

ARKANSAS NUCLEAR ONE  
UNITS 1 AND 2

ARKANSAS POWER & LIGHT COMPANY  
REANALYSIS AGAINST 10CFR50 APPENDIX R  
SECTIONS III.G, J AND O

AUGUST 15, 1984

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

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REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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TABLE OF CONTENTS

I. INTRODUCTION

- A. Background
- B. Scope

II. OVERVIEW

- A. Introduction
- B. Summary of Review

III. SAFE SHUTDOWN CAPABILITY REANALYSIS AGAINST APPENDIX R,  
SECTION III.G, AS CLARIFIED BY NRC REGION IV FIRE PROTECTION  
WORKSHOP HELD IN ARLINGTON, TEXAS, APRIL 26, 1984

- A. Introduction and Purpose
- B. Initial Conditions and Assumptions
- C. Definitions
- D. Activities Required for Achieving Hot Shutdown
- E. Activities Required for Achieving Cold Shutdown
- F. Separation Criteria
- G. Alternate Shutdown
- H. Fire Loading Calculation Methodology
- I. Fire Area Analysis and Specific Exemption Requests

IV. REANALYSIS AGAINST APPENDIX R, SECTIONS III.J AND O

- A. Emergency Lighting
- B. Reactor Coolant Pump Oil Collection System

V. AND FIRE AREA LAYOUT DRAWINGS BY ELEVATION AND UNIT

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

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REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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I. INTRODUCTION

A. Background

In 1977-78, Arkansas Power & Light Company (AP&L) conducted a fire hazards analysis study for Arkansas Nuclear One Units 1 and 2 (ANO-1&2) to meet the criteria of Appendix A to the Auxiliary Power Conversion Systems Branch (APCSB) Branch Technical Position 9.5-1 (BTP 9.5-1). The results of this study were submitted to the NRC in February of 1978 (ØCANØ278Ø5). Subsequent to that submittal, AP&L was requested via correspondence to respond to numerous additional fire protection questions and to make regulatory commitments to complete certain modifications. Additionally, the ANO fire protection program was documented in the NRC staff's ANO-1 and 2 Fire Protection Safety Evaluation Reports (SERs) dated August 22, 1978 (1CNAØ87891), and August 30, 1978 (2CNAØ87826), respectively.

On November 19, 1980, the NRC published the Fire Protection Rule, 10CFR50.48, and its guidance for implementation of that rule, Appendix R to 10CFR50. The effective date of the regulation was February 17, 1981. By letter (ØCANØ381Ø6) dated March 19, 1981, AP&L requested exemption from the requirements of Sections III.G and III.L of Appendix R, on the basis previous modifications conducted in accordance with the 1978 SERs assured the protection of the public health and safety, and additional modifications in accordance with Appendix R would not increase that protection significantly.

Subsequent to that request, AP&L stated in correspondence (ØCANØ182Ø3) dated January 15, 1982, it was unable to commit to any firm schedule for submitting specific, technically sound requests for exemption from Appendix R requirements. By letter (1CNAØ582Ø2) dated May 10, 1982, the NRC granted AP&L an extension to July 1, 1982, to submit specific exemption requests and proposed modifications pertaining to the requirements of 10CFR50.48 and Appendix R.

On July 1, 1982, AP&L submitted the results of its Appendix R compliance review and specific exemption requests via correspondence (ØCANØ782Ø2). Subsequent to that submittal, additional correspondence was sent to the NRC which provided clarification and revised exemption requests (ØCAN11821Ø). The exemptions were approved in the staff's Safety Evaluation (SE) (ØCANØ38328) dated March 22, 1983.

During the period following the initial Appendix R submittal date and the date the SE was received, AP&L received indication from its association with the Nuclear Utility Fire Protection Group (NUFPG) that the methodology used in conducting its analysis might not be consistent with NRC interpretations of the rule. Several "generic" issues were discussed at NUFPG meetings from December 1982 through February 1983.

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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On March 1, 1983, the NUFPG met with several NRC staff members to discuss these issues. As a result of that meeting, AP&L determined it would be necessary to reanalyze ANO to determine the extent of compliance with the staff's interpretations of the requirements of Section III.G of Appendix R. Hence, AP&L submitted a "blanket" exemption request for all barriers and all suppression/detection systems on March 28, 1983, (ØCANØ38322) to ensure it would be able to complete its reanalysis in accordance with the perceived staff interpretations.

During June and July 1983, AP&L had the opportunity to review, through the NUFPG, several draft versions of the staff positions regarding Appendix R requirements discussed at the March 1 meeting. These criteria were in draft form, and did not appear to be consistent between subsequent drafts. Hence, AP&L decided to halt its reanalysis of ANO and, in its letter dated July 12, 1983 (ØCANØ783Ø5), requested definitive written guidance be provided by the NRC.

The NRC provided AP&L with this guidance in a letter dated September 14, 1983 (ØCNAØ983Ø3). Subsequent to that letter, all licensees received, via Generic Letter 83-33, that same guidance. After receiving that guidance, AP&L reinitiated its reanalysis of ANO in accordance with the NRC staff's interpretation and undertook an extensive verification program. Additionally, AP&L received further regulatory clarification concerning Appendix R at the NRC fire protection workshop held in Arlington, Texas, on April 26, 1984. This report documents the results of AP&L's reanalysis of ANO in accordance with the NRC guidance on the requirements of Appendix R to 10CFR50 relative to Section III.G, J and O.

As stated in the cover letter (ØCANØ884Ø4) accompanying this document, following NRC review and concurrence that AP&L has properly incorporated the information presented in Generic Letter No. 83-33, IE Information Notice No. 84-09, and the April 26, 1984, NRC Region IV workshop, the following can be considered to supercede our March 28, 1983 (ØCANØ38322), "blanket" exemption request referenced above.

B. Scope

This report documents the results of the reanalysis of the safe shutdown capability of ANO-1 and 2, and contains requests for exemptions to 10CFR50 Appendix R Sections III.G, J, and O resulting from that reanalysis as appropriate.



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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

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REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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## II. OVERVIEW

### A. Introduction

This report contains results of a reanalysis of Arkansas Nuclear One, Units 1 and 2 (ANO-1&2) in accordance with the criteria of Section III.G of Appendix R to 10CFR50, and as clarified by Generic Letter 83-33 and the NRC Region IV fire protection workshop.

### B. Summary of Review

In order to perform this revision of AP&L's Appendix R analysis, it was necessary to re-evaluate systems which could be used to accomplish safe shutdown. AP&L located important components contained in those systems, and developed a fire area-based analysis of those systems in order to meet the requirements of Section III.G of Appendix R. AP&L's previous Appendix R submittal (ØCANØ782Ø2) and fire hazards analyses were based on fire zones or some combination thereof. Generic Letter 83-33 indicates fire zones are not in accordance with the separation requirements of Section III.G of Appendix R. Hence, AP&L was required to reanalyze ANO on a fire area basis.

The plant was divided into twenty-seven fire areas. Of these, five fire areas require new exemption requests from the requirements of Section III.G. Additional scheduler exemptions for completion of modifications in four fire areas are also required. On a categorical basis, two new exemptions are requested from fire area boundary definition requirements (the utilization of automatic suppression systems to define fire area boundaries), five exemptions are requested from the requirement to coat structural steel forming a part of a fire barrier, one exemption is requested to a hose stream test requirement, one exemption is requested to a fire test requirement for an electrical cabinet, two exemptions are requested from the requirement for an automatic suppression system, and two exemptions per unit are requested from requirements pertaining to the Reactor Coolant Pump Oil Collection System.

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

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REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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III. EVALUATION OF SAFE SHUTDOWN CAPABILITY AGAINST APPENDIX R, SECTION III.G, AS CLARIFIED BY NRC REGION IV WORKSHOP HELD IN ARLINGTON, TEXAS, APRIL 26, 1984

A. Introduction and Purpose

This section of the report provides a description of the methods used to reevaluate Arkansas Nuclear One (ANO) Units 1 and 2 against the criteria of Section III.G of Appendix R to 10CFR50. Specific exemptions are requested where appropriate, and modifications are described where needed.

The purpose of this safe shutdown analysis is to determine the extent of ANO's compliance with Appendix R as clarified by previously mentioned NRC guidance concerning that regulation. The analysis is used to assure the nuclear power station in question can be safely shut down with fire damage present. The extent of this damage and various initial conditions are defined by Appendix R.

B. Initial Conditions and Assumptions

The reanalysis of ANO-1 and 2 was performed under the initial conditions defined by Appendix R to 10CFR50. Those conditions are consistent with those utilized in AP&L's original Appendix R compliance submittal dated July 1, 1982 (ØCANØ782Ø2), and subsequent correspondence dated November 11, 1982 (ØCAN11821Ø). The following briefly summarize the conditions assumed.

This safe shutdown analysis for Appendix R was performed assuming a loss of offsite power condition. No equipment failures are considered other than those resulting from the postulated fire. Fire damaged cables are assumed to fail in the worst mode for the conditions under evaluation. For example, if it is worse for a given valve to open than it is for that valve to remain closed, then the control cable for that valve is assumed to be damaged by the postulated fire in such a manner as to cause a signal to be transmitted to the valve which will cause it to open.

Where adequate time is available, and the valve is not physically located in the vicinity of the postulated fire, credit is taken for manual operation of manually operable valves. For valves required for cold shutdown only, credit is taken for manual operation even if the valve in question is located within the area of postulated fire damage. Additionally, credit has been taken for all embedded conduit remaining undamaged by fire.

Safe shutdown, for the purposes of this analysis, is defined to mean hot shutdown, as is consistent with the Licensing basis and design of the units. However, cold shutdown must be achievable. No credit is taken for any manual action which would normally be considered repair, e.g., rewiring.

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

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REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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C. Definitions

- Fire Area:** A fire area is defined as that portion of the plant which is separated from other areas by boundary fire barriers (walls, floor and ceiling) which have fire ratings commensurate with the fire loading of the area. Any openings or penetrations through a barrier should be protected with seals or closures having a fire resistance rating equivalent to the barrier in which they are installed. At ANO, the construction of walls, floors, and ceilings is characteristically reinforced concrete. Fire doors, ventilation ducts fire dampers, and fire barrier penetration seals, where they are used, are rated substantially greater than the fire loading on either side of the barrier in which they are installed.
- Fire Zone:** A fire zone is defined as a subdivision of a fire area which may be bounded by barriers, clear space, or some combination thereof, which is selected for analytical purposes to separate equipment, fire hazards, etc.
- Hot Shutdown:** Hot shutdown is assumed to be the Technical Specification definition of hot shutdown for ANO-1 and hot standby for ANO-2. Hot shutdown is defined by ANO-1 Technical Specifications as the condition when the reactor is subcritical by at least 1%  $\Delta k/k$ , and the average temperature of the Reactor Coolant System (RCS) is greater than 525° F. The ANO-2 Technical Specifications define hot standby as the condition when the reactor is subcritical by at least 1%  $\Delta k/k$ , the reactor is producing 0% rated thermal power, and the RCS average temperature is greater than 300° F.
- Cold Shutdown:** Cold shutdown is defined by ANO-1 Technical Specifications as the condition when the reactor is subcritical by at least 1%  $\Delta k/k$ , the RCS average temperature is no more than 200° F, and RCS pressure is within limits detailed in the Specifications. The ANO-2 Technical Specifications define cold shutdown as the condition when the reactor is subcritical by at least 1%  $\Delta k/k$ , the reactor is producing 0% rated thermal power, and the RCS average temperature is no more than 200° F.

D. Activities Required for Achieving Hot Shutdown

The activities required for achieving hot shutdown are those credited in our previous Appendix R submittals referenced earlier in this report.

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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E. Activities Required for Achieving Cold Shutdown

The functions required for achieving hot shutdown are also required for achieving cold shutdown. Components used in accomplishing this objective are those components credited in our previous Appendix R submittals. Maintenance of cold shutdown conditions requires the availability of continuous AC power, as well as the ability to depressurize the RCS. The cold shutdown analysis of ANO considers only those components and indications not already considered for hot shutdown.

F. Separation Criteria

All systems necessary for achieving hot and/or cold shutdown must be operable given a fire in any single fire area of the plant. The method of assuring operability of any component in a given system is to determine whether it is sufficiently protected or separated from the postulated fire. The separation criteria to be used are specified in Appendix R to 10CFR50, Section III.G and in clarification of that regulation presented in Generic Letter No. 83-33, IE Information Notice No. 84-09.

G. Alternate Shutdown

Alternative means of providing diesel fuel oil transfer and indicating instrumentation for certain parameters have been provided independent of normal means. While this allows the loss of normal means of operation, all areas of fire damage on which these alternate measures are relied must be identified and protected accordingly.

H. Fire Loading Calculation Methodology

Fire loadings utilized in this assessment were based on information contained in the 1978 Fire Hazards Analysis. In calculating the fire area-based heat loadings evident in this reassessment for Appendix R compliance, heat loadings of individual zones were initially subdivided into BTU content. In some cases, zone BTU content was further divided to examine the BTU content of individual cable trays. These divisions were combined into the appropriate fire area components, and an overall heat loading in terms of BTUs per square foot of floor space in the area under consideration was calculated. After deriving the heat load in BTU/Ft<sup>2</sup>, the heat load was converted into the standard fire duration equivalent as described in the NFPA Fire Protection Handbook. Specifically, the heat load in BTU/Ft<sup>2</sup> in a given fire area was divided by 80,000 BTU/Ft<sup>2</sup>, which is defined by NFPA as the heat load which is sufficient to support a standard fire of one hour duration. After converting the heat load in each area to the equivalent standard fire duration in hours, a multiplier of 60 was utilized to obtain a standard fire duration in minutes. These computed fire duration values for each fire area are listed with pertinent data concerning each respective fire area in this submittal.

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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I. Fire Area Analysis

The following section provides details concerning the configuration of safe shutdown equipment within individual fire areas at ANO. Each fire area is discussed with regard to the normal safe shutdown components contained within the area under evaluation, the method for protecting redundant trains within that area, proposed modifications, and specific exemption requests. Additional data are provided as appropriate.

FIRE AREA: A

Elevation(s) Affected: 317'

Fire Zones in Fire Area: 10-EE

Fire Loading: 1107 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than one minute

Area Description:

This area, located at elevation 317' of the ANO-1 Auxiliary Building, is enclosed by barriers which will be upgraded to a three-hour fire resistant rating with the exception of a watertight door (Door No. 5) which separates this area from the remainder of elevation 317' of the ANO-1 Auxiliary Building.

Safe Shutdown Capability:

This area contains no redundant safe shutdown components or circuitry. However, it does contain the "B" Decay Heat Removal/Low Pressure Injection pump and associated cabling. As Technical Specifications require both the "A" and "B" pumps be available during operation, the loss of the "B" pump due to fire would not result in the loss of this system, as the "A" pump would still be available.

Fire Hazard Analysis:

This area contains combustibles in the form of lube oil in the "B" DHR/LPI pump and the "B" Reactor Building spray pump. Approximately eight gallons of oil are contained in both pumps. The area contains no exposed cable insulation. Transient combustible introduction into this area is unlikely due to high radiation area access restrictions.

The fire area in question, "A", is connected to fire area "B" via watertight door No. 5. The fire zones in fire area "B" adjacent to fire area "A" are 4-EE, 12-EE, and 14-EE. These zones comprise an area of approximately 6462 square feet, with a fire loading of 232 BTU/FT<sup>2</sup>. This fire loading will support a standard fire for a duration of



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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

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REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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approximately 11 seconds. Fire Zone 162-A, Stairwell No. 1, is also located on this elevation and connects the previously mentioned fire zones with the other zones in fire area "B", located on the upper elevations of the facility.

Zone 14-EE contains P34-A, the Decay Heat Removal/Low Pressure Injection pump redundant to the pump located in fire area "A". As stated previously, each pump contains approximately eight gallons of lube oil. The "A" pump in area "B" is located approximately 47 feet from watertight door No. 5. The "B" pump in fire area "A" is located approximately 22 feet from the same door. Door No. 5 has a metal curbing of approximately six inches in height at its base. A masonry missile shield wall should protect the door from any direct contact with oil leakage from the pump. That wall also acts as a radiant energy shield by preventing radiation heat transfer from the pump to the door. The curbing will ensure, in the event oil did reach the door, that it would not contact the rubber gasket seal attached to the door itself, thereby ensuring the integrity of the door is maintained.

Door No. 5 is approximately one-half inch thick and is of heavy steel construction. The door will be administratively treated as a fire door once wall upgrades are completed. Because of the sufficient separation between the pumps, between each pump and door No. 5, and because of the light fire loading in area "B" and area "A" in the vicinity of the door, a three-hour rated fire door will not provide an additional measure of safety to the plant, nor will it increase the margin of safety to the public.

Fire Protection:

This area contains full coverage ionization smoke detection capability.

Modifications:

The walls and ceiling of this area are being upgraded to achieve a three-hour fire resistant rating. This work requires an outage for completion, as it could affect the operability of safety-related equipment. As the schedules of 10CFR50.48 require these modifications be completed during the sixth refueling outage (1R6), we will complete them at that time.

Exemption Requests:

For this area, no exemptions are requested.



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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

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REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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FIRE AREA: B

Elevation(s) Affected: 317', 335', 354', 368', 386', 404'

Fire Zones in Fire Area:

40-Y	73-W	160-B	2149-B	2261-UU	2151-A
157-B	105-T	128-E	2172-ZZ	2156-A	2010-LL
170-Z	162-A	187-DD	2177-YY	2152-D	2158-F
125-E	2-E	88-Q	2243-NN	2200-MM	2147-A
78-BB	14-EE	2026-Y	2045-XX	2092-PP	2091-BB
95-O	159-B	67-U	2078-QQ	2229-SS	2230-RR
77-V	149-E	79-U	2014-LL	2006-LL	2011-LL
1-E	75-AA	161-B	2153-A	2155-A	167-B
12-EE	76-W	144-D	2154-E	2148-A	168-B
163-B	104-S	175-CC	2242-00	2183-J	16-EE
120-E	68-P	89-P	2231-TT	2223-KK	
197-X	4-EE	46-Y	2178-AAA	2112-BB	

Fire Loading: 70,704 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than 54 minutes

Area Description:

This area occupies portions of all elevations of the ANO-1 and ANO-2 Auxiliary and Turbine Buildings. The area is exposed to the environment in some locations and is not necessarily bounded by three-hour rated fire barriers.

Safe Shutdown Capability:

The area contains some redundant safe shutdown components. For ANO-1, these redundancies are: (1) the Atmospheric Dump Valves, (2) the Atmospheric Dump Valve Block Valves, (3) Decay Heat Removal/Low Pressure Injection pumps cabling, (4) Diesel Fuel Transfer pumps cabling, (5) Makeup/High Pressure Injection pumps cabling, (6) Service Water pumps cabling, and (7) High Pressure Injection/Makeup Isolation valves. For ANO-2, redundancies are: (1) the Atmospheric Dump Valves, (2) Diesel Fuel Transfer pumps cabling, and (3) Service Water pumps cabling.

Fire Hazard Analysis:

This area contains lube oil in pumps, cable insulation, cleaning solvents, and lube oil in storage reservoirs. Because this area includes the Turbine Buildings, some transient combustibles are

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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permitted. However, fire brigade access would be prompt in the event a fire occurred.

This area occupies approximately 257,000 square feet of the ANO-1 and 2 Turbine and Auxiliary Buildings. In locations where redundant safe shutdown components are routed, protection equivalent to Section III.G.2 has been provided. For ANO-1, Service Water, Makeup and Decay Heat Removal capability has been protected through separation of redundant trains without intervening combustibles, installation of one-hour barriers in locations where separation could not be provided, and localized water suppression installations as further means of providing protection. In ANO-2, Service Water cabling has been protected by the installation of one-hour barriers and localized water suppression. The Diesel Fuel Transfer pump cables for each unit are separated by several hundred feet of space filled with various concrete barriers at various elevations. While these cables are located in the same fire area, in order for a fire occurring in ANO-1 to eliminate the ANO-2 transfer capability, a fire would have to burn through an extremely tortuous path consisting of several concrete wall-enclosed rooms located at numerous elevations. As the area "B" fire loading of 70,704 BTU/Ft<sup>2</sup> could not support a fire of such intensity, separation equivalent to Section III.G.2 of Appendix R has been provided for these components as well.

Detection capability has been installed in those locations containing safe shutdown-related equipment in both units, as well as locations important from a loss prevention standpoint. The installation of full area coverage detection and suppression capability will not increase the margin of safety afforded the public by the existing fire protection system. Rather, the increase in the number of zone indicating units, alarms, etc., would create a human factors problem within the control room. The increased water discharge from a full coverage suppression system would override our drainage capacity and could result in substantial damage to safety-related equipment. We feel the current installations in this area, which actively and passively protect redundant safe shutdown equipment, are sufficient to meet the intent of Section III.G.2 of Appendix R to 10CFR50.

Fire Protection:

This area is provided with detection and automatic suppression coverage in all locations containing both previously identified large fire hazards and those locations containing redundant safe shutdown circuitry in close proximity. On a floor area basis, detection has been provided to cover approximately 167,000 square feet of Fire Area "B." Automatic suppression covers approximately 88,000 square feet. On a percentage basis, detection and automatic suppression coverage have been provided over approximately 66% and 35% of Fire Area "B" respectively.

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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The stairwells in fire area "B" connect all elevations in the plant. However, they are enclosed in masonry walls with protected door openings. The Auxiliary Building elevator shaft is enclosed in masonry walls, with door openings being protected by doors having a one and one-half hour fire resistant rating. Numerous fire resistant compartments separate equipment within certain sections of area "B" from other sections within the area.

Locations containing large oil hazards, such as the lube oil storage reservoirs, are enclosed in fire resistant walls. Additionally, these locations are protected with automatic suppression system coverage. The west half of each Turbine Building at elevations 368' and elevations 335' is protected with automatic suppression capability. As elevation 354' primarily consists of open areas and grating, suppression operating on elevation 368' effectively protects this area as well. Elevation 386' is the operating floor of the Turbine Building, and, as such, consists primarily of a concrete floor, with some gratings over access hatches. The lube oil system piping associated with the turbine is located in the west half of the Turbine Building below elevation 386'. Additionally, locations containing safe shutdown cabling and certain types of components such as valves are also provided with automatic suppression coverage where appropriate.

Modifications:

Modifications have been made to allow use of the opposite unit's Diesel Fuel Transfer pumps in the event a given unit's pumps have been disabled because of a fire.

The Decay Heat Removal/LPI pump power cables and Makeup/HPI pump power cables are routed in two vertical banks of conduit which are separated by a distance of greater than 20 feet. Specifically, the conduit in question is located on elevation 354' of the ANO-1 Turbine Building. Intervening combustibles in the form of a cable tray provide a flow path for fire from one train of these components to the other train on elevation 354'. Hence, suppression coverage has been provided to protect these conduits. Additionally, as Technical Specifications allow one Makeup/HPI pump to be out of service during operation, we have provided a one-hour rated fire barrier to protect each of the "A" and "C" Makeup pumps conduit. The DHR/LPI pumps are only needed to achieve and maintain cold shutdown conditions. However, in order to prevent damage to this system and the need for subsequent repair, we have provided a one-hour barrier to protect the "B" DHR/LPI pump conduit. By using this method of protection, both Makeup/HPI and DHR/LPI capability is assured.

The three ANO-1 Service Water pump power cables are routed through area "B" as well. Specifically, these cables are located on elevation 354' of the ANO-1 Turbine Building and on elevation 335' of the ANO-1

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

Auxiliary Building. In Zone 73-W (elevation 354' of the ANO-1 Turbine Building), the Service Water cables are routed such that two cables are routed in close proximity with a third cable being separated by greater than 40 feet. One of the two trains routed in close proximity has been protected with a one-hour barrier. Additionally, this zone contains a full coverage wet-pipe sprinkler system and ionization detection capability. In Zone 40-Y (elevation 335' of the ANO-1 Auxiliary Building), these cables are separated by a minimum of seven inches. As Technical Specifications allow one Service Water pump to be out of service for an extended period, we have provided one-hour barriers to protect two of the cables in this zone to ensure at least one Service Water pump is available should a fire occur. This zone contains no in situ combustibles. No intervening combustibles are present between the Service Water cables. An exemption for the omission of suppression in this zone was previously granted by the NRC in a letter dated March 22, 1983 (ØCNAØ38322).

The HPI/Makeup isolation valves are located in area "B" on elevation 354' of the ANO-1 Auxiliary Building. These valves will be protected by a local automatic suppression system. Additionally, a one-hour barrier will be installed where redundant valve conduits are separated by less than 20 feet to ensure at least one HPI/Makeup flowpath is available to supply makeup water to the Reactor Coolant System. No intervening combustibles are present in the vicinity of the valves. These modifications will be completed during 1R6 as an outage is required to effect installation.

The ANO-1 Atmospheric Dump Valves (and Block Valves) are only needed for cold shutdown. These valves can be manually operated and should be operable after a fire in this area. These valves are located in Zone 170-Z at approximately elevation 450'-0", and are approximately thirty feet above the concrete floor of the zone. The Main Steam piping shields these valves from an exposure fire. This zone contains no combustibles; hence, it has a fire loading of 0 BTU/Ft<sup>2</sup>.

The ANO-2 Atmospheric Dump Valves are also only needed for cold shutdown. As with ANO-1, the valves can be manually operated and should be operable after a fire in this area. These valves are located in Zone 2155-A at approximately elevation 450'-0". This zone contains no combustibles; hence, it has a fire loading of 0 BTU/Ft<sup>2</sup>. Assuming a transient combustible of 100,000 BTU yields a fire loading of 85 BTU/Ft<sup>2</sup>, which would support a standard fire for less than four seconds.

The ANO-2 Service Water pump power cables in area "B" are protected in a similar manner to the ANO-1 Service Water cables. On elevation 317' of the ANO-2 Auxiliary Building, these cables are routed in conduit along the east wall of Zone 2006-LL. Two of the three conduit have been protected with one-hour rated barriers. Additionally, a localized



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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

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REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

automatic suppression system has been installed to protect these cables as well.

Exemption Requests:

For this area, no exemptions are requested.

FIRE AREA: C

Elevation(s) Affected: 335'

Fire Zones in Fire Area:

20-Y	38-Y	34-Y
53-Y	47-Y	31-Y

Fire Loading: 1184 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than one minute

Area Description:

The area contains the Makeup/HPI pump cubicles, the Emergency Feedwater pumps room, north piping penetration room, and general access areas on elevation 335' of the ANO-1 Auxiliary Building. The area is bounded by barriers which are or will be three-hour fire resistant rated with the exceptions noted below.

Safe Shutdown Capability:

This area contains redundant components including the Borated Water Storage Tank (BWST) dropline valves, the three Makeup/HPI pumps, Service Water supply valves to the Makeup/HPI pump coolers, diesel fuel transfer pump cabling for the ANO-1 pumps, Decay Heat Removal/Low Pressure Injection pump cabling, Service Water pump cabling, the Emergency Feedwater (EFW) pumps, and the Emergency Feedwater pump suction valves.

Fire Hazard Analysis:

This area has a fire loading of approximately 1184 BTU/Ft<sup>2</sup> which will support a standard fire for less than one minute duration. Neither Zone 34-Y, which contains Makeup/HPI pump, Service Water pump, and Decay Heat Removal/LPI pump cabling, nor Zones 53-Y and 31-Y, contain combustibles. The EFW pump room, Zone 38-Y, contains EFW pumps P7A and P7B. Each pump contains approximately five gallons of lube oil. Zone

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

20-Y contains the three Makeup/HPI pumps in cubicles. These cubicles are separated by partial height (6 feet) concrete walls. Each cubicle contains a floor drain to contain any lube oil leaking from any pump. Each Makeup/HPI pump contains approximately 10 gallons of lube oil. The Makeup/HPI pump cubicles are each equipped with a locked, steel grating-type door. Zone 47-Y, the penetration rooms ventilation area, contains approximately 8,300,000 BTU in the form of charcoal filters enclosed in heavy metal containers. Transient combustibles in area "C" consist of materials necessary to perform maintenance on any one component.

The north wall of Zone 34-Y, Area "C", connects with Zone 2026-Y, Area "B". This wall contains two, normally closed, watertight doors in series, i.e., doors number 356 and 357. These doors are approximately one-inch thick and are of heavy steel construction. Zone 2026-Y contains no in situ combustibles. Assuming a 100,000 BTU transient combustible, the fire loading in Zone 2026-Y of Area "B" is 87 BTU/Ft<sup>2</sup> which corresponds to a maximum expected fire duration of less than four seconds. The fire loading in Zone 34-Y, assuming a similar transient combustible, is 59 BTU/Ft<sup>2</sup> which corresponds to a fire duration of less than three seconds. Because the fire loadings in the locations adjacent to these doors are so low, we feel a three-hour rated fire door is not justified for these barrier penetrations. We do not think the addition of such a door would increase the margin of safety to the public, nor would it increase the fire prevention aspects of the areas involved.

Two covered steel hatches connect Zone 20-Y of Area "C" with Zone 197-X of Area "B". These hatches, located between column lines 3 and 4, and 4 and 5, south of column line A, are covered with approximately one-inch thick plate steel covers. Each hatch is designed to support a load of approximately 12,000 pounds; the construction of each hatch is therefore quite massive. The fire loading in Zone 20-Y is 656 BTU/Ft<sup>2</sup> which corresponds to a fire duration of less than 30 seconds. The portion of Zone 197-X adjacent to these hatches contains no in situ combustibles, and is open to gratings at elevation 386'. The gratings are located in the floor of the turbine deck. The ceiling over the turbine deck is located at approximately elevation 448'. The fire loading of Area "B", as mentioned previously, is less than 54 minutes. The combustion of materials in Area "C" would not yield high temperatures nor the accumulation of large combustion byproducts. A fire occurring in area "C" would not cause the hatches to fail; thus, these hatches would not allow the spread of fire from Area "C" into Area "B". Additionally, as the ceiling area over the hatches in Zone 197-X is effectively one hundred feet high, it is not credible that a fire occurring in Zone 197-X would generate sufficient heat to cause the hatches to collapse, thus spreading fire from area "B" into area "C". We have, however, elected to coat one of these hatches with pyrocrete or monokote on the area "C" side in order to prevent radiant



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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

heat transfer. As this modification requires an outage to complete, we will complete it during the sixth refueling outage (1R6) in accordance with the schedules of 10CFR50.48. The second hatch is located over the spent resin tank, which is enclosed by masonry walls. Because that hatch is in a high radiation area (field strength of approximately 1000 R/hr), we do not feel sufficient justification exists for exposing personnel in order to upgrade that hatch to achieve a three-hour rating. The addition of a three-hour rated hatch cover over the spent resin tank would not significantly increase the fire protection of the areas in question, nor would such a modification increase the margin of safety to the public.

The Auxiliary Building Elevator doors are fire rated for a minimum one and a half hour of fire resistance. The elevator connects this area with elevations 354', 386' and 404' of Area "B". As the fire load in this area is less than one minute, it is not likely fire would be able to propagate from Area "C" onto the upper elevations via the elevator. Additionally, because the fire load in Area "B" is less than 54 minutes, and because combustion products from a fire on the upper elevations would not propagate down to elevation 335', it is not realistic to postulate fire spreading from one of the upper elevations to this elevation. We are upgrading the elevator walls below elevation 404' to achieve a three-hour fire resistant rating to further ensure propagation of fire is minimized. That work will be completed during the sixth refueling outage (1R6) in accordance with the schedules of 10CFR50.48.

