NRC FORM 195
(2-76)

U.S. NUCLEAR REGULATORY COMMISSION

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TO:	FROM:	DATE OF DOCUMENT
Mr. D. K. Davis	Arkansas Power & Light Company Little Rock, Arkansas Donald A. Rueter	9/21/77
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DESCRIPTION

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(1-P)

ENCLOSURE

Consists of additional answers to NRC staff questions on fire protection....

(16-P)

PLANT NAME: Arkansas Units 1 & 2

DISTRIBUTION OF FIRE PROTECTION INFO [redacted]

RJL 9/26/77

100 ENCL.

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HELPING BUILD ARKANSAS

ARKANSAS POWER & LIGHT COMPANY

P.O. BOX 551 LITTLE ROCK, ARKANSAS 72203 • (501) 371-4000

September 21, 1977

1-097-12
2-097-17

Director of Nuclear Reactor Regulation
ATTN: Mr. D. K. Davis, Acting Chief
Operating Reactors Branch #2
Mr. J. F. Stolz, Chief
Light Water Reactors Branch #1
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Arkansas Nuclear One-Units 1 & 2
Docket Nos. 50-313 & 50-368
License No. DPR-51
Fire Protection
(File: 1510, 2040, 2-1510 & 2-2040)

Gentlemen:

Enclosed find additional answers to staff questions on fire protection. In addition we have completed our fire hazards analysis of ANO-2 elevation 354', electrical man holes and intake structure below grade and grade level. All these areas meet the criteria outlined in my August 30, 1977, letter.

Very truly yours,

Donald A. Rueter

Donald A. Rueter
Manager, Licensing

DAR:DHW:tw

Enclosure

7726 90332

Item 5

Describe metal roof deck construction nd identify differences from the Class 1 Factory Mutual System Approval Guide requirements.

The term "1-1/2 hour flame spreading" referenced to in IV.B.1.(f) of your submittal is unclear. Provide data on the fire rating of ceilings and the test used to establish such ratings including those of the translucent ceiling in the control room.

Response: (ANO-1 and 2)

Metal roof deck construction conforms to Underwriters Laboratories Class A roof covering materials and Underwriters Laboratories Metal Deck Assemblies Construction No. 1 and consists of built-up roofing over inorganic, noncombustible elastic film vapor barrier which is adhered to metal roof deck with noncombustible, nontoxic, waterproof cold liquid adhesive having a dry peel strength of not less than 10#/in. of width.

The metal roof deck construction conforms to Factory Mutual Loss Prevention Data, Construction 1-28 dated June 1970, with the exception that the 4 foot wide strip of insulation around the entire roof perimeter is not mechanically fastened to the steel roof deck with mechanical fasteners. These fasteners are too short to go through the insulation, the lightweight concrete cricket and into the metal decking.

Instead, the perimeter of the roofing is hot-mopped in place over rigid insulation on a vapor barrier over the lightweight concrete cricket, the rigid insulation cant, and the parapet. At the top of the parapet, a 2 x 4 wood nailer is bolted through the vertical metal decking to the structural steel. Finishing felt is applied dry to the wood nailer and cemented to the roofing felts. Composition flashing is nailed and cemented to the wood nailer and extends to cover the finishing felts and the built-up roofing felts. Twenty gauge metal cap flashing covers the top of the composition flashing and is connected to the exterior siding.

Materials in suspended acoustical ceilings were listed by Underwriters Laboratories, Inc. as suitable for one hour fire resistive construction. All components of suspended acoustical ceilings are noncombustible and/or have a flame spread rating of 25 or less.

Materials in the translucent control room ceiling are noncombustible with the exception of the translucent panels which have a flame spread (based on ASTM test D635-63) of 1.1 inches per minute (slow burning plastic). In Unit 1, a noncombustible Marinite Board ceiling and suspension system is constructed above the translucent control room ceiling. Materials used in the construction of the suspended Marinite Board ceiling are noncombustible and the Marinite Board is listed under

Underwriters Laboratories, Inc. Fire Hazard Classification with Flame Spread 0, Smoke Developed 0, and Fuel Contributed, negligible.

The Unit 2 control room does not require a noncombustible ceiling above the luminous ceiling because all of the power cables above the ceiling are in continuous rigid steel conduit or totally enclosed cable trays.

