July 14, 2004

LICENSEE: Entergy Operations, Inc.

FACILITY: Arkansas Nuclear Station, Unit 2

SUBJECT: SUMMARY OF TELEPHONE CONFERENCE CALL HELD ON JUNE 30, 2004, BETWEEN THE U.S. NUCLEAR REGULATORY COMMISSION (NRC) STAFF AND ENTERGY OPERATIONS, INC., (ENTERGY) REPRESENTATIVES CONCERNING REQUEST FOR ADDITIONAL INFORMATION PERTAINING TO THE ARKANSAS NUCLEAR ONE, UNIT 2 (ANO-2) LICENSE RENEWAL APPLICATION (TAC NO. MB8402)

On June 30, 2004, the NRC staff and representatives of the Entergy Operations, Inc., held a telephone conference call to discuss formal responses to the request for additional information (RAI) pertaining to the technical review for the Arkansas Nuclear One, Unit 2 license renewal application.

The conference call was used to clarify the staff's position with respect to certain responses to RAI's. On the basis of the discussion, the applicant agreed to modify and/or supplement several responses.

Enclosure 1 provides a listing of the telephone conference participants. Enclosure 2 contains a listing of the RAI's, formal responses from the applicant, and a brief description of the status of each item. A copy of this summary was provided to the applicant for comment.

/RA/

Gregory F. Suber, Project Manager
License Renewal Section A
License Renewal and Environmental Impacts Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No.: 50-368

Enclosures: As stated

July 14, 2004

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FACILITY: Arkansas Nuclear Station, Unit 2

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ADAMS Accession No.: ML041960260

OFFICE:	PM:RLEP	LA:RLEP	SC:RLEP
NAME:	GSuber	MJenkins	SLee
DATE:	07/9/04	07/9/04	07/14/04

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LIST OF PARTICIPANTS
TELEPHONE CALLS WITH ENTERGY OPERATIONS, INC.
ARKANSAS NUCLEAR ONE, UNIT 2
LICENSE RENEWAL APPLICATION

June 30, 2004

Participants	**Affiliation**
Natalie Mosher	Entergy Operations, Inc. (Entergy)
Ted Ivy	Entergy
Alan Cox	Entergy
Michael Stroud	Entergy
Reza Ahrabli	Entergy
Herbert Rideout	Entergy
Andrew Taylor	Entergy
Doyle Adams	Entergy
John Ma	U.S. Nuclear Regulatory Commission (NRC)
Gregory Suber	NRC
Hansraj Ashar	NRC
Richard Morante	Brookhaven National Laboratory (NRC consultant)

POTENTIAL OPEN ITEMS FOR
ANO-2 LICENSE RENEWAL APPLICATION

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 AMR for each commodity.

Applicant's Response

[The applicant's response for cable trays, conduits, instrumental lines, and TubeTrac was not discussed during this call. Below is the response for thermal insulation].

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."

Staff's Comment

In its RAI response, the applicant indicates that some thermal insulation has an intended function. However, this insulation is apparently excluded from the scope of license renewal on the basis that there are no aging effects requiring management.

The staff requests additional information whether any thermal insulation at ANO-2 serves an intended function, in accordance with 10 CFR 54.4(a)(2), to control the maximum temperature of safety-related structures and structural components during normal plant operation. Possible examples are: (1) maintaining the maximum temperature of steel and/or concrete elements of NSSS supports below the levels assumed in the design basis of the supports; and (2) maintaining the maximum temperature of structural concrete below the threshold levels of 150^{o}F for general areas and 200^{o}F for local areas around hot penetrations.

Therefore, the applicant is requested to submit the following supplemental information:
(1) identify any thermal insulation at ANO-2 that serves an intended function in accordance with 10 CFR 54.4(a)(1), (a)(2), or (a)(3); (2) describe plant-specific operating experience related to degradation of (a) thermal insulation in general, and (b) thermal insulation that serves an intended function; and (3) describe the scoping and screening evaluation for thermal insulation

that serves an intended function, including the technical basis for either inclusion within or exclusion from the scope of license renewal.

