

September 5, 2001

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, D.C. 20555-0001

Gentlemen:

ULNRC-04522



**DOCKET NUMBER 50-483
CALLAWAY PLANT
UNION ELECTRIC COMPANY
CHANGES TO THE NRC APPROVED FIRE PROTECTION PROGRAM**

- References:
- 1) NRC Inspection Report 50-483/00-13, dated October 30, 2000
 - 2) ULNRC-4347, dated November 30, 2000
 - 3) NRC letter, dated March 6, 2001

Reference 1 transmitted Inspection Report 50-483/00-013 and it included two Non-Cited Violations. Reference 2 transmitted AmerenUE's response to the violation referring to cabling within a 20-foot separation zone (50-483/0013-01). This transmittal did not agree that a violation of the NRC approved fire protection program exists, and therefore denied the violation. Reference 3 transmitted the NRC's review of our denial and concluded that the violation as documented in NRC Inspection Report 50-483/00-13 was sustained.

In light of the above, AmerenUE herewith transmits an application for a license amendment pursuant to 10CFR50.90 to Facility Operating License No. NPF-30 for the Callaway Plant.

This proposed license amendment request (LAR) is seeking approval of the Commission, pursuant to Operating License Condition 2.C(5)(d), to make changes to the approved fire protection program as described in the Final Safety Analysis Report. This proposed LAR revises the Final Safety Analysis Report (FSAR) to provide clarification of the existing design of the plant. Although the 20-foot separation zones are discussed within the FSAR Fire Hazards Analysis, these discussions are somewhat vague and do not discuss the intervening cable trays and hazards. This change to the FSAR clarifies the existing design configuration of Fire Areas A-1, A-18, and A-27. Specifically, the discussions of the 20-foot separation zones are clarified to reflect the cable trays, which traverse through these fire areas, and the equipment, which poses potential hazards within the separation zones. The propagation of fire along the cable

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trays is not considered credible. This determination is based on the defense in depth of the fire protection features of these areas.

Attachments 1 through 4 provide the required affidavit, description and assessment, markups of the FSAR pages, and diagrams of the fire areas.

It has been determined that this amendment application does not involve a significant hazards consideration as determined per 10 CFR 50.92. Pursuant to 10 CFR 51.22(b), no environmental assessment need be prepared in connection with the issuance of this amendment.

If you have any questions on this amendment application, please contact Mr. Dave Shafer at (314) 554-3104.

Very truly yours,


for John D. Blosser
Manager, Regulatory Affairs

JMC/

- Attachments: 1) Affidavit
2) Description and Assessment
3) Markup of FSAR Pages
4) Diagrams of the Fire Areas

STATE OF MISSOURI)
) S S
CITY OF ST. LOUIS)

David Shafer, of lawful age, being first duly sworn upon oath says that he is Superintendent Licensing, Regulatory Affairs, for Union Electric Company; that he has read the foregoing document and knows the content thereof; that he has executed the same for and on behalf of said company with full power and authority to do so; and that the facts therein stated are true and correct to the best of his knowledge, information and belief.

By David Shafer
David Shafer
Superintendent Licensing
Regulatory Affairs

SUBSCRIBED and sworn to before me this 5th day
of September, 2001.

Carol A Head

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ULNRC-04522

ATTACHMENT 2

DESCRIPTION AND ASSESSMENT

DESCRIPTION AND ASSESSMENT

1.0 INTRODUCTION

1.1 This proposed License Amendment Request (LAR) pursuant to 10 CFR 50.90 is seeking approval of the Commission, pursuant to Operating License Condition 2.C(5)(d), to make changes to the approved fire protection program as described in the Final Safety Analysis Report (FSAR) to address the finding the Commission identified in NRC Inspection Report 50-483/00-013 that caused an apparent decrease in the level of fire protection at Callaway Plant. This proposed LAR revises the FSAR to provide clarification of the existing design of the plant. Although the 20-foot separation zones are discussed within the FSAR Fire Hazards Analysis, these discussions are somewhat vague and do not discuss the intervening cable trays and hazards.

1.2 Final Safety Analysis Report (FSAR) Section

The proposed changes to the fire protection program as described in the FSAR that address the Commission's findings are attached. See Attachment 3 for the proposed marked up pages to the FSAR.

2.0 DESCRIPTION

The proposed License Amendment addresses the Non-Cited Violation identified in NRC Inspection Report 50-483/00-013 for redundant trains of safe shutdown equipment in Fire Areas A-1, A-18, and A-27 which do not meet the required separation criteria. This proposed LAR revises the FSAR to provide clarification of the existing design of the plant. Although the 20-foot separation zones are discussed within the FSAR Fire Hazards Analysis, these discussions are somewhat vague and do not discuss the intervening cable trays and hazards. Specifically, the discussions of the 20-foot separation zones are clarified to reflect the cable trays, which traverse through these areas, and the equipment which poses potential hazards within the separation zones. The propagation of fire along the cable trays is not considered credible. This determination is based on the defense in depth of the fire protection features of these areas.

3.0 BACKGROUND

NRC Inspection Report 50-483/00-13 documents an apparent violation regarding the separation of redundant trains of equipment required for safe shutdown. The NRC identified intervening combustibles installed within the 20-foot separation zone between the redundant trains. As discussed in NRC Violation 50-483/0013-01, there are cable trays, a motor control center, an air handling unit, and one of the control rod drive motor generator sets located within the areas marked as the "No Combustible Zone" in Fire Areas A-1, A-18, A-27. The NRC has determined that these components are intervening combustibles and therefore fire hazards.

4.0 TECHNICAL ANALYSIS

NRC Generic Letter 83-33 issued October 19, 1983 states, "Numerous comprehensive flammability tests conducted by the Electric Power Research Institute (EPRI NP-1200, EPRI EL-1263), Factory Mutual (Contract RP-1165-1), and Sandia National Laboratories (NUREG/CR-2431, among others) have shown that burning plastic cable insulation represents a significant fire hazard. These tests were conducted on both IEEE-383 qualified and unqualified cable. While the qualified cable exhibited a tendency to ignite and propagate flame less rapidly, combustion of grouped cables continued at significant levels. In particular, grouped vertical cables which are not protected by a fire propagation retardant, such as metal tray covers or fire retardant coatings, can result in rapidly developing fires with high heat release rates."

The cables within the cable trays, which traverse the 20-foot separation zones in Fire Areas A-1, A-18, and A-27 are IEEE-383 rated cables. These cables are considered by the NRC as intervening combustibles because the jacketing on IEEE-383 cables will burn when exposed to an exposure fire as stated above in Generic Letter 83-33. However, IEEE-383-1974, paragraph 2.5.2.1 states, "the cable does not propagate fire even if the outer covering and insulation have been destroyed in the area of flame impingement...". Therefore in the absence of an exposure fire, these cables will not sustain a propagation path from one side of the zone to the other. As stated above, a "No Combustible Zone" has been clearly marked with red lines on the floor, which prevents personnel from placing transient combustibles in the zone. This is enforced by APA-ZZ-00741, Control of Combustible Materials. As evaluated in RFR 6400A, the absence of transient combustibles below the cables eliminates the potential for flame exposure and therefore eliminates the potential for fire propagation.

