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SUBJECT: Arkansas Nuclear One - Unit 1
Docket No. 50-313
License No. DPR-51
Licensee Event Report 50-313/90-004-02

Gentlemen:

In accordance with 10CFR50.73(a)(2)(i)(B), enclosed is a supplemental report concerning fire barrier penetrations.

Very truly yours,

James J. Fisicaro
Director, Licensing

JJF/TFS/mmg
enclosure

cc: Regional Administrator
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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Arkansas Nuclear One, Unit One

DOCKET NUMBER (2) | PAGE (3)
050003 | 131 | OF 06

TITLE (4) Degraded Fire Barrier Penetrations as the Result of Personnel Oversight

| EVENT DATE (5) | | | LER NUMBER (6) | | REPORT DATE (7) | | | OTHER FACILITIES INVOLVED (8) | | | | |
|----------------|-----|------|----------------|-------------------|-----------------|-------|-----|-------------------------------|----------------|--|------------------|--|
| Month | Day | Year | Year | Sequential Number | Revision Number | Month | Day | Year | Facility Names | | Docket Number(s) | |
| 05 | 31 | 90 | 90 | 004 | 02 | 04 | 22 | 92 | ANO-Unit 2 | | 05000368 | |
| 05 | 31 | 90 | 90 | 004 | 02 | 04 | 22 | 92 | | | 05000368 | |

OPERATING MODE (9) N THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

| POWER LEVEL (10) | 20.402(b) | 20.405(a)(1)(i) | 20.405(a)(1)(ii) | 20.405(a)(1)(iii) | 20.405(a)(1)(iv) | 20.405(a)(1)(v) | 20.405(c) | 50.36(c)(1) | 50.36(c)(2) | 50.73(a)(2)(i) | 50.73(a)(2)(ii) | 50.73(a)(2)(iii) | 50.73(a)(2)(iv) | 50.73(a)(2)(v) | 50.73(a)(2)(vii) | 50.73(a)(2)(viii)(A) | 50.73(a)(2)(viii)(B) | 50.73(a)(2)(x) | 73.71(b) | 73.71(c) | Other (Specify in Abstract below and in Text, NRC Form 366A) | |
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LICENSEE CONTACT FOR THIS LER (12)

| Name | Telephone Number |
|--|-----------------------------|
| Thomas F. Scott, Nuclear Safety and Licensing Specialist | Area Code: 501 964 5000 |

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

| Cause | System | Component | Manufacturer | Reportable to NFRDS | Cause | System | Component | Manufacturer | Reportable to NFRDS |
|-------|--------|-----------|--------------|---------------------|-------|--------|-----------|--------------|---------------------|
| | | | | | | | | | |

SUPPLEMENT REPORT EXPECTED (14)

| EXPECTED SUBMISSION DATE (15) | Month | Day | Year |
|-------------------------------|-------|-----|------|
| | | | |

Yes (If yes, complete Expected Submission Date) No

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

Arkansas Nuclear One initiated a comprehensive inspection program for fire barrier penetration seals as part of the Generic Letter 86-10 evaluation. There were three occasions during the inspection when deficient seals causing the penetrations to be inoperable were discovered. Two of these conditions were found to have existed prior to a general fire barrier inspection walkdown conducted in 1983. Not having identified these deficiencies during this walkdown or subsequent Technical Specification surveillances has been determined to have been caused by personnel error. The third deficiency was the result of a change to guidance concerning the relationship between an approved seal detail and its qualifying fire test. Upon discovery of each condition the appropriate fire detection system was verified to be operable and fire watches were posted as required by Technical Specifications. The fire barrier inspection procedure was revised. A training program was implemented for fire barrier inspectors. The comprehensive inspection program was completed on March 31, 1992.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

A. Plant Status

At the time the first condition was discovered, Unit 1 (ANO-1) was in power operations at 80 percent. Reactor Coolant System (RCS) [AB] temperature was 579 degrees Fahrenheit and reactor coolant system pressure was approximately 2155 psig.

At the time discovery of the second condition, Arkansas Nuclear One Unit 2 (ANO-2) was in startup conditions (Mode 2) with RCS temperature at 545 degrees Fahrenheit, pressure at 2250 psia, and zero percent reactor power.

At the time of discovery of the third condition, ANO-2 was in cold shutdown conditions (Mode 5) with RCS temperature at approximately 83 degrees and pressure at 15 psia.