Item 7

Your item IV.B. 3f does not indicate whether the cables passed the IPCEA test. State whether or not the flame tests were performed on single and jacketed cable assemblies. Provide the acceptance criteria and results of the flame tests. Identify the flame temperature used, the exposed area, and the heat rate. Provide a comparison between these test procedures and the IEEE 383 flame test procedure.

Response: (ANO 1)

Certified test reports are available indicating that the materials used to construct these cables passed the IPCEA Flame Resisting Test. Tests were performed on both single and multiconductor test specimens. Attached are copies of the IPCEA S-19-81 part 6.19.6 and the IEEE 383 flame resisting test procedures. The tests are fully described and the acceptance criteria are given in these attachments.

2.5 Flame Tests

2.5.1 *General.* This section describes the method for type testing of grouped cables via the vertical tray flame test to determine their relative ability to resist fire.

2.5.2 *Criteria*

2.5.2.1 The fire test should demonstrate that the cable does not propagate fire even if its outer covering and insulation have been destroyed in the area of flame impingement.

2.5.2.2 The fire test should approximate installed conditions and should provide consistent results.

2.5.3 *Test Specimens*

2.5.3.1 The tests proposed are for power, control, and instrumentation cables.

2.5.3.2 Sizes recommended for type tests may be as listed in Table 1 but not necessarily limited thereto.

2.5.4 *Fire Test Facility and Procedure*

2.5.4.1 Test should be conducted in a naturally ventilated room or enclosure free from excessive drafts and spurious air currents.

2.5.4.2 The vertical tray configuration is recommended as the best arrangement to establish whether or not a cable could propagate a fire. The tray should be a vertical, metal, ladder type, 3 in deep, 12 in wide, and 8 ft long. The tray may be bolted at the bottom to a length of horizontal tray for support.

2.5.4.3 Test sample arrangement — multiple lengths of cable should be arranged in a single layer filling at least the center six inch portion of the tray with a separation of approximately 1/2 the cable diameter between each cable. The test should be conducted 3 times to demonstrate reproducibility using different samples of cable.

2.5.4.4 Flame source, when specified, the procedure detailed below shall be followed:

2.5.4.4.1 The ribbon gas burner shall be mounted horizontally such that the flame impinges on the specimen midway between the tray rungs, and so that the burner face is 3 in. behind and approximately 2 ft above the bottom of the vertical tray. Because of its uniform heat content natural grade propane is preferred to commercial gas.

2.5.4.4.2 The flame temperature should be approximately 1500°F when measured by a thermocouple located in the flame close to, but not touching the surface of the test specimens (about 1/8 in spacing).

2.5.4.4.3 For the schematic arrangement see Fig 1. Under dynamic conditions, if propane gas is used the pressure shall be -2.6 ± 0.3 cm of water at the supply side A to the Venturi mixer. If commercial gas is used the pressure shall be -0.9 ± 0.1 cm of water when measured at the supply side of the Venturi mixer. For propane gas, the air pressure should be 4.3 ± 0.5 cm of water. For commercial gas it shall be 5.6 ± 0.5 cm of water, measured at the air inlet B to the mixer. In practice the flame length will be approximately 15 in when measured along its path.

2.5.4.4.4 Gas-burner procedure — ignite the burner and allow it to burn for 20 minutes. Record temperatures at point of impingement throughout the duration of the test, length of time flame continues to burn after gas burner is shut off, jacket char distance, and distance insulation is damaged.

2.5.4.5 Alternative flame source, oil or burlap — when specified, the procedure detailed below shall be followed.

2.5.4.5.1 Use a 24 in square piece of 9 oz per square yard burlap, folded as shown in Fig 2 into a bundle 4 in × 4 in × 6 in. Wrap with fine copper wire as shown, to retain the shape of the bundle. Immerse in a container of oil[1] for 5 minutes. Remove, hang free in air, allow to drain for approximately 15 minutes. The burlap ignitor is weighed before immersion and after draining, and the fuel pickup should be 160 ± 5 g. The repeatability of this test is derived from constant fuel pickup in ignitors of constant size and weight. Temperature should be monitored at point of maximum flame impingement upon the test cables.

2.5.4.5.2 After draining, the ignitor should be placed in front of and approximately 2 ft above the bottom of the tray with the 4 in × 6 in face of the ignitor held in place against the cables by a suitable metal wire or band.

