



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
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ARLINGTON, TEXAS 76011-4005**

January 29, 2005

Jeffrey S. Forbes
Vice President Operations
Arkansas Nuclear One
Entergy Operations, Inc.
1448 S.R. 333
Russellville, AR 72801-0967

**SUBJECT: ARKANSAS NUCLEAR ONE, UNIT 2 - NRC LICENSE RENEWAL AGING
MANAGEMENT REVIEW INSPECTION REPORT 05000368/2004007**

Dear Mr. Forbes:

On November 19, 2004, the US Nuclear Regulatory Commission (NRC) completed an inspection at your Arkansas Nuclear One, Unit 2 facility. The enclosed report documents the inspection findings, which were discussed in a final briefing meeting with Dale James, Licensing Manager, and other members of your management and staff on November 19, 2004. On December 14, 2004, we conducted a formal public exit for both the scoping and screening inspection (NRC Inspection Report 05000368/2004006) and this inspection.

During this inspection, we examined activities that support your application for a renewed license for the Arkansas Nuclear One, Unit 2 facility. The inspection consisted of a selected examination of procedures and representative records. Inspectors interviewed site personnel regarding your process for performing the aging management review for systems and components in the scope of license renewal as required by 10 CFR Part 54. In addition, for a sample of plant systems and structures, inspectors performed visual examination of accessible portions to observe effects of aging.

Based on the results of this inspection, the team concluded that, in general, you conducted the aging management review portion of your license renewal activities as described in the Arkansas Nuclear One, Unit 2, License Renewal Application and as described in the NRC's Draft Safety Evaluation Report, dated November 2004. The team also determined that documentation supporting the application is in an auditable and retrievable form. However, during this inspection, the team found several cases where your existing aging management programs needed to be enhanced. These are discussed in the enclosure. Your staff agreed with the team's assessment and committed to including these enhancements before the period of extended operation. In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the

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NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

//RA//

Linda J. Smith, Chief,
Plant Engineering Branch
Division of Reactor Safety

Docket: 50-368
License: NPF-6

Enclosure:
Inspection Report 05000/2004007
w/Attachments 1 and 2

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SISP Review Completed: Yes ADAMS: Yes Initials: ljs
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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket(s): 50-368
License(s): NPF-6
Report No.: 05000368/2004007
Licensee: Entergy Operations, Inc.
Facility: Arkansas Nuclear One, Unit 2
Location: Junction of Hwy. 64W and Hwy. 333 South
Russellville, Arkansas
Dates: November 1-19, 2004
Team Leaders R. L. Nease, Senior Reactor Inspector, Plant Engineering Branch
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G. Suber, Project Manager, Office of Nuclear Reactor Regulation
Approved By: Linda J. Smith, Chief
Plant Engineering Branch

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SUMMARY OF FINDINGS

IR 05000368/2004-007, 11/01/2004 -11/19/2004, Entergy Operations, Inc., Arkansas Nuclear One, Unit 2. License Renewal Inspection Program, Aging Management Review.

This inspection of the applicant's license renewal aging management review was performed by three regional office inspectors, one resident inspector, and one staff member from the NRC's office of Nuclear Reactor Regulation. The team used NRC Manual Chapter 2516 and NRC Inspection Procedure 71002 as guidance for performing this inspection. No "findings" as defined in NRC Manual Chapter 0612 were identified.

The team concluded that, in general, the applicant performed their license renewal aging management review in accordance with the Arkansas Nuclear One, Unit 2, License Renewal Application and the NRC's Draft Safety Evaluation Report (SER), Related to the License Renewal of the Arkansas Nuclear One, Unit 2, dated November 2004.

During this inspection, the team found the following instances where your existing aging management programs needed to be enhanced.

- A. An open item was identified during a walk-down of the electrical manholes, the team noted that all of the observed electrical manholes were flooded, such that the electrical cables in those manholes were submerged. The program for managing the aging of cables was not yet developed, but the applicant committed to meeting the Generic Aging Lessons Learned, and included a periodic inspection of the electrical manholes and the removal of water. This item was referred to the NRC's Office of Nuclear Reactor Regulation for further review.
- B. An open item was identified concerning the applicant's program for managing the aging of cables outside containment which consisted of including those cables in the existing equipment qualification program. However, this program specifically excludes cables outside containment. The applicant had identified this program as existing, needing no enhancements. This item was referred to the NRC's Office of Nuclear Reactor Regulation for further review.
- C. An open item was identified concerning the applicant's water chemistry program which would not ensure the protective oxide layer will be maintained intact if parameters were out of allowable limits for extended periods of time. This is an existing program which the applicant had identified as needing enhancements prior to the extended period of operation. The applicant initiated a change to the procedure to verify or restore the protective oxide layer. The applicant agreed to include this as a formal, docketed commitment.
- D. An open item was identified concerning the system walkdown program which was ineffective as implemented. This program is an existing program that the applicant had identified as needing enhancements prior to the extended period of operation. The program is currently implemented via a desk top guide, not a formal, controlled procedure. As such, the program is not implemented consistently across the systems for which it was designated. For example, the program lists fire protection as one of the

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systems whose aging effects would be managed by the system walkdown program; however, this is not being done currently for the fire protection systems. Additionally, the results of system walkdowns being conducted were not being documented in accordance with the procedure, so the program as it currently exists is not easily auditable. The applicant agreed to revise this program prior to the period of extended operation, and fire protection will be included as part of the system walkdowns.

- E. An open item was identified concerning whether a replacement part stored in a warehouse meets the intent behind the Part 54 definition of an active component, and as such, can be considered to be outside the scope of license renewal. Specifically, the team identified that the applicant had not included in the scope of license renewal, stored replacement parts that operators install for achieving and maintaining cold shutdown conditions, as required by 10 CFR Part 50, Appendix R. This issue was referred to the NRC's Office of Nuclear Reactor Regulation for further review.

- F. An open item was identified concerning the applicant's aging management program for the alternate AC Diesel Generator starting air system. The aging management program did not include any inspection of the carbon steel air start tank, because the applicant did not believe the conditions for the aging to occur would exist in the system, as long as the dryers were maintained. During system walkdowns, the team found evidence of carbon steel corrosion products on the drain line to the air start tank, indicating that the conditions for aging effects of carbon steel did or had existed in the system. Inspections of the internals of the alternate AC diesel generator air start tank should be conducted to manage this aging effect. The applicant agreed to docket a commitment to conduct inspections of the internals of the tank to manage this aging.