B. Event Description

On May 31, 1990 at 1330, while conducting a fire barrier penetration seal inspection as part of a comprehensive inspection program initiated to ensure installed seals are in accordance with tested configurations or have adequate basis for installation (i.e., Generic Letter 86-10 evaluation), a degraded fire barrier was discovered by personnel within the fire protection group at Arkansas Nuclear One (ANO). The degraded fire barrier consisted of a 2 inch metal sleeve extending approximately 3 inches above the floor slab to approximately 22 inches below the floor slab between the cable spreading room and the solid waste filler storage room. A 1½ inch conduit passing through the 2 inch metal sleeve was surrounded by an open annulus which did not contain a fire retardant seal. The sleeve appears to have been used as an equipment drain line, at one time, with the portion of the drain line extending through the floor slab modified into a sleeve and subsequently utilized for the routing of conduit through the fire barrier. The sleeve and conduit pass through penetration number 97-0038 in room 77. The sleeve passing through the floor slab was surrounded by an adequate seal and was properly identified in the fire barrier inspection procedure. The conduit within the sleeve was not surrounded by a seal nor was it identified in the inspection procedure. Documentation pertaining to installation of the conduit indicates that the conduit was routed prior to a major fire barrier walk down effort, conducted in 1933, which served to field verify the adequacy of penetration seals located in either an NRC required fire barrier or insurance required fire barrier. The results of the fire barrier walk down effort were used to supply baseline data for future inspections of fire barrier penetration seals.

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TEXT (If more spaces required, use additional NRC Form 366A's) (17)

A second degraded fire barrier was discovered by ANO fire protection personnel on April 17, 1991 at 0900 hours during a continuation of the comprehensive inspection program. Fire barrier FB-2081-03 is located between the piping penetration room and the heat exchanger equipment area at elevation 354' in the Unit 2 Auxiliary Building [NF]. A small through void was discovered in grout around piping at penetration 2081-03-0029. The through void was confirmed when a steady flow of air was detected flowing into the penetration room at the void. On the same barrier air flow was detected at two conduits, penetration numbers 2081-0033 and 0034, at the conduit covers. The conduit covers are approximately two inches from the barrier.

On March 31, 1992, ANO fire protection personnel were reviewing results from the comprehensive inspection program and discovered that two additional fire barrier penetrations did not meet detailed construction requirements because of their size and configuration. Penetration 2040-01-016 is located between a corridor at elevation 335' and a general access area at elevation 317' of the Unit 2 Auxiliary Building [NF]. Penetration 2158-01-0003 is located between a corridor at elevation 404' and a corridor at elevation 386' of the Unit 2 Auxiliary Building [NF].

C. Root Cause

Fire barrier penetration seals inspected during the walk down effort of 1983, including penetration number 97-0038, were either found containing a satisfactory fire barrier seal or were modified to conform with approved fire barrier sealant standards. Historical documentation of penetration number 97-0038 indicates that no deficiencies were found with this fire barrier seal during the 1983 walk down. Since existing documentation indicates that the routing of conduit was performed prior to the 1983 walk down, the condition should have been identified during these inspections since inspection guidance was available to the inspector. However, the sleeve configuration was such that it could have misled the inspector to overlook the gap and accept the fire barrier penetration as satisfactory. Additionally, several Technical Specification surveillance procedures for fire barrier penetrations have been performed since 1983 and also have failed to identify the deficient fire barrier penetration seal. Therefore, the root cause of this condition has been determined to be personnel error and oversight related to the failure to identify an inadequate fire barrier seal during the 1983 walk down effort. A contributing factor associated with this condition may be attributed to the fact that the sleeve through which penetration number 97-0038 passes was not correctly identified in the procedure used to perform Technical Specification inspections. Technical Specification surveillances were conducted by maintenance personnel; whereas, the current fire barrier penetration seal inspection program is being conducted by the ANO fire protection group.

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Fire barrier FB-2081-03 was also inspected during the walk down effort of 1983 and documented to be satisfactory. The condition is believed to have existed prior to the 1983 inspection and should have been identified during these inspections since adequate guidance was available to the inspector. Additionally, several Technical Specification surveillances of fire barrier penetrations have been performed since 1983 and also have failed to identify the deficiencies. Therefore the root cause of this condition is personnel error related to the failure to identify an adequate fire barrier seal during the 1983 walk down effort.