While Generic Letter 83-33 refers to fire test reports which document that IEEE-383 cable can burn, it should be noted that the fire tests utilized burners under the cable trays stacks to initiate the fire. These burners were located directly beneath the bottom of the horizontal stack of cable trays. In contrast, Room "1403", Fire Area A-27, contains very low quantities of combustible loading other than the insulated IEEE-383 cables in the room. In addition, a 20-foot area between the redundant trains is marked to prevent combustibles from being placed into the area.

Fire Test Report NUREG CR-2431, titled "Burn Mode Analysis of Horizontal Cable Tray Fires" discusses the fire propagation of the trays. Page 9 of this report states in part, "Based on these observations, which show that fires are not propagated from tray to tray due to direct flame exposure, we feel that Regulatory Guide 1.75 separation requirements are adequate to prohibit such propagation. However, physical separation by itself obviously does not necessarily inhibit other mechanisms of fire propagation."

Metal tray covers are installed on cable trays in compliance with Regulatory Guide 1.75. These tray covers are designed to limit the spread of fire from one cable tray to another. Based on these evaluations, a fire propagating across the 20-foot separation zones in the cable trays or other fire hazards in the area is not considered credible. This proposed LAR revises the FSAR but it does not make any actual changes to the plant equipment, rather it provides clarification of the existing design of the plant. Although the 20-foot separation zones are discussed within the FSAR Fire Hazards Analysis, these discussions are somewhat vague and do not discuss the intervening cable trays

and hazards. This change to the FSAR clarifies the existing design configuration of Fire Areas A-1, A-18, and A-27. Specifically, the discussions of the 20-foot separation zones are clarified to reflect the cable trays, which traverse through these areas, and the equipment which poses potential hazards within the separation zones. The propagation of fire along the cable trays is not considered credible. This determination is based on the defense in depth of the fire protection features for these areas. These fire protection features are listed in the following summary:

- Administrative controls that limit transient combustibles in the room,
- Administrative controls that prevent the placement of transient combustibles within the 20 foot separation "No Combustible Zone",
- Administrative controls that address potential ignition sources in the room,
- Low quantity of fixed combustible loading,
- Installation of IEEE-383 qualified cables,
- Area wide early warning fire detection,
- Total flooding halon system with a 100% reserve bank for fire areas A-27 & A-18; a preaction sprinkler system in fire area A-1.
- Manual fire suppression capability including hose stations, standpipes, and portable fire extinguishers,
- Well trained and well equipped fire brigade,
- When required by Regulatory Guide 1.75 Electrical raceways are enclosed with sheet-metal covers that limit the propagation of fire from one tray to another.
- Areas are enclosed with a 3-hour rated barrier, 3-hour rated fire doors, penetration seals, and fire dampers to prevent propagation from another fire area.
- Administrative controls for addressing operability of the fire protection features.

This evaluation is consistent with guidance provided in NRC Generic Letter 86-10, Enclosure 2, Section 3.6.1. This section of the Generic Letter states exemptions have been granted by the NRC for more than negligible quantities of combustible material existing between redundant shutdown divisions based on the following factors:

1. A relatively large horizontal spatial separation between redundant divisions; all cables qualified to IEEE-383.
 2. The presence of an automatic fire suppression system over the intervening combustible (such as a cable tray fire suppression system);
 3. The presence of fire stops to inhibit fire propagation in intervening cable trays;
 4. The likely fire propagation direction of burning intervening combustibles in relation to the location of the vulnerable shutdown division;
 5. The availability of compensating active and passive fire protection.
- Also, GL 86-10, Section 3.6.2 states in part, "cables in cable trays having sheet metal bottom, sides and top, if protected by automatic fire detection and suppression systems and if the design is supported by a fire hazards analysis, have been found acceptable under the exemption process."

The conclusions provided in the Fire Hazards Analysis for these fire areas remains valid. They state that a fire in these areas will not prevent safe shutdown of the plant.

Listed below is a more detailed analysis of each of the affected fire area:

Fire Area A-1 Analysis

Fire Area A-1 Description:

Fire Area A-1 contains a large section of the Auxiliary Building. Specifically, this area contains the corridors and general areas, 1974' elevation, entire 1988' elevation and the vestibule corridor to the auxiliary feedwater Pump Rooms on 2000' elevation. This area contains the letdown heat exchanger and associated piping and valves and instrumentation; reactor makeup water pumps; normal charging pump; CVCS chiller pumps; moderating heat exchanger; letdown reheat heat exchanger; letdown chiller heater exchanger; chiller surge tank; auxiliary building dry waste compactor; CVCS chiller unit; auxiliary steam deaerator feed pumps; auxiliary steam condensate recovery and storage tank; auxiliary building sump pumps; auxiliary feedwater pump room sump and sump pumps. Room 1101 of Fire Area A-1 is the west corridor of the 1974' elevation of the Auxiliary Building. The affected portion of this corridor is shown in Figure 1.

Fire Protection Features:

Fire Area A-1 is separated from other fire areas by a 3-hour rated fire barrier. The entrances into the area are sealed with 3-hour rated fire doors, penetrations are sealed with 3-hour rated penetration seals, and the ventilation ducts have 3-hour rated dampers. Equipment hatches between floors are not rated but are enclosed with metal doors and are protected with water curtains. The fire protection features provided by the equipment hatches and water curtains were found to be acceptable by the NRC staff as documented in Section 9.5.1.4 of NUREG-0830, Supplement No.3, dated May 1984.

Electrical cable installed in the room satisfies the design requirements of IEEE-383.

Fire Area A-1 has an automatic early warning fire detection system. There are more than 10 ionization detectors in Corridor 1101. Specifically, there are two ionization detectors directly in the separation area. In addition much of this area is protected with an automatic preaction sprinkler system. Upon activation of the detection system, the ventilation system will be isolated. If communication is lost between the detector circuits and the control room fire alarm panel, a trouble alarm will be annunciated on the control room panel. Administrative procedures require a continuous fire watch to be posted in this area when the detection or suppression system is inoperable. Fire protection system and components impairments are tracked on the Fire Protection Impairment Program (FPIP) System. The Control Room monitors and statuses the FPIP System.

Fire dampers within the ventilation ducts will close when heat melts the thermal links. Manual fire suppression capability includes a hose station with 75 feet of 1-1/2" hose and standpipes. Portable ABC dry chemical fire extinguishers are also located in the corridor.

Redundant Safe Shutdown Equipment:

Room 1101 contains cables associated with both trains of centrifugal charging. Cables associated with Train "B" centrifugal charging are contained in a conduit that is located a horizontal distance of 35 feet from a junction box and conduit that contains cables associated with Train "A" centrifugal charging. A 20 foot wide "No Combustible Zone" has been marked on the floor within the 35 feet of separation.

