuel oil storage tank and is divided into two parts; an electrical equipment area and an engine room. The major components of the AAC diesel generator are located in this building (except the power distribution switchgear). The engine room houses the engine generator set, fuel oil transfer pump, fuel oil day tank, air start system, engine generator control cabinets, HVAC, and the fire protection system. The foundation of the AACDG building is a reinforced concrete slab founded on grade beams, which are supported by drilled piers (caissons). The AAC system is a non-Q system designed to conform to augmented QA requirements based on NRC Regulatory Guide 1.155, "Station Blackout." The foundation of the AACDG building is subject to an AMR because it supports the alternate AC diesel generator.

The applicant determined that the building foundation is within the scope of 10 CFR 54.4(a)(2).

The seismic Category 1 electrical manholes are placed at various locations at the plant site. They are relatively small reinforced concrete structures founded partially underground either on natural soil or on backfill materials. An access opening in the top slab at grade level is provided that is covered with reinforced concrete or carbon steel cover for missile protection. The foundations of the manholes are completely independent from other structures. The applicant determined that the electrical manholes are within the scope of 10 CFR 54.4(a)(1).

The borated water storage tank (BWST) foundation is the reinforced concrete roof slab of the boron holdup tank vault that is part of the seismic Category 1 auxiliary building. The vault roof requires 2-ft thick slab to support the BWST, but the vault roof was designed with 4-ft slab for meeting the biological shielding requirements. A small ring wall, filled with oiled sand, was built on the roof slab to separate the tank bottom from the top of the concrete surface. The roof slab has a small slope for the tank drainage purposes. The applicant determined that the BWST foundation is within the scope of 10 CFR 54.4(a)(1).

The yard structures described above are within the scope of license renewal because they perform one or more of the following yard structure intended functions:

- Provide structural support or functional support to safety-related equipment
- Provide shelter or protection to safety-related equipment
- Provide rated fire barriers to confine or retard a fire from spreading to or from adjacent areas
- Serve as missile (internal or external) barriers
- Provide structural or functional support to non-safety-related equipment, failure of which could directly prevent satisfactory accomplishment of required safety-related functions
- Provide protective barriers for internal flood event

The applicant listed 9 structural components and identified their intended functions in Table 2.6-7 of the LRA. The 9 structural components are further combined into two groups: (1) steel, and (2) concrete. Other structural components that are part of the yard structures, but do not contribute to any of the intended functions of the yard structures are not included in the table. The steel group includes manhole covers and threaded fasteners. The concrete group includes walls, floor slab, columns, slabs on various foundations, tank vault, drilled piers, manhole covers, and the walls and slab of the electrical manholes. The structural components listed in the table are subject to an AMR because they are passive and long-lived and perform the intended functions without moving parts and without a change in configuration or properties, and are not subject to replacement based on qualified life or specified time period.

2.4.6.2 Staff Evaluation

The staff reviewed Section 2.4.6.1 of the LRA to determine if the applicant has adequately implemented its methodologies such that there is reasonable assurance that the structures and

structural components comprising the yard structures have been properly identified as being within the scope of license renewal and subject to an AMR. After completing its initial review, the staff issued a RAI in a letter dated April 18, 2000.

Section 2.4.6.1 of the LRA describes the aboveground and underground yard structures and trenches. However, there is no supporting information or document that can be used to verify the content of this section. The staff asked that the applicant provides a drawing or sketch that shows the location of the yard structures and trenches and highlights the components that are within the scope of license renewal. This was identified as an open item (OI-2.4-9).

In its response to OI-2.4-7, dated August 30, 2000, the applicant submitted a set of site drawings, including drawings C31(Yard underground utilities), C-2003 (plot plan), and C-2056 (anchor bolt locations of the condensate storage tank). The applicant highlighted the structures and components of the yard structures that are within the scope of license renewal. The staff reviewed Section 2.4.6.1 and Table 2.6-7 of the LRA and verified the structures and components of the yard structures with these drawings. As a result of this review, the staff found no omissions by the applicant in scoping the yard structures as defined under 10 CFR 54.4(a). The staff also found no omissions in the structures and components identified in Table 2.6-7 of the LRA that an AMR is required in accordance with 10 CFR 54.21(a)(1). Therefore, OI-2.4-7 is closed.

2.4.6.3 Conclusions

The staff has reviewed the information provided in Section 2.4.6.1 of the LRA, the drawings submitted by the applicant for this review. On the basis of this review, the staff concludes that there is reasonable assurance that the applicant has appropriately identified those portions of the yard structures and the associated structural components thereof, that are within the scope of license renewal and subject to an AMR in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.

2.4.7 Bulk Commodities

In Section 2.4.6.2, "Bulk Commodities," of the LRA, the applicant described the bulk commodities and identified the commodity groupings in the buildings and structures they are within for license renewal.