Status:

The applicant indicated that in some internal plant locations at ANO-2, insulation on piping has the function of limiting heat loss in order to reduce area heat loads following an accident. Such insulation was evaluated to determine whether it serves an intended function in accordance with 10 CFR 54.4. The insulation that limits the heat losses into an area and supports a system function 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 dry indoor environments. The aging-related failure of this insulation would therefore be considered a hypothetical failure. Per the SOC, consideration of hypothetical failures is not required. Therefore based on operating experience, this insulation does not meet the criterion of 10 CFR 54.4 based on postulated aging-related failures. The conclusion that aging-related insulation failures are hypothetical 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."

The staff stated that this does not address issue that after a system, structure, or component (SSC) is determined to be in scope for license renewal, which identifies the intended function, that the next step in the process is determining whether the SSC is passive and long-lived. Specifically, the staff expressed concern that thermal insulation used to maintain the maximum temperature of structural concrete below the threshold levels of 150^{o}F for general areas and 200^{o}F for local areas around hot penetrations (i.e. main steam lines) was not identified as requiring aging management. Additionally, the staff noted that if the thermal insulation was not used to ensure the threshold temperatures for structural concrete were not exceeded, then some other system (penetration room ventilation or cooling system) might be credited and added to the scope of license renewal. This issue remains open for discussion and resolution.

RAI 2.4-7

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 AMR." 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 AMR. 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 are included in LRA Section 2.4.2;

(b) For each listed structure and structural component, identify the intended function(s)

(c) For each listed structure and structural component, identify whether it is subject to AMR; and

(d) If only part or none of the structure or structural component is subject to AMR, then provide the technical basis for the determination.

Applicant's Response:

[The applicant's responses for Parts A through C were not discussed during this call. Below is the response for Part D].

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 10 CFR 50.48 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.

Staff's Comment:

Part D of the RAI is not addressed for the unit auxiliary transformer foundation and the main transformer foundation. Also, from the discussion of the turbine building in Part D of the response, the staff cannot determine if the entire turbine building has been included in the scope of license renewal, or if the building has been "zoned" to include only portions that contain commodities that are subject to aging management review. The applicant needs to: (1) submit the technical basis for concluding that the unit auxiliary transformer foundation and the main transformer foundation are not subject to an aging management review; and (2) clarify its treatment of the turbine building.

Status:

The applicant indicated that:

(1) As noted in the response to RAI 2.5-2, neither the main transformers nor the auxiliary transformer are included in the SBO recovery path. Therefore, neither the main transformers nor the auxiliary transformer perform a safety-related function, affect a safety-related function, or are credited for a regulated event, so they are not subject to aging management review. Thus, their foundations are not subject to aging management review.

(1) The turbine building (as a whole) is in the scope of license renewal because it contains commodities that are subject to aging management review.

The staff acknowledged the clarification and the applicant agreed to submit this information formally.

RAI 2.4-8

Section 2.4 of the LRA does not describe the cable feed-through assembly, which is part of 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 AMR table number and component name in LRA Section 3.5. If it is not in scope, provide the justification for its exclusion.

Applicant's 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 10 CFR 54.21(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 10 CFR 50 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.

Staff's Comment:

It is not clear from the response that Type B local leak rate testing, in accordance with the existing requirements of 10 CFR 50 Appendix J, is being credited to manage the leak-tightness of the cable feed-through assembly. The applicant needs to confirm this.

Status:

The applicant indicated that leak tightness of Electrical penetrations are tested in accordance with the requirements of 10 CFR 50 Appendix J as indicated in LRA table 3.5.2-1. Type B testing is performed on resilient seals of the electrical penetrations assemblies as required by Appendix J. This includes resilient seals associated with the cable feed-through assemblies. The staff acknowledged the clarification and the applicant agreed to submit this information formally.

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 AMP. 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.

Applicant's 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.

Staff's Comment:

The staff stated that the applicant was requested to provide information regarding the aging management of seals and gaskets for mechanical and electrical penetrations (other than those associated with equipment hatch and air-locks).