Combustible Loading of Entire Fire Area:

The total quantity of combustible loading in room 1101 is less than 50,000 Btu/sq. ft. This quantity includes potential transient combustibles brought into the room. This is considered a very low quantity of combustible loading (quantities less than 100,000 Btu/sq. ft. are considered a low quantity of combustible loading per NFPA Fire Protection Handbook, 18th Ed., Page 7-80). Other than the IEEE-383 cables, the fixed combustible loading in the area between redundant trains is negligible.

Intervening Combustibles Within Separation Zone:

As discussed in NRC Violation 50-483/0013-01, there are cable trays located within the area marked as the "No Combustible Zone", and the NRC has determined that these components are intervening combustibles.

The cable trays located in the "No Combustible Zone" are non-safety related cables. There are two sets of horizontal cable trays in the area, see Figure 1. These two sets of cable tray are separated by approximately 3 feet. The set to the west side of the room is located four feet from the west wall and consists of 3 horizontally stacked trays. The bottom two trays coming from the north are enclosed with metal tray covers for more than 50 feet leading up to the separation zone. The top tray in this set has a metal tray cover within a portion of the 20-foot separation zone. The other cable tray set contains three horizontally stacked trays, which are located approximately three feet from the east wall. A 12-foot section of these trays is covered in the immediate vicinity of the "A" train raceway. These cable trays are also covered at the south end of the 20-foot separation zone for 40 feet in the south direction. The cable in both set of cable trays is IEEE-383 rated cable. The west cable trays pass approximately 1 foot from the conduit that contains cables associated with "B" Train component cooling water.

As stated above, a "No Combustible Zone" has been clearly marked with red lines on the floor that would prevent personnel from placing transient combustibles in the zone. This is enforced by APA-ZZ-00741, Control of Combustible Materials.

Potential for Fire Propagation:

Although cable trays do traverse the 20 foot wide marked "No Combustible Zone", metal tray covers are installed on the trays in compliance with Regulatory Guide 1.75. The tray covers are designed to prevent ignition from exposure fires. The only credible fire in this area is from transient combustibles and the fire would have to propagate along the cable trays that contain IEEE-383 cables. The fire would have to sustain itself in the IEEE-383 cables because no transient combustibles would be located under the cable trays for the 20 foot wide "No Combustible Zone. It is not credible for a fire to propagate along the cable trays without additional combustible loading below the trays to sustain the fire in the trays. It should be noted lab tests that have determined that IEEE-383 cables will burn, contained a fuel source other than the cables. This fire would have to travel for 35 feet and then jump from cable trays that are covered with metal tray covers over into a conduit that is a horizontal distance of 1 foot away. Other than the cable

trays, the fixed combustible loading in the area is negligible. A fire of this type is not considered credible.

The Control Room uses Fire Preplans and they have a section that discusses safe shutdown. The Fire Preplan for this fire area addresses separation of the centrifugal charging trains. The Control Room's use of the Fire Preplan during an actual event would therefore make them aware of the potential consequences of a fire in this area. The Preplan also states, "The brigade should maintain integrity of the 20' separation zone for safe shutdown capabilities."

The IPEEE Fire Evaluation subdivided fire area A-1 such that Room 1101 was in Fire Area A-1A. The IPEEE completed in 1996 determined the Core Damage Frequency for area A-1A to be 8.61 E-8. No substantial changes have been made to this fire area since that time.

Conclusion:

Even though cable trays do traverse the 20' separation zone, the above evaluation has determined it is not credible for a fire to propagate to both of the redundant components in Fire Area A-1.

**Fire Area A-18
Analysis**

Fire Area A-18 Description:

Fire Area A-18 is located on the 2026' elevation of the Auxiliary Building in Room 1410. This room is the north electrical penetration room. See Figure 2 for a diagram of the room.

Fire Protection Features:

This room is enclosed in a 3-hour rated fire barrier. The entrances into the room are sealed with 3-hour rated fire doors, penetrations are sealed with 3-hour rated penetration seals, and the ventilation ducts have 3-hour rated fire dampers.

Electrical cable installed in the room satisfies the design requirements of IEEE-383.

Fire Area A-18 has an automatic early warning fire detection system. In addition this room is protected with an automatic halon fire suppression system. This halon 1301 system is designed to be activated by the cross-zoned detection system and will provide a minimum five percent concentration at the height of the highest combustible in the room for 10 minutes. The halon storage cylinders, which include a 100 percent reserve bank, are located outside of the room. Upon activation of the detection system, the ventilation system will be isolated and the fire dampers within the ventilation ducts will close when the electro-thermal links receive an electrical signal from the alarm panel. The detection system in the room contains two different zones. Even if one zone were to fail, the other zone would be operational. Specifically, there are six detectors between the redundant trains of equipment. If communication is lost between detector circuits and the control room fire alarm panel, a trouble alarm will be annunciated on the control room panel. Administrative procedures require a continuous fire watch to be posted in this area when the detection or suppression system is inoperable. Fire protection system and components impairments are tracked on the FPIP System. The Control Room monitors and statuses the FPIP System.

Manual fire suppression capability includes a hose station with 75 feet of 1-1/2" hose and a standpipe outside of both entrance doors. Portable ABC dry chemical fire extinguishers are also located outside both entrance doors to the room.

Redundant Safe Shutdown Equipment:

Room 1410 contains redundant safe shutdown equipment. A motor control center is located in the northwest corner of the room and contains fuses in the circuits for the control valves for motor driven auxiliary feedpump supply to the "B" and "C" steam generators. At the east end of the room, at a distance greater than 30 feet away are two conduits containing cables of redundant train equipment. One conduit contains cables that are associated with operating the "B" train Auxiliary Feedwater Pump discharge isolation valves. The other conduit contains a cable associated with the valve position control signal to the positioner on the "A" steam generator atmospheric PORV.

Combustible Loading of Entire Fire Area:

The total quantity of combustible loading in the room is less than 50,000 Btu/sq.ft. This quantity includes potential transient combustibles brought into the room. This is considered a very low quantity of combustible loading (quantities less than 100,000 Btu/sq.ft. are considered a low quantity of combustible loading per NFPA Fire Protection Handbook, 18th Ed., Page 7-80).

Intervening Combustibles Within Separation Zone:

There are cable trays located within the area marked as the "No Combustible Zone". These cable trays contain non-safety related IEEE-383 cables. There are 3 sets of horizontally stacked trays. The trays closest to the "B" Train cables are more than 10 feet from the cables. Motor Control Center (MCC) NG01T and NG03T are also located within the separation zone. The MCCs are enclosed in metal cabinets and are located approximately 12 feet from conduit 4J3C1C. The room cooler is located approximately 4 feet from conduits 4J3C1C and 1J1097. The room cooler contains minimal combustible material.

