Entergy

Entergy Operations, Inc.
1448 S.R. 333
Russellville, AR 72802
Tel 501 858 5000

2CAN050404

May 19, 2004

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Subject: Request for Additional Information Responses for
License Renewal Application TAC No. MB8402
Arkansas Nuclear One – Unit 2
Docket No. 50-368
License No. NPF-6

Dear Sir or Madam:

By letter dated April 14, 2004 (2CNA040404), the NRC requested additional information on the Arkansas Nuclear One, Unit 2 (ANO-2) License Renewal Application (LRA) within 30 days of receipt. The requests for additional information (RAIs) are from the LRA Section 2.4, Scoping and Screening Results (Structures) and Section 3.5, Structures and Component Supports. The responses to the RAIs are contained in the attachment.

There are no new commitments contained in this submittal. Should you have any questions concerning this submittal, please contact Ms. Natalie Mosher at (479) 858-4635.

I declare under penalty of perjury that the foregoing is true and correct. Executed on May 19, 2004.

Sincerely,

Timothy G. Mitchell
Director, Nuclear Safety Assurance

TGM/nbm

Attachment

A100

cc: Dr. Bruce S. Mallett
Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-8064

NRC Senior Resident Inspector
Arkansas Nuclear One
P.O. Box 310
London, AR 72847

U. S. Nuclear Regulatory Commission
Attn: Mr. Drew Holland
Mail Stop 0-7 D1
Washington, DC 20555-0001

U. S. Nuclear Regulatory Commission
Attn: Mr. Greg Suber
Mail Stop 0-11 F1
Washington, DC 20555-0001

Mr. Bernard R. Bevill
Director, Division of Radiation
Control and Emergency Management
Arkansas Department of Health
4815 West Markham Street, Slot 30
Little Rock, AR 72205-3867

Attachment to

2CAN050404

RAI Responses

Sections 2.4 and 3.5 RAI Reponses

RAI 2.4-1(a): LRA Table 2.2-4 identifies structures that are not within the scope of license renewal. It is not obvious to the staff that all of the listed structures serve no intended function. Please provide a description of the discharge canal and the miscellaneous tank foundations, and the technical basis for the determination that they are not within the scope of license renewal.

Response: The discharge canal is an earthen structure with the primary function of discharging the ANO-1 condenser cooling water to the lake. As stated in ANO-2 Safety Analysis Report (SAR) Section 9.2.1.2.3.7, "Under accident conditions the service water system (SWS) discharge is automatically changed to the emergency cooling pond (ECP) upon the initiation of a safety injection actuation signal (SIAS) or main steam isolation signal (MSIS)." The discharge canal is not relied on as a discharge path for the service water system. Failure of discharge canal will not prevent accomplishment of required safety functions; therefore, the discharge canal has no intended function.

Miscellaneous tank foundations are reinforced concrete foundations for miscellaneous, nonsafety-related tanks. Since the tanks have no intended functions, the foundations supporting them likewise have no intended functions. Examples of miscellaneous tanks are raw water holdup tank and concentrator bottoms tank. The raw water holdup tank holds water supplied from the Russellville city water system. It supplies the domestic water system that does not serve a safety-related function and is not required for safe shutdown of the plant. The concentrator bottoms tank is no longer in service. Neither of these examples are tanks with the potential for failures that could prevent the satisfactory accomplishment of safety functions. The foundations supporting an intended function are provided in Table 2.2-3 of the LRA.

RAI 2.4-1(b): Verify that seismic II/I considerations are not applicable to any of the structures listed in LRA Table 2.2-4 (e.g., cooling tower).

Response: As part of LRA process, the structures (e.g., cooling tower) listed in LRA Table 2.2-4 have been reviewed for II/I considerations. Those structures required to be seismically qualified for II/I considerations have been included in the scope of license renewal. None of the structures listed in LRA Table 2.2-4 are a concern for seismic II/I considerations.

RAI 2.4-1(c): While the tendon access gallery is not in scope, there is significant industry operating experience related to flooding and corrosive environments in the tendon access gallery that have contributed to degradation of the tendon anchorage components and surrounding concrete. Management of the condition of the tendon access gallery is a preventive step to minimize aging effects for the prestressing system. The applicant is requested to submit its plant-specific operating/aging experience related to (1) flooding and corrosive environments in the tendon access gallery, and (2) degradation of the prestressing system components (both steel and concrete) in the tendon access gallery, and based on the ANO-2 specific tendon gallery operating/aging experience, discuss ANO-2's basis for not including the tendon gallery structure within the aging management review scope pursuant to 10CFR54.4(a)(2).

Response: Prestressing system components in the tendon access gallery are protected by end caps as appropriate. ANO-2 operating experience indicates no significant problems with prestressing system components due to flooding or corrosive environments in the tendon access gallery. The ANO-2 containment building 20-year tendon surveillance and concrete surface inspection indicated no abnormal degradation of the building or the post tensioning system. The gallery is open to the auxiliary building. Tendon access gallery ventilation fans operate in conjunction with the auxiliary building ventilation system so the environment is essentially the same as the auxiliary building environment. Since the tendon anchorages are in the overhead of the gallery, minor water inleakage has no effect on the lower tendon anchorage components and surrounding concrete. Neither significant levels of contaminants nor excessive humidity have been noted in the tendon access gallery.