REPORT DETAILS

I. Inspection Scope

By letter dated October 14, 2003, Entergy Operations, Incorporated (the applicant) submitted to the NRC an application to renew the operating license for Arkansas Nuclear One, Unit 2 (ANO-2) to allow an additional 20 years of operation. In support of the NRC Office of Nuclear Reactor Regulation (NRR) technical review of the application, the NRC Region IV staff conducted two inspections at the plant site in Russellville, Arkansas, using the guidance in NRC Inspection Procedure 71002. The first inspection was a review of the applicant's scoping and screening activities, and was conducted from March 1 to March 5, 2004. The purpose of that inspection was to verify that the applicant had performed scoping and screening activities in accordance with their license renewal application and in accordance with the NRC staff's Draft Safety Evaluation Report, and that these activities resulted in the identification of systems, structures, and commodity groups required to be considered for aging management. The NRC staff's review in the Draft Safety Evaluation Report, Related to the License Renewal of the Arkansas Nuclear One, Unit 2, dated November 2004, had not been issued at the time of the first inspection; therefore, the team could not draw a conclusion regarding whether the applicant's scoping and screening activities were performed in accordance with the SER. That part of the scoping and screening inspection was left open. The NRC Region IV inspection team concluded that, in general, the applicant's scoping and screening process was successful. The results of the scoping and screening inspection were presented in NRC Inspection Report 05000368/2004-006, dated April 19, 2004, which is available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

The second inspection, which is the subject of this inspection report, was conducted by a team of NRC Region II and Region IV inspectors and a member of the NRR staff. The purpose of this inspection was to verify that the applicant identified the aging effects for those systems, structures, and commodity groups determined to be within the scope of license renewal, and that appropriate measures were taken or will be taken to manage those aging effects such that intended functions of the selected systems, structures, and commodity groups are maintained throughout the period of extended operation. The team reviewed the results of the applicant's aging management review to determine that the applicant had identified the appropriate aging mechanisms and aging effects. The team reviewed the applicant's aging management documents to determine if aging effects will be properly managed, so that intended functions are maintained throughout the period of extended operation in accordance with the license renewal application (LRA) and the NRC's "Draft Safety Evaluation Report (SER) Related to the License Renewal of Arkansas Nuclear One, Unit 2," dated November 2004. This included review of: (1) existing programs, (2) existing programs that require enhancement, and (3) available documentation of the applicant's plans for new programs to be created prior to the period of extended operation. Accessible portions of systems, structures, and commodity groups included in the selected management

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programs were visually examined to verify that all observable aging effects were identified by the applicant. In addition, accessible portions of systems, structures, and commodity groups whose aging effects were currently being managed by the selected existing aging management programs were visually examined to verify that the existing programs were effective in managing aging as described in the license renewal application. In addition, the team held discussions with the applicant staff responsible for the implementation of these aging management programs, to assess their knowledge and involvement in the license renewal effort.

Open items, identified in the March 2004, scoping and screening inspection are dispositioned in Section II. E of this report. This includes a review to verify that the applicant's scoping and screening activities were performed in accordance with the SER.

Attachment 1 of this report lists the applicant personnel contacted and the documents reviewed. The Aging Management Programs selected for review during this inspection are listed in Attachment 2 to this report.

II. Inspection Results

A. Visual Observation of Plant Equipment

During this inspection, the inspectors performed walkdown inspections of accessible portions of plant systems, structures, and components (SSCs) to determine their current condition and to observe aging effects. No significant aging related issues were identified. Portions of the following SSCs were observed:

- Electrical Manholes
- Diesel Fuel Oil Storage Tank Building
- Fire Protection Fire Headers
- Fire Protection Sprinkler System
- Service Water System
- Unit 2 Tendon Access Gallery
- Auxiliary Building
- Turbine Building
- Emergency Cooling Pond Spillway
- Alternate AC Diesel Generator Air Start System

B. Evaluation of Mechanical Systems Aging Management

1. Fire Protection

The team reviewed the license renewal application, the NRC's SER, ANO-2 Fire Protection Plan, and plant procedures. The team also interviewed knowledgeable applicant personnel.

The applicant's Fire Protection Program for managing the aging of fire protection system components consists of two existing programs, the Fire Protection and Fire Water System. The Fire Protection Program referenced the following existing maintenance and surveillance procedures and/or work orders for implementing the Fire Protection Program aging management requirements for license renewal:

1000.152, "Unit 1 & 2 Fire Protection System Specifications," Revision 003-09-0
1003.012, "Fire Hose Station Inspection," Revision 007-05-0
1104.032, "Fire Protection Systems," Revision 056-04-0
1203.009, "Fire Protection System Annunciator Corrective Action,"
Rev. 022-02-0
1203.012K, "Annunciator K12 Corrective Action," Revision 032-06-0
1306.027, "K-5 Diesel Fire Pump Engine Surveillance Inspection," Rev. 015-07-0
1605.035, "Determination of Diesel Coolant Additive," Revision 007-00-0
1618.030, "Sampling Emergency Fire Diesel (K-5) Cooling Water," Rev 003-02-0
2104.032, "Unit 2 Fire Protection System Operations," Revision 020-01-0
2306.025, "Unit 2 Fire Door Inspection Procedure," Revision 006-05-0
2306.027, "Unit 2 Firehose Station Testing & Hydraulic Test," Revision 004-01-0
2405.016, "Unit 2 Penetration Fire Barrier Visual Inspection," Revision 13
5120.325, "Fire Water Piping Thickness Evaluation," Revision 001-00-0
50242169, "Perform Quarterly Sampling of Emergency Fire Diesel Cooling
Water"

The team reviewed Procedures 1000.152, 1003.012, 1104.032, 2104.032, 2306.032, and 2405.016 currently used to implement the Fire Protection Program. The records were complete and the test results were satisfactory.

The team walked down portions of Unit 2 fire protection systems, features, and components (SSCs) to look for obvious signs of aging degradation, to determine if these programs were effectively managing the effects of aging. For the most part, the team observed that the fire protection system piping, fire barriers, and penetration seals, etc., appeared to be very well-maintained. The team noted some isolated cases of aging effects on fire protection systems. During a walkdown in the fuel oil storage tank building, the team identified a packing leak on Isolation Valve FS-117 and significant rust on the stem of Isolation Valve FS-116. A Work Order tag hung on FS-117 was initiated on December 1, 2003. The applicant initiated a condition report to correct the leak. In addition, during a walkdown of the Unit 2 transformer fire protection deluge piping, the team noted significant amounts of rust on baseplates supporting the fire protection transformer deluge piping and valves. Although, this piping is not included in the scope of license renewal, it should be part of the system walkdown program, and as such should identify and manage this aging mechanism. This is further discussed in Summary of Findings Section D.