The hatch connecting Area "C" with Zone 4-EE (located on elevation 317' of the ANO-1 Auxiliary Building) of Area "B" is currently covered with steel grating. This hatch is used to affect the transfer of spent filters from elevation 317' to disposal on elevation 335'. In order to ensure the ease of accomplishing that task in the future, we have elected to install a three-hour rated, horizontally mounted, rolling steel fire door. While the door in question has not been tested in the horizontal configuration, the fire loadings in the locations adjacent to the door are not sufficient to justify the need for such testing. The fire loading on elevation 317' in Area "B" is 232 BTU/Ft<sup>2</sup>, which will support a standard fire for less than eleven seconds duration. The fire loading for Area "C" will support a standard fire for less than one minute duration.

#### Fire Protection:

This area is protected with partial coverage ionization detection and partial coverage automatic suppression.

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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Modifications:

As stated previously, the Makeup/HPI pumps are located in separate cubicles which are separated by partial height walls. One-hour fire barriers have been provided to enclose cabling associated with the "A" and "C" Makeup pumps located in the corridor adjacent to the pump cubicles. Automatic detection has been provided for these components. An exemption for the omission of suppression was previously approved for the Makeup/HPI pump cubicles and the adjacent access corridor in the NRC's Safety Evaluation dated March 22, 1983, as the protection afforded by the partial barriers and one-hour barriers was determined sufficient to satisfy Section III.G of Appendix R.

The Borated Water Storage Tank valves are located in a room which is of reinforced concrete construction and is approximately 37 x 34 feet. The room connects area "C" with elevation 354' of the ANO-1 Auxiliary Building, which is in area "B". One-hour rated fire barriers have been installed to protect one train of conduit associated with the BWST valves, and a partial coverage sprinkler system has been installed in the valve area. That system consists of closed head sprinklers on approximately a ten foot spacing. Because of the low combustible loading in area "C", this system should be sufficient to act as a "water curtain" to separate the above-mentioned fire areas. Automatic fire detection is also available to protect these components. An exemption was approved for the partial coverage suppression system installed in this location in the Staff Safety Evaluation referenced above.

The Makeup/High Pressure Injection and Decay Heat Removal/Low Pressure Injection pump power cables are routed in two vertical banks of eight conduit which are separated by greater than 20 feet, with no intervening combustibles present, in Zone 34Y. Additionally, power cables for all three Service Water pumps are routed in this zone. This location is bounded by reinforced concrete walls. Two of three Service Water pump cables have been protected by one-hour barrier installation. The "B" Makeup pump power cabling is being routed out of Zone 34Y in association with the Switchgear modifications described in our July 1, 1982, Appendix R submittal (ØCANØ782Ø2). As the remaining "A" and "C" Makeup and the "A" and "B" Decay Heat Removal pumps conduit are separated by greater than 20 feet with no intervening combustibles, a one-hour barrier is not needed to protect those components. The zone contains ionization smoke detection capability. An exemption for the omission of suppression was previously granted for this fire zone by the Staff in their Safety Evaluation mentioned above.

The Service Water supply valve to each Makeup/HPI pump oil cooler is located in each pump cubicle. Cabling associated with each valve is routed outside each cubicle in the following manner. Currently, the

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

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REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

"green" and "red" cabling is routed in proximity from the rear of their respective cubicles into Zone 20-Y. The "swing" cable is routed in embedded conduit. The "green" cable will be rerouted during the sixth refueling outage (1R6) so that the cable is routed from the rear of the "green" pump cubicle up into Zone 79-U of area "B", which is protected by automatic suppression. The "red" cable will be routed from the "red" cubicle through Zone 47-Y, and then into the Lower South Piping Penetration Room, Zone 46-Y, of area "B". This routing will provide greater than twenty feet of separation between redundant circuits within fire areas "C" and "B".

The Emergency Feedwater pumps, P7A and P7B, are located in Fire Zone 38-Y, along with the EFW suction supply valves. The steam-driven pump, P7A, is fully enclosed in heavy gauge metal; it is unlikely a fire of the type that could be expected in this zone would affect the internals of the pump. The EFW pumps are separated by a partial height (approximately six feet), noncombustible missile shield wall. Cabling associated with P7A, P7B, and the suction supply valves is routed in conduit from the ceiling of Zone 38-Y to each respective component. The EFW suction supply valves are located approximately three and one-half feet above the floor of Zone 38-Y, and are mounted adjacent to the north wall next to P7B. These valves are normally open, and a fire occurring in Zone 38-Y would not result in a credible hot short or other fault which would cause both of the valves to close. These valves would be manually operable following a fire, even if a fire destroyed their control and power cables. P7A, the steam-driven EFW pump, could be manually operated if its control cable was destroyed by fire. A normal EFW flowpath is available independent of area "C" to supply inventory via P7A to the "B" Once-Through Steam Generator (OTSG). The steam supply to drive P7A would still be available; hence, in order to actuate EFW following a fire in zone 38-Y, an operator would merely have to take local control of the trip-throttle valve associated with P7A to prevent pump overspeed. High pressure, atomized oil leaking from P7A would not contact hot steam piping associated with that pump, as steam supply lines are encased in metal flashing. Hence, a fire would not originate in that manner. The availability of automatic detection capability ensures prompt response to a fire in the event one did occur in this room.

In order to achieve compliance with Appendix R to 10CFR50 in area "C," AP&L plans to install a one-hour rated barrier on cabling associated with one Emergency Feedwater pump. Additionally, we are installing a local mechanical discharge pressure gauge adjacent to the trip throttle valve on P7A to facilitate easier control of that pump. These modifications will be completed during the sixth refueling outage (1R6).

The Diesel Fuel Transfer capability, if disabled by a fire in this area affecting the ANO-1 Diesel Fuel Transfer pumps, can still be achieved

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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through the use of the ANO-2 Diesel Fuel Transfer pumps. The west walls of Zones 20-Y, 53-Y (south half only) and 38-Y; the north wall of Zone 34-Y; the east wall of Zone 20-Y adjacent to Zone 2026-Y; the floors of Zones 53-Y, 20-Y, 31-Y and 34-Y; and the south wall of Zone 47-Y will be upgraded to a three-hour rating. As these upgrades require work in controlled access and in areas containing safety-related equipment, this work must be accomplished during an outage. In accordance with the schedules of 10CFR50.48, we will complete these upgrades during the sixth refueling outage (1R6) of ANO-1.

Exemption Requests:

The exemption requests for this area are as follows:

- Omission of a three-hour rated barrier in the opening over BWST valves into Zone 67-U of Area "B"
- Omission of a normal door latch on three-hour fire door, west wall of Zone 38-Y into Zone 46-Y of Area "B"
- Omission of automatic suppression capability for the EFW pump room, Zone 38-Y
- Omission of structural steel coatings in the Lower North Piping Penetration Room, Zone 53-Y

The bases for these exemptions are addressed in the following manner:

As mentioned in our July 1982 Appendix R submittal, the location of the BWST valves in Zone 20-Y (in Area "C") is in close proximity to a bay opening leading to elevation 354' of Area "B". Suppression and one-hour barriers have been installed to protect those valves located close to this opening. This system, which is of a closed-head design, also provides a type of water curtain to prevent the spread of fire from Area "C" to Area "B" via the bay opening. As no safe shutdown equipment is located adjacent to this opening on elevation 354', smoke propagation through this opening will not affect safe shutdown capability. Thus, an open-head suppression system design was felt to be unnecessary. The suppression system protecting the BWST valves on elevation 335' should limit the propagation of fire from Area "C" to Area "B" via the bay opening. As the fire loading in Area "C" will only support a standard fire for less than one minute, this system should be adequate to meet the intent of the three-hour rated barrier separation between fire areas required by Section III.G.2 of Appendix R to 10CFR50.

The west wall of the EFW pump room, Zone 38-Y in Area "C", connects with the east wall of the south piping penetration room, Zone 46-Y of Area "B". This wall is being upgraded to a three-hour rating.



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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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However, as the door in this wall serves as a vent path in the event a high energy line break occurs in Zone 46-Y, a special modification must be made to the latch on the subject fire door. As with Zone 2055-JJ of ANO-2, which was addressed in our previous Appendix R submittal dated November 11, 1982 (ØCAN11821Ø), we plan to purchase and install a three-hour rated fire door in this opening. However, we plan to modify the door latch so the door may open on a 0.25 psig pressure buildup in Zone 46-Y. Pressures created by a fire would not cause this door to open. The door would no longer pass a hose stream test with the special latch if the stream was directed at the door from within Zone 46-Y, but this modification should not decrease the effectiveness of the fire door to contain a fire within an affected location.

We request an exemption for the omission of automatic suppression in the EFW pump room, Zone 38-Y, for the following reasons. The turbine-driven EFW pump, P7A, contains approximately eight gallons of oil. That pump is located on the south side of the EFW pump room. The motor-driven EFW pump, P7B, is located on the north side of that room. That pump contains approximately two gallons of oil. The pumps are separated by a six-foot high missile barrier. Suction valves associated with the Service Water and Condensate supplies to both pumps are located along the north wall of Zone 38-Y, adjacent to the "B" EFW pump. Those valves are normally open, and fail open in the event power is lost. As cabling associated with those valves is routed in conduit from each valve to the ceiling of that room, it is not credible to assume a hot short or other fault resulting from a fire in area "C" could cause both of the subject valves to close. One hour-rated barriers are being provided such that the cabling associated with one pump will remain free of fire damage. There are no exposed cables in Zone 38-Y. All cabling is routed in conduit from the ceiling downward to each component. The zone is equipped with automatic detection. A hose reel is available for extinguishment of any fire. A fire originating within Zone 38-Y would allow heat to initially accumulate near the ceiling, then to move downward and dissipate through a grating type door into Zone 20-Y. Because of the low fire loading within this room, the one-hour rated barrier installation to ensure one train of EFW remains operable under fire conditions, the availability of detection, floor drains to contain any oil spill, the proximity of hose reels, and the partial barrier between the EFW pumps, the addition of automatic suppression for this zone is unwarranted, and would not significantly increase the level of protection afforded this area.

An exemption is requested for coating structural steel in the Lower North Piping Penetration Room, Zone 53-Y. The subject steel supports the floor of the Upper North Piping Penetration Room, Zone 79-U, Fire Area "B". Zone 53-Y contains no insitu combustibles. Assuming a 100,000 BTU transient combustible is present in Zone 53-Y yields a fire loading for that zone of 90 BTU/FT<sup>2</sup>, which is equivalent to a standard fire severity of less than five seconds duration. Based on the low

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

fire loading in Zone 53-Y, coating of structural steel in that room is unwarranted, and would not significantly increase its level of fire protection.

FIRE AREA: D

Elevation(s) Affected: 372'

Fire Zones in Fire Area: 86-G

Fire Loading: 72,650 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than 55 minutes

Area Description:

This area contains the "Green" Diesel Generator. The area is bounded by barriers which are, or will be, three-hour resistant rated.

Safe Shutdown Capability:

This area contains no redundant safe shutdown components. It contains components associated with the "Green" Emergency Diesel Generator. The "Red" Emergency Diesel Generator is still available to provide power should this generator not function.

Fire Hazard Analysis:

This area contains approximately 637 gallons of lube oil and diesel fuel contained in the Diesel Generator and in the Diesel Fuel Day Tank. The area contains limited electrical cable in conduit.

In the west wall of this area, there is an air inlet port which was installed in the wall during construction. This port is surrounded by curbing which prevents tornado-generated missiles from entering the room and damaging the diesel generator. This curb also prevents diesel fuel leakage from draining to an area outside the building. It is not desirable nor necessary to seal this port with three-hour rated material. The port opens to the atmosphere and, because of its size and location, would not be a source of propagation of fire from this area to adjacent areas, nor vice versa. Sealing of this port would violate venting requirements for the room.

The ceiling of this room contains a fresh air ventilation opening covered by louvers which supplies air to the room itself, and also ventilation louvers which supply air to the diesel generator. This ventilation area is open to the atmosphere. No combustibles are located



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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

adjacent to the louvers. Detection capability is provided over the diesel air intake. Because these openings allow fresh air into the Diesel Generator Room and to the diesel generator itself, it is not desirable to install a three-hour rated covering over them. The addition of three-hour rated fire dampers in these openings could result in inadequate room cooling during diesel generator operation. Such a failure would result in the inability of the diesel generator to operate properly.

The full area coverage suppression and detection system, coupled with the three-hour rating of boundary barriers excluding the above-mentioned exemptions, adequately preclude the spread of fire from this area into adjacent fire areas. This area is separated from adjacent areas in sufficient manner to meet the intent of Section III.G.2 of Appendix R.

Fire Protection:

This area contains a full area coverage, pre-action sprinkler system, as well as a full area coverage detection system utilizing ionization, flame, and heat detectors.

Modifications:

The west wall and floor of this area will be upgraded to achieve a three-hour fire resistant rating. Because this work will require an outage for completion, it will be completed during the sixth refueling outage (1R6) scheduled for late 1984. As this date is in accordance with 10CFR50.48, no scheduler exemption is needed.

Exemption Requests:

No exemptions are requested for this fire area.

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

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REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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FIRE AREA: E

Elevation(s) Affected: 372'

Fire Zones in Fire Area: 100-N

Fire Loading: 10,120 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than eight minutes

Area Description:

This area is bounded by three-hour rated fire barriers. It contains electrical switchgear supplying power to the "red," or channel one, components which rely on 4160 volt power to function.

Safe Shutdown Capability:

This area contains redundant components in the form of power cables for both the "red" and "swing" Service Water pumps, in addition to cabling associated with the "red" and "swing" Makeup/HPI pumps. Since one Makeup and Service Water pump is allowed to be out of service per the ANO-1 Technical Specifications, a fire occurring in this area could eliminate Makeup and Service Water capability in the event the "green" components were out of service.

Fire Hazard Analysis:

This area contains 9,816,000 BTU in the form of cable insulation. No other in situ combustibles are present in this area. Access to this area is limited as well, as it contains vital electrical equipment. An exposure fire occurring in this area from transient cables would not be likely, as transient combustibles are not allowed in this area.

Fire Protection:

This area is equipped with full coverage ionization detection capability.

Modifications:

As stated in AP&L's July 1, 1982, Appendix R compliance submittal (0CAN078202), modifications will be made to ensure the "swing" Makeup and Service Water pumps can be powered from the "green" switchgear located in Area I, Zone 99-M. This capability will be assured even if the "swing" pumps are being powered from the "red" bus at the time a

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

fire eliminates the "red" power source. With these modifications, this area will comply with Appendix R.

Exemption Requests:

No exemptions are requested for this area as the modifications mentioned above will be completed in accordance with the schedules of 10CFR50.48. As these modifications require an outage for completion, they will be completed during the sixth refueling outage (1R6) of ANO-1 which is scheduled to commence in approximately late 1984.

FIRE AREA: F

Elevation(s) Affected: 372'

Fire Zones in Fire Area: 110-L  
Room 109 of Zone 98-J ("red" DC equipment room)

Fire Loading: 4,283 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than four minutes

Area Description:

This area is bounded by three-hour rated fire barriers with the exception of the floor of Room 109 which will be upgraded to achieve a three-hour rating.

Safe Shutdown Capability:

This area contains no redundant safe shutdown components.

Fire Hazard Analysis:

This area contains combustibles in the form of hydrogen from the station battery and in the form of cable insulation. As stated in the Final Safety Analysis Report, ventilation is provided to ensure hydrogen accumulation is maintained below concentrations sufficient to support an explosion. Transient combustibles are restricted in this area; hence, an exposure fire is not likely to occur.

Fire Protection:

This area contains partial detection capability.

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

Modifications:

The floor of the DC equipment room, Room 109, will be upgraded to achieve a three-hour rating. With this modification, this area will comply with Appendix R.

Exemption Requests:

No exemptions are necessary for this area. The floor and west wall of Room 109 require an outage to be upgraded. This work will be completed during the sixth refueling outage (1R6) in accordance with the schedules of 10CFR50.48.

FIRE AREA: G

Elevation(s) Affected: 372', 386', 404'

<u>Fire Zones in Fire Area:</u>	97-R	2137-I
	129-F	2150-C
	2199-G	2098-L
	2136-I	2119-H

Fire Loading: 32,027 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than 25 minutes

Area Description:

This area contains the ANO-1 Control Room and Cable Spreading Room and the ANO-2 Control Room, Cable Spreading Room, Health Physics Area, Upper South Electrical Penetration Room, Core Protection Calculator Panel Room, and the Printer Room adjacent to the ANO-2 Control Room. The Control Rooms are separated by a wall containing laminated glass doors and common ventilation louvers. The area is, or will be, bounded by three-hour rated fire barriers with the exception of the Core Protection Calculator Panel Room located at elevation 404' of the ANO-2 Auxiliary Building. This room has a roof of metal decking which is open to the atmosphere and is not three-hour rated.

Safe Shutdown Capability:

A fire in this area could conceivably eliminate all vital instrumentation, all vital instrument AC power, and vital control functions. Alternate shutdown is being provided for this area in accordance with Sections III.G.3 and III.L of Appendix R to 10CFR50, and as submitted in AP&L's letter dated July 1, 1982 (ØCANØ782Ø2).

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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Fire Hazard Analysis:

This area contains combustibles in the form of paper, clothing, and cable insulation. As the Cable Spreading Rooms are vital areas, transient combustible introduction into those rooms is prohibited. Any fire originating in the Cable Spreading Rooms would be a cable fire. The Control Rooms contain combustibles in the form of paper and cable insulation. These rooms are continuously manned, and hence a fire would not be likely to propagate in these rooms. The Electrical Penetration Room contains combustibles primarily in the form of cable insulation. The Health Physics Area contains combustibles in the form of clothing and limited amounts of cable insulation. The Core Protection Calculator Room contains no in situ combustibles but an allowance was made for an unknown 99,700 BTU transient combustible in the 1978 Fire Hazards Analysis. With the exception of the Cable Spreading Rooms, this area has a relatively light fire loading, and hence would not likely support a major fire.

The Health Physics Area contains partial suppression coverage. The ANO-1 Control Room is provided with automatic Halon suppression in the false floor and ceiling locations. The locations containing no automatic suppression capability in this area are: (1) the ANO-2 Control Room, (2) the Core Protection Calculator Room, and (3) the Printer Room. The Control Rooms and Core Protection Calculator Room contain computer equipment and sensitive electronic gear. The safety-related cabinets in the Control Rooms contain ionization detectors to assure rapid detection of fires. The ANO-1 Control Room is protected with a Halon system which discharges in the false ceiling and false floor and areas of the Control Room itself. The ANO-2 Control Room and Printer Room (actually part of the Control Room) are protected via detection, portable extinguishers, and a continuous fire watch in the form of Operations personnel. The Core Protection Calculator Room contains ionization detectors, a portable extinguisher, and a hose reel which is located outside the entrance to the room. Additionally, the fire loading in the CPC panel room is only 234 BTU/Ft<sup>2</sup>, assuming the transient combustible mentioned previously, which will support a standard fire for less than 11 seconds duration.

Due to the relatively low fire loading in this area, and due to the fact the heavy combustible concentrations are already provided with automatic suppression protection, we do not feel it necessary to install a full coverage automatic suppression system. The full coverage detection capability assures fires will be promptly detected, and the close proximity to personnel in the Control Room assures any fire would be promptly extinguished. Additionally, installation of a full coverage system to protect the CPC Panel Room, the Control Rooms, and the Health Physics Area could pose a safety hazard to the plant in the event of inadvertent system operation. We find that installation of such a system would not contribute to the overall plant safety, nor



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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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would it increase any margin of safety pertaining to the protection of the public.

The roof of the Core Protection Calculator Panel Room consists of sheet metal decking. Installation of a three-hour rated barrier in the roof of that room is not necessary, as that room contains a very low fire loading, no in situ combustibles, full coverage detection capability, and because it is easily accessed by the fire brigade. Additionally, the roof of this room is open to the atmosphere and does not directly separate this area from an adjacent area. Installation of a three-hour rated barrier over this room would not significantly increase the fire protection capability of this area, nor would it increase the protection of the public from the consequences of a postulated fire.

The installation of a three-hour rated fire damper in the ventilation louver in the north wall of the Health Physics area, Zone 2136-I, is not justified as this louver directly opens to the atmosphere. The louver can be used to provide outside air to the Health Physics and Electrical Penetration Room under adverse conditions. It does not connect this area with any other fire area. Hence, installation of a three-hour damper over this louver would not enhance the fire protection for the area under analysis, nor would such an installation prevent the spread of fire from this area into an adjacent fire area.

The installation of a three-hour rated door on the Auxiliary Building Elevator in the Health Physics Area, Zone 2136-I, is not warranted based on the fire loading in this or adjacent areas. The elevator doors are steel clad and have a minimum one and one-half hour rating. The elevator door separates this area from area "B." Area "B" has a fire loading of less than 54 minutes. The elevator door rating exceeds that loading with a substantial margin. We feel the protection afforded this fire area, through the modifications proposed and through current installations, is sufficient to meet Appendix R, and, as such, the addition of a three-hour rated door to the elevator in the ANO-2 Auxiliary Building at elevation 386' would not significantly enhance the fire protection for the area.

Fire Protection:

This area is equipped with full coverage ionization detection capability. The Cable Spreading Rooms are provided with full coverage automatic water spray systems. The ANO-1 Control Room is equipped with an automatic Halon suppression system to protect the false floor and ceiling areas. The Upper South Electrical Penetration Room of ANO-2 is equipped with a full coverage automatic water suppression system. The Health Physics Area of ANO-2 contains a partial coverage, manually actuated deluge system. The ANO-2 Control Room and Core Protection Calculator Room do not contain automatic suppression system capability.



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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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Modifications:

This area is being provided with alternative shutdown capability. The ANO-2 alternate shutdown system, which alleviates consequences of a fire occurring in fire Zones 2199-G, 2136-I, 2137-I, 2150-C, 2098-L, and 2119-H, was installed during the third refueling outage (2R3) which commenced in October 1983. Source Range Monitoring capability for the ANO-2 system was installed during the third refueling outage (2R3).

The ANO-1 alternative shutdown capability for this area will be installed in accordance with the schedules of 10CFR50.48, i.e., during the sixth refueling outage (1R6) as these modifications require an outage for completion.

These modifications have been previously approved by the NRC in the Safety Evaluation dated March 22, 1983 (ØCNAØ38328).

For the ANO-2 portion of this area, several barriers will need to be upgraded to a three-hour rating. These barriers include the walls around Zone 2150-C, the north wall of Zones 2136-I and 2137-I, the elevator's south, east and north walls, the floor and ceiling of Zone 2137-I, the ceiling of Zones 2136-I and 2199-G, and a small portion of the floor of Zone 2150-C. For ANO-1, the floor and ceiling of the Shift Supervisor's office and the ceiling of the Control Room will be upgraded.

The ANO-1 barrier upgrades will be accomplished during the sixth refueling outage (1R6) as required by 10CFR50.48. These modifications require an outage for completion. The ANO-2 barrier upgrades, which also require an outage for completion, were required by 10CFR50.48 to be in place after the third refueling outage (2R3) which commenced in October 1983. As AP&L received no written guidance from the NRC concerning this area-based analytical approach until September 22, 1983 (ØCNAØ983Ø8), this analysis and its ANO-2 outage-related modifications could not be completed during 2R3 as required. Hence, we must request a schedular exemption until the fourth refueling outage (2R4) to complete these modifications.

Exemption Requests:

One schedular exemption is requested for this area.

- Schedular exemption until the fourth refueling outage (2R4) for ANO-2 barrier upgrades.

The basis for this exemption is as follows:

We request a schedular exemption from the requirements of 10CFR50.48 to allow us time to complete barrier upgrades in this area for the

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

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REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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following reason. As stated previously, AP&L received definite written guidance concerning the fire area based analytical approach required by the NRC to meet Section III.G of Appendix R in the NRC's letter dated September 14, 1983 (ØCNAØ983Ø8). Subsequent to that letter, AP&L completed an area based analysis of ANO against Appendix R. Any ANO-2 modifications requiring an outage to affect completion were to be completed during the third refueling outage (2R3), which commenced in October 1983, in order to comply with 10CFR50.48. However, as our analysis was not completed until after the outage commenced, it was not possible to develop Design Change Packages, order equipment, have it delivered, and complete installation. Hence, we find it prudent to request an exemption until the fourth refueling outage (2R4) to allow us to complete the ANO-2 modifications. We have, to date, ordered the majority of the required fire dampers, fire doors, sealing materials, etc., and have initiated a detailed physical walkdown of ANO-2 fire barriers which commenced in January 1984. Design Change Packages will be developed as needed to support the fire barrier upgrade effort. As this area contains full coverage ionization detection capability, continuous presence of personnel in some locations, and as prompt fire brigade response to a fire in these locations is assured, this exemption will not result in a hazard to the safety of the plant or the public.

FIRE AREA: H

Elevation(s) Affected: 372'

Fire Zones in Fire Area: 87-H

Fire Loading: 61,890 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than 47 minutes

Area Description:

This area will be bounded by three-hour rated fire barriers. It encompasses the "Red" Diesel Generator Room.

Safe Shutdown Capability:

This area contains no redundant safe shutdown components. The "Green" Emergency Diesel Generator and associated components are available to supply power in the event this generator is not able to function.

Fire Hazard Analysis:

This area contains lube oil in the generator and diesel fuel in fuel lines and in the Diesel Fuel Day Tank. Transient combustibles are

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

restricted in this area. Hence, a fire resulting from transient combustibles is unlikely. The ventilation area located in the ceiling of this room contains no combustibles.

The west wall of this area contains a ventilation port which is available to supply fresh air during diesel generator operation. This port is enclosed by a curbing, which prevents accumulated suppression system discharge or diesel fuel leakage from draining to a location outside this area. The ceiling of this area contains ventilation louvers which provide an exit path for diesel generator exhaust gas leakage, diesel fuel fumes, and also provide inlet air to the diesel generator itself.

As in Area "D", which contains the redundant diesel generator room, Zone 86-G, these penetrations are open to the atmosphere; therefore, it is unlikely they would permit fire to spread from this area into any adjacent area. Sealing the ventilation port in the west wall of this area could allow exhaust gases to accumulate within the area, thereby introducing a hazard to diesel generator operation and personnel. The ventilation louvers in the ceiling of the area are needed to provide an exit path for exhaust gases and to allow heated air to escape, thereby preventing overheating of the diesel generator, and to supply air to the diesel generator itself to support operation.

The installation of either a three-hour penetration seal over the ventilation port in the west wall or three-hour rated dampers in the ventilation ducts supplying air to the room and to the diesel generator will not significantly increase the level of fire protection for this area, nor will it significantly increase the margin of safety to the public. Installation of fire dampers in the ventilation louvers could, in fact, cause maloperation for the diesel in the event room ventilation was lost, or could prevent the diesel from operating, in the event air could not be supplied to the fuel injection system on the diesel generator.

Fire Protection:

This area is protected with ionization, heat, and flame detectors which provide full area coverage. Additionally, a full area coverage automatic pre-action sprinkler system is provided to suppress any fire. The air intake louvers to the diesel generator are provided with ionization detection capability.

Modifications:

The west wall of this area is being upgraded to achieve a three-hour fire resistant rating, with the exception of a drainage port which is open to atmosphere. The ceiling of this area is also being upgraded to achieve a three-hour rating with the exception of the fresh air

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

ventilation louvers which connect directly to the atmosphere to provide fresh air to the area. This upgrade requires an outage for completion and hence will be completed in accordance with 10CFR50.48 during the sixth refueling outage (1R6).

Exemption Requests:

No exemptions are requested for this area.

FIRE AREA: I

Elevation(s) Affected: 372'

Fire Zones in Fire Area: 112-I, 98-J (except Rm. 109), 99-M

Fire Loading: 34,833 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than 27 minutes

Area Description:

This area contains the North Switchgear Room, the Diesel Generator/Battery/Cable Spreading Room Access Corridor, and the North Electrical Penetration Room. It will be enclosed by three-hour rated barriers.

Safe Shutdown Capability:

This area contains redundancies in the form of indication instrumentation, the vital AC instrumentation panels cabling, and in the form of power cables associated with the "swing" and "green" Makeup and Service Water pumps. The "red" switchgear and 4160v bus, diesel fuel transfer pump, inverters and 125v DC station battery are available to supply power in the event fire disables the "green" components.

Fire Hazard Analysis:

This area contains combustibles in the form of cable insulation. Access to this area is restricted. Transient combustible-caused exposure fires would be unlikely due to the limited access to the area. As this area is approximately beneath the control room, fire brigade access would be prompt.

As suppression has been provided to protect those locations where redundancies are routed in this area, and as the area contains full coverage detection capability, we feel the extension of the existing

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

suppression system in Zone 98-J to protect Zone 99-M, or the addition of a system in Zone 99-M (the "green" switchgear room), would not significantly increase the level of fire protection afforded this area. Zone 99-M, after completion of the 1R6 modifications mentioned below, will contain no redundant circuits. As damage resulting from the inadvertent actuation of a suppression system in this zone would additionally be severe, we do not think the installation of such a system is justifiable based on the safety of the public. We feel the combination of separation, one-hour barriers and automatic suppression already provided for this area are sufficient to meet the intent of Section III.G of Appendix R to 10CFR50.

Fire Protection:

This area is provided with full coverage ionization detection and partial coverage automatic water suppression capability. Zone 98-J is protected with a full zone coverage deluge water spray system which is actuated by ceiling-mounted smoke detectors and line-type heat detectors placed in cable trays. Zone 112-I is provided with a pre-action sprinkler system which is activated by smoke detectors. The switchgear room, Zone 99-M, is not protected by automatic suppression due to the possibility of damage to safety-related electrical equipment resulting from inadvertent operation.

Modifications:

The west wall of Zone 112-I, and the floor and ceiling of Zones 98-J and 112-I will be upgraded to a three-hour fire resistant rating. One-hour rated fire barriers have been provided to enclose a circuit powering the "red" RS panel, RS1. This conduit is further separated from redundant components by the deluge water spray system in Zone 98-J. Additionally, at least one channel of indication cabling has been separated from the other channels by one-hour barriers or 20 feet. The Safety Parameter Display System (SPDS) installed in the Control Room will also provide indication of at least one channel of required parameters if a fire occurring in this area eliminates other indications. Modifications are being made to both switchgear rooms to ensure the "swing" Makeup and Service Water pumps can be operated from either "red" or "green" power. With this modification, a fire in this area will not eliminate the capability to supply Makeup and/or Service Water to ANO-1. This modification will be completed during the sixth refueling outage, 1R6, in accordance with 10CFR50.48.



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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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Exemption Requests:

One exemption is requested for this area:

- Omission of three-hour rated coatings for structural steel supporting the ceiling of Zones 98-J and 112-I.

Exposed structural steel in this area is located in Zones 112-I and 98-J. These zones are provided with extensive suppression and detection capability. In order to coat exposed structural steel in these areas, it is likely several cable trays might have to be removed for some time period. In both of these zones, cable tray congestion is such that this alternative is not feasible. Because of the substantial amount of automatic suppression available in these areas, it is unlikely exposed structural steel would be subjected to 1100° F temperatures due to the cooling capability provided by system operation. Hence, we feel this exemption is justified and should be granted.

FIRE AREA: AA

Elevation(s) Affected: 317'

Fire Zones in Fire Area: 2007-LL

Fire Loading: 2556 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than two minutes

Area Description:

This area, which is located in the ANO-2 Auxiliary Building, is enclosed by barriers which will be three-hour fire resistant rated with the exception of a watertight door, door No. 206, which separates this area from previously discussed area "B". Specifically, that door separates area "AA" from Zones 2006-LL of area "B".