The tendon access gallery provides no structural support to the reactor building. Since the tendon access gallery serves no license renewal intended function, it is not within the scope of license renewal and therefore, not subject to an aging management review.

RAI 2.4-2: Based on its review of LRA Sections 2.1, 2.2, 2.3, 2.4, and 2.5, the staff identified a number of scoping and screening issues that require clarification and additional information. It is not clear to the staff how the applicant has addressed the following commodities in its scoping and screening evaluation: cable trays, conduit, instrument lines, TubeTrac (if applicable), thermal insulation on piping and/or structures that performs an intended function. The applicant is requested to (1) specifically describe the treatment of each of these commodities in its scoping and screening evaluation; (2) identify the specific table and row in LRA Section 2.3, 2.4, or 2.5 that includes each commodity; and (3) identify the location in LRA Section 3 that contains the aging management review for each commodity.

Response:

Cable trays:

1) Cable trays were treated as in scope and subject to aging management review.
2) Table 2.4-4, under the entry "Cable tray and conduit supports, embedded unistrut."
3) As shown in Table 3.5.2-4 under the same component entry.

Conduit:

1) Conduit was treated as in scope and subject to aging management review.
2) Table 2.4-4, under the entry "Cable tray and conduit supports, embedded unistrut."
3) As shown in Table 3.5.2-4 under the same component entry.

Instrument lines:

1) Instrument lines were treated as in scope and subject to aging management review. This component is referred to as tubing in the LRA.
2) As shown in the following tables.

2.3.1-3	2.3.3-2	2.3.4-1	2.4-4
2.3.2-1	2.3.3-3	2.3.4-2	
2.3.2-2	2.3.3-4	2.3.4-3	
2.3.2-4	2.3.3-5		
2.3.2-5	2.3.3-6		
	2.3.3-7		
	2.3.3-8		
	2.3.3-9		
	2.3.3-10		
	2.3.3-11		

Instrument line/tubing aging management review is addressed in the following table:

3.1.2-3	3.2.2-1	3.3.2-2	3.4.2-1	3.5.2-4
	3.2.2-2	3.3.2-3	3.4.2-2	
	3.2.2-4	3.3.2-4	3.4.2-3	
	3.2.2-5	3.3.2-5		
		3.3.2-6		
		3.3.2-7		
		3.3.2-8		
		3.3.2-9		
		3.3.2-10		
		3.3.2-11		

TubeTrac:

1) Tubing support systems, considered component supports, are in scope and subject to aging management review.
2) As listed in Table 2.4-4, under the entry "component supports."
3) As shown in Table 3.5.2-4 under the same component entry.

Thermal insulation on piping and/or structures that performs an intended function:

In some internal plant locations at ANO-2, insulation on piping has the intended function to limit heat loss in order to reduce area heat loads during accident conditions. This insulation is indoors and hence is protected from the weather. A review of ANO-2 operating experience verified that the plant has not experienced aging related degradation of piping insulation in indoor environments. Therefore, based on operating experience, there are no aging effects requiring management for indoor insulation at ANO-2. This is consistent with NUREG-1705, which states: "The staff concludes that, even if the chemical volume control system relied on the insulation to perform any accident mitigation functions, there are no plausible aging effects for the insulation that would warrant an aging management program."

RAI 2.4-3: Please clarify the complete scope of load handling systems included in the ANO-2 license renewal scope. LRA Subsections 2.4.1, 2.4.2, 2.4.3, and 2.4.4 all make reference to one or more components of various load handling systems. In addition, LRA Section 2.1.1.2.2 states "The overhead-handling systems, whose structural failure could result in damage to any system that could prevent the accomplishment of a safety function, meet the criteria of 10CFR54.4(a)(2) and are within the scope of license renewal." The applicant is requested to (1) provide a listing of all load handling systems in the license renewal scope; (2) define the associated intended function; (3) identify the specific components that are subject to an aging management review, for each in-scope load handling system; (4) identify the specific row in Table 2.4-1, 2.4-2, 2.4-3, or 2.4-4 that includes each identified component; and (5) identify the location in LRA Section 3 that contains the aging management review for each component.

Response:

1) The load handling systems included in the ANO-2 license renewal scope include the polar crane, fuel handling bridge, and spent fuel cranes (includes bridges, girders, trolleys and crane rails). Also included are monorails and their supports which meet the criteria of 10CFR54.4(a)(2).

2) As shown in Tables 2.4-1, 2.4-2, and 2.4-4 of the LRA, the intended function of cranes and crane components is either support of a 10CFR54.4(a)(1) or 10CFR54.4(a)(2) function.

3) The specific components, listed in the LRA as crane rails and support structures associated with the crane or monorail system, includes bridge, trolley, rails, and girders.

4) The specific row in Table 2.4-1, 2.4-2, and 2.4-4 that includes each identified component are as follows:
   Table 2.4-1 under "Polar crane (containment)"
   Table 2.4-2 under "Fuel handling bridge assembly (2H3) crane rails and girders"
   Table 2.4-2 under "Spent fuel overhead cranes (L3 and 2L35)"
   Table 2.4-4 under "Monorails, crane rails and girders"

5) Line items listed above are shown in Tables 3.5.2-1, 3.5.2-2, and 3.5.2-4 of the LRA under the same component entry.