Potential for Fire Propagation:

Although cable trays do traverse the 20 foot wide marked "No Combustible Zone", there are no continuous runs of cable trays from the separated components that are greater than 20 feet apart. It is not credible for a fire to propagate from one side of the separation area to the other side based on the total quantity of combustibles located in the room. Fire would have to traverse from one cable tray and ignite cable within a conduit at a distance greater than 10 feet away.

The "B" train auxiliary feedwater discharge isolation valves and steam generator PORV (ABPV0001) control cables are enclosed in conduit located at the east end of the room. The raceways associated with these cables are located at a distance greater than 20 feet away from any opposite train auxiliary feedwater components or cables. If the raceways associated with the "B" train motor-driven auxiliary feedwater system are lost, the "A" train motor driven auxiliary feedwater system components would still be available. However, manual operator action would be required to manipulate the "B" steam generator atmospheric PORV (ABPV0002) since its control cable could also be lost in the fire. Three narrow range level transmitters are available to monitor steam generator "A" level; therefore wide range level transmitter LT-501 is allowed to fail.

The Control Room uses Fire Preplans and they have a section that discusses safe shutdown. The Fire Preplan for this fire area addresses the separation of the auxiliary feedwater pump circuits and the separation of the steam generator atmospheric PORVs. The Control Room's use of the Fire Preplan during an actual event would therefore make them aware of the potential consequences of a fire in this area. The Preplan also states, "The brigade should maintain integrity of the 20' separation zone for safe shutdown capabilities."

The IPEEE Analysis for this Room completed in 1996 determined the Core Damage Frequency for the Room to be 1.70 E-7. No substantial changes have been made to this fire area since that time.

Conclusion:

Even though cable trays do traverse the 20' separation zone, the above evaluation has determined it is not credible for a fire to propagate to both of the redundant components in Fire Area A-18.

**Fire Area A-27
Analysis**

Fire Area A-27 Description:

Fire Area A-27 is located on the 2026' elevation of the Auxiliary Building in Room 1403. This room contains the Control Rod Drive MG Sets and the reactor trip switchgear. See Figure 3 for a diagram of the room.

Fire Protection Features:

This room is enclosed in a 3-hour rated fire barrier. The entrances into the room are sealed with 3-hour rated fire doors, penetrations are sealed with 3-hour rated penetration seals, and the ventilation ducts have 3-hour rated dampers.

Electrical cable installed in the room satisfies the design requirements of IEEE-383.

Fire Area A-27 has an automatic early warning fire detection system. In addition this room is protected by an automatic halon fire suppression system. This halon 1301 system is designed to be activated by the cross-zoned detection system and will provide a minimum five percent concentration at the height of the highest combustibles in the room for 10 minutes. The halon storage cylinders include a 100 percent reserve bank and are located outside of the room. Upon activation of the detection system, the ventilation system will be isolated and the fire dampers within the ventilation ducts will close when the electro-thermal links receive an electrical signal from the alarm panel. There are two fire detection zones in the room. There are six ionization smoke detectors mounted on the ceiling directly in the area between the redundant circuits. If communication is lost between the detector circuits and the control room fire alarm panel, a trouble alarm will be annunciated on the control room panel. Administrative procedures require a continuous fire watch to be posted in this area when the detection/suppression system is inoperable. Fire Protection system and component impairments are tracked on the FPIP System, and the Control Room monitors and statuses the FPIP System.

Manual fire suppression capability includes a hose station with 75 feet of 1-1/2" hose and a standpipe located at the north end of the room near the entrance door. Portable ABC dry chemical fire extinguishers are located at both the north end and south end of the room. In addition, another ABC extinguisher is located just outside the entrance to the room.

Redundant Safe Shutdown Equipment:

Room 1403 contains redundant safe shutdown equipment that is separated by a distance greater than 20 feet. Direct current contactor BB07 contains circuits for Train "A" RCS Pressurizer Power Operated Relief Valve, BBPCV0455A, and is located at the north end of the room. Circuits for BBPCV0456A, Train "B" RCS Pressurizer Power Operated Relief Valve, and BBHV8000B, Train "B" RCS Pressurizer Outlet Power Operated Relief Block Valve are located on the south end of the room. These redundant train components are separated by more than 89 feet. A 20 foot wide "No Combustible Zone" has been marked on the floor at the southern end of the 89 foot wide separation. Also, a raceway that contains cables for the Train "A" component cooling water pumps is located near the center of the room. The cables for the Train "B" component cooling water pumps are located at the south end of the room. These redundant systems are separated by a distance of greater than 52 feet. The 20 foot wide "No Combustible Zone" mentioned above also separates these circuits.

Combustible Loading of Entire Fire Area:

The total quantity of combustible loading in the room is less than 50,000 Btu/sq. ft. This quantity includes potential transient combustibles brought into the room. This is considered a very low quantity of combustible loading (quantities less than 100,000 Btu/sq.ft. are considered a low quantity of combustible loading per NFPA Fire Protection Handbook, 18th Ed., Page 7-80).

Intervening Combustibles Within Separation Zone:

As discussed in the NRC Violation 50-483/0013-01, there are cable trays, a motor control center, an air handling unit, and one of the control rod drive motor generator sets located within the area marked as the "No Combustible Zone", and the NRC has determined that these components are intervening combustibles and therefore fire hazards.

The cable trays located in the "No Combustible Zone" are non-safety related cables. There are two sets of cable trays in the area. The non-safety related cables are separated from the safety related cables in the room in accordance with Regulatory Guide 1.75. The set of cable trays in the west side of the area is located approximately 2'-6" from the west wall and contains three horizontally stacked cable trays. Each of these cable trays has a metal cover for over 50 feet of the tray length that provides some level of separation from the other cable trays. The set of three cable trays in the east side of the room within the zone are open trays which are also horizontally stacked. Motor control center PG20G is located in the separation zone and it is a 480 volt non-safety related load center. This MCC is located in a cabinet enclosed in sheet metal. The combustible components are located inside of the enclosed cabinet. The cables exiting the cabinet lead into the cable trays discussed above. This cabinet is located a horizontal distance of greater than 8 feet from the edge of the cable trays containing the cables associated with the "B" Train Pressurizer PORV valve and the "B" Train component cooling water circuits.

Air handling unit SGL20 is located within the separation zone and it is the air handling unit for the room itself. The air handling unit is located at a distance of greater than 9 feet from the "B" train cable. Based on the distance from the cables and the insignificant combustible loading of the unit, the air handling unit is not considered a fire hazard that can pose a threat to these cables.

Control rod drive motor generator set SF01 is also located within the separation zone. The motor generator set is located at a distance of greater than 17 feet from the 'B' train cables mentioned above. This motor generator set contains minimal combustible material and is therefore not considered a hazard that poses a threat to the 'B' train cables.

Potential for Fire Propagation:

Although cable trays do traverse the 20 foot wide marked "No Combustible Zone", there are no continuous runs of cable trays from the separated components. The pressurizer PORV circuits are located a distance of greater than 89 feet apart and the component cooling water circuits are located a distance of greater than 52 feet apart. It is not credible for a fire to propagate from one end of the room to the other with the total quantity of combustible material located in the room.