Safe Shutdown Capability:

This area contains redundancies in the form of power cables for both the "B" and "C" Service Water pumps. These cables are routed in conduit along the east wall of this area. Modifications will be made to the "B" Service Water pump power circuitry in association with a previously approved exemption (2CNA118301) dated November 1, 1983. Those modifications, which will be completed during the fourth refueling outage (2R4), will eliminate the existing redundancy in this fire area. The "B" Shutdown Cooling Pump is additionally located in

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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this Area "AA." However, a fire in this zone would not eliminate shutdown cooling capability as the "A" pump is located in a different fire area.

Fire Hazard Analysis:

Combustibles in this area are lightly filled cable trays and approximately 12 gallons of oil in pumps. Transient combustibles that could be brought to this area are lube oil or Class A combustibles used for pump maintenance. A fire in this area could potentially cause a loss of all service water as power cables for the "B" and "C" pumps could be damaged and the "A" pump could be out of service as allowed by Technical Specifications.

Door No. 206, which is a watertight door, is located in the south wall of this area. The "B" Shutdown Cooling pump is located approximately 19 feet from door No. 206. The "A" Shutdown Cooling pump in Zone 2014-LL of area "B" is located approximately 94 feet from door No. 206. The fire loading in the zones of area "B" located on elevation 317' of the ANO-2 Auxiliary Building, i.e., Zones 2006-U, 2010-LL and 2014-LL, is 7851 BTU/Ft<sup>2</sup>, which will support a standard fire for less than six minutes duration. Door No. 206, which will be administratively controlled as a fire door, is approximately one inch thick. A metal curb at the base of the door prevents the spread of oil from bridging the subject barrier in the event oil is spilled in either area "AA" or "B". Because of the separation provided between the pumps, and because of the negligible probability any spilled oil from one pump will create a fire of sufficient intensity to penetrate door No. 206 and disable the other pump, we feel the current protection provides separation adequate to meet Section III.G of Appendix R. The addition of a three-hour rated fire barrier would not significantly increase the level of protection afforded this area.

The Service Water conduit are protected such that one train is enclosed with a one-hour rated fire barrier and an automatic sprinkler system sprays both conduit as fusible heads are opened by heat. The extension of this system to provide full area coverage for area "AA" would not significantly increase the level of protection for this area as redundant trains are protected with the system currently installed. Extension of the existing system could result in the loss of safety-related equipment should inadvertent actuation occur, as pump motors and room coolers are enclosed in open, drip-proof cabinets. We feel the current system is adequate to protect the Service Water cables given the one-hour barrier installation, low fire loading, full coverage detection capability and accessibility of the area for fire fighting by the fire brigade. In accordance with the previously mentioned November 1, 1983, exemption (2CNA118301), modifications will be made to the "Swing" Service Water pump power circuitry which will eliminate the currently existing redundancy in this area. After

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

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REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

completion of those modifications, the suppression system in Area "AA" will no longer be necessary. The installation of a full coverage system would not significantly increase the level of protection for this area, nor would it significantly increase any margin of safety afforded the public.

Fire Protection:

This area is provided with full coverage ionization detection capability. A partial coverage sprinkler system has been installed to protect the "B" and "C" Service Water pump power cables in conduit. The need for this sprinkler system may be eliminated by the completion of the previously mentioned modifications associated with power circuitry for the "B" Service Water pump.

Modifications:

A one-hour rated fire barrier has been installed to protect one train of Service Water pump power cable in this area. The walls surrounding this area were upgraded to achieve a three-hour fire resistance rating during the third refueling outage (2R3) in accordance with 10CFR50.48. During the fourth refueling outage (2R4), in accordance with an NRC approved exemption (2CNA118301) dated November 1, 1983, modifications will be made to the "B" Service Water pump power circuitry, which will eliminate the redundancy in Area "AA." Upon completion of that modification, the previously installed suppression system will no longer be needed.

Exemption Requests:

No exemptions are requested for this area.

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

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REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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FIRE AREA: CC

Elevation(s) Affected: 335'

Fire Zones in Fire Area: 2024-JJ

Fire Loading: 2242 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than two minutes

Area Description:

This area is bounded by three-hour rated barriers with the exception of watertight door No. 306 which is located in the north wall of this area.

Safe Shutdown Capability:

This area contains no redundant safe shutdown components. Should a fire eliminate the "A" EFW pump, the "B" pump is still available as it is located in a separate fire area.

Fire Hazard Analysis:

This area contains approximately four gallons of lube oil in the EFW pump. All cables are routed in conduit, hence, no cable insulation is exposed. This area receives no traffic of personnel accessing other areas of the plant. Transient combustible fires would not be likely in this area.

Fire Protection:

This area contains full coverage ionization detection capability

Modifications:

The watertight door separating this fire area from adjacent areas was previously exempted in the NRC's letter dated March 22, 1983 (ØCNAØ38328) from the three-hour rating requirement of Section III.G.2 of Appendix R. The barriers surrounding this area were upgraded during the third refueling outage (2R3) in accordance with 10CFR50.48. The west wall of this area was upgraded by April 1, 1983, in accordance with our July 1, 1982, Appendix R submittal (ØCANØ782Ø2).

Exemption Requests:

No additional exemptions are needed for this area.

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

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REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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FIRE AREA: DD

Elevation(s) Affected: 335', 354'

<u>Fire Zones in Fire Area:</u>	2040-JJ	2019-JJ
	2032-JJ	2068-DD

Fire Loading: 4662 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than four minutes

Area Description:

This area is, or will be, enclosed by barriers which are three-hour rated, with the exception of two hatchways and one open bay area. One hatchway, which is covered by grating, is located in the southeast corner of the floor of Zone 2040-JJ and separates area "DD" from area "B". The second hatchway, which is also covered by grating, is located in the ceiling of Zone 2040-JJ above the floor grating-covered hatch and separates area "DD" from area "HH". The bay opening is located in the ceiling of Zone 2040-JJ along the west wall and separates area "DD" from area "HH" as well.

Fire Hazard Analysis:

The charging pumps contain approximately ten gallons of lube oil each. In order to assure that the contents of an oil spill are contained within the affected cubicle, floor drains are provided. Cable trays are additionally located in two of the three charging pump cubicles and in the corridor outside the cubicles. These trays are located approximately 8 to 12 feet above the floor. To preclude propagation of a fire from charging pump cubicle "A" out into the corridor via cable tray EB-163, a fire stop has been provided where this cable tray penetrates the full height wall on passing into the corridor. The "A" and "B" charging pump cable trays are separated by a minimum 12 feet of clear space. Ignition of cables in these trays would be difficult without a large exposure source. Since fire stops have been provided at wall penetrations, a cable tray fire originating in a charging pump cubicle would not propagate outside the affected cubicle. Cable trays in the corridor are located above piping which will diffuse and absorb heat from a spill fire and serve as a radiant barrier. Because of the separation afforded "red" and "green" charging pump cable trays, it is unlikely an exposure fire would damage both divisions.

The hatchway in the southeast corner of the floor of Zone 2040-JJ is covered with grating. The "red" charging pump Motor Control Center is located greater than 20 feet from this grating on elevation 335' in Zone 2040-JJ. However, the "green" charging pump Motor Control Center



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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

is located on elevation 354' in Zone 2073-DD, fire area "HH". Zone 2006-LL, fire area "B", is located on elevation 317' below this hatchway. Zone 2006-LL contains service water cabling for the service water pumps. However, this cabling, which is routed in conduit, is protected with automatic suppression, and two of the three trains of cabling are enclosed in one-hour rated barriers. There are no redundancies between fire area "DD" and elevation 317' of fire area "B". As this hatchway serves as an equipment access hatch for elevation 317', we have elected to install a steel hatch with a fireproof coating on one side to prevent radiant heat transfer and smoke propagation from one side of the hatch to the other. The fire loading on elevation 317' is 7851 BTU/Ft<sup>2</sup>, which will support a standard fire of less than six minutes duration. The hatch will be adequate to assure a fire in area "B" will not spread to area "DD" via the subject hatchway. This installation will be completed with the wall upgrades during the fourth refueling outage (2R4).

The hatchway in the southeast corner of the ceiling of Zone 2040-JJ is covered with grating as well. The "green" charging pump Motor Control Center is located 30 feet from the subject hatch in Zone 2073-DD of fire area "HH". Fire area "HH" has a fire loading of 9306 BTU/Ft<sup>2</sup>, which will support a standard fire for less than seven minutes. Area "HH" contains electrical cable insulation as the primary combustible. It contains no lube oil or other combustible fluid on a permanent basis. We have also elected to install a steel hatch similar to the one mentioned above to prevent smoke propagation and radiant heat transfer from one side of this hatch to the other. The fire loading in the affected areas would not cause extreme temperature; therefore, the hatch would not fail under fire conditions.

The redundancy within area "DD" is the existence of the three charging pump cubicles. An exemption for the omission of suppression was previously granted for this area based on the installation of one-hour barriers on charging pump cables mentioned previously to provide greater than 20 feet on horizontal separation between unprotected redundant cables. We understand that exemption granted in NRC's letter dated March 22, 1983 (ØCNAØ38328) is still valid. Hence, an exemption for partial suppression coverage is not needed for this area.

We are not extending the detection system for this area to provide full area coverage. As mentioned previously, full zone coverage detection is installed in Zones 2040-JJ and 2068-DD of this area. Safety-related cabling and components are routed in these two zones. Zones 2019-JJ and 2032-JJ are enclosed in masonry walls. These zones contain no cables or combustibles of any kind, nor do they contain components redundant to those in the remainder of the area. These zones are merely tank rooms. The installation of detection in these zones would not significantly increase the level of fire protection afforded this area, nor would it increase the margin of safety to the public.

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

We are not installing a three-hour rated door in the south wall of Zone 2040-JJ adjacent to Zone 2026-Y of Area "B". Currently, a normally closed, watertight door, No. 358, is installed in the subject barrier. This door is approximately one inch thick, and is constructed of heavy gauge steel. The door sealing gasket is protected from exposure fire damage by a metal curb. The fire loading in Zone 2026-Y will support a standard fire for less than four seconds duration. The fire loading in Area "DD" will support a standard fire for less than four minutes duration. The light fire loading adjacent to the fire door is insufficient to challenge its structural integrity. Replacement of this door with a three-hour rated fire door would not significantly increase the level of protection afforded Areas "B" or "DD."

As with other areas, we are not installing a three-hour rated door on the Auxiliary Building elevator, Zone 2040-JJ. The elevator doors are fire rated for a minimum one and one-half hours of fire resistance. The elevator connects this area with Zone 2073-DD, Area "HH," elevation 354'; Zone 2136-I, Area "G," elevation 386'; and with elevation 404' of Area "B." As the fire loads in Areas "HH," "G," and "B" are substantially less than one and one-half hours, and as the fire load in Area "DD" is less than four minutes, the existing doors are sufficient to ensure fire does not propagate from this area into adjacent areas or vice versa by way of the elevator shaft. The addition of three-hour rated doors on the elevator would not significantly enhance the level of protection afforded Area "DD."

Fire Protection:

This area is provided with full zone coverage detection capability in Fire Zones 2040-JJ and 2068-DD. Fire Zones 2032-JJ and 2019-JJ do not contain ionization detectors, as each of these zones contain no combustibles and is completely cut off by masonry walls. Pyrocrete or monokote will be applied to upgrade the grating covered hatchways to achieve a three-hour fire resistant rating. A closed-head automatic sprinkler system will be installed to provide a "water curtain" to protect the bay opening, as smoke propagation should not affect the equipment located in this and adjacent affected areas. The walls enclosing Zone 2068-DD are three-hour rated, but a fire door will have to be installed in the east wall of that zone.

Modifications:

The bay opening sprinkler system header piping was installed during the third refueling outage of ANO-2. We anticipate completing this installation by the end of September 1984. The floor of Zones 2040-JJ, 2032-JJ and 2019-JJ, and the west and north boundary walls of Zone 2040-JJ will be upgraded to a three-hour rating in accordance with Appendix R. These upgrades require an outage for completion. We have already ordered equipment needed to complete these upgrades, and

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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attempted to complete these modifications during the third refueling outage (2R3). However, the fire dampers and doors necessary to complete this work could not be delivered in time to facilitate that completion. Two of three charging pump cables have been enclosed in a one-hour barrier and one train of the charging pump corridor area cable trays has been protected with a one-hour barrier for a sufficient length to permit 20 feet of horizontal separation between unprotected redundant cables.

Exemption Requests:

We request the following exemptions for this area:

- Omission of a three-hour rated barrier in bay opening in ceiling along west wall of Zone 2040-JJ.
- Omission of structural steel coating in Zone 2040-JJ under Rooms 2082 and 2083.

The bases for these exemptions are as follows:

The bay opening in the ceiling along the west wall of Zone 2040-JJ also connects that zone in area "DD" with Zone 2073-DD of area "HH". The "red" charging pump MCC mentioned previously is located approximately 58 feet from this opening. The "green" charging pump MCC is located approximately 80 feet from this opening. The "red" charging pump (2P36A) cubicle entrance is located approximately 45 feet from the bay opening, while the "green" and "orange" cubicle entrances are separated by greater than 72 feet from this opening. Because of the separation of the "green" MCC from the "red" MCC by large distances and because of the low fire loading in each area, the installation of a three-hour rated barrier over the bay opening is unwarranted. Smoke propagation from area "DD" into area "HH" through this opening will not affect equipment in area "HH".

We have elected to install a closed head, close spaced sprinkler system to act as a "water curtain" to protect this bay opening at elevation 354' in Zone 2073-DD in lieu of installing a three-hour barrier. We will complete this system by the end of September 1984.

We request an exemption from coating structural steel under Rooms 2082 and 2083 in Zone 2040-JJ, as the fire loading does not warrant such protection. The fire loading in area "DD", which will support a standard fire for less than four minutes duration, will yield a temperature of approximately 800°F, which is substantially below the critical temperature of 1100°F. Hence, no coating of exposed structural steel is necessary, and this exemption should thus be granted as a fire in area "DD" would not result in the collapse of an

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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area boundary barrier due to temperature-induced yield stress decreases.

The following schedular exemption is requested for this area:

- We request a schedular exemption until the fourth refueling outage (2R4) to complete barrier upgrades for this area.

The basis for this exemption is as follows. AP&L identified the need to upgrade these walls in accordance with its reanalysis in October 1983. Some fire dampers and other hardware were placed on order during October and November 1983. AP&L initiated the third refueling outage (2R3) on approximately October 5, 1983, with the outage planned to be of eight weeks duration. These modifications require an outage for completion. However, necessary hardware could not be delivered until after the outage was completed. Since this modification was required by 10CFR50.48 to be completed during the third refueling outage (2R3), we find it prudent to request a schedular exemption to the requirements of that regulation until the fourth refueling outage (2R4) to complete the subject barrier upgrades. AP&L has demonstrated a good faith effort by identifying these items promptly and taking action to complete them in accordance with regulatory requirements even though insufficient time was available to accomplish that goal. This exemption is justified and should be granted.

FIRE AREA: EE

Elevation(s) Affected: 335', 354', 372'

Fire Zones in Fire Area: 2055-JJ  
2111-T  
2084-DD  
Rooms 2082, 2083 of Zone 2073-DD

Fire Loading: 5905 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than five minutes

Area Description:

This area includes two piping penetration rooms and one electrical penetration room. The area is or will be bounded by three-hour rated barriers.

Safe Shutdown Capability:

This area contains redundancies in the form of the emergency feedwater supply valves to steam generator "A", and in the form of the High Pressure Safety Injection to RCS supply valves and the charging pump



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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

discharge headers. If a fire in this area caused 2CV-0714-1 to open, the 2P7B emergency feedwater train could be disabled by flow being diverted to the test loop.

If 2CV-1026-1 or 2CV-1037-2 close, 2P7A would not be able to deliver emergency feedwater to steam generator "A". However, these losses can be sustained because emergency feedwater can still be supplied to steam generator "B" via 2P7A, thereby providing a means for decay heat removal.

If 2CV-4840-2 closes, charging will have to be routed via the Safety Injection System using one of the four High Pressure Safety Injection to the Reactor Coolant System valves in RCS pressure rated piping. All of these valves are also located in this area.

Fire Hazard Analysis:

This area contains combustibles in the form of cable insulation only. Conservatively calculated fire loadings for this area show a fire can be sustained for less than five minutes duration, which will result in a maximum temperature of less than 1000°F. The redundancies in question in this area are the High Pressure Safety Injection supply valves to the Reactor Coolant System loops and the charging pump discharge header valve. As the piping associated with these valves contain fluid, substantial heat transfer capability is available to assure the valves' internals are not damaged due to heat. These valves can also be manually operated after any fire occurring within this area was extinguished. This area is easily accessed from the control room. Hose reels have been provided outside the area to aid in the prompt extinguishment of fires in this area. This area is additionally provided with full area coverage ionization detection capability. As the analyzed fire duration in this area is less than five minutes, and as a charging pump will not be needed until at least one hour and a half after the initial shutdown, sufficient time is available to allow both extinguishment of any fire and manual operation of any of the valves needed to accomplish charging of the RCS.

As stated previously, this area contains combustibles in the form of cable insulation. Our previous submittal regarding Appendix R compliance dated July 1, 1982 (ØCANØ782Ø2), stated electrical cable was tested to IEEE 383 qualifications with some modifications. As the cable is flame resistant, propagation of flame requires a large ignition source. No ignition sources in the form of combustible liquids or other forms are available in this fire area. The cabling associated with the subject valves is routed in steel conduit, and is thus protected from an exposure fire. One of the HPSI discharge valves into the RCS, 2CV-5015-1, is separated from the charging pump discharge header valve, 2CV-4840-2, by approximately 34 feet with no intervening combustibles.



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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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A second HPSI discharge valve, 2CV-5055-1, is separated from the charging pump header valve by approximately 20 feet, also with no intervening combustibles. Hence, separation of greater than 20 feet between redundant trains within the same fire area has been provided in accordance with Section III.G.2 of Appendix R to 10CFR50.

Room 2084, the Upper South Piping Penetration Room, contains three cable trays and numerous motor-operated valves, including those referenced above. Two cable trays are routed along the south wall of the room. One of those trays contains approximately eleven small diameter "green" cables. The other tray contains a smaller amount of "black" cables. Those trays are not routed in proximity to the safe shutdown-related valves. The trays are routed approximately eight feet above the floor, and only traverse approximately one-third of length of the room. The third cable tray contains approximately fifteen "black" cables, and is located approximately ten feet above the floor. That tray bisects the room into a north and south half. That tray is routed such that it would not introduce a viable flow path for fire from one redundant valve circuit to another. In order to ignite any of the cabling in any of the three trays, a large ignition source would be required. The transient combustible which could reasonably be expected in Zones 2055-JJ and 2084-DD, would be a small amount of grease and less than a pint of solvent. Floor drains would contain any liquid spill. Valve cabling, as it is routed in conduit above the floor, would not be susceptible to an exposure fire. Because of the cable tray heights above the floor, it is unlikely an exposure fire would ignite any of the cabling routed in the trays as well.

Both Zone 2055-JJ and 2084-DD are high radiation areas. Both locations require a Health Physics escort and hard key/card reader entry. Card readers in these areas attached to doors providing access are normally de-energized. The H.P. escort accompanying personnel desiring access energize card readers prior to access; hence, security clearance is required for access as well. Because the fire loading in this area is light, the valves in this area would be manually operable after a fire, and because any fire in this area would be quickly extinguished, either by burning itself out within minutes, or by being promptly extinguished by the fire brigade, it is not necessary to install automatic suppression in these zones.

Zone 2111-T is currently provided with a full zone coverage automatic suppression system to protect safety-related cabling located in the lower south electrical penetration room. The two piping penetration rooms, Zones 2055-JJ and 2084-DD contain valves and piping, which, as mentioned above, will still be operable after a fire. Hence, we find the extension of automatic suppression coverage in this area to protect Zones 2055-JJ and 2084-DD will not enhance the fire protection for this area, nor would such an extension enhance any margin of safety pertaining to the public.

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

We are not sealing the steam generator blowdown line penetration in the south wall of Zone 2055-JJ with three-hour rated material. This piping undergoes movement, and cannot be sealed. It is normally hot; hence, silicone foam cannot be applied as a sealing material. The penetration connects this area, Area "EE", with Area "DD". The fire loadings in each respective area will support a standard fire of less than five minutes and less than four minutes respectively. The combustible loading in Zone 2055-JJ will support a standard fire for less than eight minutes duration, while the combustible loading in Zone 2040-JJ, which is adjacent to Zone 2055-JJ, will support a standard fire for less than four minutes duration. Hence, the omission of a three-hour rated seal for this penetration would not increase the level of protection for either area, nor would it increase the margin of safety afforded the public.

Fire Protection:

This area contains full coverage ionization detection and partial coverage automatic suppression capability.

Modifications:

The floor of Zone 2055-JJ, the south, east, and west wall of Zone 2055-JJ, the west wall of Zone 2111-T, and the south, east, and west walls of Zone 2084-DD have to be upgraded to achieve a three-hour fire resistance rating. The walls around Zone 2084-DD have been upgraded during the third refueling outage (2R3) in accordance with the schedules of 10CFR50.48, with the exception of one fire door. The east wall of Zone 2055-JJ has also been upgraded during 2R3 as well. The hardware necessary to complete these upgrades has been ordered, but did not arrive in time to facilitate completion of this work during 2R3.

Exemption Requests:

The following exemptions to the requirements of Section III.G.2 of Appendix R is requested for this area:

- Omission of structural steel coating, roof of 2111-T
- Omission of automatic suppression in Zone 2084-DD

The bases for these exemptions are as follows.

We request an exemption from the requirement of Section III.G.2 of Appendix R to protect exposed structural steel forming a part of a boundary fire barrier equivalent to the rating of the barrier itself. The fire load in area "EE" will support a fire duration of less than five minutes. Thus, the maximum temperature attainable during a fire would be 1000°F, which is below the critical temperature of 1100°F.

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

Coating of the subject structural steel in this area is unwarranted, as the fire loading will not induce failure from decrease yield stresses. This exemption should be granted.

We request an exemption from the requirement to install automatic suppression in Zone 2084-DD because of the low combustible loading in the area, the low probability of introduction of an ignition source into that Zone, and because sufficient time is available to allow operators to extinguish any fire and manually operate any of the necessary valves. As stated in the fire hazard analysis section, approximately thirty-four feet of separation with no intervening combustibles is provided between one set of redundant valves within Zone 2084-DD. As that zone contains two charging pump discharge header isolation valves, and four High Pressure Safety Injection isolation valves, any one of which could be used to accomplish charging of the RCS, it is not credible to assume a fire would eliminate the safe shutdown capability within this area. Additionally, all of these valves are manually operable. Charging, as credited elsewhere in this submittal, need not be accomplished until approximately one and one-half hours after the initial plant shutdown, assuming maximum Technical Specification RCS leakage. As any fire occurring in this area would be promptly detected, alarmed in the control room, and extinguished by the fire brigade via a hose reel adjacent to the area, sufficient time is available for manual operation of any of the necessary valves. The addition of automatic suppression coverage for this area would not increase its level of protection, nor would it increase any margin of safety pertaining to the public.

We request the following exemption to the schedular requirements of 10CFR50.48:

- We request until the fourth refueling outage (2R4) to complete the wall upgrades for this area.

As mentioned previously, we have ordered equipment necessary to complete the subject barrier upgrades. However, as these modifications were identified in October 1983, and as the outage ended in December 1983, we were not able to complete the subject upgrades this outage. We demonstrated a good faith effort to complete these items in accordance with 10CFR50.48. However, as this work requires an outage to complete, we find it prudent to request an exemption to the schedules of 10CFR50.48 until 2R4, which is scheduled to commence in mid-1985.

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

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REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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FIRE AREA: FF

Elevation(s) Affected: 335'

Fire Zones in Fire Area: 2025-JJ

Fire Loading: 3155 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than three minutes

Area Description:

This area is bounded by three-hour rated barriers with the exception of watertight door no. 335, which separates this area from area "DD". The area contains the "B" emergency feedwater pump room.

Safe Shutdown Capability:

This area contains components associated with the "B" emergency feedwater pump. This area additionally contains the cooling water supply valve to the 2P7A EFW pump turbine bearing. That valve, which is a solenoid valve, is only required to be de-energized in order to cause it to open. Should a fire occurring in this area disable the "B" EFW pump, the "A" pump would still be available to supply feedwater to both steam generators in order to remove decay heat from the RCS.

Fire Hazard Analysis:

This area contains approximately six gallons of lube oil. No other combustibles are present in this area. The area is not located along a through access way; hence, traffic into the area is limited.

The fire loading in area "FF" will support a standard fire for less than three minutes. The fire loading in area "DD" will support a standard fire for less than four minutes. Components necessary for the operation of components redundant to those in this area are located in area "DD", but they are separated from this area by a one-inch thick, steel watertight door and at least an additional 20 feet of space. That door will be administratively treated as a fire door once wall upgrades are completed. Redundant components located in area "CC" are separated from area "DD" by two closed, one-inch thick, steel watertight doors, and at least nine feet of space. The fire loading in area "CC" will support a standard fire for less than two minutes duration. There are no exposed combustibles in the area outside door no. 335. Detection capability is provided in area "DD" adjacent to this area, as well as in area "CC". Since this door is watertight, it is provided with a low metal curb which will ensure any oil spill will

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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not directly contact the gasket seal on the door. Additionally, the area is provided with floor drains which will contain any oil spill. Because of the low fire loading in this area, and because of the additional protection provided, the addition of a three-hour rated fire door would not significantly increase the level of protection for the area, nor would it significantly increase the margin of safety to the public.

The 2P7A emergency feedwater pump turbine bearing cooling water supply valve is located in this area, as mentioned above. Whenever the steam supply valve to 2P7A is opened, power to the cooling water supply valve is automatically removed, thereby allowing cooling water flow to be admitted to the pump bearing. Cabling associated with this valve is routed in individual conduit within area "FF"; hence, no credible hot short resulting from a fire in this area could cause this valve to remain energized and prevent cooling water admission.

Fire Protection:

The area is provided with full coverage ionization smoke detection capability.

Modifications:

As stated previously, the 2P7A EFW pump turbine bearing cooling water supply valve is contained in this area. However, for reasons stated previously, no modifications are necessary for circuitry associated with this valve.

Exemption Requests:

No exemptions are requested for this area.



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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

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REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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FIRE AREA: GG

Elevation(s) Affected: 335', 354'

Fire Zones in Fire Area: 2081-HH  
2076-HH

Fire Loading: 5033 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than four minutes

Area Description:

This area, which will be enclosed by three-hour barriers, contains an electrical equipment room and a piping penetration room.

Safe Shutdown Capability:

A fire in this area could cause 2CV-0798-1 to open, thereby disabling the 2P7B by diverting emergency feedwater flow to the test loop. If 2CV-1039-1 or 2CV-1076-2 closes, 2P7A cannot deliver emergency feedwater to steam generator "B". However, decay heat will still be removed by 2P7A supplying feedwater to steam generator "A".

The Diesel Fuel Transfer Pumps from ANO-1 are available to supply diesel fuel to the ANO-2 diesel generators, should a fire occurring in this area disable the ANO-2 pumps.

Fire Hazard Analysis:

Zone 2076-HH contains in situ combustibles in the form of cable insulation. Zone 2081-HH contains no in situ combustibles. Zone 2076-HH is separated from Zone 2081-HH by a masonry wall. Damage from an exposure fire in Zone 2076-HH would be unlikely, as this zone contains electrical equipment. Valve cabling is routed in conduit, and would not be damaged by an exposure fire. Zone 2081-HH contains piping and motor-operated valves.

Fire Protection:

This area contains full coverage ionization detection capability.

Modifications:

The floor of Zone 2076-HH requires upgrading to a three-hour rating. The south walls of Zone 2081-HH and 2076-HH were upgraded during the third refueling outage (2R3) in accordance with the schedules of

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

10CFR50.48. Modifications to allow the use of the ANO-1 Diesel Fuel Transfer pumps were previously completed.

Exemption Requests:

We request a scheduler exemption from the requirements of 10CFR50.48 until the fourth refueling outage (2R4) to complete modifications associated with the floor of Zone 2076-HH. As this zone contains safety-related DC equipment, an outage is required to complete this work. As this work was not identified until October 1983, when 2R3 was in progress, we could not obtain all materials necessary to complete this work prior to outage completion. Hence, we find it appropriate to request an exemption until the fourth refueling outage (2R4) to complete this work.

FIRE AREA: HH

Elevation(s) Affected: 354', 372'

<u>Fire Zones in fire Area:</u>	2063-DD	2108-S
	2072-R	2107-N
	2106-R	2096-M
	2073-DD (excluding Rooms 2082, 2083)	

Fire Loading: 9306 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than seven minutes

Area Description:

This area will be bounded by three-hour fire barriers with some exceptions. It contains a DC equipment room, a Motor Control Center, and various tank and pump rooms, and the general access area for the ground elevation of the ANO-2 auxiliary building. This area is connected to area "DD" via a steel covered hatchway and a bay opening mentioned previously in the analysis for that area.

Safe Shutdown Capability:

This zone contains redundant components in the form of the Diesel Generator Jacket Cooler Outlet Valves, 2CV-1504-2 and 2CV-1503-1. The loss of these valves would result in the inability to supply cooling water to the Emergency Diesel Generators.

This area additionally contains the Motor Control Center and cabling associated with the "green" charging pump, 2P36B, cabling for the "red" service water pump, 2P4A, and the "green" diesel fuel transfer pump, 2P16B.

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

If a fire should affect the "green" charging pump components, the "red" and/or "swing" pumps would still be available to supply makeup water to the RCS.

If the "red" service water pump power cable were damaged by fire, the "green" and/or "swing" pumps would be available to supply service water.

The "red" ANO-2 and "red" and "green" ANO-1 diesel fuel transfer pumps are available to supply diesel fuel to the emergency diesel generator day tanks if a fire damaged the "green" ANO-2 pump.

Fire Hazard Analysis:

This area contains in situ combustibles in the form of cable insulation, approximately three gallons of oil in pumps, and approximately  $1.1 \times 10^6$  BTU in the form of chemicals including hydrogen and nitrogen in pressurized cylinders. The area, as it does not contain large quantities of oil in pumps, would not be subjected to large oil concentrations in the form of transient combustibles. A large exposure fire would not be likely to occur in this area.

Automatic suppression has been provided to protect the diesel jacket cooler valves, and a one-hour barrier has been provided to protect conduit for one of the valves where they are separated by less than 20 feet. Automatic detection has been provided for this area as well. The diesel jacket cooler valves will not be needed until at least an hour and a half after shutdown, as a diesel generator is not needed until that time. Because of the low fire loading in this area, the probability of a fire in this area overwhelming the partial coverage suppression system is negligible. As the partial area coverage provided is adequate to protect redundant safe shutdown equipment in this area, the extension of this coverage to spray the entire area would not enhance the level of fire protection for this area.

Similarly, this area has been provided with ionization detection capability in all fire zones except 2063-DD. As 2063-DD contains no safe shutdown equipment, and as it is separated by masonry walls from the remainder of area "HH", it has not been provided with ionization detection capability. As the remainder of area "HH" contains such capability, and as redundant safe shutdown equipment is already protected by a one-hour barrier and by partial suppression, the installation of ionization detectors in Zone 2063-DD would not significantly enhance fire protection in the area. The modifications mentioned for area "DD" for the covered hatchway and the exemption requested for area "DD" in association with the bay opening preclude the necessity of discussing those items in this fire area.