The team identified that the applicant had not included in the scope of license renewal, replacement parts, equipment, and tools that operators use for taking manual actions necessary in certain fire scenarios for achieving and maintaining cold shutdown

conditions. In particular, operators may have to replace parts of low pressure safety injection Valve 2CV-5017-1 which could fail due to fire-induced mal-operation. The applicant stated that these spare valve components are stored in the warehouse, therefore, are not included in the scope of license renewal. In addition, the applicant stated that these stored components are all active internal valve components, and as such, are excluded from the scope of license renewal. The team agreed that these components could be considered active if installed in valves in the plant; however, as stored spare components may not meet the definition of active as intended in Part 54. This issue was referred to the NRC's Office of Nuclear Reactor Regulation (NRR) for further review.

2. Boric Acid Corrosion Prevention

The team reviewed "Boric Acid Corrosion Prevention Program Administration," and "Inspection and Evaluation of Boric Acid Leaks," and interviewed program engineers to determine if the boric acid corrosion prevention program can address the effects of aging on systems, structures, and commodity groups for which it is credited in the applicant's license renewal application and aging management reviews.

The Boric Acid Corrosion Prevention Program, primarily controlled by "Boric Acid Corrosion Prevention Program Administration," and "Inspection and Evaluation of Boric Acid Leaks," is given credit in the license renewal application for managing the loss of material due to boric acid corrosion of carbon steel. The Boric Acid Corrosion Prevention Program consists primarily of a walkdown of the systems within the reactor building, after reactor shutdown and before final reactor building closure prior to restart. This walkdown includes a visual inspection of the components to detect the presence of leakage, as evidenced by moisture or the presence of boric acid powder or crystals on the exterior of valves, connections, and insulated surfaces. If such evidence is found, the presence and characteristics of the leak are recorded on a form entitled, "Identification & Evaluation of Boric Acid Leakage," and turned over to the boric acid corrosion coordinator for evaluation and disposition. The team discussed this program's attributes and results with engineers responsible for the program and examined the available records generated by the program for several years and found them to be adequate.

The team concluded that the Boric Acid Corrosion Prevention Program meets the criteria of the LRA and of NUREG 1801 with noted enhancements.

3. Cast Austenitic Stainless Steel Evaluation (CASS)

The team reviewed the license renewal application, the NRC's SER, ANO-2 Inservice Inspection Plan, and plant procedures. The team also interviewed knowledgeable applicant personnel.

The CASS Evaluation Program is a new program for which there is no operating experience. The Cast Austenitic Stainless Steel (CASS) Evaluation Program will be

comparable to the program described in NUREG-1801, Section XI.M12, Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS). Reactor coolant system components will be inspected in accordance with the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI. The ASME Section XI inspection will be augmented to detect the effects of loss of fracture toughness due to thermal aging embrittlement of CASS components. The CASS Evaluation Program will include a determination of the susceptibility of the CASS components to thermal aging embrittlement based on casting method, molybdenum content, and percent ferrite. The applicable ANO-2 components include the pressurizer surge line piping and elbows, surge nozzle safe end, safety injection and shutdown cooling outlet nozzle safe ends and reactor coolant pump (RCP) safe ends. Additionally, the program will manage aging effects of potentially susceptible components, as defined below, utilizing additional inspections and a component-specific flaw tolerance evaluation.

Based on relevant industry operating experience, this program should provide reasonable assurance that the aging effects will be managed so that the applicable components will continue to perform their intended functions for the period of extended operation.

The team concluded that the CASS Program meets the criteria of the LRA and is consistent with the guidelines of NUREG 1801.

4. Fatigue Monitoring

The team reviewed the LRA, the NRC's SER, ANO-2 fatigue monitoring program, and plant procedures. The team also interviewed knowledgeable applicant personnel.

The Fatigue Monitoring Program at ANO-2 is comparable to the program described in NUREG-1801, Section X.M1, Metal Fatigue of Reactor Coolant Pressure Boundary. In order not to exceed the design limit on fatigue usage, the Fatigue Monitoring Program tracks the number of critical thermal and pressure transients for selected reactor coolant system (RCS) components. The program ensures the validity of analyses that explicitly assumed a specified number of thermal and pressure fatigue transients.

The Fatigue Monitoring Program will be consistent with the program described in NUREG-1801, Section X.M1, Metal Fatigue of Reactor Coolant Pressure Boundary with the following exceptions:

Preventive Actions: The Fatigue Monitoring Program only involves tracking the number of transient cycles.

Detection of Aging Effects: The ANO-2 program does not provide for periodic update of the fatigue usage calculations and corrective actions are initiated only when the number of accumulated cycles approach the number of component design cycles.

The inspectors reviewed selected portions of ANO-2 quarterly reports documenting operating history, the total number of critical types of transients, and the design limits. Condition report trending data does not reveal need for improvements to this program. The number of pressure and temperature transient cycles is monitored and periodically compared with the design cycle count, as required by the Fatigue Monitoring Program, to ensure that fatigue sensitive components don't exceed their allowable number of design cycles. This operating experience provides reasonable assurance that the Fatigue Monitoring Program will be effective in managing the effects of aging so that components crediting this program can perform their intended function consistent with the current licensing basis during the period of extended operation.

The Fatigue Monitoring Program as described in the LRA provides reasonable assurance that the effects of aging will be managed such that the applicable components continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

The team concluded that the Fatigue Monitoring Aging Management Program meets the criteria of the LRA and is consistent with the guidelines of NUREG 1801 with acceptable exceptions.

5. Heat Exchanger Monitoring

The team reviewed the license renewal application, the NRC's SER, the description of the planned new Heat Exchanger Monitoring Program, and engineering reports. The team also discussed particulars of this program with knowledgeable applicant personnel, and NRC technical staff in NRR.

The Heat Exchanger Monitoring Program is a new inspection program which will utilize nondestructive examinations, such as eddy-current testing or visual inspections of a sample of heat exchangers. The aging effects addressed by the Heat Exchanger Monitoring Program are cracking and loss of material that could result in degradation in the seismic qualification of the heat exchangers in the SW system, control room ventilation system, and emergency feedwater system.

The Heat Exchanger Monitoring Aging Management Program meets the criteria of the LRA and is acceptable and consistent with the guidelines of NUREG 1743 which was previously accepted for ANO Unit 1.

6. Containment In-Service Inspection

The team reviewed the LRA, the NRC's SER, ANO-2 Inservice Inspection Plan, and plant procedures. The team also interviewed knowledgeable applicant personnel.