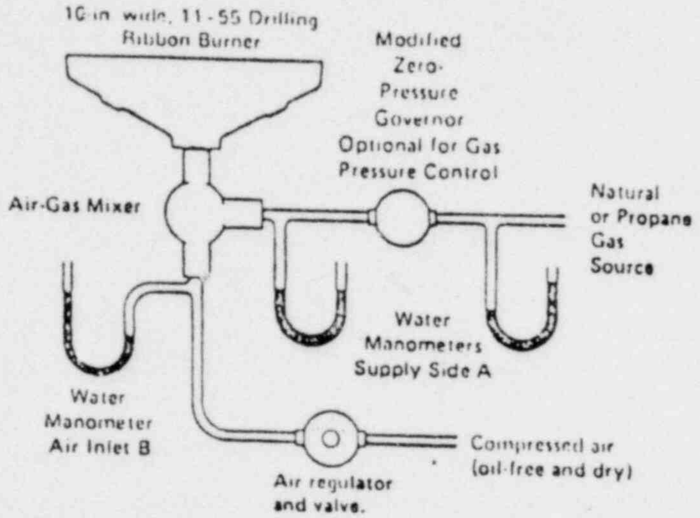
2.5.4.5.3 Ignite the oil soaked burlap. The applied flame should be allowed to burn itself out naturally.

2.5.5 *Evaluation.* Cables which propagate the flame and burn the total height of the tray above the flame source fail the test. Cables which self-extinguish when the flame source is

[1]Such as Mobilect 33.

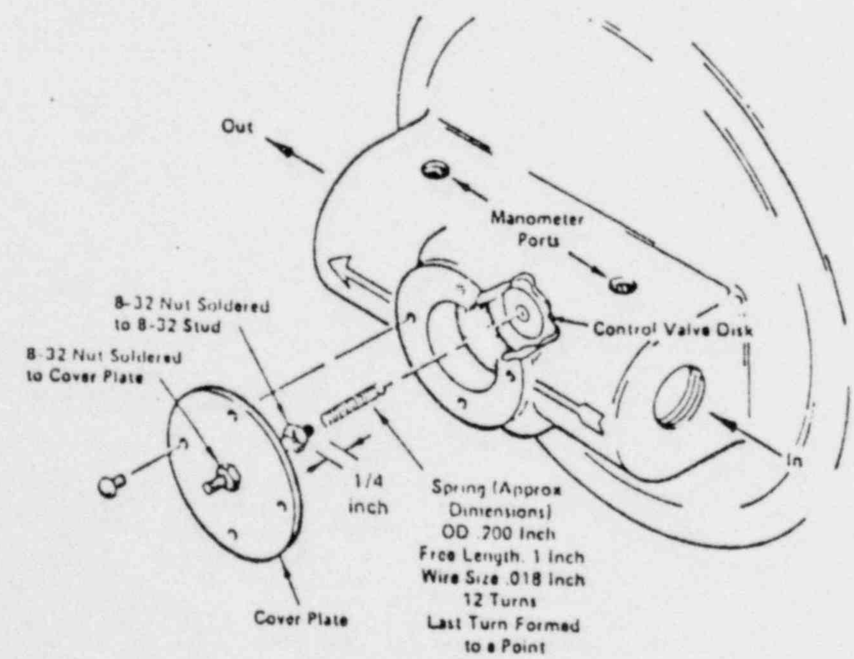
removed or burn out pass the test. Cables which continue to burn after the flame source is shut off or burns out should be allowed to burn in order to determine the extent.

2.5.6 *Instrument Cable and Single Conductors from Multiconductor Assembly.* A specimen of each type of instrument cable or the individually insulated or insulated and jacketed conductors removed from each multiconductor control cable which is type tested should pass a flame resistance test in accordance with ASTM D2220-68, Vinyl Chloride Plastic Insulation for Wire and Cable, Section 5 (IPCEA Standard S-19-81, Section 6.19.6), except the weight may be omitted if the specimen is securely clamped.



NOTE: All pressures measured under dynamic conditions.