RAI 2.4-4: Please clarify the complete scope of liquid storage tanks and tank foundations/supports included in the ANO-2 license renewal scope. SAR Tables 3.6-25, 3.6-26, and 3.6-27 list liquid storage tanks located outside buildings, inside containment, and in the auxiliary building, respectively. It is not clear to the staff (1) whether all the listed Seismic Category I tanks and their foundations/supports are included in the license renewal scope; and (2) whether any of the Seismic Category II tanks and/or their foundations/supports need to be included in the license renewal scope due to seismic II/I considerations. Furthermore, the foundations for tanks T-41B and T-25 are identified as structures within the scope of license renewal in LRA Table 2.2-3, but these tanks are not listed in the SAR tables.

Therefore, the applicant is requested to (1) provide a list of all liquid storage tanks and tank foundations/supports included in the license renewal scope; (2) define the associated intended function(s); (3) provide the technical basis for exclusion of any tanks (and their foundations/supports) that are listed in the SAR tables; (4) identify the specific table and row in LRA Section 2.3 or 2.4 that includes each in-scope liquid storage tank and tank foundation/support; and (5) identify the location in LRA Section 3 that contains the aging management review for each tank and tank foundation/support.

Response: The seismic category I tanks (and their foundations/supports) listed in SAR Table 3.6-25 through Table 3.6-27 are in scope and subject to aging management review. Some Seismic Category II tanks and their foundations are included in the license renewal scope due to seismic II/I considerations and due to other 10CFR54.4(a)(2) considerations. Tanks T-41B and T-25 are addressed in Section 1.2.2.10 of the ANO-2 SAR. Section 9.5.4 of the ANO-2 SAR provides additional information on the T-25 tank. These tanks are not listed in the referenced SAR tables since they are designated as ANO-1 components, which are shared with ANO-2. The following addresses the five requested items:

1) Even though not all tanks are in the scope of license renewal, all tank foundations in containment and the auxiliary building are in the scope of license renewal. The outside tanks which are in the scope of license renewal also include the foundation as being in-scope. Tanks in the auxiliary building that are not subject to aging management review are those that are nonsafety-related and have no potential for failure to prevent accomplishment of a safety function.

2) As listed in Tables 2.4-2 and 2.4-4, intended functions for tank foundations/supports are support of (a)(1), (a)(2) or (a)(3) equipment. The intended function for tanks is "pressure boundary" as reflected in the various tables listed in Section 2.3 of the LRA.

3) Tanks in the auxiliary building (Table 3.6-27) that are excluded are those that are nonsafety-related and have no potential for failure to prevent accomplishment of a safety function. Most of the Seismic Category II tanks listed in Table 3.6-27 are in the turbine auxiliary building in areas containing nonsafety-related equipment or are abandoned in place. The waste tanks and the waste condensate tanks are in service and in the auxiliary building and are subject to aging management review. Tank foundations or supports in the auxiliary building and containment are included under the line items "anchors" and "equipment pads" in Table 2.4-4. Seismic category II tanks in SAR Table 3.6-25 are excluded on the technical basis that they do not perform a license renewal intended function. They are neither safety-related nor required for compliance with regulations governing the regulated events. Their failure cannot prevent the satisfactory accomplishment of a required safety function.

4) As listed under line item "Tank" Table 2.3.2-1, 2.3.2-2, 2.3.3-3, 2.3.3-4, 2.3.3-5, 2.3.3-6, 2.3.3-7, 2.3.3-8, 2.3.3-10, and 2.3.3-11.

   As listed in Table 2.4-2 under line item: RWT 2T3 foundation, fuel oil storage tank T-25 foundation, sodium hydroxide tank 2T10 foundation, T41 tank foundation.

   Inside tank foundations and supports are included in the LRA as reflected in Table 2.4-4 under "anchors" and "equipment pads."

5) As shown under the same line item in Tables, 3.2.2-1, 3.2.2-2, 3.3.2-3, 3.3.2-4, 3.3.2-6, 3.3.2-7, 3.3.2-10, 3.3.2-11, 3.4.2-3, 3.5.2-2, and 3.5.2-4.

RAI 2.4-5(a): Based on review of ANO-2 LRA Section 2.4.3, the referenced SAR Section 9.2.5, and the ANO-1 LRA, the staff requests additional information before it can conclude that all the necessary elements of the "ultimate heat sink" for ANO-2 have been included in the license renewal scope.

From LRA Section 2.4.3, it appears that only the water in the emergency cooling pond and the intake canal are needed for safe shutdown of ANO-2. However, for ANO-1, the discharge canal was also included as part of the "ultimate heat sink". The applicant is requested to explain this apparent discrepancy.

Response: The discharge canal is not credited as part of ANO-2's ultimate heat sink. As stated in ANO-2 SAR Section 9.2.1.2.3.7, "Under accident conditions the SWS discharge is automatically changed to the ECP upon the initiation of an SIAS or MSIS." The ANO-1 service water system discharge is not automatically changed to the ECP under accident conditions so the discharge canal is credited as part of the ultimate heat sink for ANO-1.