The ANO-2 containment is a steel lined and post-tensioning concrete containment. Subsection IWL of ASME Section XI provides instructions for the inspection, documentation, and repair of reinforced concrete and post-tensioning systems of Class

CC components. The aging effects that the applicant credits their Subsection IWL inservice inspections for managing are loss of material in tendon anchorage and cracking and change in material properties in concrete. The team reviewed Procedure/Work Plan 5220.011 which provides instructions and documentation requirements to assess the continuing quality and structural performance of the containment post-tensioning system and the concrete containment. This includes inspecting the post-tensioning tendon system for evidence of water and general visual examination of the concrete surfaces. The team reviewed records of the last Subsection IWL inservice inspection and found that many deficiencies had been identified by the applicant and reported in condition reports. The team reviewed several selected condition reports and the engineering evaluations of some of these identified deficiencies. The team found that the applicant evaluated the deficiencies and either determined them to be acceptable or took appropriate corrective actions to correct the deficiency.

The team concluded that the Containment Inservice Inspection Aging Management Program meets the criteria of the LRA and is consistent with the guidelines of NUREG 1801 as implemented through the ASME Section XI codes.

7. Alloy 600 Aging Management

The team reviewed the LRA, the NRC's SER, ANO-2 Alloy 600 Inspection Plan, and plant procedures. The team also interviewed knowledgeable applicant personnel.

The Alloy 600 Aging Management Program is a new program for which there is no specific operating experience. The program incorporates proven monitoring techniques and acceptance criteria. Although there is no corresponding NUREG-1801 program, it is comparable to the program described in NUREG-1801, Section XI.M12, Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS).

The NUREG-1801 Nickel-Alloy Nozzles and Penetrations Program (XI.M11) applies to reactor vessel closure head penetrations. The Reactor Vessel Head Penetration Program will manage the Alloy 600 reactor vessel head penetrations and the Steam Generator Integrity Program will manage cracking of the Alloy 690 steam generator tubes and plugs for the period of extended operation. Aging effects on the balance of Alloy 600/690 items and Alloy 52/152 and 82/182 welds will be managed by the Alloy 600 Aging Management Program. The aging effect requiring management for Alloy 600/690 items (SB-167, SB-168, etc.), Alloy 52/152 welds and Alloy 82/182 welds is cracking by primary water stress corrosion cracking (PWSCC).

The Alloy 600 Aging Management Program utilizes the examination and inspection requirements of ASME Section XI. The parameters monitored will be the presence and extent of cracking. The applicant has stated that guidance developed by the EPRI Materials Reliability Program (MRP) will be used to identify critical locations for inspection and augmentation of existing ISI inspections at ANO-2 where appropriate.

Records of the inspection program, examination and test procedures, examination/test data, and corrective actions taken will be maintained in accordance with the requirements of ASME Section XI, Subsection IWA.

The inspectors concluded that an adequate Alloy 600 Management Program with enhancements is planned, although, as noted for other programs, enhancements were not yet tracked in the applicant's site item data base. When implemented as described, there is reasonable assurance that the intended function of Alloy 600 components will be maintained through the period of extended operation.

The team concluded that the Alloy 600 Aging Management Program meets the criteria of the LRA and is consistent with the guidelines of NUREG 1801.

8. Buried Piping Inspection

The team reviewed the LRA, plant procedures, condition reports concerning buried piping failures, and the NRC's SER. The team also interviewed knowledgeable program engineers.

The license renewal application contains the applicant's description of the buried pipe aging management program. The staff's SER of this aging management program is documented in the SER. The buried pipe inspection program is credited for managing damage to protective coating and loss of material for the SW and fuel oil systems buried piping that are within the scope of license renewal. The buried pipe program includes visual inspection of carbon steel piping for damage to protective coating, and inspection of the external surface of the piping for corrosion when ever excavation of the pipe is required.

The buried pipe inspection program is a new program not yet implemented at ANO-2. The applicant has yet to develop specific procedures for the implementation of this program; therefore, there was little documentation of the program itself. Because this program is based on plant experience and operating history, the inspection team requested a maintenance history review of corrective action activities involving buried pipe. The applicant identified seven condition reports involving buried pipe. A review of each condition report revealed only one leak in 1995, due to failure of exterior coating (documented in Condition Report CR-C-95-0167). The root cause analysis identified the presence of acid or caustic soda in the soil from a spill from an abandoned and corroded acid pipe that caused the fuel oil pipe coating to fail and accelerated corrosion of the carbon steel piping. The service water intake structure and the Unit 2 acid and caustic building were identified as potential areas of future concern, and operational changes were implemented to minimize the potential affects of future pipe failures. The applicant stated that this was the only time a chemical spill caused a buried pipe to leak at ANO.

The team concluded that the Buried Piping Aging Management Program meets the criteria of the LRA and is consistent with the guidelines of NUREG 1801.

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9. Wall Thinning Monitoring

The team reviewed the applicant's LRA, the NRC's SER and the aging management report. In addition, the team interviewed knowledgeable program engineers.

The wall thinning inspection program is not an existing or established program and is not documented beyond a brief description in the applicant's license renewal application and engineering report. The inspections are planned to be volumetric, nondestructive examinations. As described, this inspection program should manage the effects of loss of material due to corrosion of the internal surfaces of carbon steel piping and components.

The team concluded that the Wall Thinning Aging Management Program meets the criteria of the LRA and is consistent with NUREG 1801.

10. Water Chemistry Control

The team reviewed the license renewal application, the NRC's SER, plant procedures, and records of past chemistry level data and discussed the program with responsible applicant personnel.

This was an existing program that was identified for managing corrosion in certain systems containing water. The program involves sampling and analysis of the fluids, limiting the levels of certain impurities, and use of chemical additives to preclude corrosive environments.

The purpose of the Water Chemistry Monitoring Program is to maximize long term availability of the systems by minimizing corrosion in the systems. The Water Chemistry Monitoring Program provides assurance that elevated levels of contaminants and oxygen do not exist in the systems covered by the program. This prevents or minimizes the occurrence of cracking and other aging effects.

The ANO-2 Water Chemistry Monitoring Program consists of sampling criteria, frequencies, locations, and allowable values with specific guidance for actions to be taken with parameters exceeding allowable values. The frequency of sampling is daily, weekly, monthly, quarterly or as required, based on plant operating conditions. This frequency has been established based on Technical Specification requirements, Electric Power Research Institute guidelines, and ANO-specific experience. The team reviewed further details of the attributes of the program described in plant Procedure 1000.106, Procedure/Work Plan 1052.007, and Procedure/Work Plan 1000.042 which detail the programs for primary, secondary and steam generator water chemistry. The inspectors noted that the water chemistry program would not ensure the protective oxide layer will be maintained intact if parameters were out of allowable limits for extended periods of time. Since the protective oxide layer is the component that is subsequently, the team verified implementation of the program through a random review of chemistry levels

recorded in the applicant's databases for January through October 2004. The team found that all the data reviewed showed the chemical concentration parameters were maintained within specifications.