Status:

The applicant clarified its response by stating that there are no seals and gaskets associated with containment mechanical penetrations. As indicated in LRA Table 3.5.2-1, containment electrical penetrations (which includes cable feed through assemblies) are included in the containment leak rate program. The seals and gaskets associated with the penetrations are tested under this program. The applicant agreed to provide information related to the Type B test interval for electrical penetrations. The staff acknowledged the clarification and the applicant agreed to submit this information formally.

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.

(b) If the primary shield wall concrete is kept below the threshold temperature (i.e., 150^{o}F) by means of air cooling, provide the operating experience related to the performance of the cooling system.

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

Applicant's Response:

[The applicant's responses for Parts A and B were not discussed during this call. Below is the response for Part C].

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.

Staff's Comment:

The Boric Acid Corrosion Program only addresses the conditions affected by boric acid exposure. It cannot, by itself, indicate the condition of the concrete structures. Section XI.S6 of NUREG-1801 recommends the use of ACI 349-3R, as part of the Structural Monitoring Program (as summarized in ANO-2 AMP B.1.27), for identifying and evaluating degradation of concrete structures, including that for the structures inside containment. Please provide the requested information in RAI 3.5-4(c) in terms of the criteria similar to those established in Chapter 5 of ACI 349-3R.

Status:

The applicant indicated that for concrete, there was no cracking or spalling of RV support concrete structures noted during the last inspection (CII). Nonetheless, the staff requested that the applicant provide the latest inspection results and state the specific criteria similar to those in ACI 349-3R at ANO-2. The applicant will submit this information formally.

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 lll 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.

Applicant's 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.

Staff's Comment:

The staff disagrees with the applicant's assertion that periodic monitoring of groundwater chemistry is not required to assure the non-aggressiveness of the below-grade environment. The fact that there has been no significant change in groundwater chemistry in the past does not guarantee that the groundwater chemistry will remain the same in the future. Therefore, periodic monitoring of groundwater chemistry in the future is needed to assure that no significant change in groundwater chemistry.

Status:

The applicant stated that the ANO-2 ground water chemistry will be monitored by sampling from representative sample points at least once every 10 years. The samples will be analyzed for pH, chlorides and sulfates. The program will be initiated prior to the period of extended operation. The staff acknowledged the statement and the applicant agreed to submit this information formally.

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.

Applicant's 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.

Staff's Comment:

The applicant identifies that the loss of form of the emergency cooling pond is the only aging effect that requires an AMP. The staff believes that the intake structure, such as the intake canal, also requires an AMP. The applicant is requested to provide an AMP for the intake structure or a justification for its exclusion.

Status:

The applicant stated that Table 3.5.2-3 shows the structures monitoring program has been identified as AMP for managing the aging effects associated with intake structure components and commodities. The staff asked should the intake canal be included as a water control structure and, as such, would it require an aging management program. The applicant agreed that the intake canal should be included as a water control structure. However, the applicant did not agree that the intake canal has aging effects requiring management. The applicant agreed to revise its response to include the intake canal as a water control structure. This information will be submitted formally. The issue regarding the staff's position that the intake canal should be subject to an AMP is discussed below in RAI 3.5-9.

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 and loss of material due to crevice corrosion. The applicant is requested to provide justifications for the exclusion of this GALL aging management program.

Applicant's 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.

Staff's Comment:

The staff does not understand the response, "This activity was not crediting an aging management program because of its very limited scope." The applicant is requested to explain

what is the very limited scope and why the monitoring of spent fuel pool water level can not be credited as an AMP.

Status:

The applicant indicated that the response should have said, "This activity was not credited as an aging management program because of its very limited scope." This was intended to reflect the treatment of spent fuel level monitoring in NUREG-1801, which identifies spent fuel pool level monitoring in the aging management program column in Item A5.2-B but does not include it in the program descriptions of Section XI of NUREG-1801. Spent fuel pool level monitoring was not credited as an aging management activity because it relied on significant leakage to cause a change in indicated level. At ANO-2 this activity is performed as required by ANO-2 Technical Specifications.