RAI 2.4-5(b): SAR Section 9.2.5.2.1 and (to a lesser extent) ANO-2 LRA Section 2.4.3 describe various components of the ECP, such as the pipe inlet and outlet structures, the 100 foot long weir, and the ECP spillway. It is not evident to the staff which components described in SAR Section 9.2.5.2.1 are essential to the "ultimate heat sink" function and are included within the license renewal scope. The applicant is requested to (1) identify all components essential to the "ultimate heat sink" function and included in the license renewal scope; (2) provide the technical basis for exclusion from the license renewal scope of any components described in SAR Section 9.2.5.2.1; (3) identify the specific row in LRA Table 2.4-3 that includes each in-scope component; and (4) identify the location in LRA Section 3 that contains the aging management review for each component.

Response:

1) Structural ECP components essential to the "ultimate heat sink" function and included in the license renewal scope are the pond, the pond inlet and pond outlet structures and the ECP spillway. Associated piping to and from tie points to the service water system is in scope as part of the service water system.

2) The 225-acre watershed area listed in SAR Section 9.2.5.2.1 is excluded from the license renewal scope since no makeup to the pond is credited after an accident begins.

3) The specific rows in LRA Table 2.4-3 that address the inlet and outlet structures and the pond are "ECP concrete intake" and "emergency cooling pond". The row labeled "piping" in Table 2.3.3-8 addresses the piping to and from the ECP. The spillway and 100-foot long weir are included in the line item "emergency cooling pond."

4) As listed under the same line items in Tables 3.5.2-3 and 3.3.2-8.

RAI 2.4-6(a): SAR Tables 3.7-12, 3.7-13, and 3.7-14 list concrete block walls that appear to serve intended functions, as defined by 10CFR54.4(a). The applicant is requested to (1) verify that all of the listed walls are within the license renewal scope; (2) if not, then provide the technical basis for any exclusions; (3) identify any additional block walls, not listed in the tables, that are included in the license renewal scope; and (4) explain the statement "No Access For xx-B-xx" in SAR Table 3.7-14 under "Remarks".

Response:
1) The walls listed in SAR Tables 3.7-12, 3.7-13 and 3.7-14 are within the scope of license renewal and subject to aging management review.

2) There are no exclusions from the above list of block walls.

3) All seismic category I block walls located within the auxiliary building are included in scope. Also included are 50.48 required block walls located in the turbine building.

4) "No Access For xx-B-xx" indicates that one side of the wall is in a high radiation area making it inaccessible for routine inspection (e.g., 24-B-29 is the front face of the wall and 24-B-30 is the opposite face).

RAI 2.4-6(b): SAR Table 3.8-1 lists "Flued Head Penetrations" for the Containment. The applicant is requested to (1) verify that all of the listed penetrations are within the license renewal scope; and (2) if not, then provide the technical basis for any exclusions.

Response: All containment penetrations are within the scope of license renewal and subject to aging management review as indicated in LRA Table 2.4-1.

RAI 2.4-7(a): LRA Section 2.4.2 covers the very broad structural category "Auxiliary Building, Turbine Building and Yard Structures". LRA Section 2.4.2 describes the in-scope structures and structural components under both "Description" and "Evaluation Boundaries"; and then refers to LRA Table 2.4-2 for "Components Subject to Aging Management Review". The staff cannot clearly define the specific scope of structures and structural components addressed in LRA Section 2.4.2 and cannot correlate which in-scope structures and structural components are subject to aging management review. Consequently, the applicant is requested to provide the following additional information:

(a) A complete and concise list of all the structures and structural components that is included in LRA Section 2.4.2.

Response: Structures and structural components that are included in LRA Section 2.4.2:

Evaluation Boundaries	LRA Table	Line Item
Alternate AC (AAC) generator building		
Building foundation	2.4-2 and 3.5.2-2	AAC generator building foundation
Embedded items (including conduit, unistrut and anchor)	2.4-4 and 3.5.2-4	Cable tray, conduit and embedded unistrut, anchor bolts
Floor and roof slabs (Note: The roof is supported by the steel columns and braces without reliance on the precast walls. Walls are not credited with supporting intended function of the building).	2.4-2 and 3.5.2-2	AAC generator building foundation
Pipe supports, cable trays, conduits and other equipment supports	2.4-4 and 3.5.2-4	Component Supports (Instrument racks, frames, etc.) Piping supports Cable tray and conduit supports, embedded unistruts
Steel beams	2.4-2 and 3.5.2-2	AAC generator building (framing and structural shapes)
Steel floor framing, columns and bracing	2.4-2 and 3.5.2-2	AAC generator building (framing and structural shapes)
Auxiliary Building		
Auxiliary building sump (except valves, piping)	2.4-2 and 3.5.2-2	Auxiliary building sump
Building foundation	2.4-2 and 3.5.2-2	Auxiliary building foundation mat
Concrete beams	2.4-2 and 3.5.2-2	Auxiliary building columns and beams
Crane rails and crane support structures	2.4-4 and 3.5.2-4	Monorails, crane rails, and girders
Doors (e.g., flood doors, fire doors)	2.4-4 and 3.5.2-4	Fire doors
Embedded items (including conduit, unistrut, and anchor)	2.4-4 and 3.5.2-4	Cable tray, conduit and embedded unistrut, anchor bolts
External penetrations and louvers	2.4-4 and 3.5.2-4	Penetration sleeves (electrical/mechanical not penetrating the liner)
Exterior and interior concrete walls	2.4-2 and 3.5.2-2	Auxiliary building exterior walls above grade Auxiliary building exterior walls below grade Auxiliary building interior load bearing walls Tank 2T12 vault walls and floors PASS Building substructure