A Schematic Drawing



B Detail Drawing of Zero Pressure Governor Modification

Fig 1
Flame Source

6.19.6 Flame Resisting Test

6.19.6.1 The test apparatus shall consist of the following:

(*a*) Test chamber of sheet metal 12 inches (305 mm) wide, 14 inches (356 mm) deep and 24 inches (610 mm) high, which is open at the top, and which is provided with means for clamping the test specimen at the upper end and supporting it in a vertical position.

(*b*) Means for adjusting the position of the test specimen.

(*c*) A 4-pound (1.8-kg) weight (for 8 AWG and smaller sizes) to be attached to the lower end of the test specimen to keep it taut.▲

(*d*) Tirrill burner with an attached pilot light and mounted on a 20-degree angle block. The burner shall have a nominal bore of ⅜ inch (9.5 mm) and a length of approximately 4 inches (102 mm) above the primary air inlets.

(*e*) An adjustable steel angle (jig) attached to the bottom of the chamber to insure the correct location of the burner with relation to the test specimen.

(*f*) Gas--a supply of ordinary illuminating gas at normal pressure.

(*g*) Watch or clock with a hand which makes one complete revolution per minute.

(*h*) Flame indicators consisting of strips of gummed kraft paper having a nominal thickness of 5 mils (0.127 mm) and a width of ½ inch (12.7 mm).•▲

• The paper used for the indicators is known to the trade as 60-pound stock and is material substantially the same as that described in Federal Specification UU-T-111 covering "Tape, Paper, Gummed (Kraft)."†

† This paragraph is approved by NEMA as Authorized Engineering Information.

6.19.6.2 The test shall be made in a room which is generally free from drafts of air, although a ventilated hood may be used if air currents do not affect the flame. One end of the test specimen approximately 22 inches (559 mm) in length shall be clamped in position at the upper end of the chamber, and (for 8 AWG and smaller) the 4-pound (1.8-kg) weight attached to keep the specimen taut. A paper indicator shall be applied to the specimen so that the lower edge is 10 inches (254 mm) above the point at which the inner blue cone of the test flame is to be applied. The indicator shall be wrapped once around the specimen, with the gummed side toward the conductor. The ends shall be pasted evenly together and

shall project ¾ inch (19.0 mm) from the specimen on the opposite side of the specimen to that to which the flame is to be applied. The paper tab shall be moistened only to the extent necessary to permit proper adhesion. The height of the flame with the burner vertical shall be adjusted to 5 inches (127 mm), with an inner blue cone 1½ inches (38.1 mm) high.

6.19.6.3 The burner, with only the pilot lighted, shall be placed in front of the sample so that the vertical plane through the stem of the burner includes the axis of the wire or cable. The angle block shall rest against the jig, which shall be adjusted so that there is a distance of 1½ inches (38.1 mm) along the axis of the burner stem between the tip of the stem and the surface of the specimen. The valve supplying the gas to the burner proper shall then be opened and the flame automatically applied to the sample. This valve shall be held open for 15 seconds and then closed for 15 seconds. This process shall be repeated four times. During each application of the flame, the specimen shall be adjusted, if necessary, so that the top of the inner blue cone touches the surface of the specimen. If more than 25 percent of the extended portion of the indicator is burned after the five applications of the flame, the wire is considered to have conveyed flame. The duration of burning of the specimen after the fifth application of the flame shall be noted, and any specimen which continues to burn for more than 1 minute shall be considered to have failed this test.

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Item 15

Provide an evaluation of the potential for a single fire to cause damage to electrical wiring which would result in the loss of both regular and emergency lighting to safety-related areas not involved in the fire or areas providing access to safety-related areas.

Response: (ANO 1 & 2)

Plant lighting is divided into three categories: normal lighting, preferred emergency lighting, and emergency d-c lighting. The preferred emergency lighting is fed from a diesel bus and is designed to remain operative if normal power is lost. Should the preferred emergency lighting source fail, the d-c lighting automatically turns on and provides lighting for stairways, corridors, and selected areas.

The following design features provide reasonable assurance that at least minimum lighting exists in all areas.

Lighting circuits throughout the plant are interspersed so each area has more than one normal lighting circuit. Therefore, the loss of one branch circuit will only partially reduce the local lighting level.

Embedded conduits are used for most lighting circuits, thus minimizing direct exposure to mechanical damage or fire.

Preferred emergency lighting fixtures and part of the general area lighting are normally energized. It is not necessary to turn the preferred emergency on in the event the normal lighting malfunctions.