The staff stated that the monitoring program was intended to be used as a verification of the effectiveness of the Water Chemistry Program. Additionally, the staff requested that the applicant take credit for monitoring as an aging management activity since the applicant was already performing the monitoring. The applicant agreed to take credit for monitoring the spent fuel pool level and to submit this information formally.

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.

Applicant's 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.

Staff's Comment:

The staff does not understand the response, "This is not an applicable aging effect for ANO-2 structural bolts." Since the applicant states that a limited number of high strength bolts (yield strength >150 ksi) were used in structural connections. The applicant is requested to provide

the technical bases for its AMR conclusion that the SCC is not an aging effect for these high strength bolts and references to the claim that cracking of bolting in an air environment due to SCC has not been observed in a survey of industry experience.

Status:

The applicant stated that three conditions are required for stress corrosion cracking to occur: (1) a corrosive environment, (2) a susceptible material, and (3) tensile stresses. All three of these factors are necessary to initiate and propagate SCC. Elimination or reduction of any of these factors will decrease the likelihood of SCC. ANO-2 high strength bolts are located in a dry non corrosive air environment. In addition, cracking by SCC is an applicable aging effect on bolting if lubricants containing MoS2 (molybdenum disulfide) were used on the bolting. Such lubricants are not used in bolting applications for ANO-2. ANO-2 has not identified stress corrosion cracking as a credible aging effect requiring management for high-strength carbon steel bolting in plant indoor air. The operating experience review in support of ANO-2 license renewal did not identify occurrences of SCC for bolting in contaminant-free air environments.

The staff maintains that for high tension bolting, even 100% humidity can cause an environment for SCC. The staff also requested information on material hardness since this property may also help determine whether SCC could occur. The applicant stated that they will review the EPRI guidelines for high strength bolting and its susceptibility to cracking to find information to support their position. This issue remains open for discussion and resolution.

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 10 CFR 54.4(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.

Applicant's 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.”

Staff’s Comment:

The staff disagrees with the applicant’s assertion that the canal has no aging effects requiring management. The fact that the intake canal is qualified as Seismic Category 1 as stated by the applicant further demonstrates that it needs an AMP.

Status:

The applicant stated that for ANO-2, the only systems that utilize the intake canal as a suction source are the service water and fire protection systems. During normal operation the service water system flow rate is approximately 20,000 gallons per minute (gpm). The design basis accident flow rate is approximately 14,000 gpm. The two fire protection pumps that support Unit 2 operation are rated at 2500 gpm. In comparison, on ANO-1 the circulating water pumps use the intake canal as their suction source. Each circulating water pump is rated at 191,000 gpm. The total flow rate with four pumps operating would be ~760,000 gpm. The ANO-2 flow requirements (including fire pumps) are less than 3% of the flow required to support ANO-1 operation. As a result, the intake canal could easily provide the flow required ANO-2 even with significant degradation of the canal. There are no known aging effects for the intake canal that would result in not being able to supply the minimum required flow for ANO-2.

The intake canal is seismic Category 1 because it supports emergency operation of ANO-1. The canal was conservatively included in the scope of license renewal and subjected to aging management review for ANO-2 because it provides an alternate suction source for the service water and fire protection systems. The review did not identify any aging effects requiring management, thus no AMP is needed for the intake canal. This is consistent with the previously approved staff position documented in NUREG-1743, “Safety Evaluation Report related to the License Renewal of Arkansas Nuclear One, Unit 1.”

However, the staff noted that the integrity of the intake canal is also dependent on the vegetation on the banks that prevent erosion. 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. The staff stands by its position that there are aging effect for the intake canal that require management. This issue remains open for discussion and resolution.