Cables for PORV BBPCV0456A traverse the area from the south wall about 8 feet from where the trays turn west to exit through a fire rated penetration seal into the control building. The trays are approximately 16 feet and 18 feet from the floor. The trays are covered on top for a distance of about 3 feet from the west wall. The trays directly beneath them are covered on the top and bottom for about 7 feet.

If a fire damages a cable that would prevent the operation of BBPCV0456A, then BBPCV0455A can be operated to relieve RCS pressure if needed. The horizontal separation of greater than 89 feet will prevent a fire from damaging both valves. As shown on Figure 3, there is no continuous propagation path from the BBPCV0456A cables to the BBPCV0455A circuits. The fire would have to propagate along 75 feet of cable trays and jump over the next set of trays. The majority of tray segments are completely covered with sheet-metal covers.

The Control Room uses Fire Preplans and they have a section that discusses safe shutdown. The Fire Preplan for this fire area addresses the separation of the pressurizer PORVs. The Control Room's use of the Fire Preplan during an actual event would therefore make them aware of the potential consequences of a fire in this area. The Preplan also states, "The brigade should maintain integrity of the 20' separation zone for safe shutdown capabilities."

The IPEEE Analysis for this Room completed in 1996 determined the Core Damage Frequency for the Room to be 2.27 E-7. There have been no substantial changes to this fire area since that time.

Conclusion:

Even though cable trays do traverse the 20' separation zone, the above evaluation has determined it is not credible for a fire to propagate to both of the redundant components in Fire Area A-27.

Proposed Changes to the FSAR:

The following FSAR sections are revised to clarify the plant design configuration for intervening combustibles in the affected 20-foot separation zones:

For Fire Area A-1, FSAR SP Appendix 9.5B, Section A.1.7.2 states in part, "Redundant safe shutdown circuits in Rooms 1101, 1120, 1121, and 1122 of this area are protected by preaction sprinkler systems. One train of centrifugal charging is assured for hot shutdown for a fire in the west corridor (Room 1101) due to at least 35 feet of separation, suppression, and detection."

This paragraph will be clarified to state, " Redundant trains of centrifugal charging are located in Room 1101. One of the redundant trains of centrifugal charging is assured for hot shutdown in the event of a fire in this area. These redundant trains are separated by a horizontal distance of greater than 35 feet. Cable trays do traverse through the separation zone. However due to the fire resistance of the IEEE-383 cables in conjunction with the installed fire protection features of this area that include automatic detection and suppression, a fire propagating across the 20 foot separation zone is not considered credible."

For Fire Area A-18, FSAR SP Appendix 9.5B, Section A.18.7.2 states in part, "This area contains predominately Separation Group 1 circuits and equipment. With the exception of the B train auxiliary feedwater and steam generator PORV control cables discussed below, redundant Separation Group 4 circuits and equipment are located in the south electrical penetration room, which is in another fire area. For a fire in fire zone A-18, it is assumed that secondary side heat removal is accomplished using motor-driven auxiliary feedwater pump B and steam generators A and D. However, control cables for the A steam generator atmospheric PORV (ABPV0001) and for the B-motor driven auxiliary feedwater pump discharge isolation valves (ALHV0005 and 7) route through this fire zone. The raceways associated with these cables are located greater than 20 feet from any opposite train auxiliary feedwater components or cables, with automatic detection and suppression. If the raceways associated with the B motor-driven auxiliary feedwater system are lost, the A motor-driven auxiliary components would still be available due to the 20 feet separation with detection and suppression. However, manual Operator action would be required to manipulate the B steam generator atmospheric PORV (ABPV0002) since its control cable could also be lost in the fire. Three narrow range level transmitters are available to monitor steam generator A level; therefore, wide range level transmitter LT-501 is allowed to fail."

This section will be revised by adding the following statement, "There are several cable trays, motor control centers, and the room cooler which traverse the 20 foot separation zone. However due to the fire resistance of the IEEE-383 cables in conjunction with the installed fire protection features of this area, a fire propagating across the 20 foot separation zone is not considered credible."

For Fire Area A-27, FSAR SP Appendix 9.5B, Section A.27.7.2 states in part, "The redundant Separation Groups 1 and 4 circuits in this area are separated by greater than 20 feet."

This section will be revised by adding the following statement, "The 'A' Train pressurizer PORV cables are separated by a distance of greater than 20 feet from the 'B' Train pressurizer PORV and block valve cables, and the 'A' Train component cooling water

circuits are separated by a distance of greater than 20 feet from the 'B' Train component cooling water circuits. There is a motor control center, several cable trays, an air handling unit, and a control rod drive motor generator set which traverse the 20 foot separation zone. However, based on the fact that the motor control center is enclosed within a metal cabinet, the intervening cables are IEEE 383 rated, and the installed fire protection features of this room, a fire propagating across the 20 foot separation zone is not considered credible."

For 10CFR50 Appendix R Requirements, FSAR SP Appendix 9.5E contains Union Electric's response to those requirements listed. Section III.G.2 of Appendix R states, "Except as provided for in paragraph G.3 of this section, where cables or equipment, including associated non-safety circuits that could prevent operation or cause maloperation due to hot shorts, open circuits, or shorts to ground, of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment, one of the following means of ensuring that one of the redundant trains is free of fire damage shall be provided:

- a. Separation of cables and equipment and associated non-safety circuits of redundant trains by a fire barrier having a 3-hour rating. Structural steel forming a part of or supporting such fire barriers shall be protected to provide fire resistance equivalent to that required of the barrier;
- b. Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustible or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area; or
- c. Enclosure of cable and equipment and associated non-safety circuits of one redundant train in a fire barrier having a 1-hour rating. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area;..."

Union Electric's response to this Appendix R Section states, "Redundant trains of systems required to achieve and maintain hot standby are separated by 3-hour rated fire barriers, or the equivalent provided by III.G.2, or else a diverse means of providing the safe shutdown capability exists and is unaffected by the fire."

This section is will be revised by adding the following statement, "Specific plant configurations for III.G.2.b 20 foot separation distances and intervening combustibles are detailed in the appropriate Fire Area safe shutdown analysis section."

REGULATORY ANALYSIS

5.1 No Significant Hazards Determination

AmerenUE has evaluated whether a significant hazards consideration is involved with the proposed change by focusing on the three standards set forth in 10 CFR 50.92 as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No

A design basis accident occurring simultaneously with a fire hazard is not assumed. Failure of plant systems and components required for safe shutdown is not postulated unless that equipment is exposed to the fire. The FSAR Fire Hazards Analysis concludes that a fire within Fire Areas A-1, A-18, and A-27 will not affect the safe shutdown of the plant. A fire propagating along cable trays across the 20 foot separation zones is not considered credible for these fire areas. The fact that intervening cables are located within the 20 foot separation zone will not increase the radiological consequences of an accident evaluated previously in the FSAR.