Automatic Transfer from preferred emergency to d-c lighting occurs if the preferred emergency lighting is lost.

Turbine and auxiliary building lighting consists of over 88 Unit 1 and 113 Unit 2 normal AC, preferred AC, and emergency d-c branch circuits. It is unlikely a fire in one room would affect all the remaining lighting circuits in other rooms.

Based on our review of plant lighting distribution, the only areas where the power sources for both normal and emergency lighting could potentially be damaged by a common fire is at elevation 386 of the turbine deck of Unit One and Unit Two. The main distribution panels for both the normal and emergency sources are grouped together in these locations.

Item 20b

The "red" switchgear room contains some power cables from the redundant diesel generators to supply power for the turbine generator turning gear. Describe the safety-related loads fed from the same buses which supply these cables and the effect on safe shutdown if these loads are lost.

Response: (ANO-2)

The following is a list of the safety related loads connected to MCC buses 2B54 and 2B64 which also supply power for the non-safety-related turbine generator turning gear:

2VUC2A,B,C,D	Auxiliary Building Switchgear Room Unit Coolers
2P36C	Charging Pump
2VUC27A-1	Control Room Emergency Cooler
2VSF9	Control Room Emergency Air Filter Fan
2CV-1418-1 2CV-1419-1 2CV-1421-2 2CV-1422-2	Service Water Pump Crossover Valves
2CV-1473-1	Volume Control Tank Outlet Valve
2CV-1473-5 2CV-1472-5 2CV-1470-1 2CV-1471-2 2CV-1475-2	Sluice Gate At Intake Structure Valves
2CV-1425-1 2CV-1427-2	Auxiliary Cooling Water System Isolation Valves
2CV-1451-5	HPSI Pump 2P89C Cooler Inlet Valve
2CV-1501-5	Charging Pump Room Cooler 2VUC7C Inlet Valve
2CV-1543-1 2CV-1531-2	Component Cooling Water Heat Exchanger Inlet Valves
2CV-1511-1 2CV-1519-1	Containment Cooling Coil Service Water Outlet Valves
2CV-4824-2	Pressurizer Auxiliary Spray Pump Valve
2VUC-7C	Auxiliary Building Charging Pump Room Unit Cooler
2UCD-8216-2 2UCD-8222-2	Containment Cooling Bypass Dampers

2D32 2D34	Battery Chargers
2Y11,13 2Y22,24	Inverters

FSAR Figures 8.3-11 and 8.3-15 show loads fed from MCC's 2B54 and 2B64. Besides the turbine-generator turning gear system, there are also other non-safety-related loads fed from safety-related MCC's other than 2B54 and 2B64. Since all the loads on these MCC's are connected through Class IE circuit breakers and starters, the bus is electrically protected from malfunctioning equipment and/or damaged cables. In addition, since these loads have redundant backup units fed from other ESF MCC's or from Unit 1, safe shutdown will not be affected by the loss of the safety-related loads on MCC's 2B54 and 2B64.

Item 25

To minimize the possibility and magnitude of a fire on the reactor coolant pumps inside containment, an oil catch basin has been provided to contain oil leaks and drain them to a remote tank. Discuss the capability of this design to contain the oil from line breaks in the discharge piping of the hydraulic lift pumps and provide the design drawings showing this capability. Describe the means for detecting and extinguishing a reactor coolant pump fire.

Response: (ANO-2)

The method used by ANO-2 to effectively control oil leakage or spillage from the reactor coolant pump motors consists of a system of oil deflectors, drip pans, and catch basins. Leakage from the upper guide or thrust bearings are collected by two drip pans attached to the outside of the stator frame while leakage from the lower bearing is contained within a catch basin surrounding the motor shaft. All catch basins and drip pans drain to either of two 180 gallon sump tanks.

In addition, the oil lift system is completely contained within an oil-tight enclosure with the exception of the oil lift pump discharge and return lines running between the coolant pump motor and the oil lift system enclosure. It should be noted that the oil lift pumps are only operated during startup and shutdown of the reactor coolant pumps thus minimizing the probability of a break occurring in one of these lines.

Two smoke detectors have been provided in the vicinity of each reactor coolant pump to detect fires on or near the pumps. Extinguishing a reactor coolant pump fire would be accomplished through the use of hand held carbon dioxide fire extinguishers.