The two deficient seals identified on March 31, 1992, were installed as part of a fire barrier upgrade design change in 1985. Subsequent to their installation, NRC Information Notice 88-04 was issued. This notice provided more stringent guidance concerning the relationship between an approved seal detail and its qualifying fire test. Part of the ANO Business Plan comprehensive inspection program included identification and evaluation of deviations to substantiate whether as-built seals were equivalent to fire-tested designs. The cause for these seals failing to conform to design details is attributed to a clarification of the requirement for design replications subsequent to installation.

D. Corrective Actions

Upon discovery of the first condition, the fire detection system for the cable spreading room was verified operable and a fire watch was posted in accordance with Technical Specification requirements. The fire barrier was sealed through a job request initiated to ensure the annulus between the sleeve and conduit was adequately enclosed. In response to identifying the fire barrier penetration for future inspections, the new fire barrier penetration designation for sleeve (97-0127) has been listed on fire print 97-1 and entered in Penetration Log FB-00-L1. The fire barrier inspection procedure (1405.016) was also revised to correctly identify the penetration. This should be effective in providing a cue to inform the fire barrier inspector that this penetration exists and requires inspection during future inspections.

A comprehensive fire barrier seal inspection program was initiated as part of the ANO Business Plan (Action D.5.C). The objectives of the assessment program were to verify the physical configuration of Technical Specification penetration seals, perform evaluations of seal designs when deviations were identified, develop a data base and procedures for seal configuration management, and the correction of identified deficiencies. This inspection program was completed on March 31, 1992.

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To provide additional guidance to the fire barrier penetration seal inspector on the correct method of inspecting fire barrier penetrations, a training program was developed addressing the identification of deficient conditions. The training program presents a discussion of penetration sealant material and possible conditions rendering particular sealant materials deficient.

Upon discovery of the second degraded fire barrier, the fire detection system for the area was verified to be operable and a fire watch was posted in accordance with Technical Specification requirements. The deficiencies were repaired.

Upon discovery of the deficient penetrations on March 31, 1992, fire detection capabilities were verified for each area except elevation 404' where detection is not installed. Fire watches were posted in accordance with Technical Specification requirements. Fire watches will be maintained until an approved seal design is in place at the two penetrations.

E. Safety Significance

This condition has potential safety significance considering that the deficient fire barrier seal provides protection for the cable spreading room. A fire spreading to the cable spreading room could result in degraded plant control due to possible conductor damage associated with Control Room instrumentation. The degree of damage to Control Room instrumentation is dependent on the nature and extent of the fire within the cable spreading area. Plant control in the event of a fire in the cable spreading room is addressed through abnormal operating procedure 1203.02.

In actuality, the fire preventative measures currently available make the spread of fire in these areas only remotely possible. These measures include a fixed fire detection system in the cable spreading room which provides alarm annunciation in the ANO-1 Control Room, fire suppression equipment in the form of fire extinguishers, fire water hose reels, and an automatically actuated system. Fire Brigade personnel, specifically trained in fire fighting, are available at all times in the unlikely event a fire were to occur. Although the seal was degraded, the availability of detection instrumentation, suppression equipment, and Fire Brigade personnel provide adequate protection against fire propagation. Therefore, there is not a safety concern related to the degraded seal.

The second degraded fire barrier had less safety significance because the areas on either side of the barrier did not contain as much potentially combustible material and a large number of cables associated with instrumentation and control were not involved. Fire detection instrumentation and Fire Brigade personnel were also available if a fire were to have occurred in the area of the second degraded barrier.

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The safety significance of the deficiencies discovered on March 31, 1992, is also minor. The fire duration in three of the four affected zones is low. In the area located at elevation 386' the fire duration is moderate but there are both smoke detectors with control room alarm and a wet pipe suppression system.

At the ANO site there are approximately 8600 total penetrations through plant fire barriers. With the small population of reportable deficient penetrations which were identified, the safety concerns as they relate to potentially existent conditions are considered to be relatively small.

F. Basis For Reportability

Technical Specifications require that all penetration fire barriers protecting safety related areas shall be operable. With one or more of the required penetration fire barriers inoperable, a continuous fire watch must be established in the affected area within one hour. Although the fire watches were established within one hour of discovering the deficient fire barriers, investigation of the conditions revealed that they had existed for greater than one hour without a fire watch established. Therefore, these events are reportable pursuant to 10CFR50.73(a)(2)(i)(B) as conditions prohibited by Technical Specifications.

G. Additional Information

Conditions involving inadequate fire barrier seals in conjunction with personnel related error were previously reported in Licensee Event Reports 50-368/88-018, and 50-368/90-013.

Energy Industry Identification System (EIIIS) codes are identified in the text as [XX].