In accordance with the requirements of FSAR SP 3.1.2.a, the location of the intervening cable trays in Fire Areas A-1, A-18, and A-27 will not cause initiation of a Design Basis Accident. The intervening cable trays, motor control centers, and air handling units located in the 20 foot separation zones do not increase the probability of an accident evaluated in the FSAR. The location of the cable trays, motor control centers, and air handling units within the 20 foot separation zones does not degrade the reliability of any safe shutdown component. No additional equipment is assumed to be damaged during a fire in Fire Areas A-1, A-18, and A-27 due to the cable trays, motor control centers, and air handling units located within the 20 foot separation zones. This change does not alter or degrade the function of any safe shutdown components.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

A fire event has previously been evaluated for Fire Areas A-1, A-18, and A-27 in the FSAR Fire Hazards Analysis. This analysis determined that safe shutdown of the plant would not be affected by a fire in this area. The change to the FSAR clarifies the configuration of cable trays and equipment within the 20 foot separation areas. This change does not create the possibility of any new accidents of a different type than any evaluated previously in the FSAR.

The configuration of cable trays, motor control centers, and air handling units, within the 20 foot separation zones of these areas does not change the failure modes of any safety related equipment. A fire event has been previously evaluated for these fire areas in the FSAR Fire Hazards Analysis. The analysis determined that a fire in these areas would not prevent safe shutdown of the plant. The intervening cable trays, motor control centers, and air handling units in the separation zones do not create the possibility of a new or different kind of accident than any evaluated previously in the FSAR.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No

The fire hazards analysis is not defined in any Technical Specification. This change does not reduce the margin of safety as defined in the basis for any Technical Specification. There will be no effect on the manner in which safety limits or limiting safety system settings are determined nor will there be any effect on those plant systems necessary to assure the accomplishment of protection functions.

Therefore, the proposed change does not involve a reduction in a margin of safety.

Based on the above evaluations, AmerenUE concludes that the activities associated with the described change present no significant hazards consideration under the standards set forth in 10 CFR 50.92 and accordingly, a finding by the NRC of no significant hazards consideration is justified.

5.2 Regulatory Safety Analysis

Applicable Regulatory Requirements/Criteria

The regulatory bases for the fire protection system are 10CFR50 Appendix A, General Design Criterion (GDC) 3 and Regulatory Guide 1.120.

The fire protection system is designed to detect fires, protect the plant against damage from fire, minimize hazards to personnel, and reduce property loss due to fire.

General Design Criterion 3, "Fire Protection," requires that structures, systems, and components important to safety be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions. Fire detection and fighting systems of appropriate capability shall be provided and designed to minimize the adverse effects of fires on structures, systems and, components.

Regulatory Guide 1.120, Revision 1, "Fire Protection Guidelines for Nuclear Power Plants," presents guidelines acceptable to the NRC staff for implementing GDC 3 in the development of a fire protection program for nuclear power plants by ensuring the capability to shut down the reactor and maintain it in a safe shutdown condition and to minimize radioactive releases to the environment in the event of a fire. FSAR Appendix 9.5A provides a summary of the compliance to this regulatory guide.

Analysis

There have been no changes to the fire protection system design such that any of the above regulatory requirements and criteria would not be met. This amendment application only involves making clarifications to the FSAR Fire Hazards Analysis.

Conclusion

The evaluation performed by AmerenUE concludes that Callaway Plant continues to comply with the above regulatory requirements.

6.0 ENVIRONMENTAL EVALUATION

AmerenUE has determined that the proposed amendment would change requirements with respect to the installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. AmerenUE has evaluated the proposed change and has determined that the change does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amount of effluent that may be released offsite, or (iii) a significant increase in the individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental assessment of the proposed changes is not required.

7.0 REFERENCES

1. NRC Letter, dated October 30, 2000 that transmitted NRC Inspection Report 50-483/00-13
2. ULNRC-04347, dated November 30, 2000.
3. NRC Letter, dated March 6, 2001

ULNRC-04522

ATTACHMENT 3

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extinguished manually, using hose stations and/or portable extinguishers. Adequate floor drains are provided to remove the fire suppression system discharge.

A.1.7.2 Safe Shutdown Capability

Insert 1

Redundant safe shutdown circuits in Rooms 1101, 1120, 1121, and 1122 of this area are protected by preaction sprinkler systems. ~~One train of centrifugal charging is assured for hot shutdown for a fire in the west corridor (Room 1101) due to at least 35 feet of separation, suppression, and detection.~~ Local damage to the RHR system which is required for cold shutdown can be circumvented by manually realigning valves BN-HV-8812A, EJ-HV-8701A, and BB-PV-8702A. Similarly, for a fire in Room 1121, during RHR initiation for cold shutdown, valve EJ-HV-8701B may have to be manually opened.

Room 1128 contains circuits for both motor-driven auxiliary feedwater pumps; however, the turbine-driven auxiliary feedwater pump is not affected by a fire in this area and will be available to bring the plant to a safe shutdown. Additionally it is highly unlikely that both motor-driven pumps could be affected by the same fire, since the circuits are contained in Separation Group 1 and 4 trays which are routed vertically along the west wall. These are 9-inch trays, and the minimum horizontal separation between them is 19 feet. No other safe shutdown equipment, trays, or exposed conduits are located in this room. A sump with two sump pumps is located along the east wall of this room. Traffic to the other areas of the plant cannot pass through this zone. Rooms 1128 and 1129 are used as maintenance tool storage and contaminated spare parts storage areas with a very low combustibile loading. There is no continuity of combustibles between the Group 1 and 4 trays. Besides the fixed and transient combustibles associated with the storage areas, the only other transient combustibles introduced into this room would be those required for the maintenance of the sump pumps or the auxiliary steam deaerator feed pumps located in the adjoining Room 1129.

An ionization-type smoke detector is installed over the Groups 1 and 4 trays in this room. The detector will alarm locally and in the control room in the event of a fire in the trays, in the tool storage fixed combustibles or a transient fire. The control room alarm is zoned for easy identification of the trouble area. A portable extinguisher is located within the room. Another portable extinguisher is located just outside the room. This room is within the reach of hose stations in Room 1122 (see Figure 9.5.1-2).

Also in Fire Area A-1 and located directly above Rooms 1128 and 1129 are Rooms 1206 and 1207, respectively, which may be accessed from 1129 by ladder. The floor opening is covered by a steel security hatch. Rooms 1206 and 1207 contain circuits associated with both motor-driven auxiliary feedwater pumps (AFWPs), the suction valves to all three AFWPs, and the condensate storage tank level transmitters which switch the suction source to ESW on low CST level.