Item 33

Identify those fire detectors which protect safety-related equipment or are located in areas containing a potential fire hazard to safety-related equipment, whose protective signaling circuitry is not an NFPA Code 72D Class A system.

Response: (ANO-1 & 2)

All fire and smoke detectors and fire detection systems utilized at Arkansas Nuclear One for both fire alarm service and automatic system actuation are designed and installed in accordance with NFPA No. 72A, "Local Protection Signaling System," with Class B circuitry as defined in NFPA No. 72D, "Proprietary Protective Signaling Systems."

The detectors, zone indicating units, and fire indicating units are all automatically supervised. The detector circuit is supervised to detect open or short circuits, loss of power or undervoltage. The alarm circuit is supervised to detect open or short circuits and ground faults. When any of the above conditions exist, the trouble light and audible alarms, both locally and in the control room, will be actuated. In addition, the power supplies for the fire detection systems are accessible to the diesel generators. The fire detection system cables are installed in rigid steel conduit to connect the individual detectors to the local control unit.

Item 38

Provide the sprinkler system design criteria including the NFPA standards used, design densities and pipe schedules applied.

Response: (ANO-2)

Sprinkler system design criteria for Arkansas Nuclear One are based on the recommendations of the Nuclear Energy Liability - Property Insurance Association (NEL-PIA), "Basic Fire Protection for Nuclear Power Plants (March, 1970)" and the requirements of the applicable National Fire Protection Association standards.

Automatic wet sprinklers, arranged on ordinary hazard pipe schedule, are provided in accordance with NFPA No. 13 to protect certain non-safety related areas and/or equipment. (See FSAR Section 9.5.1.2.2 for areas and/or equipment protected by this system).

Automatic wet sprinklers, hydraulically designed in accordance with NFPA No. 13, are provided for areas under the turbine-generator operating floor. Densities are 0.3 gpm/sq.ft. for any, including the most remote 3000 sq.ft. of floor area, and 0.2 gpm/sq.ft. for any area up to a maximum of 10,000 sq.ft.

The deluge water spray systems, hydraulically designed in accordance with NFPA No. 15, are provided for the transformers, the hydrogen seal oil unit, the feedwater pumps lube oil reservoir, and the cable spreading room. Transformer deluge water spray systems are designed to provide a density of 0.25 gpm/sq.ft. of the transformer surface area envelop and extending three feet beyond the maximum hazard dimensions. The deluge water spray systems for the hydrogen seal oil unit and the feedwater pumps lube oil reservoir are designed to provide a density of 0.30 gpm/sq.ft. of surface area. The cable spreading room deluge water spray system is designed to provide a density of 0.20 gpm/sq.ft. for the entire floor area of the room and one unit of intermediate sprinklers, located between the second and third cable trays in conformance with NEL-PIA recommendations.

The pre-action sprinkler systems, hydraulically designed in accordance with NFPA No. 13, are provided for the emergency diesel generator rooms and the electrical penetration areas in the auxiliary building. The pre-action sprinkler systems are designed to provide a density of 0.30 gpm/sq.ft. for the entire floor area of each protected hazard.

The combined pre-action and water spray systems, hydraulically designed in accordance with NFPA Nos. 13 and 15, are provided for the electrical penetration areas within the containment building. These systems are designed to provide a density of 0.30 gpm/sq.ft. of the cable's surface area envelop extending three feet beyond the maximum hazard dimensions.

Item 43

Describe the provisions for monitoring loss of air flow in the ventilation system used for hydrogen removal in the battery rooms. Provide the design calculations on hydrogen generation which are the basis of the battery room ventilation capacity to remove hydrogen.

Response: (ANO-2)

Battery Room #1

Batteries 2D11 & 2D13
Room Volume = 3000 ft^3
Each cell generates 0.0956 ft^3 of H_2 per hour
Each battery consists of 60 cells
120 cells x .00956 ft^3/cell-hr = 1.147 ft^3/hr
4% of room volume = .04 x 3000 = 120 ft^3

$$\frac{120\ ft^3}{1.147\ ft^3/hr} = 104.6 \text{ hrs} = 4.36 \text{ days}$$

This indicates that one air change each 4.36 days would be sufficient to maintain the hydrogen concentration below 4%.