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

We are not installing a three-hour rated fire door in the south wall of Zone 2073-DD adjacent to Zone 162-A of Area "B". Currently, watertight door No. 375 separates these two areas in the subject barrier. That door is normally closed. It is of the typical one inch thick, heavy gauge steel construction mentioned in conjunction with similar analyses. The fire loading in Zone 162-A, which is a stairwell enclosed by steel reinforced concrete walls, is 0 BTU/Ft<sup>2</sup>, as that zone contains no combustibles. However, by assuming a transient combustible of 100,000 BTU is introduced into the stairwell, a fire loading of 75 BTU/Ft<sup>2</sup> is apparent. This fire loading will support a standard fire of less than four seconds duration. As the fire loading in Area "HH" will support a standard fire of less than seven minutes duration, the replacement of door No. 375 with a three-hour rated fire door will not significantly increase the level of fire protection for this area, nor will it increase the margin of safety afforded the public.

Fire Protection:

This area contains partial coverage automatic suppression and partial coverage automatic detection capability. Automatic detection is provided for full zone coverage in Zones 2073-DD, 2072-R, 2096-M, 2108-S, 2107-N, and 2106-R. No detection coverage is provided for Zone 2063-DD. The fire load in Zone 2063-DD is 1572 BTU/FT<sup>2</sup>, and that zone is cut off by masonry walls from the other zones in this area. Automatic suppression capability will be provided in the Bay Area of Zone 2073-DD.

Modifications:

One diesel jacket cooler valve conduit has been protected with a one-hour rated barrier where conduit associated with both valves are separated by less than 20 feet. Additionally, header piping for a partial coverage automatic suppression system to protect these valves was installed during the third refueling outage (2R3). As mentioned in association with the section concerning fire area "DD", Zone 2073-DD of area "HH" connects with Zone 2040-JJ of area "DD" via a bay opening in the floor along the west wall of Zone 2073-DD and via a covered hatch in the floor of the southeast corner of Zone 2073-DD. The "water curtain" of closed head, close spaced design being installed to protect that bay opening, and the diesel jacket cooler valve suppression system mentioned above, will be installed by the end of September 1984. The covered hatch connecting area "DD" and area "HH" will be protected with pyrocrete or monokote to achieve a one-hour equivalent fire resistant rating.



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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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Exemption Requests:

The following exemptions are requested for this area:

- Scheduler exemption until the fourth refueling outage (2R4) to complete modifications associated with barrier upgrades.

The west and north walls of Zone 2073-DD, and the north and east walls of the Auxiliary Building elevator shaft were upgraded during the third refueling outage (2R3). However, hardware necessary to upgrade the floor of Zones 2073-DD, 2063-DD, and 2107-N could not be procured in time to facilitate completion of those modifications during 2R3. Since those modifications require an outage for completion, as safety-related equipment could be affected by construction, we request a scheduler exemption until the fourth refueling outage (2R4) to complete those modifications.

FIRE AREA: II

Elevation(s) Affected: 372'

Fire Zones in Fire Area: 2101-AA

Fire Loading: 23,235 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than eighteen minutes

Area Description:

This area is completely enclosed by three-hour rated barriers. It contains electrical switchgear and other electrical equipment.

Safe Shutdown Capability:

A fire in this area could cause the loss of the ESF "red" 4160V bus, 2A3; the ESF "red" 480V bus 2B5; the "red" power to the "swing" charging pump and service water pump, 2P36C and 2P4B respectively; all "red" 4160V switchgear, power to the "red" charging and service water pumps, 2P36A and 2P4A; and "red" diesel generator auxiliaries. The "green" components redundant to the above are available to supply necessary functions if the above functions are lost, with the exception of the "swing" charging and service water pumps. However, an exemption was approved for completing modifications to supply "green" power to these pumps via disconnect switches until the fourth refueling outage (2R4). With the completion of those modifications, no redundant functions will be impaired by a fire in this area.



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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

Fire Hazard Analysis:

This area contains electrical cabinets and cables. In situ combustibles include cable insulation. Damage to components resulting from an exposure fire would be unlikely because of access restrictions to this area.

Fire Protection:

This area contains full coverage ionization detection capability.

Modifications:

Interrupter switchgear have been purchased which will ensure the "swing" service water pump can be powered by "green" power from Zone 2100-Z in area "JJ" in the event a fire eliminates "red" power in this area. Disconnect switches have been purchased which will ensure the "swing" charging pump can be powered with "green" power from that same zone in area "JJ" with the loss of the "red" bus. With these modifications, this area will comply with Section III.G of Appendix R.

Exemption Requests:

An exemption (2CNA118301) until the fourth refueling outage (2R4) has been granted to allow AP&I to complete the above-mentioned modifications. No additional exemptions are necessary.

FIRE AREA: JJ

Elevation(s) Affected: 372'

<u>Fire Zones in Fire Area:</u>	2100-Z	2102-Y
	2097-X	2109-U
	2094-Q	

Fire Loading: 53,323 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than forty minutes

Area Description:

This area contains the "green" switchgear room, diesel generator access corridor, "green" diesel generator room, the "green" battery room, and other rooms. It will be bounded by three-hour rated fire barriers, with the exception of ventilation louvers in the ceiling of the diesel generator room.

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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Safe Shutdown Capability:

A fire occurring in this area could disable the "green" 4160V and 480V switchgear, busses, and diesel auxiliaries; the "green" vital 125V DC battery bank, the vital instrument AC power panels; the "green" emergency diesel generator, and the "green" diesel fuel transfer pump. The "red" components are still available to supply 4160V and 480V power, the "red" diesel generator and auxiliaries are still available, and the "red" electrical busses, 125V DC battery bank, and diesel fuel transfer pump are all available to accomplish necessary functions in the event the "green" components were disabled. The instrument AC panels, "swing" charging pump, and "swing" service water pump, which could be affected as well, are all protected by modifications.

Fire Hazard Analysis:

This area contains diesel fuel in a day tank enclosure, lube oil for the diesel generator in its crankcase, and combustibles primarily in the form of cable insulation. Transient combustibles are brought into the area during maintenance activities on the diesel generator. An exposure fire would be likely to occur in the diesel generator room itself or in the access corridor. As cabling in these areas is routed several feet above the floor, damage would be slight.

Automatic suppression is provided in locations where redundant components are located in proximity to each other. One-hour barriers have also been used extensively to provide additional separation to meet Section III.G. The section of this area containing a substantial fire hazard, the north diesel generator room, is provided with full zone coverage automatic suppression as well. The unsuppressed areas, which contain high voltage switchgear, Motor Control Centers and the "green" station battery bank, could suffer damage from automatic water suppression coverage. As these areas are provided with detection capability and as they are accessible within a few minutes of a fire alarm in the control room, they do not require the provision of an automatic suppression system. Additional coverage would not significantly enhance the level of fire protection for this area, nor would it increase significantly any margin of safety pertaining to the public.

A three-hour rated fire damper in the two sets of ventilation louvers in the ceiling of the diesel generator room is not needed for reasons similar to those in ANO-1. The ventilation louvers in question serve two functions: (1) one set of louvers provide fresh air to the diesel generator room from outside the Auxiliary Building, and (2) the second set of louvers provides air to the diesel generator to support combustion. These louvers open directly to the atmosphere. They do not provide a viable flow path for fire from this area into an adjacent

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

area. Because the level of protection provided for the diesel generator room is high, as it includes full zone coverage pre-action automatic suppression, three-hour rated fire barriers on four sides (the fifth and sixth sides are the ceiling, mentioned above, and the wall connecting to the Zone 2109-U respectively), and full zone coverage automatic detection capability, the containment of fire within this area is further assured. The addition of a fire damper in the subject ventilation openings would not increase significantly the level of fire protection for the area, nor would it increase the margin of safety pertaining to the public. As with ANO-1, the installation of fire dampers could cause the diesel generator to fail to operate due to poor fuel/air mixtures caused by a reduction or stoppage of intake air flow, or to increased room temperature during operation.

Fire Protection:

Zone 2109-U (diesel generator access corridor) contains a deluge water spray system actuated by smoke and line-type heat detectors which provides full zone coverage. Zone 2094-Q, the north diesel generator room, contains a full zone coverage pre-action sprinkler system. This area is provided with full area coverage ionization detection capability.

Modifications:

One vital instrument AC panel, 2RS4, has been enclosed in a one-hour barrier. The inverter feeds to 2RS3 and 4 have been enclosed with one-hour barriers. "Red" diesel generator cabling is no longer routed through this area. All AC panels (2RS1, 2, 3 and 4) are also protected by the water spray system in Zone 2109-U. Partial suppression is used in Zone 2109-U and one-hour barriers where redundant conduit are separated by less than 20 feet. The "swing" service water and charging pumps will be capable of obtaining power independently of Zone 2100-Z in this area via the use of interrupter switchgear or disconnect switches, and will obtain power from Zone 2101-AA, area "II", if needed. An exemption to complete these modifications during the fourth refueling outage (2R4) was previously granted by the NRC in its letter dated November 1, 1983 (2CNA118301).

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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Exemption Requests:

The following exemptions from the requirements of Section III.G of Appendix R are requested for this area:

- Omission of coatings for exposed structural steel supporting the ceiling slab of Zone 2109-U
- Omission of an approved fire test for the one-hour rated barrier enclosing 2RS4

We request an exemption from the requirement to coat structural steel forming part of a boundary fire barrier in Zone 2109-U for the following reason. Corridor 2109 contains multi-level cable trays, conduit, and safety-related electrical equipment. It is not feasible to coat structural steel supporting the ceiling of that corridor, nor is such protection warranted. While the fire loading in this area could theoretically cause the steel to be subjected to temperatures exceeding 1100° F, the directional water spray system in Corridor 2109 will be actuated during the early stages of a fire, and will ensure the steel remains at relatively low temperatures prior to the extinguishment of any fire. The protection of the subject structural steel would not significantly increase the level of protection afforded the area.

The one-hour rated barrier enclosing vital AC instrument panel 2RS4 in Zone 2109-U conforms to the Hymek barrier system tested by Consumers Power Company and presented to and approved by the NRC. The barrier wrap utilized to protect 2RS4 is of an untested configuration. In order to test that configuration, a duplicate electrical panel would have to be ordered. We do not feel such a test is justified, as the one-hour barrier wrap used conforms to the system approved by NRC for wrapping cable trays, conduit, etc. We believe the barrier protecting 2RS4 is acceptable based on its similarity with approved configurations.

The following exemption to the schedules of 10CFR50.48 is requested:

- Delay of completion of upgrading floor of Zone 2109-U until the fourth refueling outage (2R4).

The floor of Zone 2109-U is reinforced concrete. Penetrations through this floor are not necessarily sealed as the floor was not credited as being three-hour fire resistance rated in previous fire protection work. As this corridor is provided with a deluge water spray system and the area is provided with full coverage detection capability, the possible existence of some open penetrations through the floor will not significantly affect the level of fire protection for the area. As this work requires an outage for completion and as it was not



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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

identified until October 1983, when the third refueling outage (2R3) was already in progress, we were unable to complete this work during 2R3. We, therefore, find it prudent to request an exemption until the fourth refueling outage (2R4) to complete this work. As open penetrations in the floor of Zone 2109-U connect with fire area "HH", which has a fire load of only seven minutes duration, we do not feel such openings constitute a hazard for fire spread from area "HH" into Zone 2109-U of area "JJ". As suppression and detection coverage in Zone 2109-U ensure a fire would be promptly detected and extinguished in that zone, such penetrations do not constitute a viable pathway for fire spread from area "JJ" into area "HH" either. Because of the substantial fire protection already provided for areas "HH" and "JJ", we do not feel the granting of this exemption until the fourth refueling outage (2R4) would result in a decrease in the level of protection afforded the plant and the public.

FIRE AREA: KK

Elevation(s) Affected: 368'

Fire Zones in Fire Area: 2093-P  
2115-I

Fire Loading: 62,857 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than forty-eight minutes

Area Description:

This area contains the "red" diesel generator room and the tank room above that room. It is bounded by three-hour fire barriers, with the exception of two sets of ventilation louvers located in the ceiling.

Safe Shutdown Capability:

A fire in this area could result in the loss of the "red" emergency diesel generator, the "red" diesel auxiliaries, the "red" diesel fuel transfer pump and the solenoid valve in the line supplying diesel fuel to the Day Tank, 2SV-2802-1. All "green" components are available to accomplish shutdown functions in the event these components are lost.

Fire Hazard Analysis:

This area contains diesel fuel in Day Tanks, and lube oil in the diesel generator itself. Cables are routed in conduit in this area, as well. The area is not routinely accessed. A fire from transient combustibles would not be likely to occur in this area as such materials are only permitted during servicing of the generators.



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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

For reasons similar to those stated for Area "JJ", we are not installing three-hour rated fire dampers in the ventilation louvers located in the ceiling of this area. These louvers cover the air intake supplying air to the diesel generator, and the air intake which supplies outside air to the diesel generator room to prevent excessive temperatures. These louvers are open to the atmosphere, and do not provide a viable flow path for fire from this area into an adjacent area. Because the Area "KK" contains full coverage automatic suppression and detection, and substantial fire barrier boundaries on all sides adjacent to other fire areas, the addition of three-hour rated dampers in these ventilation flowpaths would not significantly increase the level of protection for the area, nor would it increase the protection afforded the public.

Fire Protection:

This area is provided with full coverage automatic suppression and detection capability.

Modifications:

No additional modifications are necessary.

Exemption Requests:

No exemptions are requested for this area.

FIRE AREA: MM

Elevation(s) Affected: 372'

Fire Zones in Fire Area: 2103-V  
2099-W

Fire Loading: 3934 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than three minutes

Area Description:

This area is enclosed by three-hour rated barriers.

Safe Shutdown Capability:

A fire in this area could cause the loss of the "red" vital DC bus, the "red" vital battery bank, and inverter AC power to the "red" and "yellow" vital AC instrument panels. All "green" and "blue" vital AC

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

instrument panels, the "green" battery bank, and the "green" vital DC bus are still available to accomplish safe shutdown functions.

Fire Hazard Analysis:

This area contains hydrogen in the battery bank, and cable insulation. Transient combustibles are restricted. An exposure fire would not be likely to occur in this area. The area is easily accessed by the fire brigade.

Fire Protection:

This area contains full coverage detection capability.

Modifications:

No modifications are needed for this area.

Exemption Requests:

No exemptions are needed for this area.

FIRE AREA: ANO-1 Intake Structure

Elevation(s) Affected: 366', 354', and below 354'

Fire Zones in Fire Area: ANO-1 Intake Structure

Fire Loading: 24,150 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than nineteen minutes

Area Description:

This fire area is located in an isolated, cast concrete structure separated from the Auxiliary Building by several hundred feet. The area has three levels, which are configured as described in our July 1, 1982, Appendix R compliance submittal (ØCANØ782Ø2).

Safe Shutdown Capability:

This area contains service water pumps and associated valves which are necessary to achieve safe shutdown. Below elevation 354' the "red" and "swing" service water pump power cables are separated by approximately eight inches. The "green" service water pump power cable is separated from the "red" and "swing" cables by over 20 feet. the portion of this area below elevation 354' consists of three concrete service water pump

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

bays of dimensions 23 feet by 27 feet, with a ceiling of fifteen feet above normal water level.

At elevation 354', this area contains service water pump cabling, service water sluice gate valve operators, service water cross-over valves, and the service water discharge valves. Two service water pump cables are routed in tandem, with minimal separation between conduit. The third pump cable is separated from these two by over 20 feet. Elevation 366' contains the three service water pump motors, and the cross-over and discharge valve motors.

Fire Hazard Analysis:

No combustibles are located below elevation 354'. At elevation 354', certain cable trays containing a limited number of cables are routed at different locations, as indicated in the previously mentioned submittal. Elevation 366' contains the diesel driven fire pump day tank in the diesel driven fire pump room. The tank is enclosed by a tall curb sufficiently sized to hold the entire tank contents. The pump room is separated from the remainder of elevation 366' by concrete walls, and a three-hour fire door. The service water pump motors are equipped with upper and lower lube oil reservoirs which contain six gallons of lube oil and a nominal amount of grease respectively. Floor drains are available to remove any oil leakage.

Missile shields are provided between service water pump motors to act as radiant energy shields. With the floor drains and the existing missile shields, the effects of a service water pump lube oil fire will be contained within the areas bounded by the missile shields.

Because of modifications made to protect cabling at the 354' and below the 354' elevation, and because of separation provided, the lack of in situ combustibles, and the low probability of a transient combustible exposure fire, a fire in this area would not cause a loss of all service water capability.

We have not provided automatic detection capability below elevation 354'. As separation greater than 20 feet will be assured after 1R6 between redundant cables at that elevation, and as the service water bays normally contain water, the addition of automatic detection would not enhance the level of fire protection for this area, nor would it provide an increase in the level of protection afforded the public.

Fire Protection:

This area is provided with automatic detection capability on elevations 354' and 366'.

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

Modifications:

This area has been provided with one-hour fire barriers. During the sixth refueling outage (1R6), cables will be rerouted such that greater than 20 feet of separation or one-hour barriers protect redundant trains of service water pump power cables.

Exemption Requests:

An exemption from the omission of automatic suppression was previously granted for this area in the NRC's letter dated March 22, 1983 (ØCANØ38328). No additional exemptions are needed for this area.

FIRE AREA: Yard Area Manholes

Elevation(s) Affected: N/A

Fire Zones in Fire Area: 1MH04  
1MH06  
2MH01 East  
2MH02 East  
2MH03 East

Fire Loading: 55,671 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than forty-two minutes

Area Description:

The ANO-1 Manholes are poured concrete construction bunkers of approximately 25 square feet in area. The ANO-2 Manholes are poured concrete construction bunkers of approximately 64 square feet in area. Each manhole is technically a fire area. However, for purposes of this submittal, manholes containing similar components have been grouped together.

Safe Shutdown Capability:

The ANO-1 Manholes, 1MH04 and 1MH06 contain power cables associated with the "red" and "swing" ANO-1 service water pumps. The ANO-2 Manholes, 2MH01 East, 2MH02 East, and 2MH03 East, contain power cables associated with the "swing" and "green" ANO-2 service water pumps. As the "green" ANO-1 service water pump and the "red" ANO-2 service water pump could be out of service for an extended period per the Technical Specifications, a fire in those manholes could cause loss of all service water capability.

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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Fire Hazard Analysis:

This area contain no combustibles other than cable insulation. It contains no ignition sources, either. The cable is difficult to ignite without an ignition source, as it is flame resistant. Introduction of transient combustibles into this area is extremely remote due to the difficulty of access to the area, and because of the lack of need for such access during operation.

Fire Protection:

This area contain no automatic detection or suppression capability.

Modifications:

These manholes are filled with sand to prevent propagation of fire from damaging redundant trains of service water cabling. During the fourth refueling outage (2R4), which is scheduled to commence in mid-1985, the "swing" service water pumps will be provided with a separate cable leading to the redundant switchgear of the opposite division, i.e., for ANO-1, power for the "swing" pump will be directly available from the "green" 4160V bus independent of 1MH04 and 1MH06, and for ANO-2, power for the "swing" pump will be available from the "red" 4160V bus independent of 2MH01E, 2MH02E, and 2MH03E. With the completion of those modifications, this area will meet Appendix R, and the sand will no longer be needed.

Exemption Requests:

Exemptions allowing AP&L to fill the subject manholes with sand was previously approved by the NRC in its letter dated March 22, 1983 (0CNA038328). No additional exemptions are needed for this area.

FIRE AREA: Yard Area Manholes 1MH09 and 1MH10

Elevation(s) Affected:

Fire Zones in Fire Area: 1MH09  
1MH10

Fire Loading: 15,213 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than twelve minutes

Area Description:

This area consists of two poured concrete construction manholes and of approximately sixteen square feet in area. Each manhole is technically



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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

a self-contained fire area. However, for purposes of this submittal, these manholes have been grouped together.

Safe Shutdown Capability:

This area contains redundant cabling associated with the ANO-1 diesel generator fuel oil transfer pumps. These pumps are used to transfer oil from the ANO-1 fuel oil storage tank to each of the diesel generator day tanks. Modifications have been made involving crossties to the ANO-2 fuel transfer pumps which ensure the ANO-2 pumps can be used if a fire in either manhole were to cause the loss of both ANO-1 diesel fuel transfer pumps.

Fire Hazard Analysis:

This area contains no combustibles other than cable insulation. It contains no ignition sources, either. The cable is difficult to ignite without an ignition source, as it is flame resistant. Introduction of transient combustibles into this area is unlikely due to the difficulty and the lack of need of access during operation.

Fire Protection:

This area contains no automatic detection or suppression capability.

Modifications:

Modifications have been completed which allow the use of the ANO-2 diesel fuel transfer pumps to transfer fuel oil from the diesel storage vaults to the diesel generator day tanks in the event a fire in this area causes a loss of the ANO-1 pumps.

Exemption Requests:

No additional exemptions are requested for this area.

This area has been provided with alternative shutdown capability. A fire originating in this area could only occur from a cable burning. Access into this area is extremely difficult. Hence, a fire resulting from transient combustibles would be unlikely. Installation of a suppression system and/or a detection system in this area is not practical. Such systems would be difficult to maintain because of extreme environmental conditions. Yard hose stations are available to combat fires occurring in this area. An exemption for the omission of suppression and detection was previously granted for this area in the NRC's letter dated March 22, 1983 (ØCNAØ38328).

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

FIRE AREA: ANO-2 Intake Structure

Elevation(s) Affected: 366', 354', and below 354'

Fire Zones in Fire Area: ANO-2 Intake Structure

Fire Loading: 11,581 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than nine minutes

Area Description:

This area is located in a self-contained, reinforced concrete building. It is not connected to the ANO-1 Intake Structure building. The building has three levels; below elevation 354' are the three service water pump bays containing service water piping, some cabling, and some conduit; elevation 354' contains service water piping, valves, and associated cabling; and, elevation 366' contains ventilation equipment, the three service water pump motors and the service water crossover valve operators. The service water bays normally contain water. The ceiling of these bays is normally 19 feet above water level.

Safe Shutdown Capability:

This area contains all three service water pumps. At least one pump is required to achieve and maintain safe shutdown. The crossover valves associated with the "swing" service water pump are required to align that pump with either Loop I or II if both the "red" and "green" pump were unavailable.

Fire Hazard Analysis:

The only combustibles in the ANO-2 Intake Structure are located at elevation 366'. These combustibles are in the form of lube oil in the three service water pump motors. Each pump contains approximately 12 gallons of lube oil in the upper reservoir, and approximately one and one-half gallons of lube oil in the lower reservoir. A nonsafety-related cable tray is also routed at this elevation. Floor drains are provided within each service water pump cubicle to contain any oil spill occurring within that cubicle. Additionally, missile barriers separate each pump cubicle. These barriers act as radiant energy shields to protect adjacent pump motors from heat generated within an affected cubicle in the event of an oil fire.

Automatic detection capability below elevation 354' is not being provided. Below elevation 354', the area contains service water pump power cables, associated valves, and piping. The floor level is

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

normally covered with water, as this location contains the service water bays. One-hour barriers have been provided where redundant cables are separated by less than 20 feet. Because of the normal water level in the bays, the accumulation of transient combustibles is precluded. Hence, an exposure fire is unlikely. The separation and barriers provided reduce the likelihood of damage resulting from such a fire to a negligible probability. The protection provided this area is sufficient to meet Section III.G of Appendix R. The addition of an automatic detection system at this elevation would not significantly enhance the level of protection for this area.

Fire Protection:

This area is provided with automatic detection on elevations 354' and 366', and partial automatic suppression coverage is provided to protect the three service water pump motors from damage which could be caused by an oil fire in one cubicle.

Modifications:

One-hour barriers have been provided to protect safe shutdown service water cabling below elevation 354' where separation of redundant trains by greater than 20 feet has not been provided. The same is true for service water cabling needed for safe shutdown at elevation 354'. At elevation 366', the three service water pump motors have been provided with an automatic suppression system which will spray the floor area around the base of each service water pump motor. This system will prevent the spread of an oil fire occurring in one cubicle into an adjacent cubicle.

Exemption Requests:

An exemption for partial suppression was previously granted for elevation 366'. An exemption for the omission of 20 feet of separation was previously granted for elevation 366'. An exemption for the omission of suppression at elevation 354' and below was previously granted. These exemptions were granted in the NRC's letter dated March 22, 1983 (ØCNAØ38328).

No additional exemptions are needed for this area.

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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FIRE AREA: Diesel Fuel Storage Vaults

Elevation(s) Affected: below 354'

Fire Zones in Fire Area: Diesel Fuel Storage Vaults

Fire Loading: Greater than 240,000 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Greater than three hours

Area Description:

This area actually contains four sub-areas in the form of diesel fuel storage vaults (two per unit), which are each bounded by three-hour rated barriers, and a common corridor, also bounded by three-hour rated barriers. The structure is located below grade several hundred feet west of the Auxiliary Buildings, ANO-1 Reactor Building, and ANO-2 Containment Building.

Safe Shutdown Capability:

Each diesel fuel storage vault qualifies as a fire area. Each vault contains a fuel storage tank of 22,500 gallon capacity, and the diesel fuel transfer pump for that tank. Additionally, each vault contains piping necessary to transfer fuel from the storage tank to the diesel fuel day tanks located in the emergency diesel generator rooms. A fire in any one vault would not affect the ability to provide diesel fuel to the day tanks, as each vault is isolated from the other vaults by three-hour barriers, and the other vaults are available to provide the necessary transfer capability.

Fire Hazard Analysis:

Each vault contains 22,500 gallons of diesel fuel in a storage tank. Because of this substantial fire hazard, transient combustibles and ignition sources are strictly prohibited from this area. Hence, an exposure fire would be unlikely. Ignition of the diesel fuel would be difficult as the fuel is contained in a closed tank.

Fire Protection:

Each vault is provided with full coverage automatic detection and suppression capability.

Modifications:

No modifications are necessary for this area.

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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Exemption Requests:

No exemptions are requested or needed for this area.

FIRE AREA: ANO-1 Reactor Building

Fire Zones in Fire Area: 32K, 33K

Fire Loading: 12,756 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than ten minutes

Area Description:

This area is described on pages 14 through 16 of Section 3 of AP&L's July 1, 1982, Appendix R compliance submittal. It is bounded by three-hour rated walls with the exception of the electrical and mechanical penetrations

The reactor building was divided into two fire zones for the purposes of evaluating effects of fires. The zones were established on the basis of clear space without intervening combustibles, and provision of fire stops where cables provide a pathway between zones. The north half of the reactor building (Zone 32K) contains cabling and equipment associated with safe shutdown that is separated by over 20 feet from cabling and equipment in the south half of the reactor building (Zone 33K), although certain nonsafety related cable trays pass from one zone to the next and present a potential fire path. The protection provided to prevent transfer of fire between these two zones via the cable trays is described below (see Fire Protection). The reactor building walls are concrete construction with a steel liner. These zones comprise an extremely large room volume, with only limited combustibles. The areas of significant combustible concentration are at the two electrical cable penetration areas and the reactor coolant pump motors. Protection for these hazards is described below (see Fire Protection). Other areas of the reactor building contain minimal combustibles.

Safe Shutdown Capability:

Each fire zone in the reactor building generally contains cabling and components associated with one of the two redundant shutdown paths. However, Zone 32K contains a redundancy that does not fully satisfy Appendix R.

Zone 32K contains both decay heat drop line valves and their associated cables. The cables are located in conduits that are within inches of each other for a portion of this zone. Although these valves are only



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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

required for cold shutdown purposes, a spurious operation of both at the same time could cause a loss of reactor coolant outside of the reactor building. The only cables in this zone associated with the decay heat valves that could conceivably cause such a spurious operation due to the fire are power cables to the valves since no automatic open signals go to the valves. For a loss of reactor coolant outside the reactor building to occur, the power cables for both valves would have to short phase to phase in a specific manner.

Fire Hazard Analysis:

No exposed combustibles are located in the vicinity of the decay heat valves. Due to the restricted access to the reactor building during plant operations, transient combustibles are not considered feasible for this area. With respect to fire stops separating Zones 32K and 33K, these are described below (see Fire Protection). All Reactor Building penetrations are not fire resistant rated. These penetrations are sealed according to criteria governing reactor building pressure maintenance. Piping seals are constructed of heavy gauge metal, and could likely pass a three-hour fire resistance test. Most electrical penetration seals, however, contain epoxy or rubber compounds which are potentially flammable and do not possess fire resistant ratings. Fire resistant seals would not be capable of meeting the rigid pressure maintenance requirements necessary to ensure integrity in the event of a Design Basis Accident. Hence, installation of such seals would likely result in a decrease in the level of radiological protection provided the public and in a decrease in the safety of the unit.

Fire Protection:

Considerable fire prevention, detection, and suppression systems have been provided in the reactor building including: smoke detection devices in various areas to provide early warning of fires; automatic preaction type fire suppression systems at the electrical penetration areas; hose stations; lube oil collection systems on the reactor coolant pump motors and fire stops on cable trays that provide a pathway between Fire Zones 32K and 33K. Various design fire stops have been used to prevent fire propagation from one fire zone to an adjacent zone. Drawing 32 in AP&L's July 1, 1982, submittal (ØCANØ782Ø2) provides details of the fire stop designs that are used in ANO-1 for horizontal cable trays passing between Fire Zones 32K and 33K.

Modifications:

None.

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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Exemption Requests:

An exemption to the requirement for 20-foot separation with no intervening combustibles or fire hazards was previously granted for this area in the NRC's letter (ØCNAØ38328) dated March 22, 1983.

No additional exemptions are necessary for this area.

FIRE AREA: ANO-2 Containment Building

Fire Zones in Fire Area: 2032-K, 2033-K

Fire Loading: 26,682 BTU/FT<sup>2</sup>

Fire Duration Based on Fire Loading: Less than 20 minutes

Area Description:

This area is described on pages 40 through 43 of Section 3 of AP&L's July 1, 1982, Appendix R compliance submittal (ØCANØ782Ø2). It is bounded by three-hour rated fire barriers with the exception of the electrical and mechanical penetration assemblies.

The containment building was divided into two zones for the purposes of evaluating the effects of fires. The zones were divided on the basis of clear space without intervening combustibles, and provision of fire stops where cables provide a pathway between zones. The north half of the containment building (Zone 2033K) contains cabling and equipment associated with safe shutdown that is separated by over 30 feet from cabling and equipment in the south half of the containment building (Zone 2032K), although certain cable trays pass from one zone to the next. The protection provided to prevent transfer of fire between these two zones via the cable trays is described below (see Fire Protection). The containment walls are concrete construction with a steel liner. These zones comprise an extremely large room volume, with only limited combustibles. The areas of significant combustible concentration are at the two electrical cable penetration areas and the reactor coolant pump motors. Protection for these hazards is described below (see Fire Protection). Other areas of containment contain minimal combustibles.

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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Safe Shutdown Capability:

Each fire zone in containment generally contains cabling and components associated with one of the two redundant shutdown paths; however, each zone contains a redundancy that does not fully satisfy Appendix R.

Zone 2032K:

Fire Zone 2032K contains all four channels that provide indication of RCS pressure. Junction boxes associated with these four channels of indication are located outside the secondary shield wall near the pressurizer; at this point, the junction boxes for Channels 1 and 4 (redundant) are separated by about 17 feet of open space with no intervening combustibles. There is no line of sight between these two junction boxes as they are located on opposite sides of a corner of the shield wall (see Figures 2032-1, -2, -3 of AP&L's July 1, 1982, submittal [0CAN078202]). From the junction boxes, conduits associated with Channels 1 and 4 are embedded in concrete and routed in opposite directions to their respective electrical penetration areas. Indication of RCS pressure would be required for establishing and maintaining safe hot shutdown conditions.

Zone 2033K:

Zone 2033K contains both shutdown cooling drop line valves and their associated cables. The cables are located in conduits that are within inches of each other for a portion of this zone. Although these valves are only required for cold shutdown purposes, a spurious operation of both at the same time could cause a LOCA outside of containment. The only cables in this zone associated with the shutdown cooling valves that could conceivably cause such a spurious operation due to a fire are the power cables to the valves since no automatic open signals go to the valves. For a LOCA outside containment to occur, the power cables for both valves would have to short phase to phase in a specific manner.