RAI 4.5-1

For the discussion of prestressing force losses over the initial 40-year, the LRA Section refers to SAR Section 3.8.1.3.4. This section of the SAR discusses the design approach used in designing the containment to satisfy the load combinations in SAR Section 3.8.1.3.3. There is no discussion of the estimation of projected prestressing forces after 40 years of operation. As

the estimated prestressing forces at 40 years and 60 years depend upon the regression analysis of these time dependent attributes (i.e. creep of concrete and relaxation of prestressing steel), please provide the estimated values of these attributes which were used in arriving at the minimum required prestressing forces.

Applicant's Response:

The estimated values of creep of concrete and relaxation of prestressing steel, used in the ANO-2 containment analysis calculations for 40 and 60 years are:

- Creep and shrinkage of concrete = 420 μ in/in
- Relaxation of prestressing steel = 14.28 ksi for hoop, vertical and dome tendons

Staff's Comment:

The response to this item indicates that prior to 1999 tendon inspection, the applicant was not using random samples for performing tendon inspections. Thus, reliable data for constructing trend lines is limited to only one set of readings. Under similar situation, two licensees (applicants) have performed inspections of additional randomly selected tendons at approximately 2 year interval. This is to compensate for the lack of reliable pre-stressing force data and to comply with the basic requirements of Subsection IWL related to pre-stressing tendon force measurements, and 10 CFR 50.55a (b)(viii)(B). The trend lines shown in Figures 1, 2, and 3 cannot be relied upon for future projections. The applicant is requested to propose a plan or a program, that would provide a valid TLAA for each group of tendons in ANO-2 containment. In developing the program, the applicant is requested to follow the precautions and guidelines provided in NRC Information Notice 99-10 (e.g. use of raw measured (non-normalized) pre-stressing forces, use of tendon forces (instead of wire forces), trend line construction (as provided in Attachment 3, etc.).

Status:

The applicant stated that additional tendon data will be obtained for Unit 2 in accordance with the Containment Inservice Inspection program which requires inspection every 5 years. The next round of tendon inspections for Unit 2 is anticipated to start early in 2005. This examination data will be compared against projected trends. While Entergy maintains that the trend data supplied is in accordance with the current licensing basis, in the event that the data obtained in future tendon examinations shows a divergence from the expected trend, this discrepancy will be addressed in accordance with the requirements of the Containment Inservice Inspection (IWE/IWL) Program and the licensing basis.

The staff stated that typically applicants have performed a regression analysis. Other plants that did not have sufficient data to perform the analysis have agreed to collect random samples to obtain the required data for the analysis. The staff recommended that the applicant propose a program to project a trend line prior to entering the period of extended operation. This issue remains open for discussion and resolution.

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RLEP RF
G. Suber (PM)
E-MAIL:
RidsNrrDrip
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G. Bagchi
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S. Duraiswamy
Y. L. (Renee) Li
RLEP Staff

R. Gramm
A. Howell
T. Alexion
Linda Smith RIV

Arkansas Nuclear One, Unit 2

cc:

Executive Vice President
& Chief Operating Officer
Entergy Operations, Inc.
P. O. Box 31995
Jackson, MS 39286-1995

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

Winston & Strawn
1400 L Street, N.W.
Washington, DC 20005-3502

Mr. Mike Schoppman
Framatome ANP, Richland, Inc.
Suite 705
1911 North Fort Myer Drive
Rosslyn, VA 22209

Senior Resident Inspector
U.S. Nuclear Regulatory Commission
P. O. Box 310
London, AR 72847

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

County Judge of Pope County
Pope County Courthouse
Russellville, AR 72801

Vice President, Operations Support
Entergy Operations, Inc.
P. O. Box 31995
Jackson, MS 39286-1995

Wise, Carter, Child & Caraway
P. O. Box 651
Jackson, MS 39205

Garry Young
1448 SR 333
Russellville, AR 72802

Mr. Fred Emerson
Nuclear Energy Institute
1776 I St., N.W., Suite 400
Washington, DC 20006-3708

Mr. Jeffrey S. Forbes
Site Vice President
Arkansas Nuclear One
Entergy Operations, Inc.
1448 S. R. 333
Russellville, AR 72801