Evaluation Boundaries	LRA Table	Line Item
Floor and roof slabs	2.4-2 and 3.5.2-2	Auxiliary building floor slabs Roof slabs
Fuel transfer tube support	See line item for spent fuel pool concrete and liner	See line item for spent fuel pool concrete and liner.
Fuel handling bridge assembly (2H3) crane rail and girders	2.4-2 and 3.5.2-2	Fuel handling bridge assembly (2H3) crane rail and girders
High energy line break (HELB) barriers such as walls, floors, and doors	2.4-2 and 3.5.2-2	HELB doors (For walls and floors see component walls and floors)
Manway hatches (concrete and steel)	2.4-4 and 3.5.2-4	Hatch covers and plugs
Masonry block walls	2.4-2 and 3.5.2-2	Category I masonry block walls
Miscellaneous structural steel floor framing, columns, bracing, platforms and catwalks	2.4-4 and 3.5.2-4	Stairs, ladders, platform, and grating (supports)
New fuel racks	2.4-2 and 3.5.2-2	New fuel racks
Pipe supports, cable trays, conduits and other equipment supports	2.4-2 and 3.5.2-2	Battery racks Emergency diesel generator (EDG) stack vent exterior louvers Exhaust stack supports (EDG and emergency feedwater turbine)
	2.4-4 and 3.5.2-4	Component supports (Instrument racks, frames, etc.) Piping supports Cable tray and conduit supports, embedded unistruts Pipe whip restraints
Spent fuel overhead cranes (L3 and 2L35)	2.4-2 and 3.5.2-2	Spent fuel overhead cranes (L3 and 2L35)
Spent fuel pool bulkhead gates	2.4-2 and 3.5.2-2	Spent fuel pool bulkhead gates
Spent fuel pool concrete and liner (includes spent fuel pool concrete, liner plate and transfer tube support (auxiliary building))	2.4-2	Spent fuel pool liner (auxiliary building) (includes spent fuel pool liner (auxiliary building) and fuel transfer tube support)
	3.5.2-2	Spent fuel pool liner (includes spent fuel pool and fuel transfer tube support) Spent fuel pool bottom slab and walls

Superstructure framing (over spent fuel pool)	2.4-2	Spent fuel pool superstructure framing (includes associated structural shapes, bars, and plates)
	3.5.2-2	Spent fuel pool superstructure framing
Sump structures excluding piping, equipment, instrumentation, and controls associated with the sump	2.4-2 and 3.5.2-2	Auxiliary building sump
Spent fuel crane (L3)	2.4-2 and 3.5.2-2	Spent fuel pool overhead cranes (L3 and 2L35)
Steel beams	2.4-2 and 3.5.2-2	Tank 2T12 vault beams
Stairways, platforms, ladders, handrails, grating, catwalks	2.4-4 and 3.5.2-4	Stairs, ladders platform and grating (supports)
Steel floor framing, columns, and bracing	3.5.2-2	Spent fuel pool superstructure framing
Watertight and flood doors	2.4-2 and 3.5.2-2	Watertight and flood doors
Turbine Building		
Building foundations	2.4-2 and 3.5.2-2	Aux building foundation
Control room extension substructure	2.4-2 and 3.5.2-2	Control room extension substructure
Fire doors	2.4-4 and 3.5.2-4	Fire doors
HELB doors	2.4-2 and 3.5.2-2	HELB doors
Masonry block walls	2.4-2 and 3.5.2-2	Category I masonry block walls
Yard Structures		
Manway hatches	2.4-2 and 3.5.2-2	Category I electrical manholes, walls, slab and ductwork Category I electrical man hole covers
Tank foundations	2.4-2 and 3.5.2-2	Emergency diesel fuel oil storage tank vault (walls, floor slab, columns) Fuel oil storage tank T25 foundation Sodium hydroxide tank 2T10 foundation T41 tank foundation, valve pit and pipe trench
RWT 2T3 foundation slab	2.4-2 and 3.5.2-2	RWT 2T3 foundation slab
Startup #3 transformer foundation	2.4-2 and 3.5.2-2	Startup #3 transformer foundation
Transformer yard concrete firewall/missile barrier	2.4-2 and 3.5.2-2	Startup #3 transformer concrete firewall and missile shield

Transformer bus structural steel supports and foundation	2.4-2 and 3.5.2-2	Switchyard bus structural steel supports Transformer bus structural supports Transformer bus foundation supports
Switchyard start up #3 voltage regulator foundation	2.4-2	Switchyard circuit breaker foundation
	3.5.2-2	Switchyard circuit breaker 1262F03 foundation
Switchyard bus structural steel support and foundation	3.5.2-2	Switchyard bus structural steel supports
	2.4-2 and 3.5.2-2	Switchyard bus structural foundation
Switchyard circuit breaker 1262F03 foundation	2.4-2	Switchyard circuit breaker foundation
	3.5.2-2	Switchyard circuit breaker foundation
Unit auxiliary transformer foundation	This line item was evaluated, but is not subject to an aging management review.	
Main transformer foundation	This line item was evaluated, but is not subject to an aging management review.	