Fire Hazard Analysis:

Zone 2032K:

There are no combustibles in close proximity to the two Channel 1 and 4 junction boxes associated with RCS pressure. The nearest combustible is one cable tray located at the next lower elevation below a floor grating; the tray is routed approximately 15 feet above the elevation 354" floor, and is about 8 feet below these junction boxes (see Figure 2032-2 and 2032-3 of AP&L's previously reference submittal). There are no ignition sources in proximity to this cable tray. This cable tray is lightly load with a cable tray fill of 7%. The potential for

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

---

electrical ignition of the cable trays is remote since the cables have been tested as described in Appendix C to this report. Due to the limited access to containment while the plant is operating, the introduction of transient combustibles is not considered feasible.

Zone 2033K:

No exposed combustibles are located in the vicinity of the shutdown cooling valves. Due to the restricted access to containment during plant operations, transient combustibles are not considered feasible for this area.

As with ANO-1, the ANO-2 Containment Building electrical and mechanical penetration assemblies were designed to maintain the building integrity under Design Basis Accident conditions. Accordingly, these penetrations are sealed with materials which are not necessarily fire resistant rated. The mechanical penetrations are constructed of heavy gauge metal, and would likely pass a three-hour fire test. The electrical penetration assemblies contain rubber and epoxy-based compounds which are flammable under certain conditions. If these penetration seals were replaced with fire resistant materials, we could not assure building pressure requirements could be met, nor could we ensure proper performance of such seals under Design Basis Accident conditions. Installation of fire resistant seals could result in a decrease in the radiological protection afforded the public by the current seal design.

Fire Protection:

Considerable fire prevention, detection, and suppression systems have been provided in containment, including: smoke detection devices in various areas in containment to provide early warning of fires; automatic pre-action type fire suppression systems at the electrical penetration areas; hose stations; lube oil collection systems on the reactor coolant pump motors; and fire stops on cable trays that provide a pathway between Fire Zones 2032K and 2033K. Various design fire stops have been used inside containment to prevent fire propagation from one fire zone to an adjacent zone. Drawings 2032-4, -5, -6, and -7 attached to AP&L's July 1, 1982, submittal (ØCANØ782Ø2) show the fire stop designs used.

Modifications:

No modifications are necessary for this fire area.



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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

---

REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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Exemption Requests:

An exemption from the requirement to have 20 feet of separation with no intervening combustibles or fire hazards was previously granted for this area in the NRC's letter (ØCNAØ38328) dated March 22, 1983.

No additional exemptions are requested for this area.

IV. REANALYSIS AGAINST SECTIONS III.J AND O

A. Emergency Lighting

On November 16, 1981, AP&L submitted by letter (ØCAN1181Ø4) its Design Change Package (DCP) containing details of the 8-hour battery-backed emergency lighting system which was to be installed at ANO-1 and 2 to achieve compliance with Section III.J of Appendix R to 10CFR50. In a letter dated February 17, 1982, (ØCNAØ28212), the NRC granted an exemption until March 1, 1982, in order to allow AP&L to complete those modifications. The approval of the exemption was based upon the existence of safetygrade and D.C. powered lighting already installed at ANO at the time Appendix R became effective.

Since that exemption was granted, AP&L has installed numerous self-contained battery-powered lighting units to meet the requirements of Section III.J of Appendix R to 10CFR50. With the development of the alternate shutdown procedure for ANO-2, additional lighting units were installed to ensure availability of sufficient illumination to accomplish that procedure. The alternate shutdown procedure for ANO-1 is currently under development. That procedure is not required to be in place until after the sixth refueling outage (1R6). Prior to implementing that procedure, modifications similar to ANO-2 will be made to the emergency lighting system at ANO-1. After completion of those modifications, ANO will comply with the requirements of Appendix R.

B. Reactor Coolant Pump Oil Collection System

AP&L received the NRC Office of Inspection and Enforcement IE Information Notice No. 84-09 (ØCNAØ28418) on February 21, 1984. Item XII of that notice, entitled "RCP Oil Collection Systems," states the following, "At some facilities, the lube oil collection systems for the reactor coolant pumps were not sized to accept the entire lube oil inventory from all reactor coolant pumps without overflow. This does not protect against the consequences of simultaneous failure of more than one lube oil system during a seismic event...The NRC staff position on the capacity of a reactor coolant pump oil collection system which meets Section III.O of Appendix R



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ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

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REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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to 10CFR50 is: one or more tanks need to be provided with sufficient capacity to collect the total lube oil inventory from all reactor coolant pumps draining to the container. Alternatives which have been found acceptable under the exemption process are: 1. One or more tanks need to be provided with sufficient capacity to hold total lube oil inventory of one reactor coolant pump with margin if the tank(s) is/are located such that any overflow from the tank(s) will be drained to a safe location where the lube oil will not present an exposure fire hazard to or otherwise endanger safety-related equipment...".

In the NRC's letter (2CAN118064) to AP&L dated November 5, 1980, the following was stated, "On May 29, 1980, the Commission published a proposed rule, a new paragraph 50.48 and Appendix R to 10 CFR Part 50, concerning fire protection, which sets forth the minimum acceptable fire protection requirements necessary to resolve contested areas of concern for nuclear power plants operating prior to January 1, 1979. We have reviewed all the information you have provided to date regarding your fire protection program. The status of all currently identified unacceptable items is presented in the Enclosure 1 Table. Enclosure 2 is our Safety Evaluation of those items we now find acceptable. Enclosure 3 presents our requirements on modifications that would have to be made at your facility to resolve these open items in a manner that would meet the requirements of the proposed Appendix R." The RCP Oil Collection System was listed in the Table presented in Enclosure 1 of the above-mentioned letter. That system was also described as being acceptable in the Safety Evaluation of Enclosure 2. Enclosure 3 did not mention any modifications which would have to be made to the ANO-2 RCP Oil Collection System in order to meet the requirements of Section III.0 of Appendix R to 10CFR50. Hence, AP&L concluded that the ANO-2 system was accepted as meeting the above-mentioned regulation. As the ANO-1 RCP Oil Collection System was similar in design to the ANO-2 system, it was also felt to have been accepted as meeting Appendix R.

Prior to submitting its initial Appendix R compliance report (0CAN078202 dated July 1, 1982, AP&L, through discussions with its NRC Project Managers, received assurance its RCP Oil Collection System satisfied the requirements of Appendix R. During the inspection conducted by Mr. M. E. Murphy of the NRC Region IV office during the period November 28 - December 2, 1983, the RCP Oil Collection System was reviewed for compliance with Section III.0 of Appendix R. The report from that inspection (Nos. 50-313/83-31 and 50-368/83-31), dated January 10, 1984 (0CNA018404), states, with regard to that system, "The NRC inspector determined through correspondence and drawing reviews that the oil collection system for Unit 1 has been accepted as installed. The system installed for Unit 2 required modification and these have been completed. Physical inspection of the systems was not possible during this inspection and will be made during a future inspection." The inspector's statements further confirmed AP&L's RCP Oil Collection System conformed to the requirements of Section III.0 of the Fire Protection Rule.

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REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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However, based on the information contained in IE Notice No. 84-09, we note our system does not meet the Staff interpretation of Section III.O of Appendix R to 10CFR50. We therefore find it prudent to request the following two exemptions from that regulation:

- omission of a full capacity enclosure for the contents of the entire lube oil system of the reactor coolant pumps
- omission of the requirement for the RCP oil collection system to be designed to provide adequate assurance of withstanding a safe shutdown earthquake.

The following is the basis for the first exemption. The RCP Oil Collection Systems at ANO-1 and 2 each contain two tanks. These tanks are each designed to hold the contents of one reactor coolant pump's lube oil inventory with margin. Oil leakage from the remaining pump in each RCS loop will be drained into the appropriate tank, until the tank capacity is reached, and then to an open curbing where it can be safely contained. The system is located above the floor of the Reactor and Containment Buildings. Safe shutdown circuitry is routed approximately forty feet above that elevation outside the primary shield walls containing the reactor, RCPs, etc. Hence, the shielding wall separates the heavy concentrations of safe shutdown circuitry in the electrical penetration areas from the RCPs and the Oil Collection System itself. Additionally, that circuitry is protected by localized automatic suppression and detection capability. Any oil spillage on the floor of these buildings will not endanger safe shutdown circuitry. An increase in the collection system capacity to ensure the contents of all four reactor coolant pumps will be contained in a closed container is unwarranted, and will not increase the level of protection provided in either the ANO-1 Reactor Building or the ANO-2 Containment Building, as substantial protection has already been provided in these buildings via suppression systems, detection systems, cable tray fire stops, etc.

We request an exemption from the requirement of Section III.O of Appendix R to 10CFR50 that the RCP lube oil collection system be designed, engineered, and installed so as to provide a reasonable assurance of withstanding a Safe Shutdown Earthquake based on the following:

1. The lubrication oil systems for the reactor coolant pumps are designed, engineered, and installed such that they will remain functional during and after seismic events including an SSE, and
2. The installed oil collection system would not cause a loss of operability of safety-related equipment, nor would it cause a fire in the event of an SSE.

In AP&L's July 8, 1980 (2-070-10), letter to the NRC, the following information concerning the RCP Oil Collection Systems at ANO-1 and 2 was provided. "The RCP oil collection system, which is presently installed on

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ARKANSAS POWER & LIGHT COMPANY  
ARKANSAS NUCLEAR ONE - UNITS 1 AND 2

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REANALYSIS AGAINST 10CFR50 APPENDIX R SECTIONS III.G, J AND O

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Unit 1, is not seismically qualified." Additionally, with regard to the ANO-2 system, the following description was provided, "The ANO-2 RCP oil collection system, like Unit One's, was not designed to withstand an SSE." The Reactor Coolant Pump motor lube oil systems are integral with the pump motors. These motors, which are not seismically qualified, i.e., which are not required to function after a SSE, are seismically supported. The RCPs, RCP motors, and the integral lube oil systems contained within those pump motors are all designed, engineered, and installed such that a reasonable assurance of withstanding a Safe Shutdown Earthquake has been provided.

Because the lubrication oil systems for the reactor coolant pumps are qualified to remain functional during and after a SSE, oil leaks should not result from such an event. Further, because the installed oil collection system itself is designed so that the dropping of its components during an SSE should not cause loss of operability of safety-related equipment nor cause a fire, the systems for each plant would not degrade safety features within containment.

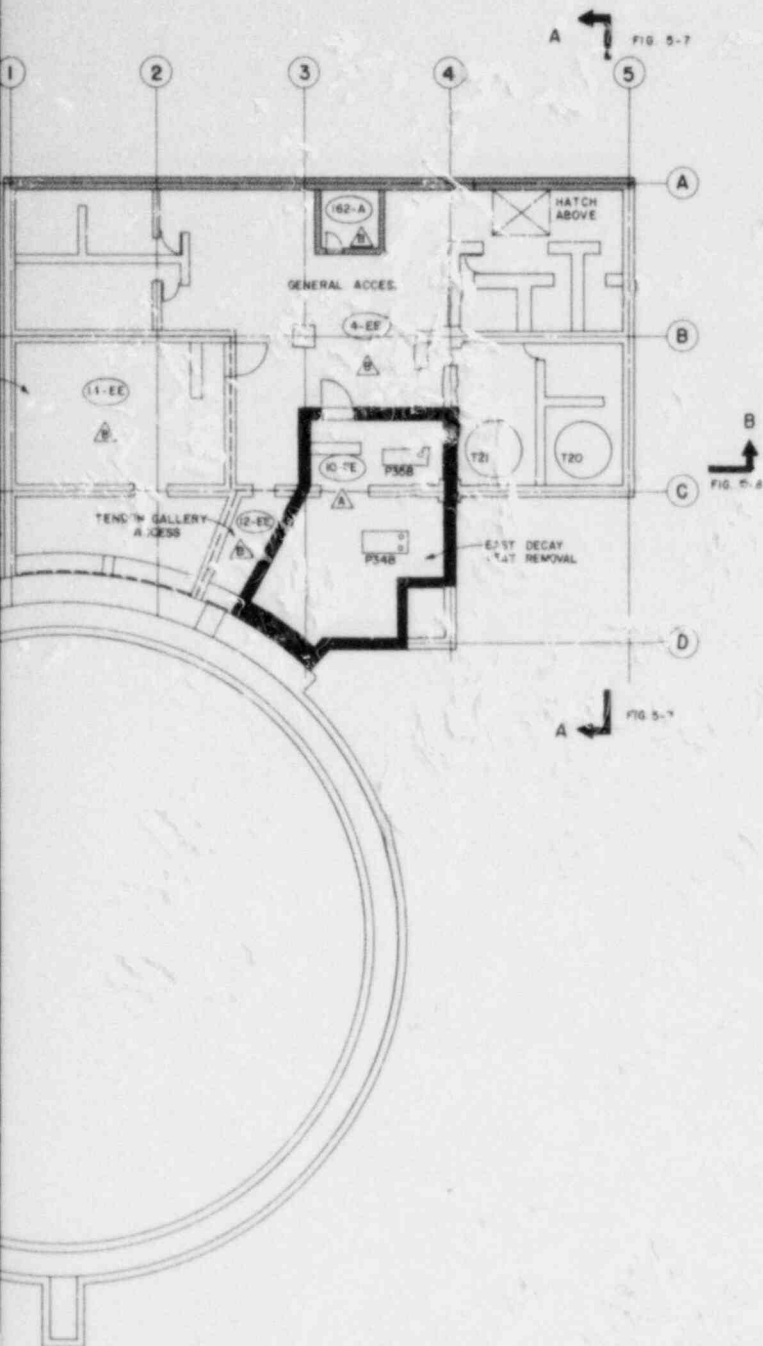
WEST  
DECAY  
HEAT  
REMOVAL

B



FIG. 5-8





# LEGEND

- TECH SPEC FIREWALLS
- - - - - NON-TECH SPEC FIREWALLS
- ▤ TECH SPEC FIRE-RATED FLOORS
- - - - - NON-TECH SPEC FIRE-RATED FLOORS
- 104-E FIRE ZONE
- 104-A FIRE AREA
- DENOTES FIRE ZONE BOUNDARY

FIRE ZONE	ZONE DESCRIPTION
<b>FIRE AREA A</b>	
10-EE	EAST DECAY HEAT REMOVAL PUMP ROOM (EL. 317)
<b>FIRE AREA B</b>	
12-EE	TENDON GALLERY ACCESS AREA (EL. 317)
14-EE	WEST DECAY HEAT REMOVAL PUMP ROOM (EL. 317)
16-EE	GENERAL ACCESS AREA (EL. 317)
18-EE	STAIRWELL NO. 1 (EL. 317 TO 404)

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CARD

DRAWING REFLECTS FIREWALLS AND  
FIRE-RATED FLOORS AFTER  
COMPLETION OF MODIFICATIONS  
IDENTIFIED IN THE APPENDIX H  
AREA ANALYSIS

THIS DRAWING TO BE USED FOR  
FIRE PROTECTION  
ONLY  
BACKGROUND EQUIPMENT MAY NOT BE  
CORRECT AS TO LOCATION OR SIZE

ARKANSAS POWER AND LIGHT COMPANY  
ARKANSAS NUCLEAR ONE-UNIT 1  
FIRE PROTECTION PROGRAM

FIRE AREA AND ZONE BOUNDARIES

ELEVATION 317'-0"

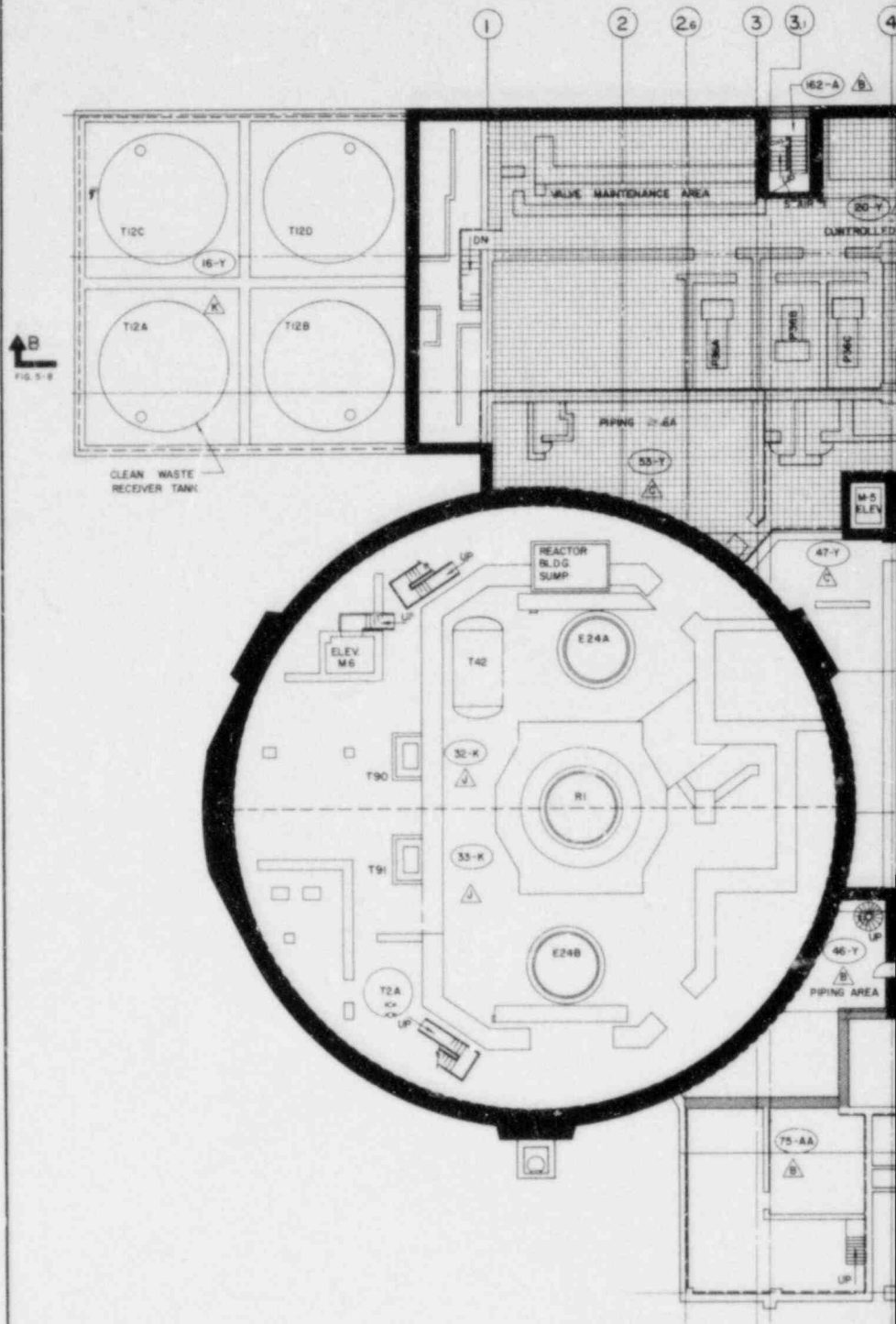


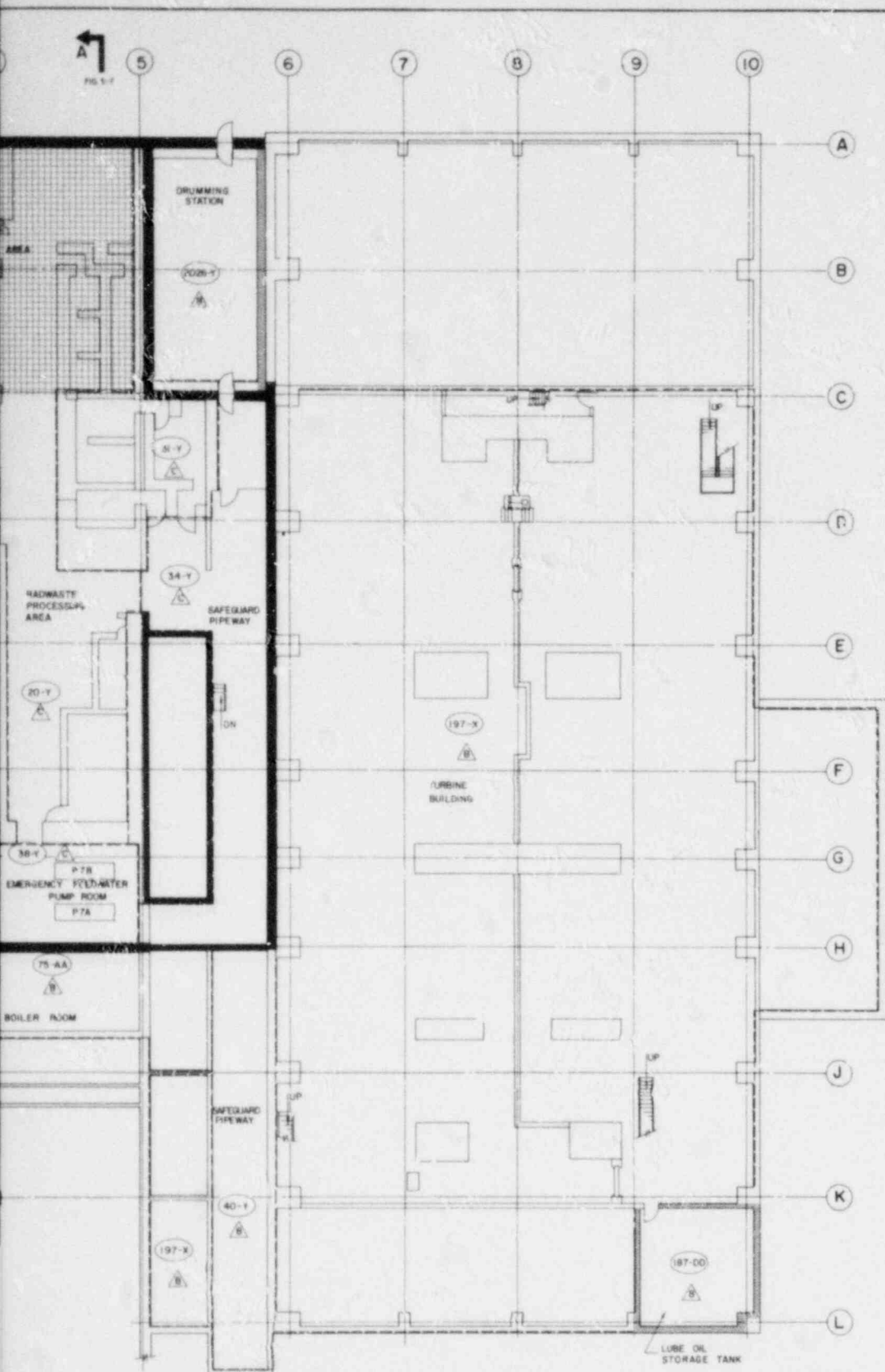
FIGURE 5-1

REV  
0

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**LEGEND**

- TECH SPEC FIRE WALLS
- NON-TECH SPEC FIRE WALLS
- TECH SPEC FIRE-RATED FLOORS
- NON-TECH SPEC FIRE-RATED FLOORS
- 2026-Y FIRE ZONE
- A FIRE AREA
- DENOTES FIRE ZONE BOUNDARY

FIRE ZONE	ZONE DESCRIPTION
<b>FIRE AREA B</b>	
156-A	STAIRWELL NO. 1 (EL. 317 TO 304)
2026-Y	DRUMMING STATION (UNIT 1 - EL. 335)
47-Y	LOWER SOUTH PIPING PENETRATION AREA (EL. 335)
75-AA	BOILER ROOM (EL. 335)
197-X	TURBINE BUILDING (EL. 335 TO 405)
40-Y	PIPE AREA (EL. 341)
187-DO	DIRTY & CLEAN LUBE OIL STORAGE TANK ROOM (EL. 335)
<b>FIRE AREA C</b>	
20-Y	RADWASTE PROCESSING AREA (EL. 335)
53-Y	LOWER NORTH PIPING PENETRATION AREA (EL. 335)
47-Y	PENETRATION VENTILATION AREA (EL. 335)
34-Y	P.P.V. AREA (EL. 341)
31-Y	PULVITIZER DEMINERALIZER AREA (EL. 335)
38-Y	EMERGENCY FEEDWATER PUMP AREA (EL. 335)
<b>FIRE AREA K</b>	
16-Y	CLEAN WASTE RECEIVER TANK AREA (EL. 337)
<b>FIRE AREA J</b>	
52-K	NORTH SIDE CONTAINMENT BUILDING
53-K	SOUTH SIDE CONTAINMENT BUILDING

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DRAWING REFLECTS FIREWALLS AND  
FIRE-RATED FLOORS AFTER  
COMPLETION OF MODIFICATIONS  
IDENTIFIED IN THE APPENDIX A  
AREA ANALYSIS

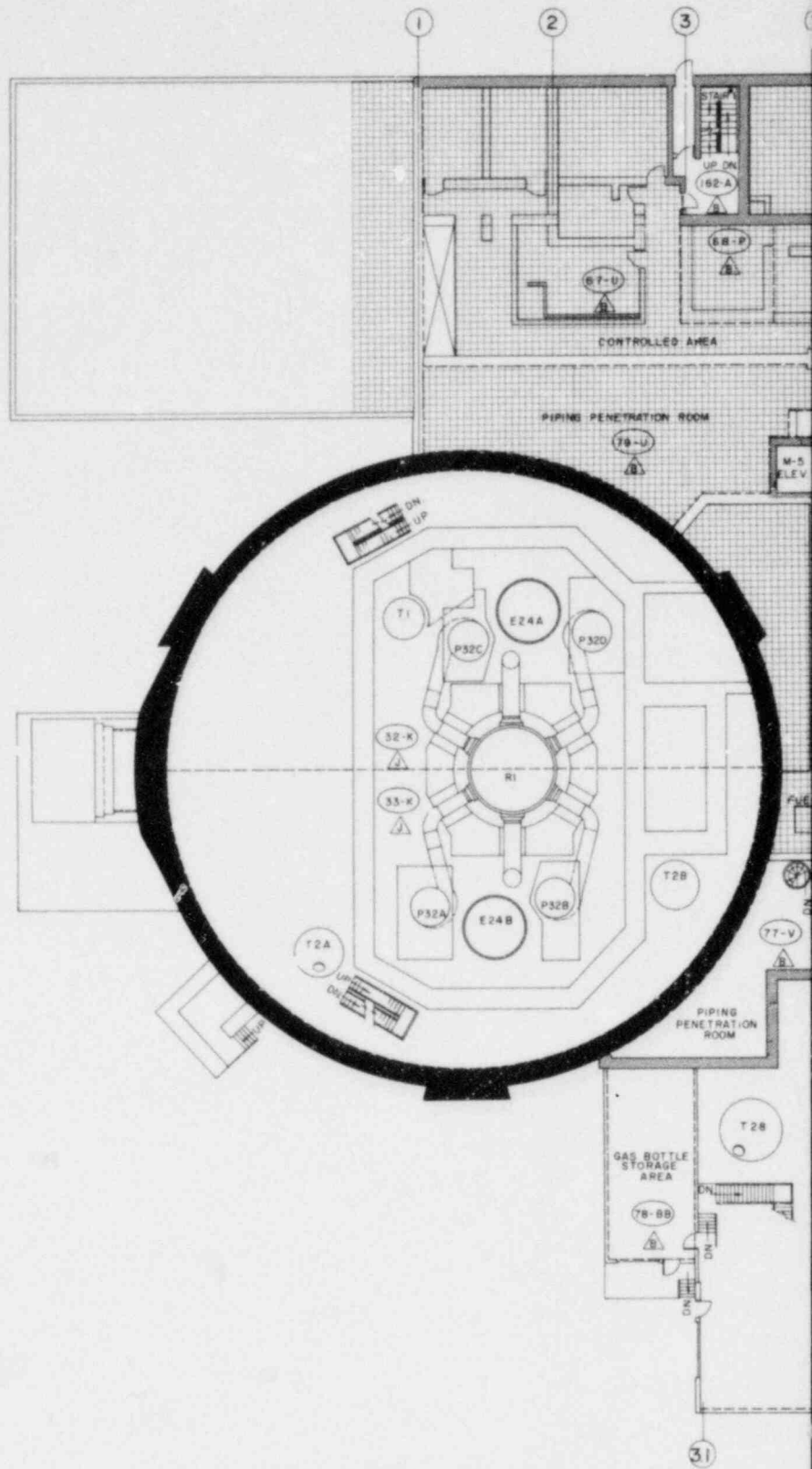
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ONLY**  
BACKGROUND EQUIPMENT MAY NOT BE  
CORRECT AS TO LOCATION OR SIZE

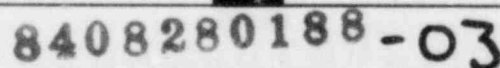
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APERTURE  
CARD**

ARKANSAS POWER AND LIGHT COMPANY ARKANSAS NUCLEAR ONE-UNIT 1 FIRE PROTECTION PROGRAM	
FIRE AREA AND ZONE BOUNDARIES	
ELEVATION 335' BELOW GRADE	
<b>AP</b>	FIGURE 5-2
	REV. 0