For a fire in fire zone A-18, it is assumed that secondary side heat removal is accomplished using motor-driven auxiliary feedwater pump B and steam generators A and D. However, control cables for the A steam generator atmospheric PORV (ABPV0001) and for the B motor-driven auxiliary feedwater pump discharge isolation valves (ALHV0005 and 7) route through this fire zone. The raceways associated with these cables are located greater than 20 feet from any opposite train auxiliary feedwater components or cables, with automatic detection and suppression. If the raceways associated with the B motor-driven auxiliary feedwater system are lost, the A motor-driven auxiliary components would still be available due to the 20 feet separation with detection and suppression. However, manual Operator action would be required to manipulate the B steam generator atmospheric PORV (ABPV0002) since its control cable could also be lost in the fire. Three narrow range level transmitters are available to monitor steam generator A level; therefore, wide range level transmitter LT-501 is allowed to fail. ← Insert 2

This room contains circuits for pressurizer PORV BB-PCV-455A and the PORV block valve BB-HV-8000A which are both Train A valves; however, should the PORV fail to the open position and the block valve fails in the as-is open position, the RCS would blow down to the PRT. In this case, the control room operator would place the PORV in manual and close the PORV from the control room.

Circuits for valves BG-HV-8157A and B are located in this area. If both of these valves were to fail in the closed position, letdown through the excess letdown path to the PRT would be unavailable. However, if letdown were required to allow for addition of borated water from the RWST to maintain extended hot standby or to borate to cold shutdown concentrations, the alternate path of letdown to the PRT through the pressurizer PORV BB-456A is available.

For cold shutdown using RHR Train B, manual closing of valve BN-HV-8812B and opening of EJ-HV-8701B may be required to provide a suction source from the RCS hot leg through valves BB-PV-8702B and EJ-HV-8701B. This is due to the postulated failure of a Train A interlock from the position switch associated with valve BN-HV-8812B which could prevent the remote opening of EJ-HV-8701B.

When going to cold shutdown, the RCS must be depressurized. Prior to depressurization, the accumulator tanks must be isolated or vented to preclude the release of the nitrogen cover gas into the RCS. The accumulator tanks are to be isolated/vented as follows due to potential fire damage to isolation/vent valves: accumulator A open vent valve EP-HV-8950A; accumulator B open vent valve EP-HV-8950B or close EP-HV-8808B; accumulator C open vent valve EP-HV-8950D or E; accumulator D open vent valve EP-HV-8950F or close valve EP-HV-8808D.

Therefore, a fire in this area will not prevent safe shutdown of the plant.

A.27.7.2 Safe Shutdown Capability

The redundant Separation Groups 1 and 4 circuits in this area are separated by greater than 20 feet. ← **Insert 3**

When going to cold shutdown, the RCS must be depressurized. Prior to depressurization, the accumulator tanks must be isolated or vented to preclude the release of the nitrogen cover gas into the RCS. The accumulator tanks B and D are to be vented by opening EP-HV-8950B or C and EP-HV-8950F, respectively.

Pressurizer PORV BB-PCV-455A could spuriously open which would require the block valve to be manually closed from the control room.

Pressurizer PORV BB-PCV-456A will be used to depressurize the RCS for initiation of cold shutdown due to the potential failure of valves in the excess letdown path.

Therefore, based on the fire suppression design features and the physical separation of redundant equipment in this area, a fire would not prevent a safe shutdown.

10 CFR 50 Appendix R

Union Electric

III.G Fire Protection of Safe Shutdown Capability

1. Fire protection features shall be provided for structures, systems, and components important to safe shutdown. These features shall be capable of limiting fire damage so that:
 - a. One train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency control station(s) is free of fire damage; and
 - b. Systems necessary to achieve and maintain cold shutdown from either the control room or emergency control station(s) can be repaired within 72 hours.
2. Except as provided for in paragraph G.3 of this section, where cables or equipment, including associated non-safety circuits that could prevent operation or cause maloperation due to hot shorts, open circuits, or shorts to ground, of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment, one of the following means of ensuring that one of the redundant trains is free of fire damage shall be provided:
 - a. Separation of cables and equipment and associated non-safety circuits of redundant trains by a fire barrier having a 3-hour rating.
Structural steel

FSAR Appendix 9.5B provides an area-by-area analysis of the SNUPPS power block that demonstrates that no single fire can prevent safe shutdown.

Redundant trains of systems required to achieve and maintain hot standby are separated by 3-hour-rated fire barriers, or the equivalent provided by III.G.2, or else a diverse means of providing the safe shutdown capability exists and is unaffected by the fire. ← **Insert 4**

For redundant trains of systems required to achieve and maintain cold shutdown that could potentially be affected by a single fire, repairs or local operator actions can be performed within 72 hours.

As described in Appendix 9.5B and Section 7.4, an auxiliary shutdown panel is provided as a dedicated means of achieving and maintaining hot standby in the event that the main control room is uninhabitable due to a fire.

Refer to the Site Addendum for site-related structures.

INSERT 1

Redundant trains of centrifugal charging are located in Room 1101. One of the redundant trains of centrifugal charging is assured for hot shutdown in the event of a fire in this area. These redundant trains are separated by a horizontal distance of greater than 35 feet. Cable trays do traverse through the separation zone. However due to the fire resistance of the IEEE-383 cables in conjunction with the installed fire protection features of this area that include automatic detection and suppression, a fire propagating across the 20 foot separation zone is not considered credible.

INSERT 2

There are several cable trays, motor control centers, and the room cooler which traverse the 20 foot separation zone. However due to the fire resistance of the IEEE-383 cables in conjunction with the installed fire protection features of this area, a fire propagating across the 20 foot separation zone is not considered credible.

INSERT 3

The 'A' Train pressurizer PORV cables are separated by a distance of greater than 20 feet from the 'B' Train pressurizer PORV and block valve cables, and the 'A' Train component cooling water circuits are separated by a distance greater than 20 feet from the 'B' Train component cooling water circuits. There is a motor control center, several cable trays, an air handling unit, and a control rod drive motor generator set which traverse the 20 foot separation zone. However, based on the fact that the motor control center is enclosed within a metal cabinet, the intervening cables are IEEE 383 rated, and the installed fire protection features of this room, a fire propagating across the 20 foot separation zone is not considered credible.

INSERT 4

Specific plant configurations for III.G.2.b 20 foot separation distances and intervening combustibles are detailed in the appropriate Fire Area safe shutdown analysis section.