The team concluded that the Water Chemistry Control Aging Management Program meets the criteria of the LRA and of NUREG 1801 with noted enhancements.

11. Auxiliary Systems and Closed Cooling Water Chemistry Control

The team reviewed the LRA, plant procedures, test results, and the NRC's SER to verify that the Auxiliary Systems and Closed Cooling Water Chemistry Monitoring program was being implemented consistent with the information presented in the application and the SER. The team also discussed the Auxiliary Systems and Closed Cooling Water Chemistry Monitoring program with knowledgeable applicant staff.

The applicant's license renewal application states that the purpose of Auxiliary Systems and Closed Cooling Water Chemistry Monitoring is to maximize the availability and operating life of the components used for the closed cooling water loops. The applicant credits Auxiliary Systems and Closed Cooling Water Chemistry Monitoring with minimizing the loss of material due to corrosion, cracking, fouling, and loss of mechanical closure integrity aging effects.

Auxiliary Systems and Closed Cooling Water Chemistry Monitoring is an existing program, implemented by the applicant's Procedure 1052.027, "Auxiliary Systems Water Chemistry Monitoring". The team reviewed the requirements contained in the procedure and discussed the implementation of these requirements with the applicant's responsible personnel. The team found that Procedure 1052.027 required sampling and testing the closed cooling water loops water chemistry at specified frequencies. The water in the applicable closed loop cooling water systems is sampled and the control parameters (i.e., pH, iron, copper, biological activity, etc.) are monitored and trended. Based on these trends, corrective action is taken when a control parameter is outside of the acceptable range. The team reviewed the test results and trends from the water samples taken within the past few months from the closed loop cooling water systems included in the scope of license renewal. The team found that the water chemistry control parameters from these water samples were maintained within the acceptable range and that appropriate corrective action was taken when control parameters were found outside the acceptable range.

The Auxiliary Systems and Closed Cooling Water Chemistry Control Aging Management Program meets the criteria of the LRA and of NUREG 1801 with noted enhancements.

12. Service Water Integrity

The team reviewed the applicant's license renewal application, the NRC's SER, applicable program documentation and records of the program testing. The implementation of this program was verified by reviewing a sample of testing performed

in 2003 and 2004, a partial system walkdown and interviews with program engineers responsible for the system.

The Service Water Integrity Program is a combination of testing, nondestructive examination, and chemistry and maintenance activities performed on various SW components. This program satisfies the requirements of Generic Letter 89-13 and other commitments such as inservice testing and maintenance rule performance monitoring. The testing is documented in various documents such as test reports and maintenance action items.

The Service Water Integrity Program meets the criteria of the LRA and of NUREG 1801.

C. Evaluation of Electrical Systems Aging Management Programs

1. Non-EQ Inaccessible Medium-Voltage Cable

The team reviewed the LRA, the NRC's SER, ANO-2 Inservice Inspection Plan, and plant procedures. The team also interviewed knowledgeable applicant personnel.

The LRA section Aging Management Program B.1.15 Non-EQ Inaccessible Medium Voltage Cable specifies that periodic actions will be taken to prevent cables from being exposed to significant moisture, such as inspecting for water collection in cable manholes and conduit, and draining water as needed. In-scope medium-voltage cables exposed to significant moisture and voltage will be tested to provide an indication of the condition of the conductor insulation. The specific type of test performed will be determined prior to the initial test.

To determine the current condition of such cables, the inspectors requested that two manholes which contain energized safety related cables be opened. These manholes contain the cables which provide power from the switchyard to the startup transformers and are normally energized. The manholes were completely flooded with water submerging the cables. These manholes had not been opened for several years so it is indeterminant as to how long the cables have been submerged. The applicant initiated a Condition Report to initiate corrective action to address the failure to prevent cables from being exposed to significant moisture.

The team concluded that, if properly implemented, the Non-EQ Aging Management Program meets the criteria of the LRA and of NUREG 1801.

2. Non-EQ Insulated Cables and Connections

The team reviewed the LRA, the NRC's SER, and plant procedures. The team also interviewed knowledgeable applicant personnel.

The Non-EQ Insulated Cables and Connections Program at ANO-2 is a new program for which there is no operating experience. The Non-EQ Insulated Cables and Connections

Program at ANO-2 and is comparable to the program described in NUREG-1801, Section XI.E1, Electrical Cables and Connections Not Subject to 10CFR50.49 Environmental Qualification Requirements.

The team concluded that the Non-EQ Insulated Cables and Connections Aging Management Program meets the criteria of the LRA and of NUREG 1801.

3. Non EQ Instrumentation cables

The inspectors identified that the LRA for managing the aging of instrumentation cables outside containment consisted of including those cables in the existing equipment qualification program. However, this program specifically excludes cables outside containment. The applicant had identified this program as existing, needing no enhancements.

Generic Aging Lessons Learned item XI.E2 is concerned that over time and exposure to heat and radiation, Non-EQ instrumentation cables for nuclear instrumentation and radiation monitors inside containment may suffer a degradation in insulation resistance. The concern is that for such cables operating with high voltages and low currents, such a loss of insulation resistance may cause the instrument to read in error. GALL recommends that a solution to the problem would be to trend the results of normal technical specification surveillance to detect cable degradation. NRC and industry have agreed on an alternate recommendation which is to conduct a test of the cable during the period of extended operation. The ANO applicant is not using either of these methods.

The applicant committed to include the entire length of cable from the detector to the control room instrumentation in the EQ program during the period of extended operation even though this is not required by 10CFR 50.49". The inspectors noted that this is not responsive to the technical issue at hand, which is to detect, prevent or mitigate the aging effect of concern. This issue will be referred to NRR to determine an appropriate resolution.

D. Evaluation of Structures and Structural Component Aging Management Programs

1. Bolting and Torquing Activities:

The team reviewed the LRA, the NRC's SER, plant procedures, planned work packages, and results of completed work packages to verify that the applicant implemented their torquing and bolting activities as described in the application and as accepted in the NRC's SER. The team also interviewed knowledgeable program engineers. In their LRA, the applicant states that the aging effects in pressure boundary bolting applications associated with Class 1 piping components within the scope of license renewal are cracking, loss of material, and loss of mechanical closure. These aging effects are prevented or identified and corrected by bolting and torquing activities. In their LRA, the applicant describes its bolting and torquing activities as including

inspection of mating surfaces to ensure that they are smooth and free of major defects. Male and female threads are inspected for major defects (such as nicks, burrs, evidence of galling, etc.). Other criteria includes proper and adequate thread engagement, no loose fasteners, and use of proper torquing values.