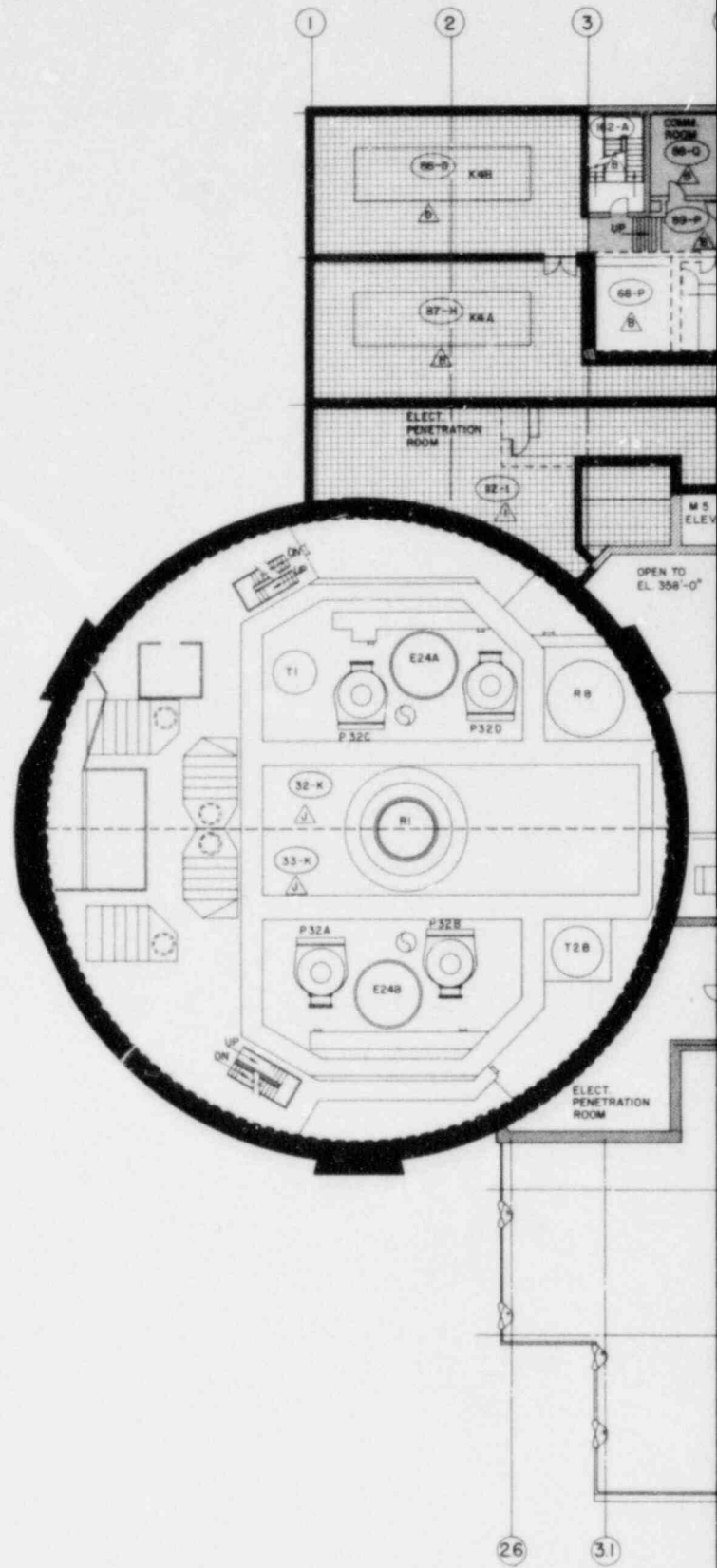
**8408280188-02**

↑ B  
FIG. 5-B

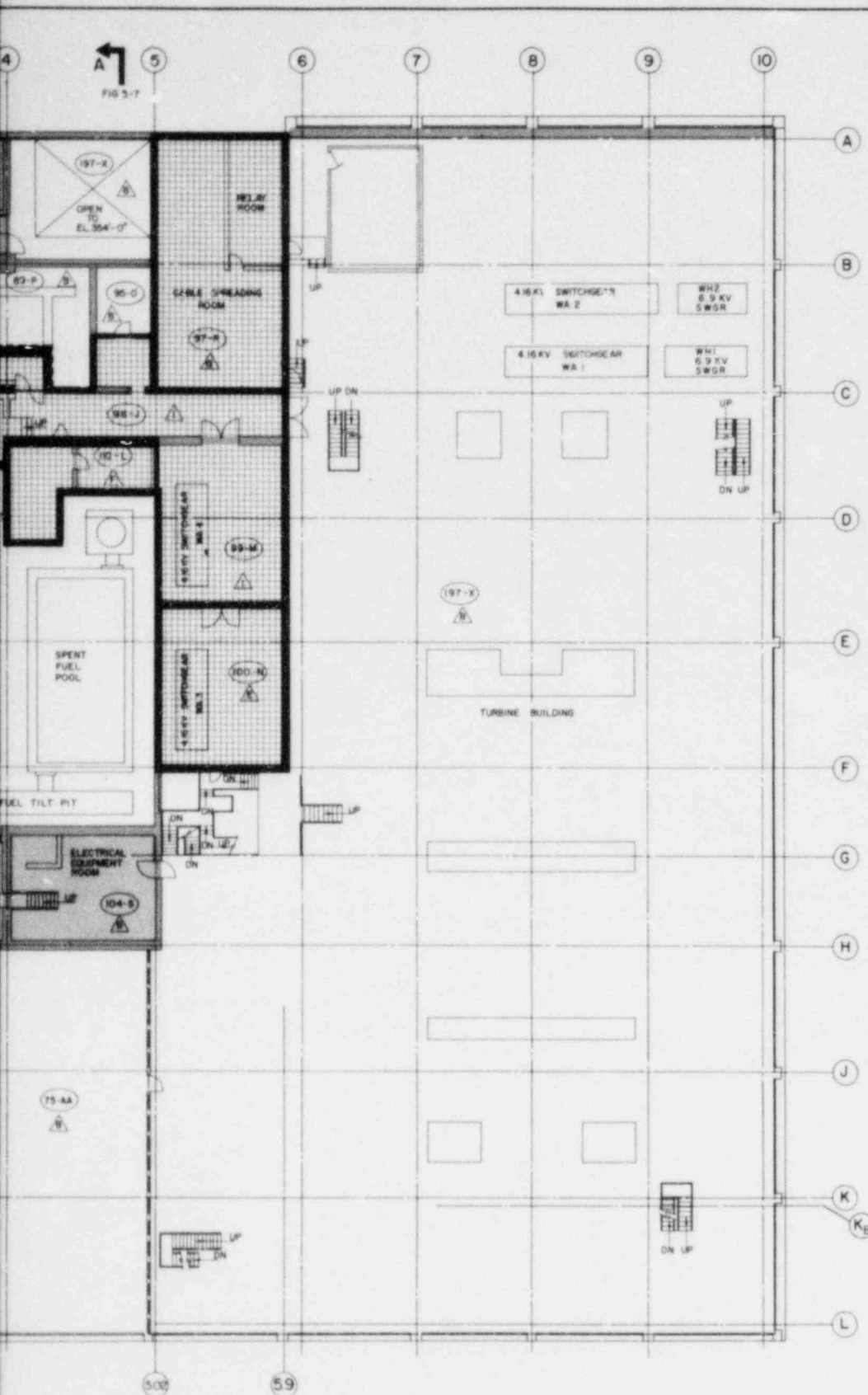




↑B  
FIG 5-B







- LEGEND**
- TECH SPEC FIRE WALLS
  - NON-TECH SPEC FIRE WALLS
  - TECH SPEC FIRE-RATED FLOORS
  - NON-TECH SPEC FIRE-RATED FLOORS
  - 104-S FIRE ZONE
  - A FIRE AREA
  - DENOTES FIRE ZONE BOUNDARY

FIRE ZONE	ZONE DESCRIPTION
<b>FIRE AREA B</b>	
104-S	LOWER SOUTH ELECTRICAL PENETRATION ROOM (EL 374'-6")
104-S	ELECTRICAL EQUIPMENT ROOM (EL 368")
75-AA	BOILER ROOM (EL 354")
197-X	TURBINE BUILDING (EL 355 TO 404")
95-O	NORTH BATTERY ROOM (EL 372")
88-P	REACTOR COOLANT MAKEUP TANK ROOM (EL 355 & 368")
89-P	CONTROLLED ACCESS (EL 374")
88-Q	COMMUNICATIONS ROOM (EL 374")
162-B	STAIRWELL NO. 1 (EL 317 TO 404")
<b>FIRE AREA D</b>	
86-G	NORTH DIESEL GENERATOR ROOM (EL 368")
<b>FIRE AREA E</b>	
100-N	SOUTH SWITCHGEAR ROOM (EL 372")
<b>FIRE AREA F</b>	
100-N	SOUTH BATTERY ROOM (EL 372")
<b>FIRE AREA G</b>	
97-R	CABLE SPREADING ROOM AND RELAY ROOM (EL 372")
<b>FIRE AREA H</b>	
87-H	SOUTH DIESEL GENERATOR ROOM (EL 368")
<b>FIRE AREA I</b>	
99-M	NORTH SWITCHGEAR ROOM (EL 372")
88-J	UNCONTROLLED ACCESS (EL 372")
104-S	LOWER NORTH ELECTRICAL PENETRATION ROOM (EL 373'-6")
<b>FIRE AREA J</b>	
32-K	NORTH SIDE CONTAINMENT BUILDING
33-K	SOUTH SIDE CONTAINMENT BUILDING

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DRAWING REFLECTS FIREWALLS AND  
FIRE-RATED FLOORS AFTER  
COMPLETION OF MODIFICATIONS  
IDENTIFIED IN THE APPENDIX R  
AREA ANALYSIS

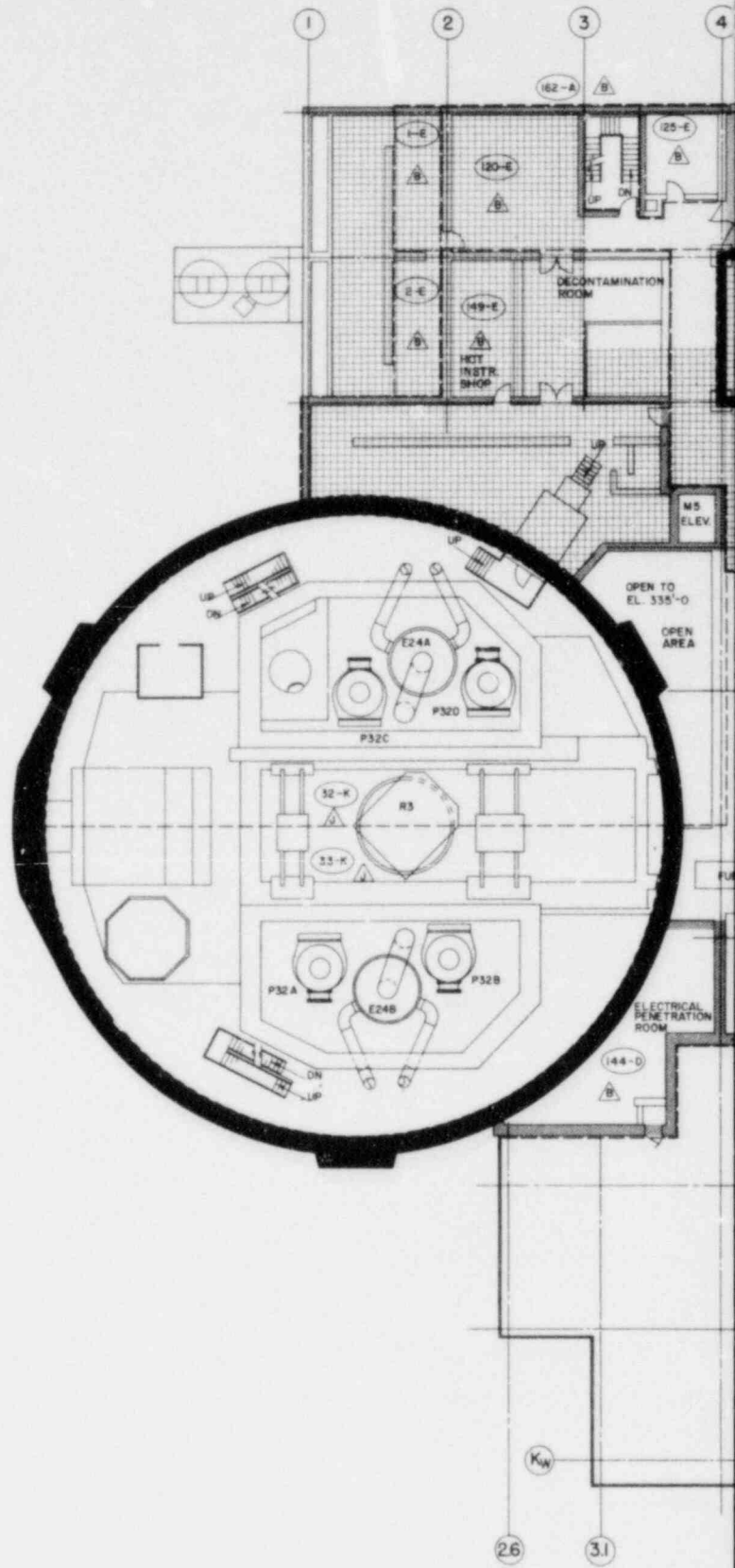
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BACKGROUND EQUIPMENT MAY NOT BE  
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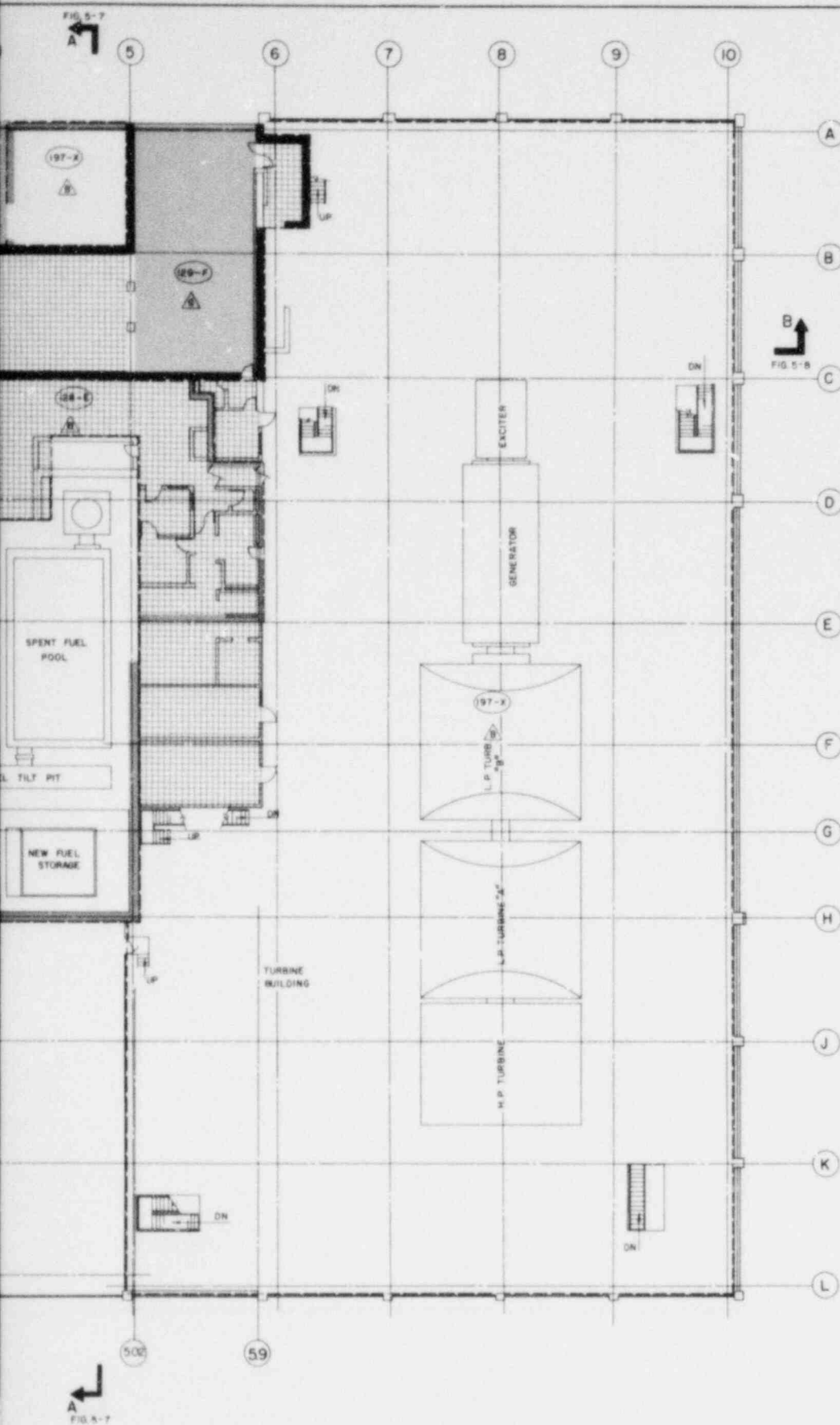
ARKANSAS POWER AND LIGHT COMPANY ARKANSAS NUCLEAR ONE-UNIT 1 FIRE PROTECTION PROGRAM
FIRE AREA AND ZONE BOUNDARIES
ELEVATION 368'-374'-6" INTERMEDIATE FLOOR
AP <span style="float: right;">FIGURE 5-4</span>

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CARD**

8408280188-04

FIG. 5-8





# LEGEND

- TECH SPEC FIRE WALLS
- NON-TECH SPEC FIRE WALLS
- TECH SPEC FIRE-RATED FLOORS
- NON-TECH SPEC FIRE-RATED FLOORS
- FIRE ZONE
- FIRE AREA
- DENOTES FIRE ZONE BOUNDARY

FIRE ZONE	ZONE DESCRIPTION
<b>FIRE AREA B</b>	
125-E	RESPIRATOR STORAGE ROOM (EL. 336.1)
120-E	SULFURIC ACID ADDITION TANK AND PUMP ROOM (EL. 336.1)
107-X	TURBINE BUILDING (EL. 335 TO 404)
102-A	STAIRWELL, NO. 1 (EL. 317 TO 404)
149-E	UPPER NORTH ELECTRICAL PENETRATION ROOM, HOT TOOL ROOM, DECONTAMINATION ROOM (EL. 386.1)
128-E	CONTROLLED ACCESS (EL. 386.1)
144-D	UPPER SOUTH ELECTRICAL PENETRATION ROOM (EL. 386.1)
1-E	NORTH EMERGENCY DIESEL GENERATOR EXHAUST FANS (EL. 386.1)
2-E	SOUTH EMERGENCY DIESEL GENERATOR EXHAUST FANS (EL. 386.1)
<b>FIRE AREA G</b>	
129-F	CONTROL ROOM (EL. 386.1)
<b>FIRE AREA J</b>	
32-K	NORTH SIDE CONTAINMENT BUILDING
33-K	SOUTH SIDE CONTAINMENT BUILDING

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FIRE-RATED FLOORS AFTER  
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AREA ANALYSIS

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ARKANSAS POWER AND LIGHT COMPANY  
ARKANSAS NUCLEAR ONE-UNIT 1  
FIRE PROTECTION PROGRAM

FIRE AREA AND ZONE BOUNDARIES

ELEVATION 386'  
OPERATING FLOOR

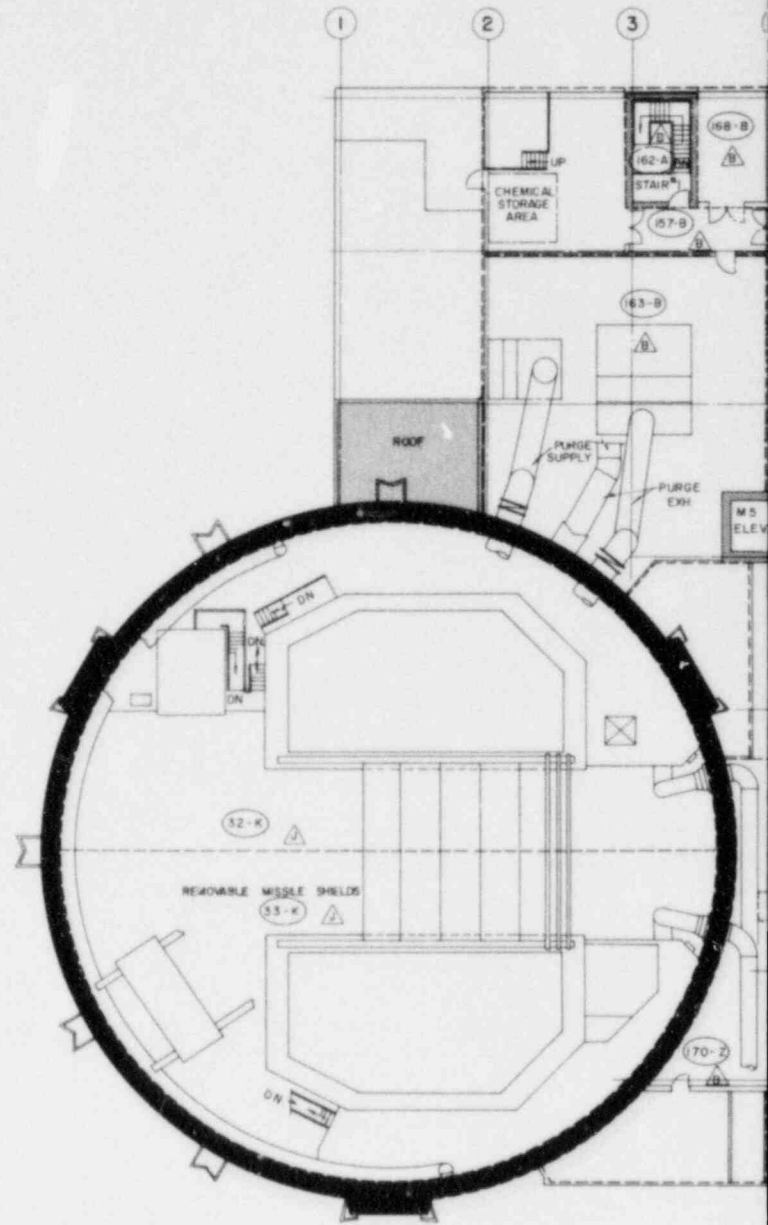
**AP**

FIGURE 5-5

REV  
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8408280188-05

B  
↑  
FIG 5-8





# LEGEND

- TECH SPEC FIRE WALLS
- NON-TECH SPEC FIRE WALLS
- ▨ TECH SPEC FIRE-RATED FLOORS
- ▤ NON-TECH SPEC FIRE-RATED FLOORS
- 57-B FIRE ZONE
- △ FIRE AREA
- - - - - DENOTES FIRE ZONE BOUNDARY

FIRE ZONE	ZONE DESCRIPTION
<b>FIRE AREA B</b>	
57-B	CHEMICAL ADDITION AREA (EL. 404)
70-Z	STEAM PIPING AREA (EL. 404)
53-B	REACTOR BUILDING PURGE ROOM (EL. 404)
97-X	TURBINE BUILDING (EL. 335 TO 404)
82-A	STAIRWELL NO. 1 (EL. 317 TO 404)
99-B	SPENT FUEL AREA (EL. 404)
100-B	COMPUTER ROOM (EL. 404)
40-B	VENTILATION EQUIPMENT AREA (EL. 404 TO 422)
87-B	COMPUTER TRANSFORMER ROOM (EL. 404)
88-B	TRANSFORMER ROOM (EL. 404)
<b>FIRE AREA J</b>	
32-K	NORTH SIDE CONTAINMENT BUILDING
33-K	SOUTH SIDE CONTAINMENT BUILDING

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DRAWING REFLECTS FIREWALLS AND  
FIRE-RATED FLOORS AFTER  
COMPLETION OF MODIFICATIONS  
IDENTIFIED IN THE APPENDIX R  
AREA ANALYSIS

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ARKANSAS POWER AND LIGHT COMPANY  
ARKANSAS NUCLEAR ONE-UNIT 1  
FIRE PROTECTION PROGRAM

FIRE AREA AND ZONE BOUNDARIES

ELEVATION 404'  
FUEL HANDLING FLOOR

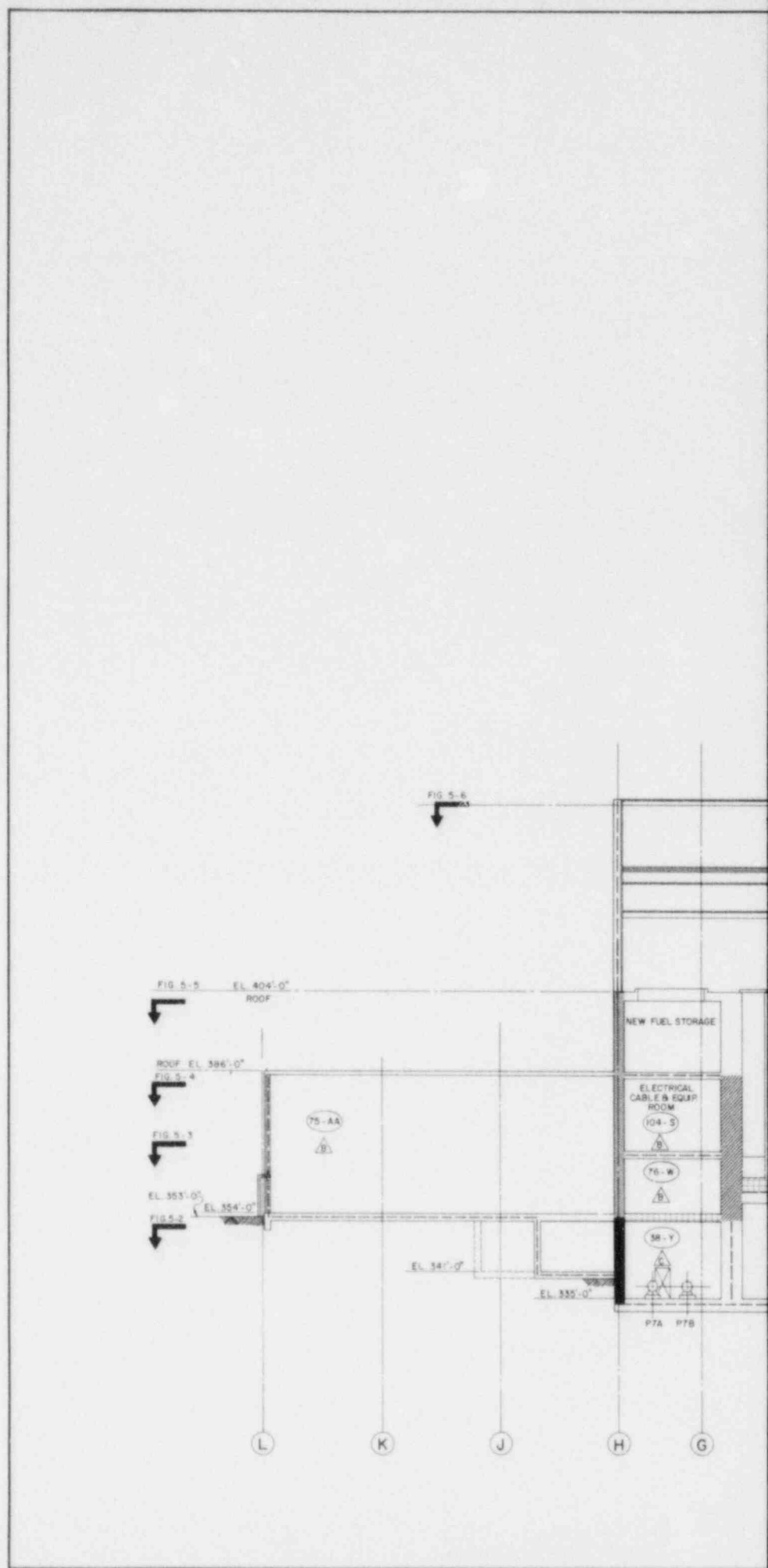


FIGURE 5-6

REV  
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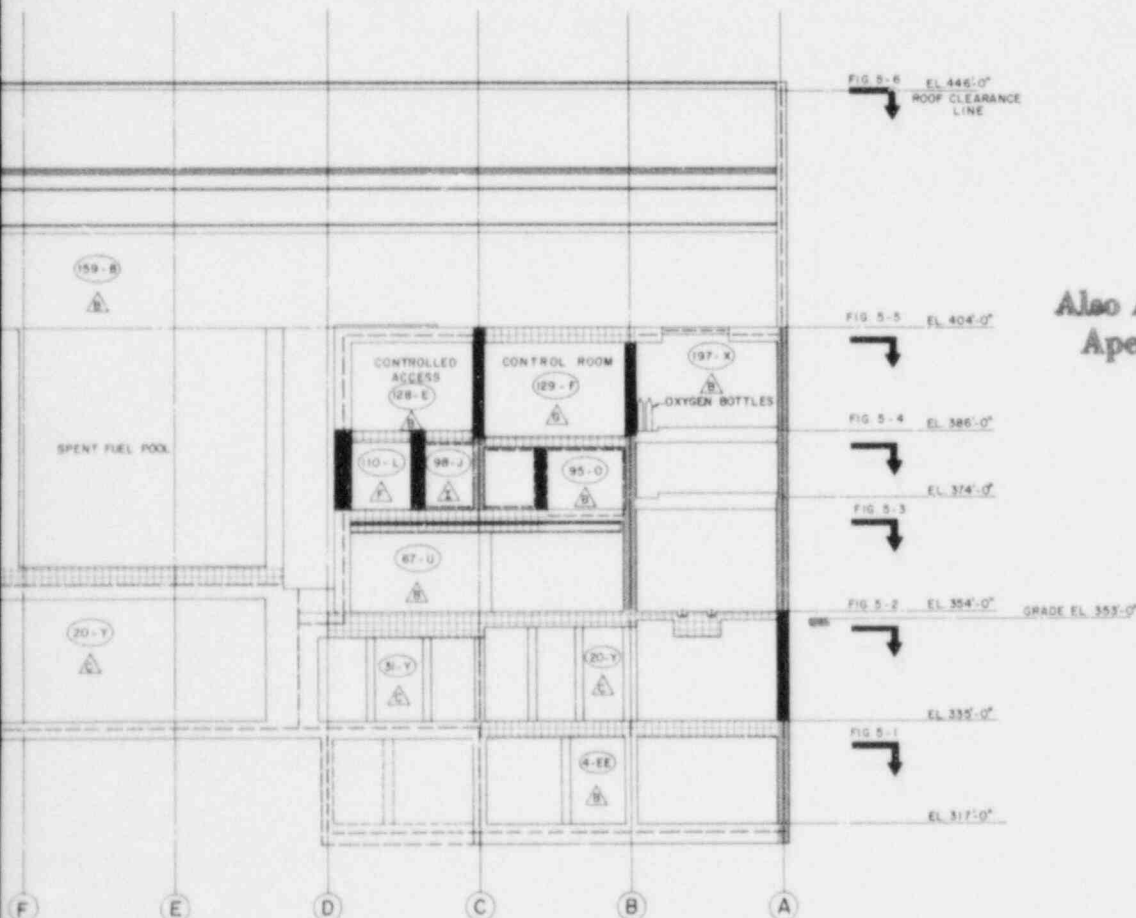
# LEGEND

- TECH SPEC FIRE WALLS
- NON-TECH SPEC FIRE WALLS
- TECH SPEC FIRE-RATED FLOORS
- NON-TECH SPEC FIRE-RATED FLOORS
- 75-AA FIRE ZONE
- FIRE AREA
- DENOTES FIRE ZONE BOUNDARY

FIRE ZONE	ZONE DESCRIPTION
FIRE AREA B	
75-4A	BOILER ROOM (EL 354)
75-1W	COMPRESSOR ROOM (EL 354)
124-S	ELECTRICAL EQUIPMENT ROOM (EL 368)
189-B	SPENT FUEL AREA (EL 404)
4-EE	GENERAL ACCESS AREA (EL 317)
67-U	LAB & DEMINERALIZER ACCESS AREA (EL 354)
95-D	NORTH BATTERY ROOM (EL 372)
128-E	CONTROLLED ACCESS AREA (EL 386)
97-Y	TURBINE BUILDING (EL 325 TO 404)
FIRE AREA C	
58-Y	EMERGENCY FEEDWATER PUMP AREA (EL 335)
20-Y	RADWASTE PROCESSING AREA (EL 335)
8-Y	PURIFICATION DEMINERALIZER AREA (EL 335)
FIRE AREA F	
110-1	SOUTH BATTERY ROOM (EL 372)
FIRE AREA G	
129-F	CONTROL ROOM (EL 386)
FIRE AREA I	
98-J	UNCONTROLLED ACCESS AREA (EL 372)

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DRAWING REFLECTS FIREWALLS AND  
FIRE-RATED FLOORS AFTER  
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IDENTIFIED IN THE APPENDIX R  
AREA ANALYSIS

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ARKANSAS POWER AND LIGHT COMPANY  
ARKANSAS NUCLEAR ONE-UNIT 1  
FIRE PROTECTION PROGRAM