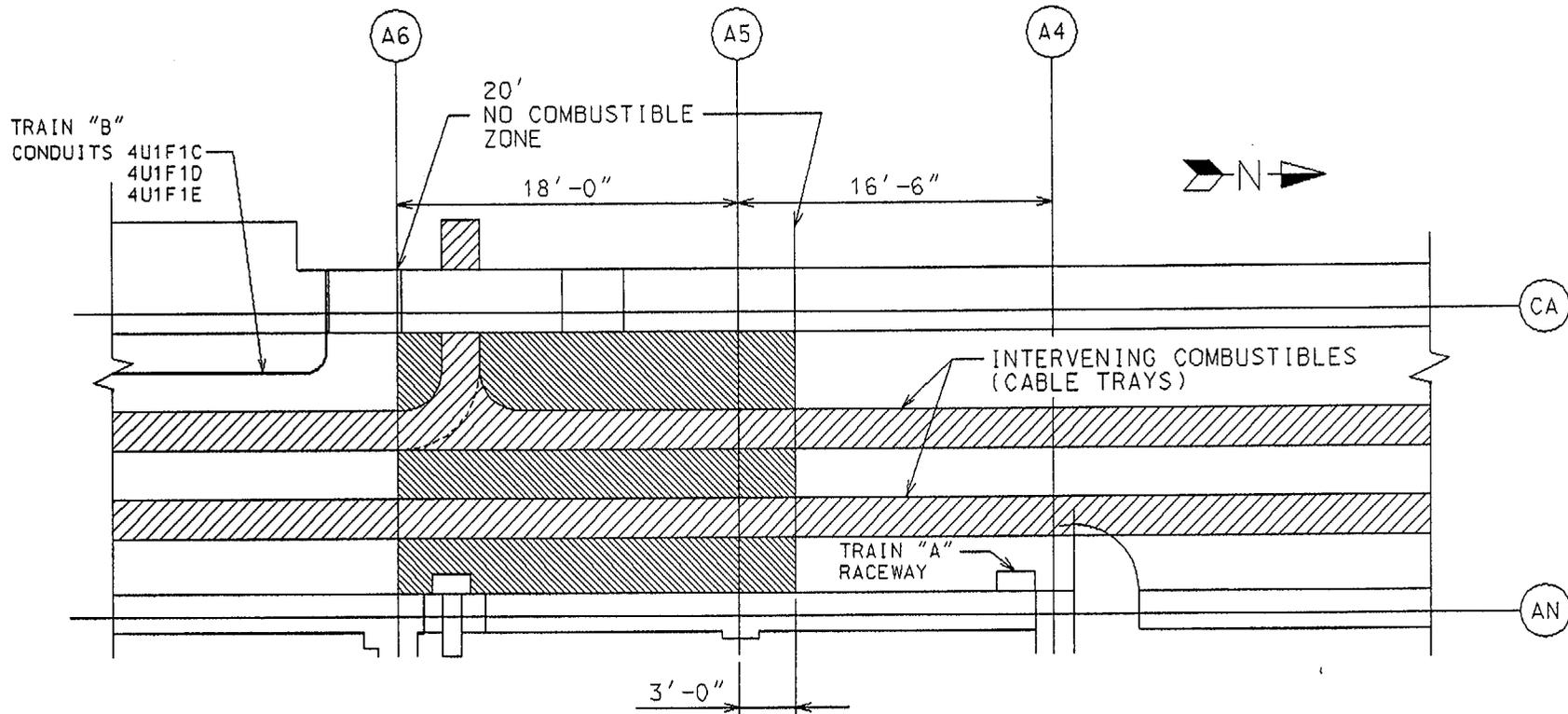
ULNRC-04522

ATTACHMENT 4

DIAGRAMS OF THE FIRE AREAS

Figure 1

FIRE AREA A-1
ROOM 1101 1974' AUXILIARY BUILDING
WEST CORRIDOR



CAD-0493

06-06-01

Figure 2

FIRE AREA A-18
ROOM 1410 2026' AUXILIARY BUILDING
NORTH ELECTRICAL PENETRATION ROOM

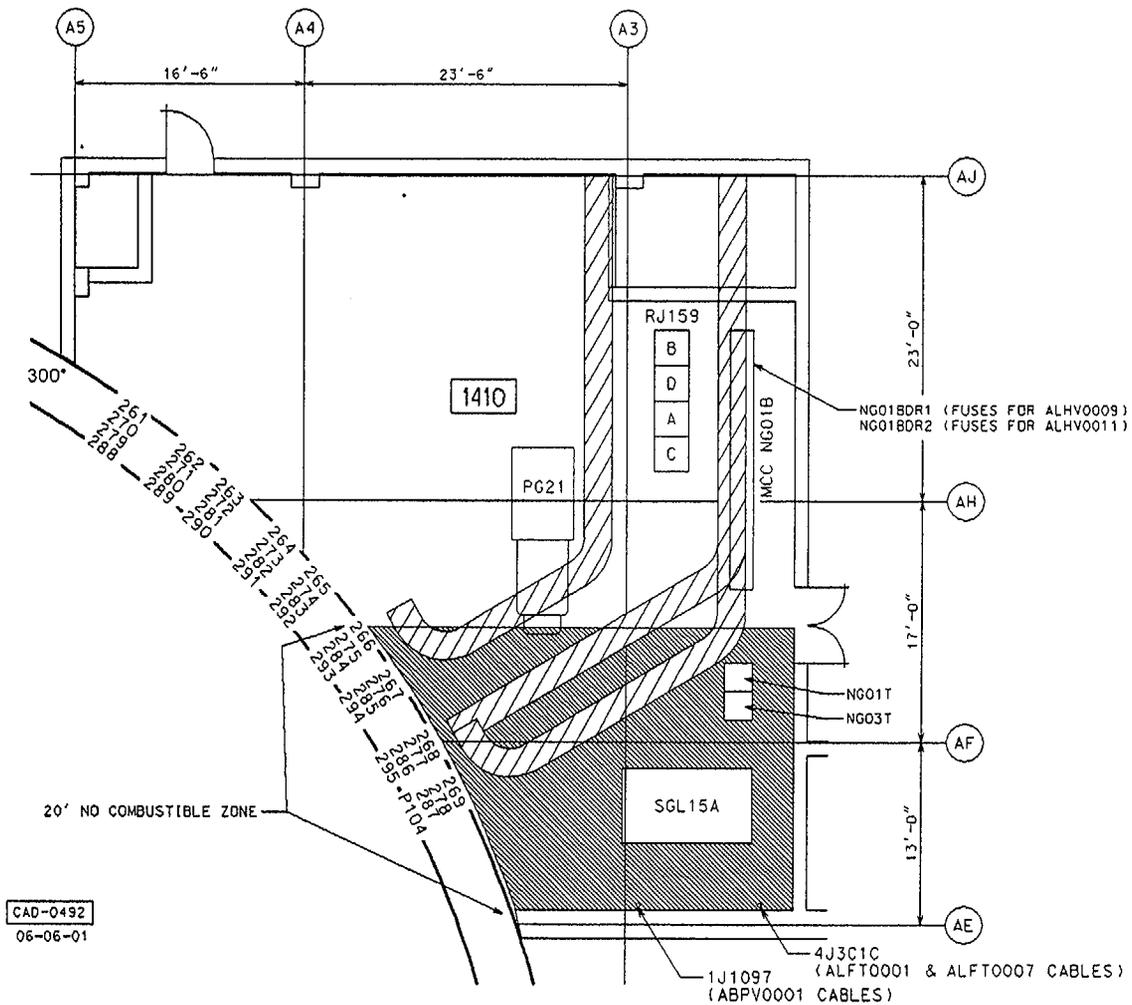


Figure 3

FIRE AREA A-27
ROOM 1403 2026' AUXILIARY BUILDING
MG SETS & REACTOR TRIP SWITCHGEAR ROOM