RAI 2.4-7(b): For each listed structure and structural component, identify the intended function(s).

Response: The intended functions for the structures and structural components are provided in Tables 2.4-2 and 2.4-4 of the application.

RAI 2.4-7(c): For each listed structure and structural component, identify whether it is subject to an aging management review.

Response: The components subject to an aging management review are summarized in the above table and specifically addressed in Tables 3.5.2-2 and 3.5.2-4.

RAI 2.4-7(d): If only part or none of the structure or structural component is subject to an aging management review, then provide the technical basis for the determination.

Response: The turbine building has been included in the scope of license renewal because part of the building contains commodities that are subject to aging management review. These commodities include 10CFR50.48 fire walls/floors, missile barriers, and component supports (associated with the station blackout function) which are located in the turbine building at various locations. The remaining portions do not perform an intended function.

RAI 2.4-8: Section 2.4 of the LRA does not describe the cable feed-through assembly, which is part of the containment electrical penetrations. This assembly serves a pressure boundary intended function. Therefore, the applicant is requested to clarify whether the cable feed-through assembly is in scope or not. If it is in scope, identify the applicable table number and component name in LRA Section 2.4 and the aging management review table number and component name in LRA Section 3.5. If it is not in scope, provide the justification for its exclusion.

Response: LRA Table 2.1-1 identifies electrical portions of electrical and instrumentation and control penetration assemblies (e.g., electrical penetration assembly cables and connections) as an electrical commodity group that serves an intended function. The cable feed-through assemblies are part of the penetration assemblies and are, therefore, in scope for license renewal. As described in LRA Section 2.1.2.3.32, most of the electrical penetration assemblies (including the cable feed-through assemblies) are included in the Environmental Qualification (EQ) Program.

Under the EQ Program, the electrical penetrations, including the cable feed-through assemblies, are subject to replacement based on a qualified life and thus, in accordance with 10CFR54.21(a)(1)(ii), are not subject to aging management review.

The non-EQ electrical penetrations are subject to an aging management review. The electrical portions of the non-EQ electrical and I&C penetration assemblies are included in the electrical scoping review. The structural portions of the electrical penetrations providing pressure boundary (essentially leak-tight radiological control barrier) are included in the structural review.

Although the EQ electrical penetrations are not subject to aging management review, all electrical penetrations (EQ and non-EQ) are tested in accordance with the requirements of 10CFR50 Appendix J. The structural components of the electrical penetrations (EQ and non-EQ) were included in the containment and containment internals aging management review as "mechanical and electrical penetrations" listed in LRA Tables 2.4-1 and 3.5.2-1, on pages 2.4-10 and 3.5-25 through 3.5-26.

RAI 3.5-1: In discussing Item Number 3.5.1-3 (Table 3.5.1) of the LRA, the applicant asserts that the ANO-2 plant specific containment ISI Program and containment leak rate testing will monitor loss of material due to corrosion of penetration bellows. NUREG-1801 under item A3.1 (page II A3.6) recommends further evaluation regarding the stress corrosion cracking of containment bellows. The applicant is requested to provide additional information regarding the containment pressure boundary bellows at ANO-2, relevant operating experience, and method(s) used to detect their age related degradation. Note: In many cases, VT-3 examination of IWE, and Type B, Appendix J testing cannot detect such aging effects (See NRC Information Notice 92-20).

Response: Item Number 3.5.1-3 (Table 3.5.1) pertains to carbon steel penetrations which are not susceptible to stress corrosion cracking (SCC). Consistent with NUREG-1801, this item does not require further evaluation. Item number 3.5.1-2 addresses SCC of stainless steel penetration bellows. No bellows are used for piping system containment penetrations. The fuel transfer tube is equipped with bellows type expansion joints that connect the transfer tube to the liner of the refueling canal in containment and to the liner of the spent fuel pool in the auxiliary building. The fuel transfer tube (assembly) is identified in Table 2.3.3-1 and 3.3.2-1. Item 3.5.1-2 of Table 3.5.1 applies to the fuel transfer tube sleeve but not to the bellows since the bellows is not part of the containment penetration boundary.

The bellows connecting the transfer tube to the refueling canal liner is an extension of the refueling canal liner which has no license renewal intended function. The bellows on the other end of the transfer tube connects the transfer tube to the liner in the fuel tilt pit portion of the spent fuel pool. The low point of the opening connecting the spent fuel pool to the tilt pit is above the top of the spent fuel stored in the storage racks so failure of the bellows cannot result in uncovering of the fuel. Therefore, neither bellows attached to the fuel transfer tube performs a license renewal intended function.