At ANO-2, bolting and torquing activities are governed by Procedure/Work Plan 1025.020. Bolting and torquing activities are used to prepare, install, and tighten threaded fasteners. This procedure, as stated within, applies to all maintenance activities that involve threaded fasteners. This procedure provides guidance for determining the two basic conditions required of fasteners, including "snug tight" (where all mechanical slack has been removed from the mating surfaces of a bolted joint) and "tensioned" (where a specific amount of preload is applied). In addition, this procedure specified visual inspections of nuts, bolts, washers, and surfaces to identify any degradation. The team found that the criteria described in this procedure agreed with that provided in the LRA. The team reviewed randomly selected seven planned and completed maintenance packages for Class 1 components. Each of the packages referenced Procedure/Work Plan 1025.020 for torquing requirements. In addition, the completed packages contained sign-off sheets for torquing activities.

The team concluded that the Bolting and Torquing Activities Aging Management Program will meet the criteria of the LRA and of NUREG 1801 when fully implemented.

2. System Walkdown

The team reviewed the LRA, the NRC's SER, and plant procedures. The team also interviewed knowledgeable applicant personnel.

The Systems Walkdown Program AMP credits periodic walkdowns normally done by the assigned system engineers for identifying aging effects on sixteen plant systems within the scope of license renewal and the group of nonsafety-related systems and components affecting safety-related systems. Engineering Report A2-EP-2002-002, Revision 1, ANO-2 License Renewal Project Evaluation of Aging Management Programs, paragraph 4.17 describes the program and specifies that for the credited systems system engineers are expected to perform a walkdown at least once per refueling. The ER references a document ENS-SEDG , System Engineering Desk Guide - System Walkdown Guide which was in use by the system engineering group when the LRA was prepared. The inspectors reviewed that document and observed that it contained the statement that systems must be walked down at least once per cycle unless dose or other considerations make this undesirable. The inspectors discussed the status of the system walkdowns with applicant engineers and were told that currently the walkdowns are not being performed on all systems at least every outage. Also the Desk Guide was replaced by Revision 1 dated November 2, 2004 which removed the once - per - refueling frequency.

The inspectors discussed with applicant representatives that the current status of system walkdowns does not agree with LR documentation of future plans. The

applicant acknowledged that changes in practices will have to be made before this is implemented.

The team concluded that the Systems Walkdown Aging Management Program will meet the criteria of the LRA and of NUREG 1801 if implemented as described in the LRA.

3. Structures Monitoring - Structures and Masonry Walls

The inspectors reviewed the applicable sections and appendices to the Structural Monitoring Program (SMP) of the Arkansas Nuclear One – Unit 2 (ANO-2) License Renewal Application. Civil Engineering Standard Number 19 (CES-19), "Maintenance Rule Structural Monitoring at Arkansas Nuclear One," Revision 1, monitors the conditions of structures and structural components by conducting periodic walkdowns and visual inspections in accordance with the requirements and guidance in the maintenance rule, 10 CFR 50.65 and Regulatory Guide 1.160 and NUREG-1522, "Assessment of Inservice Conditions of Safety Related Nuclear Plant Structures." The ANO-2 SMP assesses the conditions of the buildings and structures, including accessible areas that may be below ground. Items identified during the SMP inspections are documented accordingly.

The applicant will continue to address masonry wall considerations consistent with NRC IE Bulletin 80-11 and NRC Information Notice (IN) 87-67 as stated in ANO-2 LRA, Appendix A, Section A.2.1.27. The masonry wall program is covered under the structures monitoring program walkdowns and inspections. The ANO-2 SMP will also include provisions to inspect inaccessible concrete exposed to groundwater during opportune soil excavations, such as maintenance of buried piping. Structures are inspected every 5 years based on CES-19 which is similar to the frequency specified in NEI 96-03, "Industry Guidelines for Monitoring the Condition of Structures at Nuclear Power Plants." The inspectors also reviewed 96-R-003-02, "Structural Review of Maintenance Rule", Revision 0, which included a historical list of numerous condition reports (CR) related to SSCs inspectable under the SMP.

The inspectors performed a walkdown of the Unit 2 tendon access gallery to assess the conditions of the concrete walls. The tendon gallery was well ventilated, had adequate lighting and appeared to be recently painted which allows for easy detection of any tendon can leaks, deterioration or water leakage that may be present. The inspectors concluded that the overall structural condition of the tendon gallery was adequate with no signs of structural deterioration.

A number of tendon grease stains were observed around the exterior of the Unit 2 containment; based on observations from a distance. The grease leakage appears to be inactive or progressing very slowly. The applicant indicated that these areas had been previously identified under the SMP and are being monitored.

The inspectors reviewed 96-R-003-05, "Maintenance Rule Walk down for Evaluation of Structures," Revision 0, which documents structures and structural components which are monitored under the 10 CFR 50.65 scope. This walkdown was performed during the fourth quarter of 1997. It is the baseline maintenance rule inspection of the Containment Building, Auxiliary Building, Intake Structure, Radwaste Storage Building, Diesel Fuel Storage Vaults and

Turbine Building. The applicant documented the results in the inspection report and wrote condition reports and job requests on items that were identified as deficient or required additional monitoring. The inspectors did not identify any significant items in the report which required additional assessment for license renewal purposes. 96-R-003-11, "2004 Maintenance Rule Structural Monitoring Walkdown of High Risk Structures," Revision 0, documents the inspection results identified during the Unit 2 reactor building SMP walkdown in September 2003 during the 2R16 refueling outage. The walkdown of the remaining high risk structures was performed during July and August 2004.

The inspectors conducted a general plant walkdown of the Auxiliary Building. During the walkdown, the inspectors noted a crack in wall 2048-6 of the Lower North Piping Penetration Room #2048. This crack was previously identified during the Maintenance Rule Structural 2004 walkdowns and documented in CR-ANO-2-2004-01351. A follow-up inspection was conducted as a result of a corrective action and found that the size of the crack was within the acceptance criteria. The inspectors found this to be acceptable. The seismic gap which is designed to prevent damage to the structure appeared to be deteriorated at some locations in the Auxiliary Building. This is not a structurally significant concern; however, due to the debris, staining, and missing portions of the expansion filler within the gap it would be difficult to determine the actual conditions of the seismic gap. The inspectors also toured the Emergency Cooling Pond Spillway. The spillway structure exhibited various minor leaks through the dam as well as signs of deterioration along the protective tarp designed to minimize erosion. The leaks have not been quantified; however, the applicant stated that periodic sounding surveillance, as required by Technical Specifications, of the pond reveals the volume and level. There are no significant structural concerns for license renewal purposes.