FIRE AREA AND ZONE BOUNDARIES

SECTION A-A



FIGURE 5-7

REV  
O

8408280188-07



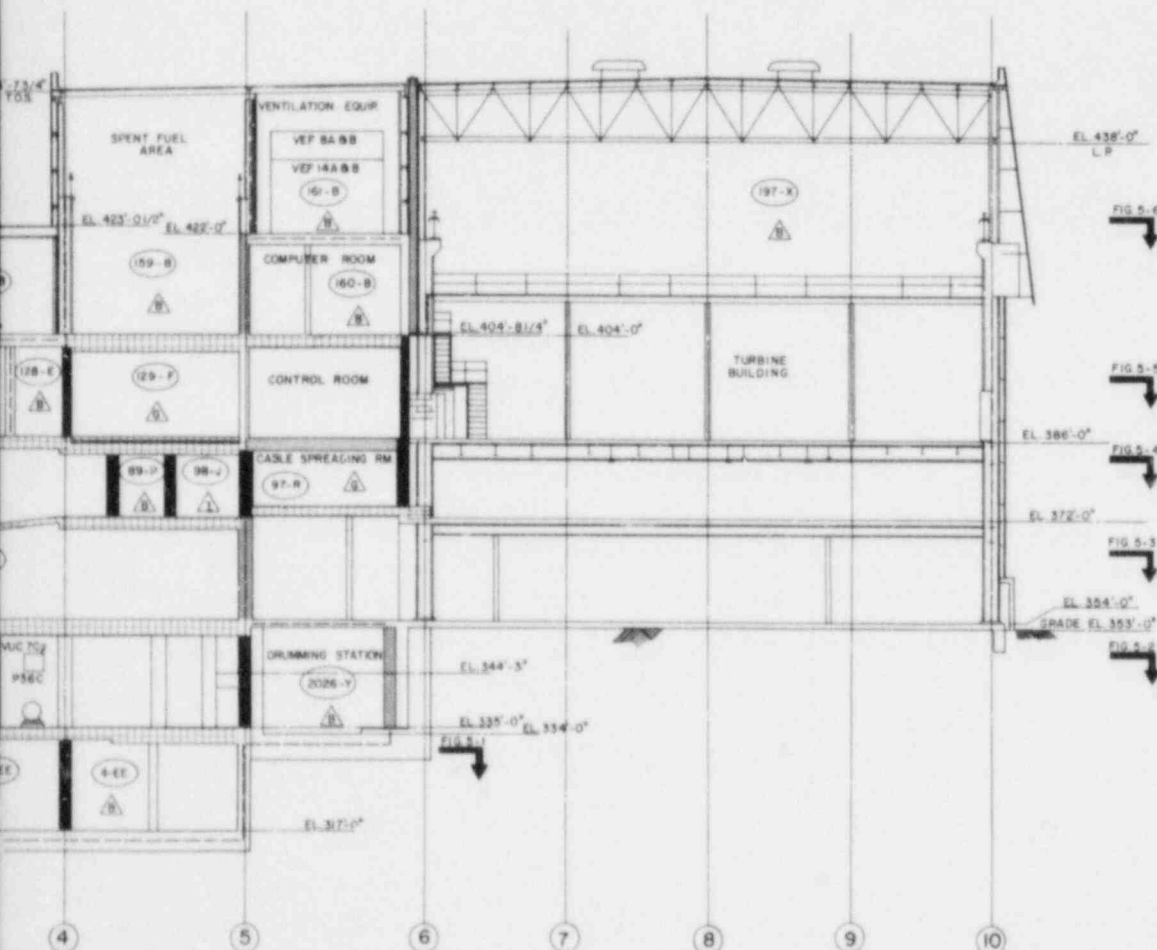
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## LEGEND

- TECH SPEC FIREWALLS
- NON-TECH SPEC FIREWALLS
- TECH SPEC FIRE-RATED FLOORS
- NON-TECH SPEC FIRE-RATED FLOORS
- FIRE ZONE
- FIRE AREA
- DENOTES FIRE ZONE BOUNDARY



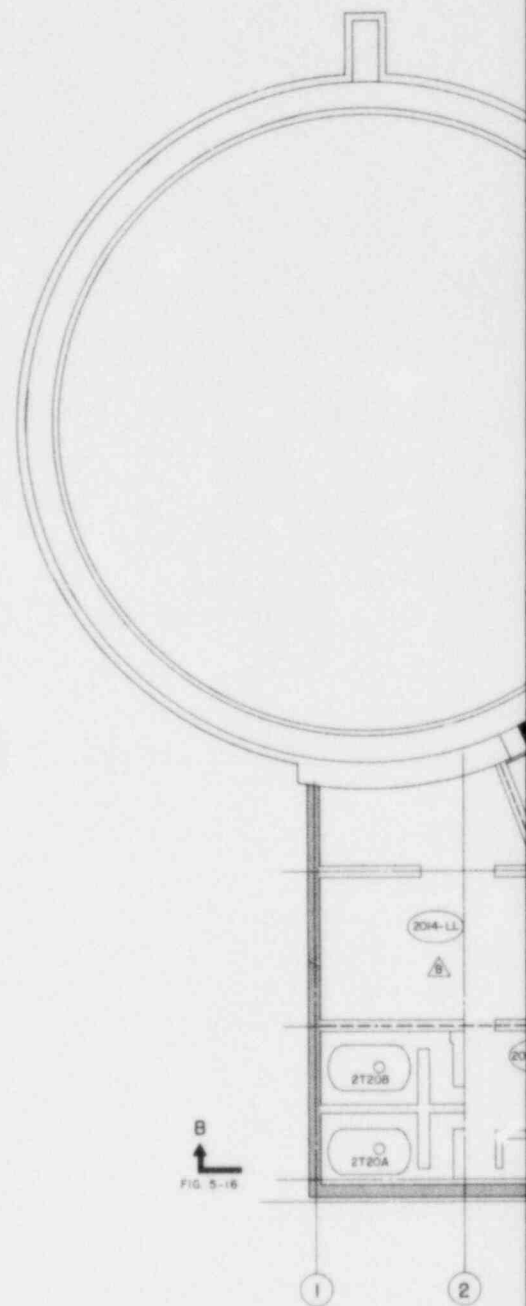
FIRE ZONE	ZONE DESCRIPTION
<b>FIRE AREA A</b>	
10-EE	EAST DECAY HEAT REMOVAL PUMP ROOM (EL 317)
<b>FIRE AREA B</b>	
14-EE	WEST DECAY HEAT REMOVAL PUMP ROOM (EL 317)
4-E	GENERAL ACCESS AREA (EL 317)
2026-Y	DRUMMING STATION (UNIT 1 - EL 335)
67-U	LAB B DEMINERALIZER ACCESS AREA (EL 334)
2-E	SOUTH EMERGENCY DIESEL GENERATOR EXHAUST FANS (EL 336)
149-E	UPPER NORTH ELECTRICAL PENETRATION ROOM, HOT TOOL ROOM, DECONTAMINATION ROOM (EL 336)
28-E	CONTROLLED ACCESS (EL 336)
163-B	REACTOR BUILDING PURGE ROOM (EL 404)
160-B	COMPUTER ROOM (EL 404)
161-B	VENTILATION EQUIPMENT AREA (EL 404 & 402)
159-B	SPENT FUEL AREA (EL 404)
197-X	TURBINE BUILDING (EL 335 TO 404)
<b>FIRE AREA C</b>	
20-Y	RADWASTE PROCESSING AREA (EL 335)
<b>FIRE AREA D</b>	
125-F	CONTROL ROOM (EL 336)
97-R	CABLE SPREADING ROOM & RELAY ROOM (EL 372)
<b>FIRE AREA H</b>	
187-H	SOUTH DIESEL GENERATOR ROOM
<b>FIRE AREA I</b>	
98-B	UNCONTROLLED ACCESS (EL 372)
<b>FIRE AREA K</b>	
16-Y	CLEAN WASTE RECEIVER TANK AREA (EL 327)

DRAWING REFLECTS FIREWALLS AND  
FIRE-RATED FLOORS AFTER  
COMPLETION OF MODIFICATIONS  
IDENTIFIED IN THE APPENDIX R  
AREA ANALYSIS

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CORRECT AS TO LOCATION OR SIZE

ARKANSAS POWER AND LIGHT COMPANY ARKANSAS NUCLEAR ONE-UNIT 1 FIRE PROTECTION PROGRAM	
FIRE AREA AND ZONE BOUNDARIES	
SECTION B-B	
AP	FIGURE 5-8
REV	0

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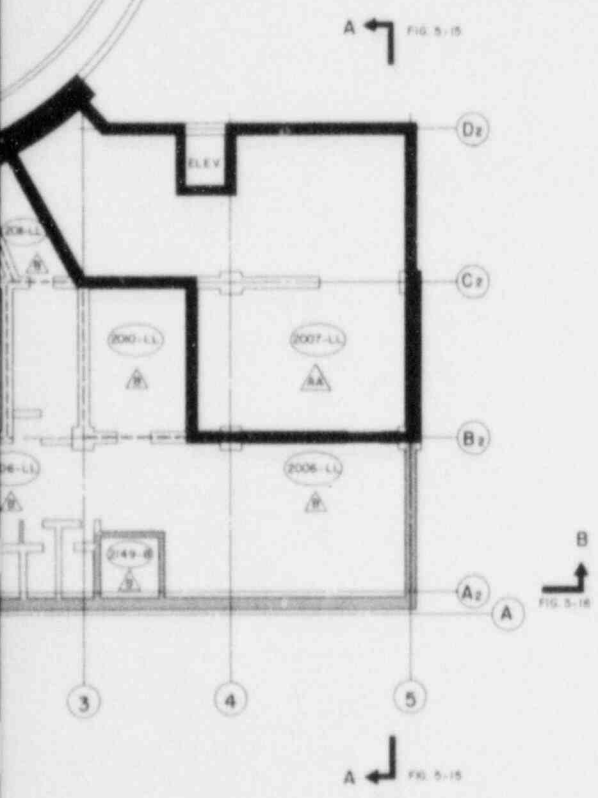
LEGEND

- TECH SPEC FIREWALLS
- NON-TECH SPEC FIREWALLS
- TECH SPEC FIRE-RATED FLOORS
- NON-TECH SPEC FIRE-RATED FLOORS
- FIRE ZONE
- FIRE AREA
- DENOTES FIRE ZONE BOUNDARY

FIRE ZONE	ZONE DESCRIPTION
<b>FIRE AREA B</b>	
200N-LL	GENERAL ACCESS AREA (EL. 317)
200D-LL	"C" HPSI PUMP AREA (EL. 317)
200I-LL	TENDON GALLERY ACCESS (EL. 317)
200H-LL	WEST HPSI, LPSI & CONTAINMENT SPRAY PUMP AREA (EL. 317)
2149-B	STAIRWAY NO. 2001 (EL. 317 TO 400)
<b>FIRE AREA AA</b>	
2007-LL	EAST HPSI, LPSI & CONTAINMENT SPRAY PUMP AREA AND GALLERY (EL. 317)

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DRAWING REFLECTS FIREWALLS AND  
FIRE-RATED FLOORS AFTER  
COMPLETION OF MODIFICATIONS  
IDENTIFIED IN THE APPENDIX B  
AREA ANALYSIS

THIS DRAWING TO BE USED FOR  
FIRE PROTECTION  
ONLY  
BACKGROUND EQUIPMENT MAY NOT BE  
CORRECT AS TO LOCATION OR SIZE

ARKANSAS POWER AND LIGHT COMPANY ARKANSAS NUCLEAR ONE-UNIT 2 FIRE PROTECTION PROGRAM	
FIRE AREA AND ZONE BOUNDARIES	
ELEVATION 317'	
APL	FIGURE 5-9
REV	0

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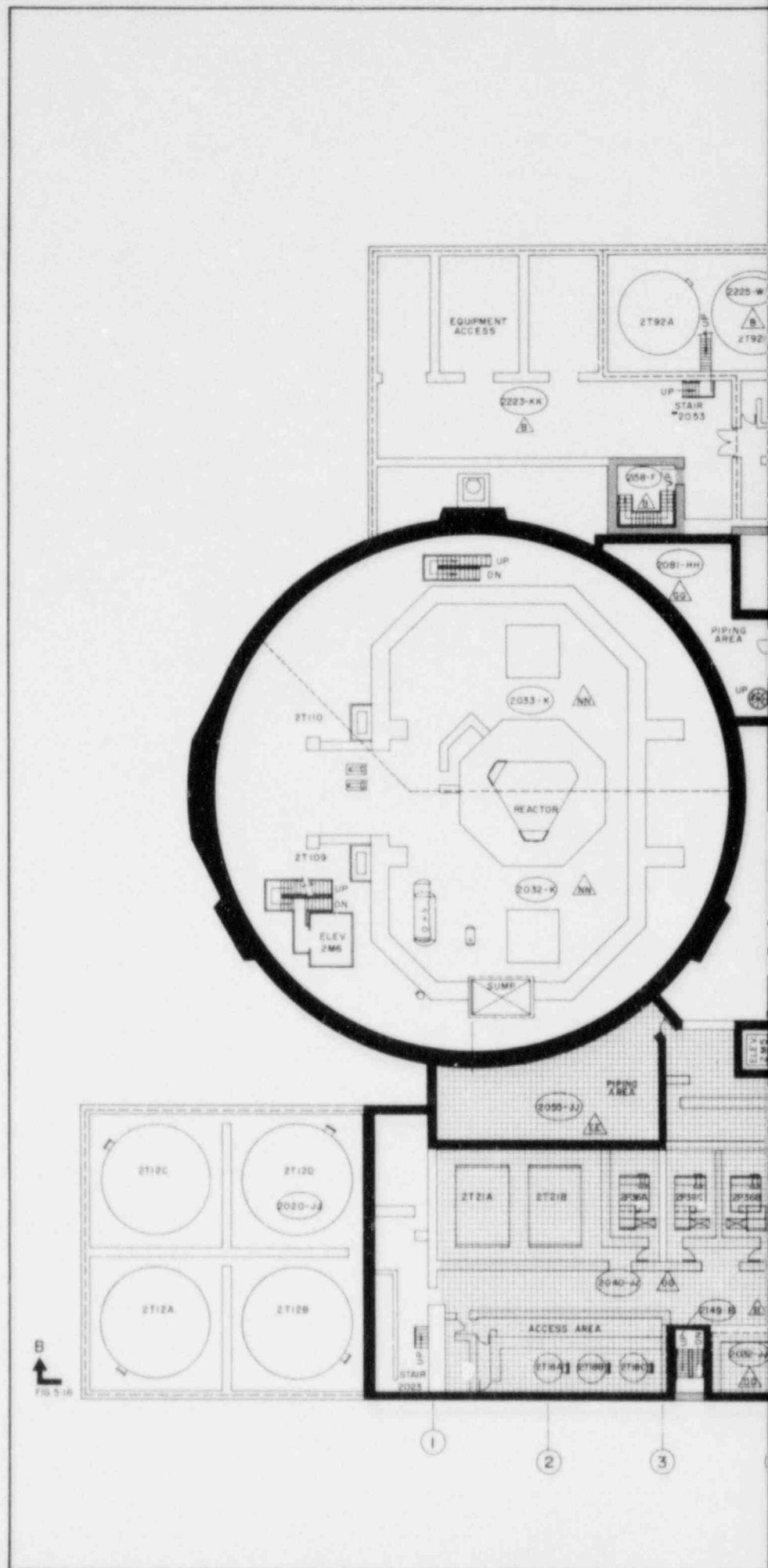


FIG. 5-15



# LEGEND

- TECH SPEC FIREWALLS
- NON-TECH SPEC FIREWALLS
- TECH SPEC FIRE-RATED FLOORS
- NON-TECH SPEC FIRE-RATED FLOORS
- FIRE ZONE
- FIRE AREA
- DENOTES FIRE ZONE BOUNDARY



FIRE ZONE	ZONE DESCRIPTION
FIRE AREA B	
2023-KX	PIPEWAY EQUIPMENT ACCESS AREA (EL. 335)
2045-KX	TURBINE LUBE OIL STORAGE TANK ROOM (EL. 335)
2040-MM	TURBINE BUILDING (EL. 335 TO 404)
2148-B	STAIRWAY NO. 200 (EL. 317 TO 422)
2177-YY	NEUTRALIZER TANK ROOM (EL. 336)
2179-ZZ	LAUNDRY STORAGE & BOTTLED AIR REFILL ROOM (EL. 334 & LOWER STORAGE AREA (EL. 335))
2048-F	STAIR NO. 200 (EL. 335 TO 404)
2025-WW	REGENERATIVE WASTE PUMP & TANK AREA (EL. 335)
FIRE AREA CC	
2024-JJ	TURBINE DRIVEN EMERGENCY FEEDWATER PUMP ROOM (EL. 329)
FIRE AREA DD	
2040-JJ	TANK ROOMS, PUMP ROOMS & CORRIDORS (EL. 335)
2032-JJ	SPENT RESIN STORAGE TANK ROOM (EL. 335)
2019-JJ	BORIC ACID CONDENSATE TANK ROOM (EL. 335)
FIRE AREA EE	
2055-JJ	UPPER SOUTH PIPING PENETRATION AREA (EL. 335)
FIRE AREA FF	
2025-JJ	MOTOR DRIVEN EMERGENCY FEEDWATER PUMP ROOM (EL. 335)
FIRE AREA GG	
2026-HH	UPPER NORTH PIPING PENETRATION AREA (EL. 335) & LOWER NORTH PIPING PENETRATION AREA (EL. 335)
FIRE AREA NN	
2032-K	CONTAINMENT BUILDING SOUTH SIDE (EL. 335 TO 426.6)
2033-K	CONTAINMENT BUILDING NORTH SIDE (EL. 335 TO 426.6)

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DRAWING REFLECTS FIREWALLS AND  
FIRE-RATED FLOORS AFTER  
COMPLETION OF MODIFICATIONS  
IDENTIFIED IN THE APPENDIX B  
AREA ANALYSIS

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ARKANSAS POWER AND LIGHT COMPANY  
ARKANSAS NUCLEAR ONE-UNIT 2  
FIRE PROTECTION PROGRAM

FIRE AREA AND ZONE BOUNDARIES

ELEVATION 335'  
BELOW GRADE



FIGURE 5-10

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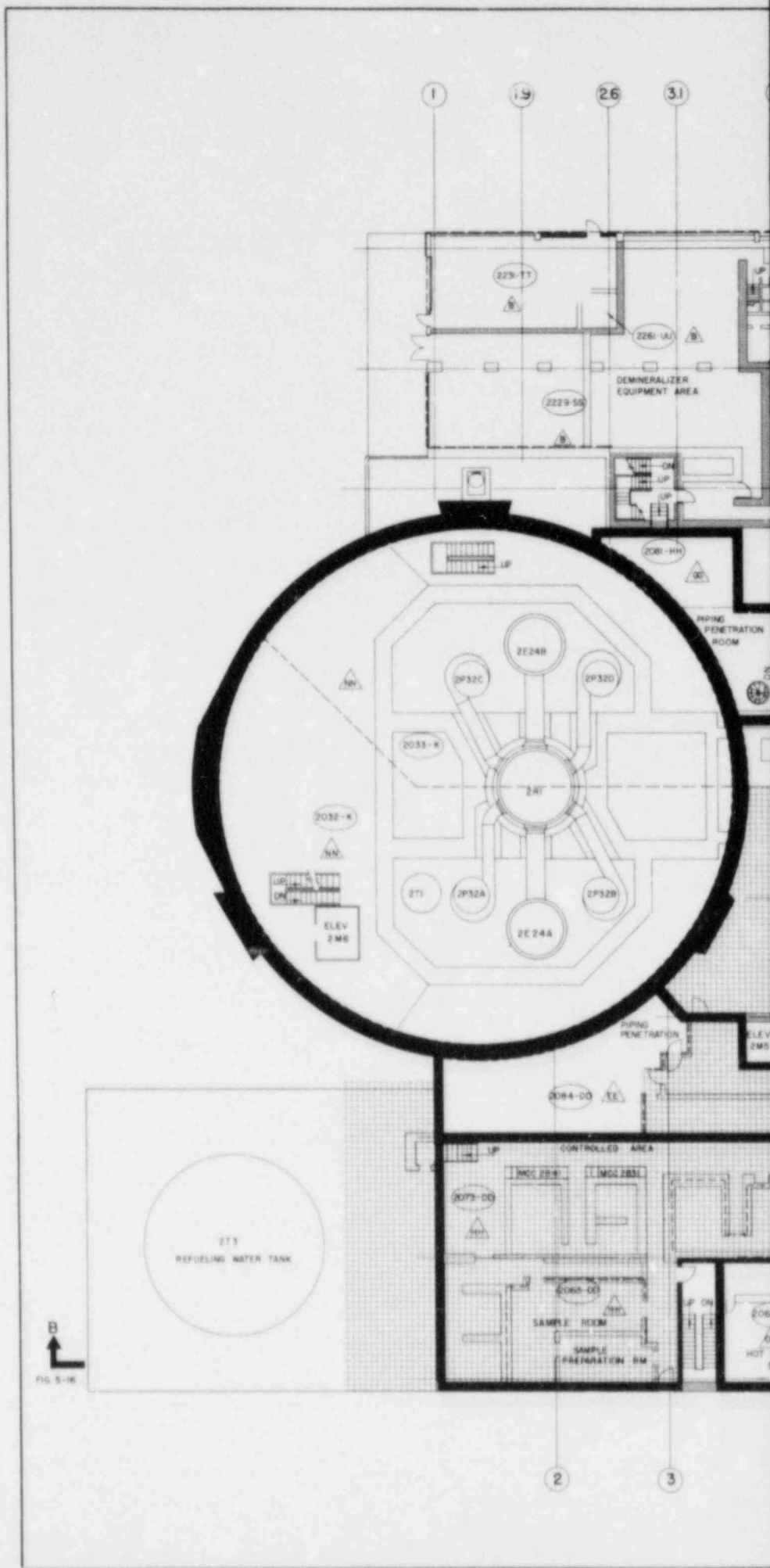


FIG. 5-16

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## LEGEND

- TECH SPEC FIRE WALLS
- NON-TECH SPEC FIRE WALLS
- TECH SPEC FIRE-RATED FLOORS
- NON-TECH SPEC FIRE-RATED FLOORS
- FIRE ZONE
- FIRE AREA
- DENOTES FIRE ZONE BOUNDARY

FIRE ZONE	ZONE DESCRIPTION
<b>FIRE AREA B</b>	
2078-GG	COMPONENT COOLING WATER HEAT EXCHANGER EQUIPMENT AREA (EL. 354)
2078-AAA	LUBE OIL RESERVOIR (EL. 354)
2200-MM	TURBINE BUILDING (EL. 355 TO 404)
2049-B	STAIRWAY NO. 2001 (EL. 317 TO 422)
2072-ZZ	LAUNDRY STORAGE & BOTTLED AIR REPLY ROOMS (EL. 354) & LOWER STORAGE AREA (EL. 355)
2086-X	STAIR NO. 2005 (EL. 355 TO 404)
<b>FIRE AREA B</b>	
2229-SS	DEMINERALIZING EQUIPMENT & LUNCH ROOM AREA (EL. 354)
2206-UU	PLANT HEATING BOILER DAY TANK (EL. 354)
2207-TT	PLANT HEATING BOILER ROOM (EL. 354)
2230-WW	DRUM FILLING ROOM (EL. 354)
<b>FIRE AREA DD</b>	
2048-DD	HOT MACHINE SHOP
<b>FIRE AREA EE</b>	
2084-DD	UPPER SOUTH PIPING PENETRATION ROOM (EL. 354)
<b>FIRE AREA GG</b>	
2078-HH	ELECTRICAL EQUIPMENT ROOM (EL. 354)
2080-YY	UPPER NORTH PIPING PENETRATION AREA (EL. 354) & LOWER NORTH PIPING PENETRATION AREA (EL. 355)
<b>FIRE AREA HH</b>	
2072-GU	ACCESS AREA, PUMP AREA, TANK AREA, WASTE GAS EQUIPMENT AREA & PROBABLY WAY (EL. 354)
2072-X	UPPER VOLUME CONTROL TANK ROOM (EL. 372) & LOWER TANK & PUMP ROOM (EL. 354)
2041-DD	SAMPLE ROOM (EL. 354)
<b>FIRE AREA NN</b>	
2032-X	CONTAINMENT BUILDING SOUTH SIDE (EL. 315 TO 416-B-5)
2032-X	CONTAINMENT BUILDING NORTH SIDE (EL. 315 TO 426-B-5)

**Also Available On  
Aperture Card**

DRAWING REFLECTS FIREWALLS AND FIRE-RELATED FLOORS AFTER COMPLETION OF MODIFICATIONS IDENTIFIED IN THE APPENDIX AREA ANALYSIS

THIS DRAWING TO BE USED FOR  
**FIRE PROTECTION  
ONLY**

BACKGROUND EQUIPMENT MAY NOT BE CORRECT AS TO LOCATION OR SIZE

ARKANSAS POWER AND LIGHT COMPANY  
ARKANSAS NUCLEAR ONE-UNIT2  
FIRE PROTECTION PROGRAM

FIRE AREA AND ZONE BOUNDARIES

ELEVATION 354'  
GROUND FLOOR

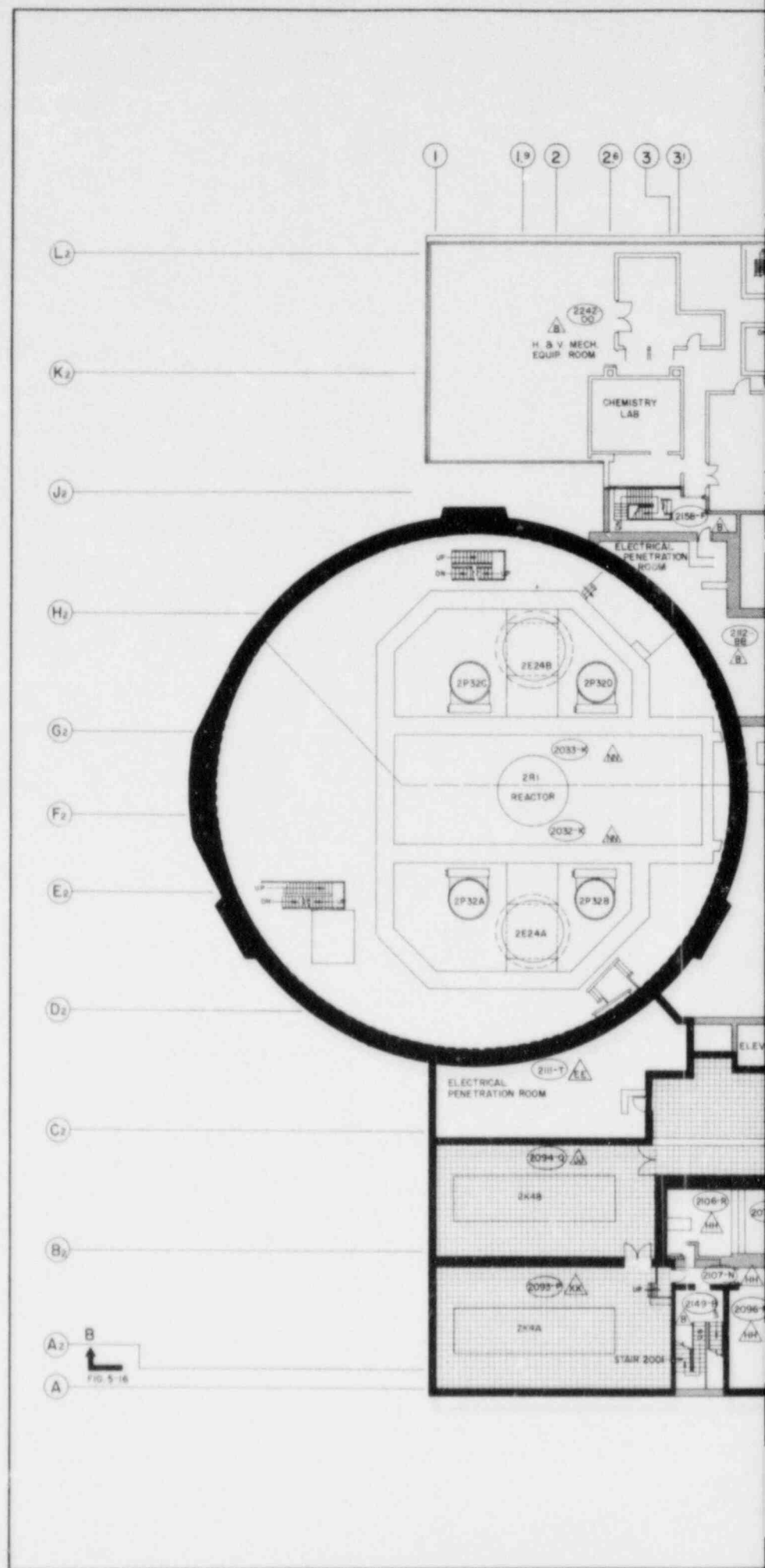
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FIGURE 5-11

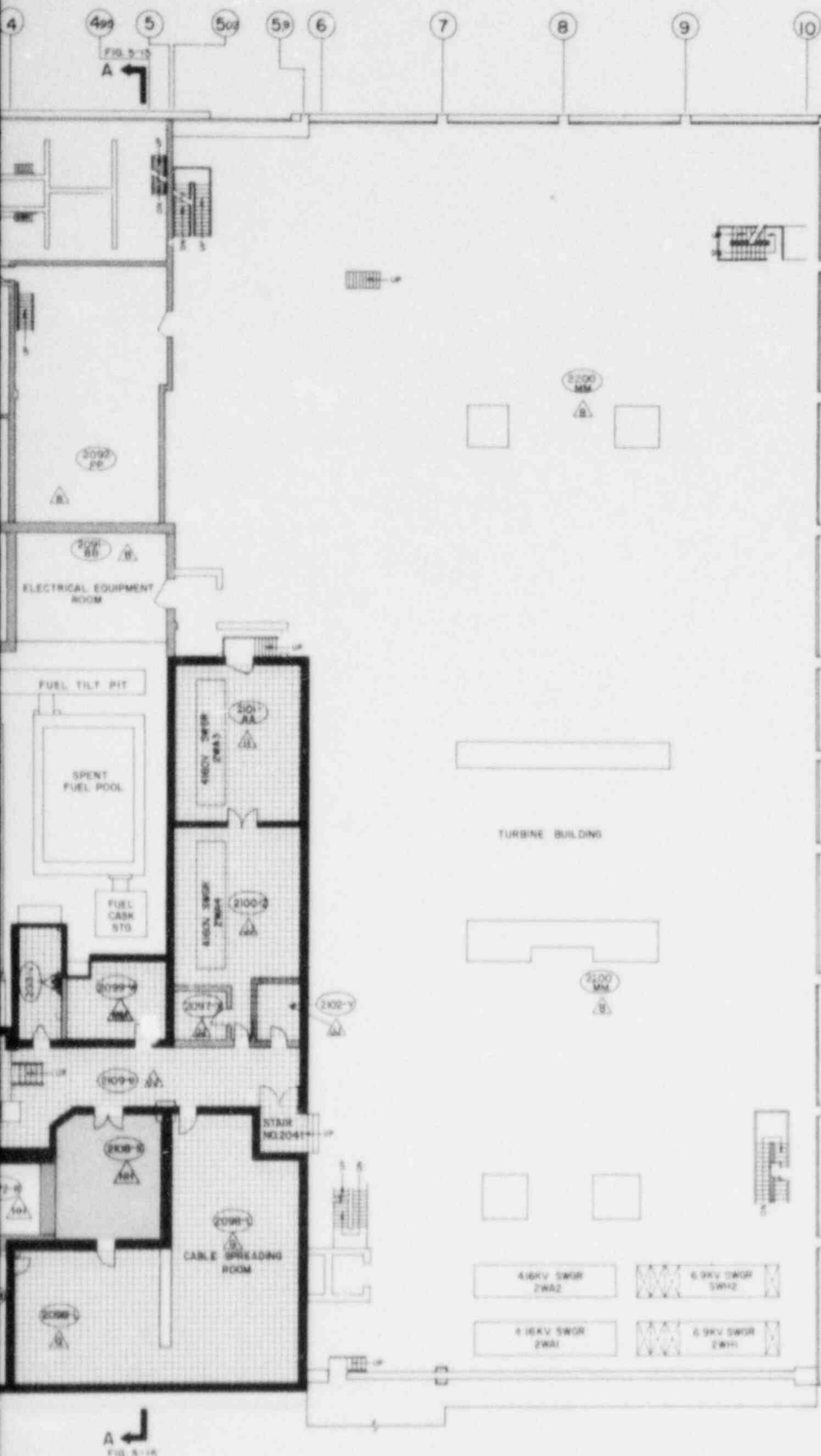
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# TI APERTURE CARD