RAI 3.5-2: For seals and gaskets related to containment penetrations, in Item Number 3.5.1-6 of the LRA, containment leak rate testing has been identified as the applicable aging management program. For equipment hatches and air-locks at ANO-2, the staff agrees with the applicant's assertion that the Leak Rate Testing Program will monitor aging degradation of seals and gaskets, as they are leak rate tested after each opening (at least once every 24 months). For other penetrations with seals and gaskets, the applicant is requested to provide information regarding the adequacy of Type B leak rate testing frequency to monitor aging degradation of seals and gaskets at ANO-2.

Response: For ANO-2, the equipment hatch seal listed in Table 3.5.2-4 is the only line item for seals or gaskets that credits the Containment Leak Rate Program. The equipment hatch seal is the only line item that refers to item 3.5.1-6 of Table 3.5.1.

RAI 3.5-3: In discussion of Item 3.5.12 in Section 3.5.2.2.4, the applicant notes that the moisture barrier is monitored under IWE for aging degradation, and since the conditions in NUREG-1801 are met for inaccessible areas (i.e., liner plate), loss of material due to corrosion is insignificant. The industry experience indicates that the moisture barrier degrades with time, and any moisture accumulation in the degraded barrier corrodes the steel liner. The applicant is requested to provide information regarding the operating experience related to the degradation of moisture barrier and the containment liner plate at ANO-2. Please include a discussion of acceptable liner plate corrosion before the liner plate is reinstated to its nominal thickness.

Response: It appears that the item referenced in the above question should be Item 3.5.1-12 and Section 3.5.2.2.1.4. The ANO-2 operating experience review did not identify degradation of the moisture barrier and containment liner plate at ANO-2. The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, Subsection IWE provides the requirements for inservice inspection of containment structures. The requirements include examination, evaluation, repair, and replacement of the concrete containment liner plate in accordance with 10CFR50.55a. The acceptable thickness for ANO-2 liner plate is determined in accordance with ASME Boiler and Pressure Vessel Code, Section XI, Subsection IWE.

RAI 3.5-4: For structural items inside the ANO-2 containment, e.g., primary and secondary shield walls, reactor missile shields, and reactor vessel foundation, in Table 3.5.2, the applicant refers to Notes I and 501 to indicate that the temperatures around these components are within the NUREG-1801 threshold, and therefore, the aging effects, i.e., reduction in concrete strength and modulus of elasticity are not applicable (also discussed, in general, in Section 3.5.2.2.1.3 of the LRA). In this context, the applicant is requested to provide the following information:

(a) The method(s) of monitoring temperatures within the primary shield wall concrete, and around the reactor vessel, and in the reactor cavity.

Response: Temperatures within the primary shield wall concrete are not directly monitored. Assurance that bulk concrete temperatures around the reactor vessel within the reactor cavity remain below 150°F is obtained through maintaining average bulk containment temperature within the limits allowed by ANO-2 Technical Specification 3.6.1.4. Since forced cooling is provided directly to the reactor cavity, its temperature is lower than the bulk average containment temperature. A review of containment temperature readings from near the reactor vessel over the last 12 months, as recorded in the plant data system, show the area temperature has remained below 150°F.

RAI 3.5-4 (b): If the primary shield wall concrete is kept below the threshold temperature (i.e., 150°F) by means of air cooling, provide the operating experience related to the performance of the cooling system.

Response: The primary shield wall concrete temperature is kept below the threshold temperature by means of air cooling. The operating experience review did not identify significant degradation or system failures. The technical specification requirement on containment temperature provides assurance that plant operation will continue only with satisfactory performance of the containment cooling system.

RAI 3.5-4(c): The results of the latest inspection of these components, in terms of cracking, spalling, and condition of reactor vessel support structures, etc.

Response: The results of the last inspection of the reactor vessel supports, performed during the spring 1997 refueling outage, identified inactive boron deposits on the support steel. The condition was evaluated under the Boric Acid Corrosion Program and determined to have no effect on the support's ability to perform its intended function. No other conditions were identified.

RAI 3.5-5: LRA Section 3.5.2.2.1.1 states that the below-grade environment is not aggressive (pH>5.5, chlorides<500 ppm, and sulfates<1,500 ppm). The applicant is requested to provide the values of pH, chlorides, and sulfates at the plant site and when they were obtained. In III A7.1-e, GALL recommends periodic monitoring of below-grade water chemistry for non-aggressive environments. Since the applicant has made no commitment to periodically monitor the groundwater, the applicant is requested to submit its method for assuring the continuing verification of the non-aggressiveness of the below-grade environment.

Response: The most recent data associated with ANO groundwater chemistry was obtained in May 1996. The results of this analysis are as follows (values obtained near ANO-2 containment):

- pH = 7.23
- chlorides <5 ppm
- sulfates = 20.3 ppm

Comparing this data to that of the ANO-2 SAR Table 2.4-4 (well point 1) and Figure 2.4-1 (well point location), the limiting chemistry parameters have shown no significant increase and are still far from the established limits. The existing data indicates that there has been no significant change in groundwater chemistry since original licensing (a period of approximately 25 years) that would warrant increased monitoring and it is not anticipated to significantly change in the future. Therefore, periodic monitoring of groundwater chemistry is not required to assure the non-aggressiveness of the below-grade environment.