2.4.7.1 Technical Information in the Application

The bulk commodities are the structural components or items that support or protect various in-scope system components or equipment and are common in two or more buildings or structures. The applicant determined that the in-scope bulk commodities are in the reactor building (including reactor building internals), auxiliary building, intake structure, diesel fuel vault, BWST foundation, Q-CST foundation, and pipe trenches. Some of the commodities in the turbine building, such as fire wrap banding, fire damper mountings, fire hose reels, fire wraps, and fire stops, are also included in the bulk commodities. These in-scope bulk commodities meet one of 10 CFR54.4-(a)(1), -(a)(2), -(a)(3) criteria. The applicant listed the bulk commodities and their associated buildings and structures in Table 3.6-8 of the LRA that are within the scope of license renewal because they fulfill one or more of the following

intended functions:

- Provide structural support and functional support to safety-related equipment
- Provide shelter or protection to safety-related equipment (including radiation shielding)
- Provide rated fire barriers to confine or retard a fire from spreading to or from adjacent areas
- Serve as missile (internal or external) barriers
- Provide structural or functional support to non-safety-related equipment, failure of which could directly prevent satisfactory accomplishment of required safety-related functions
- Provide protection barrier for internal or external flood events

In Table 3.6-8 of the LRA, the applicant combined the bulk commodities into six groups based on the materials of construction. These groups are: (1) steel (including weld), (2) threaded fasteners (including structural bolt, expansion anchor, and undercut anchor), (3) concrete (including non-shrink grout, epoxy grout, embedment, and reinforcement, but not including prestressed concrete), (4) fire barrier, (5) elastomer, and (6) Teflon. No bulk commodities are associated with the material group earthen structures. These bulk commodities are subject to an AMR because they are passive and long-lived components and are not subject to replacement on a periodic basis.

2.4.7.2 Staff Evaluation

The staff reviewed Section 2.4.6.2 and Table 3.6-8 of the LRA to determine if there is reasonable assurance that the applicant has appropriately identified and listed the bulk commodities subject to an AMR. The applicant identified the following bulk commodities and their associated buildings or structures:

(1) Steel Group:

piping and tubing supports	reactor bldg, aux bldg, intake, diesel fuel vault, pipe trenches
pipe whip restraints	reactor bldg, aux bldg
motor-operated valve supports	reactor bldg, aux bldg, intake, diesel fuel vault
hatch frames/covers	aux bldg, intake, Q-CST foundation
conduit supports	reactor bldg, aux bldg, intake, diesel fuel vault, pipe trenches
cable trays and supports	reactor bldg, aux bldg, intake
H&V duct supports	reactor bldg, aux bldg
cabinets, electrical panels and supports	reactor bldg, aux bldg, intake
equipment supports	reactor bldg, aux bldg, intake
hazard barrier curbs	aux bldg, intake
10 CFR 50.48-required banding for fire wraps	reactor bldg, aux bldg, turbine bldg

fire damper mountings and fire hose reels	reactor bldg, aux bldg, turbine bldg, intake, and diesel fuel vault
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(2) Threaded Fastener Group:
threaded fasteners on piping
and tubing supports, pipe whip
restraints, hazard barrier curbs,
cabinets, electrical panels and
supports, and the supports for
MOV, conduit, H&V ducts
and equipment

reactor bldg, aux bldg, intake, diesel fuel vault, pipe
trenches

pipe lugs, tubing clips and the
threaded fasteners for
hatch frames/covers

reactor bldg, aux bldg, intake, diesel fuel vault, pipe
trenches

threaded fasteners for
cable trays and supports
threaded fasteners for
fire damper mountings and
fire hose reels

reactor bldg, aux bldg, intake

aux bldg, intake, turbine bldg, and diesel fuel vault

(3) Concrete Group:
equipment pads and foundations
hatch covers and lugs

reactor bldg, aux bldg, intake, turbine bldg
aux bldg, intake, diesel fuel vault, BWST foundation

(4) Fire Barrier Group (10 CFR 50.48-required):
fire wraps and fire stops

reactor bldg, aux bldg, turbine bldg, diesel fuel vault

(5) Elastomer Group:
water-stops at the construction joints
of the exterior concrete walls

reactor bldg, aux bldg, diesel fuel vault, Q-CST foundation

(6) Teflon Group:
piping support restraints
equipment pad, and foundation
plates

reactor bldg, aux bldg

reactor bldg and aux bldg

The staff reviewed Table 3.6-8 of the LRA to determine if the applicant has adequately identified the bulk commodities in the buildings or structures that are not listed in other sections of the LRA for an AMR. The staff previously reviewed Table 3.6-8 of the LRA in reviewing the reactor building, reactor building internals, and auxiliary building to verify whether the listed bulk commodities are within these buildings. The staff found that there is limited plant-specific design information in the submittals for the staff to verify the accuracy and completeness of the table. However, 10 CFR 54.13 requires that the information provided to the NRC by the applicant for license renewal must be complete and accurate in all material respects. Therefore, the applicant is responsible for any omissions that are not included in the submittal that require an AMR. As a result of this review, the staff found that the commodities in the table are not

listed in the associated tables for the buildings or structures but they are the components in the buildings or structures subject to an AMR. These bulk commodities are part of the safety-related system components or equipment and are common in most nuclear power plants. Based on the above review, the staff should have reasonable assurance that the applicant has appropriately identified the bulk commodities subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

2.4.7.3 Conclusions

On the basis of this review, the staff concludes that there should be reasonable assurance that the applicant has properly identified the bulk commodities for the in-scope buildings and structures that are within the scope and subject to an AMR for license renewal in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.