## LEGEND

- TECH SPEC FIRE WALLS
- NON-TECH SPEC FIRE WALLS
- TECH SPEC FIRE-RATED FLOORS
- NON-TECH SPEC FIRE-RATED FLOORS
- FIRE ZONE
- FIRE AREA
- DENOTES FIRE ZONE BOUNDARY

FIRE ZONE	ZONE DESCRIPTION
2242-00	1. AB, STORAGE & H.V. MECHANICAL EQUIPMENT AREA (EL. 335 TO 400)
2092-F	STAIR NO. 2050 (EL. 335 TO 400)
202-BB	LOWER NORTH ELECTRICAL PENETRATION ROOM (EL. 334)
2092-BB	NORTH ELECTRICAL EQUIPMENT ROOM (EL. 368)
2092-PP	CHILLER EQUIPMENT ROOM (EL. 368)
2092-R	STAIRWAY NO. 2001 (EL. 317 TO 422)
2200-MM	TURBINE BUILDING (EL. 335 TO 400)
FIRE AREA G	CABLE SPREADING ROOM (EL. 372)
FIRE AREA HH	ELECTRICAL EQUIPMENT ROOM (EL. 372)
2072-R	UPPER VOLUME CONTROL TANK ROOM (EL. 372) AND LOWER TANK AND PUMP ROOM (EL. 354)
2052-R	DESASIT. EV. VACUUM PUMP ROOM (EL. 372)
2047-N	CORRIDOR NORTH OF STAIRWAY 2001 (EL. 372)
2092-M	MOTOR CONTROL CENTER (EL. 372)
FIRE AREA II	NORTH SWITCHGEAR ROOM (EL. 372)
FIRE AREA JJ	EAST D.C. EQUIPMENT ROOM (EL. 372)
2007-X	SOUTH SWITCHGEAR ROOM (EL. 372)
2002-Y	EAST BATTERY ROOM (EL. 372)
2009-U	CORRIDOR AND MOTOR CONTROL CENTER (EL. 372 & 374-6)
2092-G	NORTH DIESEL GENERATOR ROOM (EL. 368)
FIRE AREA KK	SOUTH DIESEL GENERATOR ROOM (EL. 368)
2092-P	WEST BATTERY ROOM (EL. 372)
2009-W	WEST D.C. EQUIPMENT ROOM (EL. 372)
FIRE AREA EE	LOWER SOUTH ELECTRICAL PENETRATION ROOM (EL. 374-6)
FIRE AREA NN	CONTAINMENT BUILDING SOUTH SIDE (EL. 335 TO 425-6)
2032-K	CONTAINMENT BUILDING NORTH SIDE (EL. 335 TO 425-6)

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DRAWING REFLECTS FIREWALLS AND  
FIRE-RATED FLOORS AFTER  
COMPLETION OF MODIFICATIONS  
IDENTIFIED IN THE APPENDIX B  
AREA ANALYSIS

THIS DRAWING TO BE USED FOR  
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ONLY

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ARKANSAS POWER AND LIGHT COMPANY  
ARKANSAS NUCLEAR ONE-UNIT 2  
FIRE PROTECTION PROGRAM

FIRE AREA AND ZONE BOUNDARIES

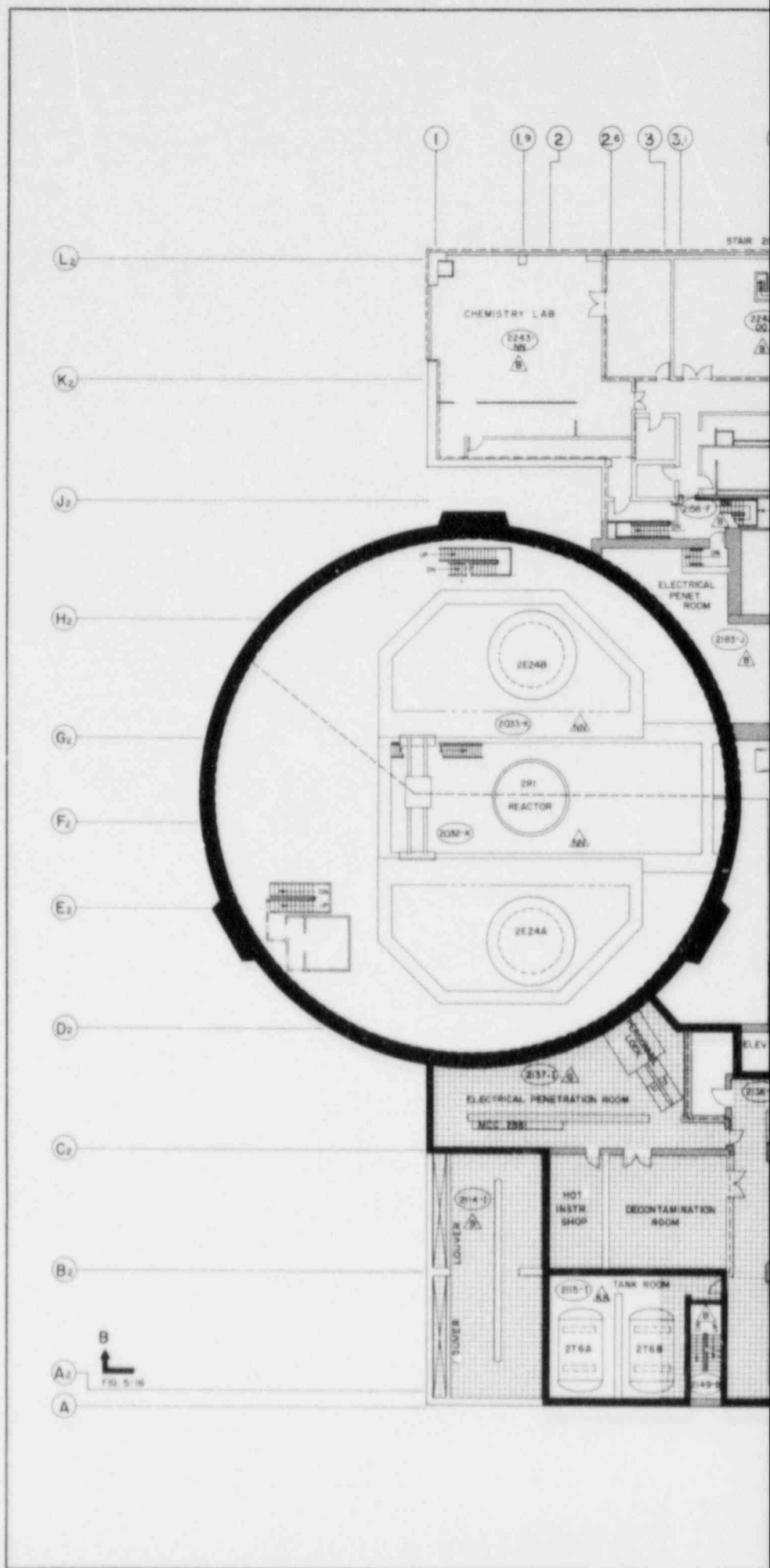
ELEVATION 368-374-6  
INTERMEDIATE FLOOR

AP

FIGURE 5-12

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# LEGEND

- TECH SPEC FIRE WALLS
- NON-TECH SPEC FIRE WALLS
- TECH SPEC FIRE-RATED FLOORS
- NON-TECH SPEC FIRE-RATED FLOORS
- FIRE ZONE
- FIRE AREA
- DENOTES FIRE ZONE BOUNDARY

FIRE ZONE	ZONE DESCRIPTION
<b>FIRE AREA B</b>	
2141-1	H.V. AIR INTAKE AREA (EL. 386)
2142-2	STAIRWAY NO. 200 (EL. 374 TO 422)
2200-MM	TURBINE BUILDING (EL. 335 TO 404)
2185-1	UPPER NORTH ELECTRICAL PENETRATION ROOM (EL. 386)
2242-10	LAB STORAGE AND H.V. MECHANICAL EQUIPMENT AREA (EL. 374 TO 386)
2158-2	STAIR NO. 205 (EL. 335 TO 404)
2243-NN	CHEMISTRY LAB (EL. 389-9)
<b>FIRE AREA G</b>	
2159-3	CONTROL ROOM (EL. 389)
2157-1	UPPER SOUTH ELECTRICAL PENETRATION ROOM, HOT INSTRUMENT SHOP
2119-H	RECORDS STORAGE (EL. 386)
<b>FIRE AREA KK</b>	
2118-1	SULFURIC ACID MAKEUP TANK ROOM (EL. 386)
<b>FIRE AREA NN</b>	
2032-K	CONTAINMENT BUILDING SOUTH SIDE (EL. 335 TO 426-6)
2033-K	CONTAINMENT BUILDING NORTH SIDE (EL. 335 TO 426-6)

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DRAWING REFLECTS FIREWALLS AND  
FIRE-RATED FLOORS AFTER  
COMPLETION OF MODIFICATIONS  
IDENTIFIED IN THE APPENDIX B  
AREA ANALYSIS

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CORRECT AS TO LOCATION OR SIZE

ARKANSAS POWER AND LIGHT COMPANY  
ARKANSAS NUCLEAR ONE-UNIT 2  
FIRE PROTECTION PROGRAM

FIRE AREA AND ZONE BOUNDARIES

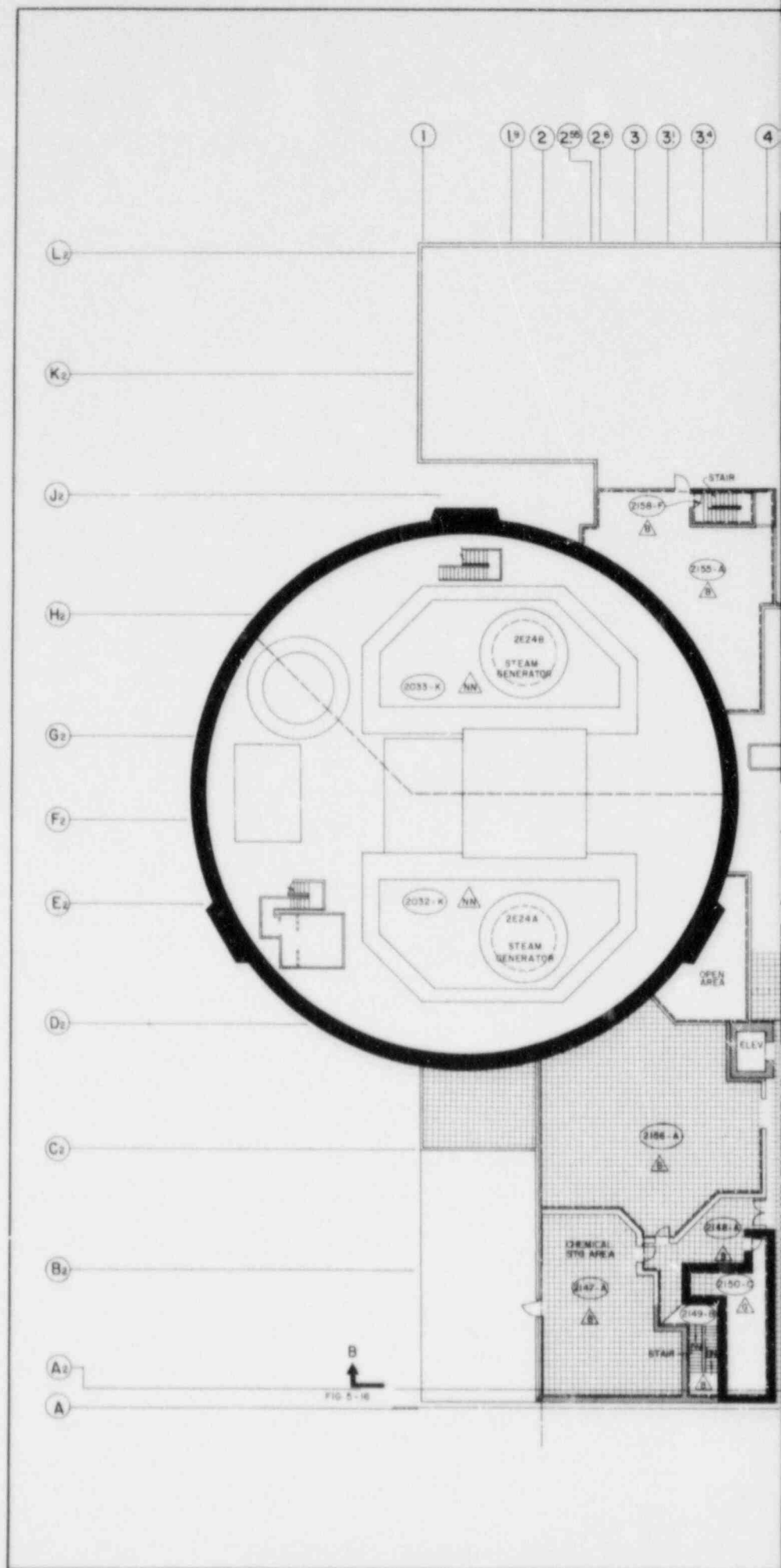
ELEVATION 386'  
OPERATING FLOOR



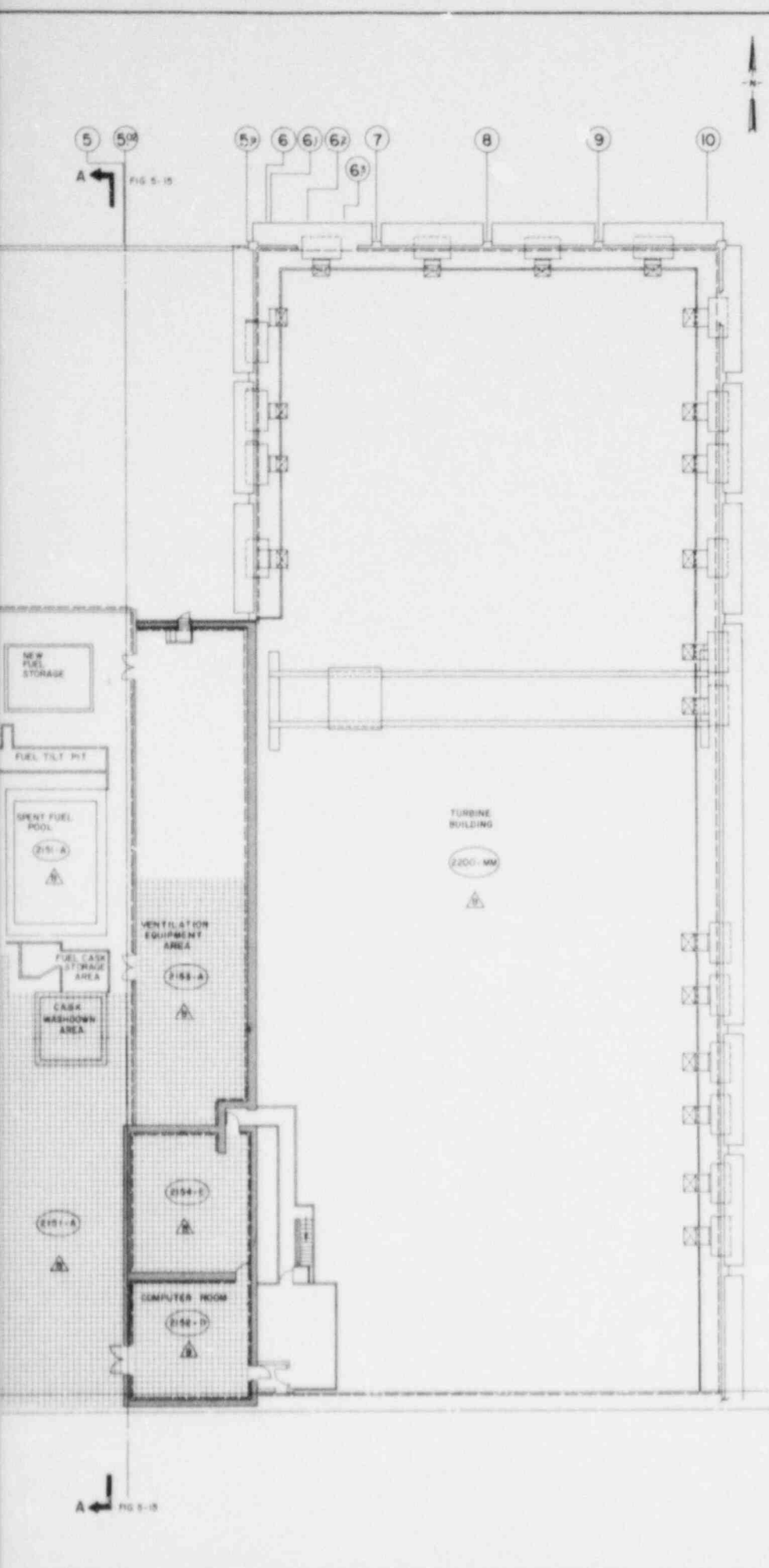
FIGURE 5-13

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**LEGEND**

- TECH SPEC FIREWALLS
- NON-TECH SPEC FIREWALLS
- TECH SPEC FIRE-RATED FLOORS
- NON-TECH SPEC FIRE-RATED FLOORS
- FIRE ZONE
- △ FIRE AREA
- DENOTES FIRE ZONE BOUNDARY

FIRE ZONE	ZONE DESCRIPTION
<b>FIRE AREA B</b>	
2149-B	STAIRWAY NO. 2001 (EL. 317 TO 422)
2152-A	VENTILATION EQUIPMENT AREA (EL. 404 & 422)
2154-E	GEOM. EQUIPMENT ROOM (EL. 404)
2154-S	CONTAINMENT PURGE AIR EQUIPMENT AREA (EL. 404)
2152-D	COMPUTER ROOM (EL. 404)
2200-MM	TURBINE BUILDING (EL. 335 TO 404)
2155-A	STEAM PIPE AREA (EL. 404)
2148-B	CORRIDOR NORTH OF PMWL ROOM AND STAIRWAY NO. 2001 (EL. 404)
2151-A	FUEL HANDLING AREA (EL. 404)
2158-F	STAIR NO. 2055 (EL. 335 TO 505)
2167-A	CHEMICAL STORAGE AREA (EL. 404)
<b>FIRE AREA G</b>	
200-C	CORE PROTECTION CALCULATOR ROOM (EL. 404)
<b>FIRE AREA NN</b>	
2039-X	CONTAINMENT BUILDING SOUTH SIDE (EL. 335 TO 425-61)
2035-X	CONTAINMENT BUILDING NORTH SIDE (EL. 335 TO 425-61)

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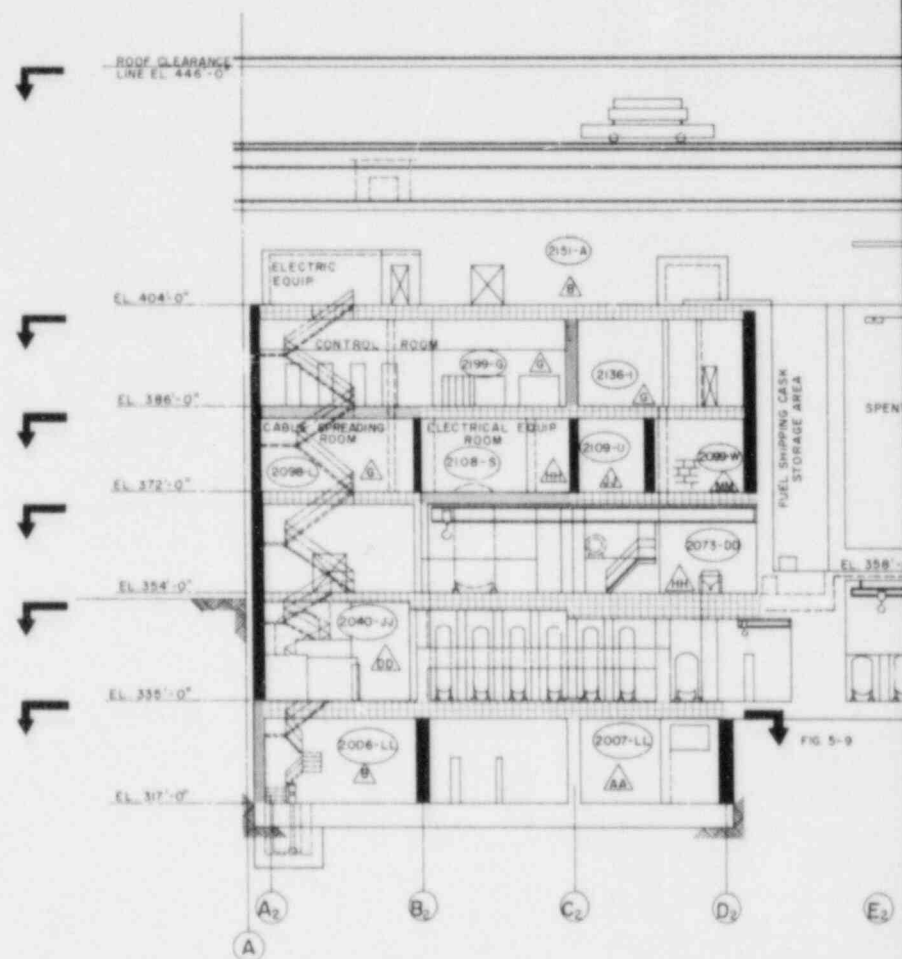
DRAWING REFLECTS FIREWALLS AND FIRE-RATED FLOORS AFTER COMPLETION OF MODIFICATIONS IDENTIFIED IN THE APPENDIX R AREA ANALYSIS

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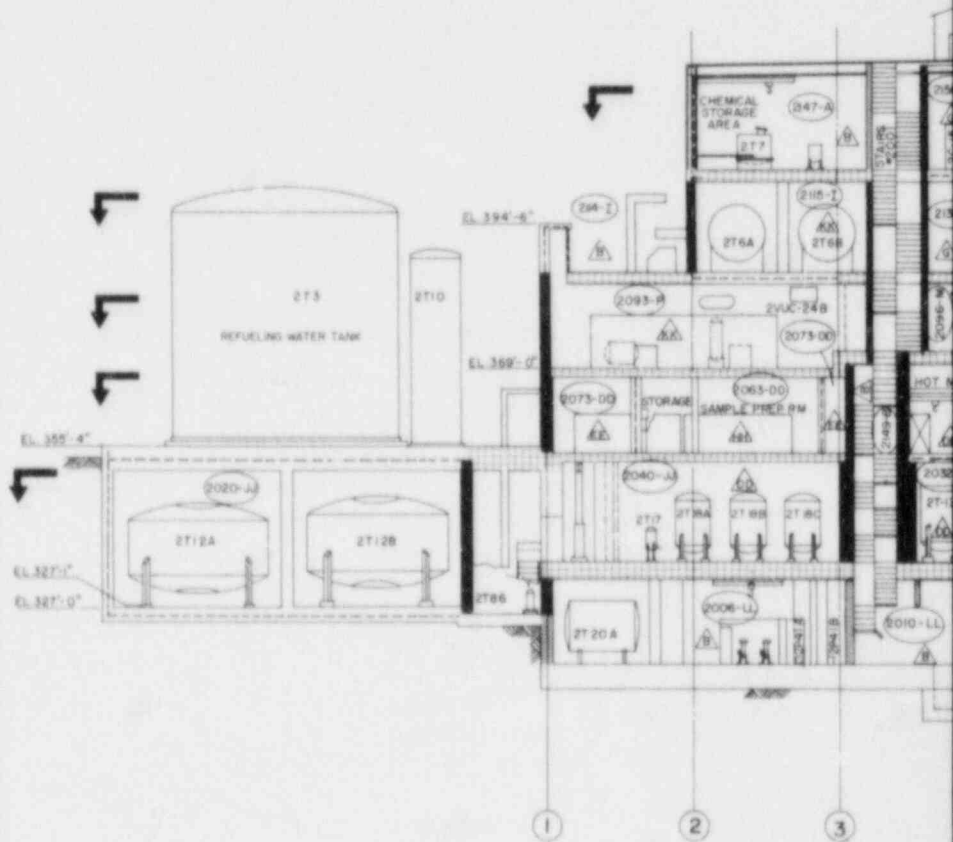


FIG 5-16

ARKANSAS POWER AND LIGHT COMPANY ARKANSAS NUCLEAR ONE-UNIT 2 FIRE PROTECTION PROGRAM	
FIRE AREA AND ZONE BOUNDARIES	
ELEVATION 404'-0" FUEL HANDLING FLOOR	
AP	FIGURE 5-14



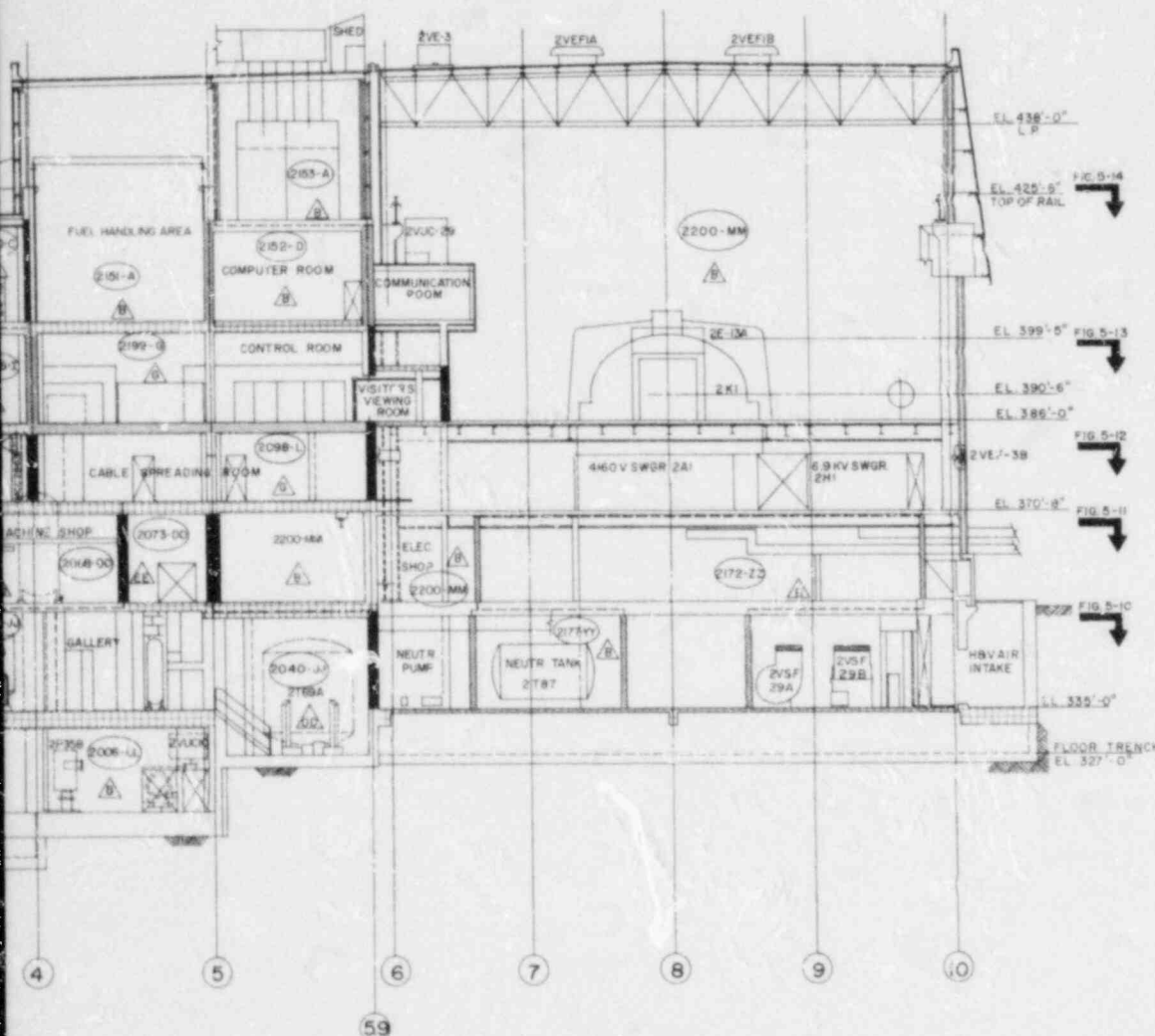




# LEGEND

- TECH SPEC FIRE WALLS
- NON-TECH SPEC FIRE WALLS
- TECH SPEC FIRE-RATED FLOORS
- NON-TECH SPEC FIRE-RATED FLOORS
- FIRE ZONE
- FIRE AREA
- DENOTES FIRE ZONE BOUNDARY

FIRE ZONE	ZONE DESCRIPTION
<b>FIRE AREA B</b>	
2009-LL	GENERAL ACCESS AREA (EL 317)
2010-LL	"C" HPS PUMP AREA (EL 317)
2149-B	STAIRWAY NO 2001 (EL 317 TO 422)
2149-I	H & V AIR INTAKE AREA (EL 386)
2147-A	CHEMICAL STORAGE AREA (EL 404)
2151-A	FUEL HANDLING AREA (EL 404)
2152-D	COMPUTER ROOM (EL 404)
2153-A	VENTILATION EQUIPMENT AREA (EL 404 & 422)
2177-YY	NEUTRALIZER TANK ROOM (EL 336)
2200-MM	TURBINE BUILDING (EL 335 TO 404)
2172-ZZ	LAUNDRY STORAGE AND BOTTLED AIR REFILL ROOMS (EL 354)
	LOWER STORAGE AREA (EL 335)
<b>FIRE AREA G</b>	
2189-S	CONTROL ROOM (EL 386)
2190-C	CORE PROTECTION CALCULATOR ROOM (ELECTRICAL EQUIPMENT ROOM) (EL 404)
2095-L	CABLE SPREADING ROOM (EL 372)
2136-I	HEALTH PHYSICS AREA (EL 386)
<b>FIRE AREA DD</b>	
2040-JL	TANK ROOMS, PUMP ROOMS & CORR'DORS (EL 335)
2032-JJ	SPENT RESIN STORAGE TANK ROOM (EL 335)
2088-DD	HOT MACHINE SHOP (EL 354)
<b>FIRE AREA EE</b>	
2073-DD	ACCESS AREA, PUMP AREA, TANK AREA, WASTE GAS EQUIPMENT AREA AND PASSAGEWAY (EL 354)
<b>FIRE AREA HH</b>	
2063-DD	SAMPLE ROOM (EL 354)
2096-M	MOTOR CONTROL CENTER (EL 372)
<b>FIRE AREA KK</b>	
2083-P	SOUTH DIESEL GENERATOR RM (EL 386)
2115-I	SORIC ACID MAKEUP TANK ROOM (EL 386)
<b>ALSO SHOWN BUT NOT INCLUDED IN FIRE AREA</b>	
2070-JJ	SOVEN MANAGEMENT HOLDUP TANK UNIT (EL 321)



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DRAWING REFLECTS FIREWALLS AND  
FIRE-RATED FLOORS AFTER  
COMPLETION OF MODIFICATIONS  
IDENTIFIED IN THE APPENDIX A  
AREA ANALYSIS

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ARKANSAS POWER AND LIGHT COMPANY  
ARKANSAS NUCLEAR ONE-UNIT 2  
FIRE PROTECTION PROGRAM

FIRE AREA AND ZONE BOUNDARIES

SECTION B-B



FIGURE 5-16

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