The inspectors reviewed CR-2-2003-01417, which had identified areas of corrosion as a result of the walkdown for insulation and unqualified coatings associated with clogging of the sump in the Reactor Building. This condition report documented some corrosion on the containment liner plate. As part of their corrective actions, the applicant will perform an engineering evaluation to more clearly establish minimum wall thickness, as required by Code for local allowable wall thickness over a defined, small area. The inspectors found this to be acceptable.

Integrated Leak Rate Test (ILRT) results documented in 01-R-2001-01, "ANO Unit 2 2R14 ILRT Report" were reviewed by the inspectors and determined to be within the acceptance criteria.

Testing is required once every 10 years in accordance with Option B, 10 CFR Part 50 Appendix J requirements, except that it ANO Unit-2 was conducted at the Structural Integrity Test pressure of 68 psig (1.15 times design pressure), rather than the normal ILRT accident pressure. Justification for this deviation from the 10CFR50 test pressure requirement was provided in approved relief request 2CAN060011. NRC Regulatory Guide 1.163 requires a general visual examination during two other refueling outages, approximately 40 months apart. The acceptance criteria is defined as no evidence of containment damage or deterioration which could affect containment leakage or structural response to internal pressure.

The inspectors conducted a walkdown of the Service Water Intake Structure which is also monitored under the SMP. During the walkdown, the inspectors identified the conditions of the

SWIS to be in acceptable condition. The applicant had conducted previous inspections of the service water intake bays and taken pictures. These pictures demonstrated no significant visible signs of deterioration along the walls or supports. The bays are continuously flooded and are drained down during maintenance activities. The applicant indicated that credit is taken for SWIS inspection in the SMP. The Structures Monitoring Program provides reasonable assurance that the effects of aging will be managed such that the applicable components will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

The team concluded that the Structures Monitoring - Structures and Masonry Walls Aging Management Programs meet the criteria of the LRA and of NUREG 1801 with noted enhancements.

E. Open Items from Scoping and Screening Inspection

During the license renewal scoping and screening inspection conducted in March of 2004, the inspection team identified that the Switchyard Relay Building and the spent fuel pool cooling pumps would need to be considered in scope based on criterion 10 CFR 54.4(a)(2). Criterion 10 CFR 54.4(a)(2) involves the evaluation of nonsafety-related systems, structures, and components whose failure could prevent safety related systems, structures, and components that are relied upon during and following design-basis events. Inspection open items, were documented in NRC Inspection Report 05000368/2004-06, dated April 19, 2004. These open items were either discrepancies that the applicant agreed to correct or were items that needed further review to reach a conclusion. The team reviewed these open items during this inspection, and their resolutions are discussed below.

4. Switchyard Relay Building: (Closed)

The applicant agreed to include the Switchyard Relay Building in the scope of the Scoping and Screening Program.

5. Spent Fuel Pool Cooling Pumps (Closed)

The applicant agreed to include the Spent Fuel Pool Cooling Pumps in the scope of the Scoping and Screening Program.

III. Exit Meeting Summary

On November 19, 2004, the team leader presented the preliminary inspection results to Mr. Garry Young and other members of applicant's management at the conclusion of the onsite portion of the inspection.

The team leaders presented the results of the scoping and screening inspection and the aging management review inspection during a formal exit meeting open for public observation. The applicant acknowledged the findings presented and voiced no dissenting comments.

A third inspection will be conducted to verify the following open items:

- a. Aging Management Review Engineering Reports for Main Feedwater Block Valve, Intake Canal, and Transmission Connectors revised to reflect components added by the Staff's review.
- b. Status/resolution of fire protection components in consultation with NRR.
- c. Status/resolution of inspections for manholes in consultation with NRR.
- d. Status/resolution of EQ cables outside containment in consultation with NRR.
- e. Status of enhancements to the water chemistry aging management program.
- f. Status of enhancements to the systems walkdown aging management program.
- g. Status of enhancements to the Alternate AC Diesel Generator Air Start aging management program.

ATTACHMENT 1

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Applicant

R. Ahrabli, Structural Lead Engineer for Arkansas Nuclear One (ANO), Unit 2 License Renewal
S. Bonner, ANO Unit 2, System Engineer
A. Cox, Technical Manager for ANO Unit 2 License Renewal
K. Gaston, Mechanical Engineer for ANO Unit 2 License Renewal
K. Graham, Electrical Engineer for ANO Unit 2 License Renewal
T. Ivy, Mechanical Lead Engineer for ANO Unit 2 License Renewal
J. Holtz, Senior Electrical Engineer, Design Engineering
N. Mosher, Licensing Engineer
R. Rucker, Electrical Lead Engineer ANO Unit 2 License Renewal
M. Stroud, Project Manager for ANO Unit 2 License Renewal
A. Taylor, Mechanical Engineer ANO Unit 2 License Renewal
G. Young, Group Manager for ANO Unit 2 License Renewal

NRC

L. J. Smith, Branch Chief, Plant Engineering Branch, Division of Reactor Safety
R. Dipert, Fire Protection Specialist, Office of Nuclear Reactor Regulation
C. Paulk, Senior Reactor Inspector, Plant Engineering Branch, Division of Reactor Safety

LIST OF DOCUMENTS REVIEWED

The following documents were selected and reviewed by the team to accomplish the objectives and scope of the inspection.

Drawings

- LRA—204, Sht 5, "Emergency Feedwater Storage," Revision 0
- LRA—217, Sht 1, "Emergency Diesel Generator Fuel Oil Storage," Revision 0
- LRA—2202, Sht 3, "Auxiliary Steam System," Revision 0
- LRA—2202, Sht 4, "Lube Oil, Lube Oil Cooling, Electro/Hydraulic Controls & Main Steam," Revision 0
- LRA—2204, Sht 4, "Emergency Feedwater," Revision 0
- LRA—2206, Sht 1, "Steam Generator Secondary System," Revision 0
- LRA—2210, Shts 1&2, "Service Water System," Revision 0
- LRA—2218, Sht 1, "Service Air System," Revision 0
- LRA—2218, Sht 3 & 6, "Instrument Air System," Revision 0
- LRA—2234, Sht 1, "Component Cooling Water System," Revision 0
- LRA—2236, Sht 1, "Containment Spray System," Revision 0