RAI 3.5-6: Item 3.5.1-22 of Table 3.5.1 indicates that the applicant intends to use the Structures Monitoring Program to manage the aging effect for Group 6 structures instead of using the Generic Aging Lessons Learned (GALL) Chapter XI.S7, "Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants" or the FERC/US Army Corp of Engineers dam inspections and maintenance. The applicant is requested to list the attributes, which are in the GALL but not in the ANO-2 Structures Monitoring Program, and provide justifications for use of the Structures Monitoring Program without those attributes.

Response: Regulatory Guide (RG) 1.127, Inspection of Water-Control Structures associated with Nuclear Power Plants, is identified as XI.S7 Program in GALL for managing aging effects associated with water control structures, and Structures Monitoring Program, XI.S6, is identified as managing aging effects associated with structures and structural components. The water-control structures at ANO-2 are the intake structure and ECP. Aging effects requiring management for the intake structure and ECP were determined based on industry guidelines and operating experience.

The attributes that are in the GALL XI.S7 aging management program, but not in the ANO-2 Structures Monitoring Program, are attributes dealing with earthen embankment water control structures. RG 1.127 proposes inspection parameters (e.g., settlement, depressions, sink holes, slope stability (e.g., irregularities in alignment and variances from originally constructed slopes), seepage, proper functioning of drainage systems, and degradation of slope protection features) and frequency (not to exceed 5 years) for earthen embankment water control structures. During the ANO-2 aging management review, the only aging effect requiring management for earthen structures was determined to be loss of form of the emergency cooling pond. Loss of form is effectively managed by sounding under the Periodic Surveillance and Preventive Maintenance Program as indicated in LRA Table 3.5.2-3. Therefore, the attributes of the NUREG-1801 XI.S7 aging management program regarding earthen structures are not necessary attributes for the ANO-2 Structures Monitoring Program for water control structures.

RAI 3.5-7: Item 3.5.1-23 of Table 3.5.1 indicates that the applicant does not plan to monitor the spent fuel pool water level as stated in the GALL in managing liners for crack initiation and growth due to SCC; loss of material due to crevice corrosion. The applicant is requested to provide justifications for the exclusion of this GALL aging management program.

Response: Monitoring of spent fuel pool level is required by ANO-2 Technical Specification 4.9.10. This activity was not crediting an aging management program because of its very limited scope. As stated in the LRA, the ANO-2 Water Chemistry Program provides effective management of the effects of aging on the spent fuel pool liner.

RAI 3.5-8: Item 3.5.1-33 of Table 3.5.1 indicates that the applicant intends to use inservice inspection (IWF) and Boric Acid Corrosion Prevention Programs to manage the crack initiation and growth due to SCC for high strength low-alloy bolts instead of using the GALL Bolting Integrity Program. The applicant is requested to identify bolts that have actual yield strength equal to or greater than 150 ksi and provide justification for not using the Bolting Integrity Program.

Response: A more appropriate statement for "Discussion" column for item 3.5.1-33 is "This is not an applicable aging effect for ANO-2 structural bolts. This line item is not referenced in the 3.5.2-series table."

The materials used in bolting and threaded structural steel connections within the scope of license renewal are identified in ANO-2 SAR Section 3.8.3.6.2.2. ANO-2 utilizes a limited number of high strength bolts (yield strength >150 ksi) in structural connections. The ANO-2 aging management review identifies loss of material (but not cracking) as the aging effect requiring management for these bolts. Cracking of bolting in an air environment due to SCC has not been observed at ANO-2 and was not identified in a survey of industry experience. For ANO-2 the Inservice Inspection (IWF) and Boric Acid Corrosion Prevention Programs are credited and have been determined to be effective in managing loss of material.

RAI 3.5-9: The intended function of the intake canal, as listed on Table 3.5.2-3, is to provide structural or functional support to equipment required to meet the Commission's regulations for the five regulated evens in 10CFR54.4(a)(3). Section 2.4.3 of the LRA states that the intake canal provides a suction source for the fire water and service water pumps. However, the applicant provides no aging management program for the intake canal. The applicant is requested to provide justifications for not providing an aging management program for the intake canal and to explain how the intended function can be met without an aging management program.

Response: The intended function of the intake canal can be met without an aging management program because the canal has no aging effects requiring management. As described in ANO-2 SAR Section 2.5.5.1, the seismic stability of the intake canal slope was analyzed. The intake canal is qualified as Seismic Category 1. The intake canal has adequate vegetation and consists of engineered slopes to limit erosion caused by wind. The intake canal was completely excavated and contains no sections formed by dikes or fill. The overburden soils at the site are mainly stiff highly plastic clays. At the intake canal about 13 to 25 feet of clay overlies weathered bedrock. The underlying bedrock consists of dense shale with about two to five feet of weathered shale which prevents erosion of the bed. In addition, since the intake canal was designed with the capacity to supply circulating water to ANO-1, its capacity is far greater than required to provide service water to ANO-2. As a result no aging effects requiring management are identified in Table 3.5.2-3. This is consistent with a previously approved staff position documented in Section 3.3.6.6.2.1 of NUREG-1743, Safety Evaluation Report Related to the License Renewal of Arkansas Nuclear One, Unit 1.