Engineering Reports

- A2-CS-2002-002-0, "Aging Management Review of the Auxiliary Building Turbine Building and Yard Structures," Revision 1
- A2-EP-2002-003-01, "Engineering Report-Site Specific Operating Experience; ANO-2 License Renewal Project Operating Experience Reviews," Revision 1
- A2-ME-2003-001-01, "Aging Management Review of Nonsafety-related Systems and Components Affecting Safety-related Systems," Revision 1
- 02-R-2005-01, "ANO-2 License Renewal Project Aging Management Review of the Reactor Coolant System," Revision 1
- 02-R-2005-02, "ANO-2 License Renewal Project Aging Management Review of the Emergency Core Cooling Systems," Revision 1

02-R-2005-03, "ANO-2 License Renewal Project Aging Management Review of the Containment Spray System," Revision 1

02-R-2005-05, "ANO-2 License Renewal Project Aging Management Review of the Hydrogen Control System," Revision 1

02-R-2005-06, "ANO-2 License Renewal Project Aging Management Review of the Containment Penetrations," Revision 1

02-R-2005-07, "ANO-2 License Renewal Project Aging Management Review of the Spent Fuel Pool System," Revision 1

02-R-2005-13, "ANO-2 License Renewal Project Aging Management Review of the Fuel Oil System," Revision 1

02-R-2005-16, "ANO-2 License Renewal Project Aging Management Review of the Service Water System," Revision 1

02-R-2005-20, "ANO-2 License Renewal Project Aging Management Review of the Main Feedwater System," Revision 1

02-R-2005-21, "ANO-2 License Renewal Project Aging Management Review of the Emergency Feedwater System," Revision 1

02-R-2008-01, "System and Structure Scoping Method and Results," Revision 1

License Renewal Project Guidelines

LRPG-01, "License Renewal Project Plan," Revision 0

LRPG-03, "System and Structure Scoping, Revision 0

LRPG-04, "Mechanical System Screening and Aging Management Reviews," Revision 0

LRPG-05, "Electrical System Scoping, Screening, and Aging Management Reviews," Revision 0

LRPG-06, "Structural Screening and Aging Management Reviews," Revision 1

Miscellaneous Documents

Draft Safety Evaluation Report, Related to the License Renewal of the Arkansas Nuclear One, Unit 2, dated November 2004

NUREG 1801, "Generic Aging Lessons Learned," dated April 2001

Memorandum dated May 10, 2004, to P.T. Kuo, Chief, License Renewal and Environmental Impacts Branch, NRR, from D. Thatcher, Chief, Quality and Maintenance Section, NRR, regarding the audit of the applicant's license renewal scoping and screening methodology.

Audit and Review Report for Plant Aging Management Reviews and Programs, Arkansas Nuclear One - Unit 2, dated July 29, 2004

Arkansas Nuclear One, Unit 2 Final Safety Analysis Report, Chapter 9, "Auxiliary Systems," Amendment 17.

NEI 95-10, "Industry Guideline for Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule," Revision 3

ULD-0-19, "Arkansas Nuclear One Upper Level Document, Station Blackout," dated 3/3/1998

ULD-2-STR-01 "Arkansas Nuclear One Upper Level Document, Auxiliary Building," Revision 1

ULD-2-SYS-01, "Arkansas Nuclear One Upper Level Document, Emergency Diesel Generator," Revision 5

ULD-2-SYS-05, "Arkansas Nuclear One Upper Level Document, Containment Spray System," Revision 3

Procedures

DC-147, "Engineering Reports," Revision 0

AD-103, "Document Control and Records Management Activities," Revision 6

1000.152, "Unit 1 & 2 Fire Protection System Specifications," Revision 003-09-0

1003.012, "Fire Hose Station Inspection," Revision 007-05-0

1104.032, "Fire Protection Systems," Revision 056-04-0

1203.009, "Fire Protection System Annunciator Corrective Action," Rev. 022-02-0

1203.012K, "Annunciator K12 Corrective Action," Revision 032-06-0

1306.027, "K-5 Diesel Fire Pump Engine Surveillance Inspection," Rev. 015-07-0

- 1605.035, "Determination of Diesel Coolant Additive," Revision 007-00-0
- 1618.030, "Sampling Emergency Fire Diesel (K-5) Cooling Water," Rev 003-02-0
- 2104.032, "Unit 2 Fire Protection System Operations," Revision 020-01-0
- 2306.025, "Unit 2 Fire Door Inspection Procedure," Revision 006-05-0
- 2306.027, "Unit 2 Firehose Station Testing & Hydraulic Test," Revision 004-01-0
- 2405.016, "Unit 2 Penetration Fire Barrier Visual Inspection," Revision 13
- 5120.325, "Fire Water Piping Thickness Evaluation," Revision 001-00-0
- 50242169, "Perform Quarterly Sampling of Emergency Fire Diesel Cooling Water"

ATTACHMENT 2

ARKANSAS NUCLEAR ONE UNIT 2 LICENSE RENEWAL INSPECTION SAMPLE AGING MANAGEMENT ACTIVITIES

Auxiliary Boiler Fuel Oil
Auxiliary Feedwater
Component Cooling Water
Main Steam
Turbine Steam Extractions
Reactor Coolant
Spent Fuel Pool Cooling
Auxiliary Building HVAC
Containment HVAC
Control Room HVAC
Diesel Generators and Support Systems
Fire Protection
Instrument Air
Ventilation Air
Chemical and Volume Control
Containment Isolation
Safety Injection (HPSI, LPSI, CONT. SPRAY)
Raw Water
Reactor Vessel
125 Volt dc
4.16 KVolt Electrical
480 Volt Electrical
Communications
Containment Electrical Penetrations
Reactor Protection System
Engineered Safeguards
Radiation Monitoring
Qualified Safety Parameter Display
Containments
Diesel Fuel Oil Tank Foundation
Emergency Diesel Generator Buildings
Intake Structures
Auxiliary Building
Turbine Building
Service Building
Safety Injection and Refueling Water Tank
Building Piles
Component Supports
Duct Banks
Reactor Vessel Internals

Existing Aging Management Activities

Bolting Integrity Program
Chemistry Program
Containment Inservice Inspection Program
Containment Leak Rate Program
Flow Accelerated Corrosion Program
Inservice Inspection Program
Reactor Vessel Integrity Program
Service Water Integrity Program

Enhanced Aging Management Programs

Boric Acid Corrosion Prevention Program
Cooling Water Corrosion Program
Diesel Fuel Monitoring and Storage Program
Fatigue Monitoring Program
Fire Protection Program
Periodic Surveillance and Preventive Maintenance Program
Reactor Vessel Internals Inspection Program
Steam Generator Program
Structures Monitoring Program

New Aging Management Activities

Alloy 600 Program
Buried Surfaces External Corrosion Program
General Corrosion of External Surfaces Program
Non-EQ Cable Aging Management Program
One-Time Inspection Program
Thermal Aging Embrittlement of Cast Austenitic Stainless Steel