This room is ventilated at a rate of 800 cfm or a complete air change approximately every four minutes.

Battery Room #2

Battery 2D12
Room Volume = 1500 ft3
4% of room volume = 60 ft^3
Hydrogen generation rate = 0.5736 ft^3/hr

$$\frac{60\ ft^3}{0.576\ ft^3/hr} = 104.6 \text{ hrs} = 4.36 \text{ days}$$

This indicates that one air change is required each 4.36 days to maintain the hydrogen concentration below 4%. This room is ventilated at 800 cfm or about 1 air change every two minutes.

Item 52.

Describe the potential for a postulated fire in the remote shutdown panel causing transfer of control or loss of control of safe shutdown equipment from the control room. Describe how the plant would be shutdown following a fire in the remote shutdown panel.

RESPONSE:

A postulated fire in the remote shutdown panel is capable of disabling the following indicating devices within the control room. Additionally, such a fire may cause certain controlling devices to fail as indicated below and may initiate a trip of any or all of the reactor coolant pumps.

Control Devices

Volume Control Tank Inlet Valve (2CV-4826) - Fails to VCT

Volume Control Tank Waste Gas Vent Valve (2SV-4837) - Fails Closed

Pressurizer Spray Valves (2CV-4651 & 4652) - Fails Closed

Auxiliary Pressurizer Spray Valve (2CV-4824) - Fails As Is

Letdown Control Valves (2CV-4816 & 4817) - Fails Closed

Backpressure Control Valves (2CV-4810 & 4811) - Fails Closed

Shutdown Cooling Flow Control Valves

(2CV-5091) - Fails Open

(2CV-5092) - Fails Closed

Pressure input signal from condensers to steam dump and bypass control system. (Prevents steam dump to condensers)

Indication

Steam generator level indicators (2LI- 1033A, 1033B, 1133A, 1133B) (Two channels still available)

Condensate storage tank level recorder (2LR-0605)

Condenser high pressure indicators (2PIS - 0605 & 0644)

Due to physical barriers within the remote shutdown panel (2C80), a loss of all of the above controlling devices and indicators is considered to be extremely unlikely. However, assuming the worst possible case, the simultaneous loss of all of the above indications, failure of the controlling devices to the positions indicated, and the loss of all reactor coolant pumps. The plant would be safely shut down using the same procedure followed after a plant trip with loss of offsite power with the following exceptions.

1. The auxiliary spray valve, 2CV-4824, may be either open or closed when it fails. If it is closed, the valve will be manually opened from within the containment to allow flow to the pressurizer spray head. Once 2CV-4824 is opened, the pressurizer spray may be operated by closing valves 2CV-4827 & 4831 in the charging system and operating the charging pumps. Valves 2CV-4827 & 4831 may be operated from within the control room and are not affected by the postulated fire.

2. Once the reactor coolant system has reached a state of 300 F/300 psig via steam dump, the shutdown cooling system may be operated using manual control of the shutdown cooling flow control valves, 2CV-5091 & 5093. These valves are outside of the containment.

The remaining controlling and indicating devices disabled by the fire will not affect the shutdown procedure.

Item 56

Describe the combustible materials used in safety-related motc. ontrol centers and their combustion properties. Describ. the procedures and results of any testing performed to establish these properties. Describe the extent of damage to a motor control center by a localized hot spot or arcing affecting these materials.

Response: (ANO-2)

The combustible materials used in safety-related motor control centers and their combustion properties are as follows:

<u>Horizontal Bus Bar</u>

X Material: Borg-Warner ABS extrusion compound, type GSM, .125 in. thick.
U.L. Flammability Rating - 94HB (U.L.-94, pg. 4)
U.L. Recognized Component Index - pg. 358

Z Material: .048 in. thick steel with .062 in. thick Glastic Corp. type UTS-1478 glass polyester laminate insert.
U.L. Flammability Rating - 94V-0 (U.L.-94, pg. 6)

<u>Vertical Bus Bar</u>

A Material: .062 in. thick Glastic Corp. type UTS-1478 glass polyester laminate.
U.L. Flammability Rating - 94V-0 (U.L.-94, pg. 6)

B Material: .062 in. thick Glastic Corp. type TSF.
U.L. Flammability Rating - SB (.'ow burning)
0.8 in. per minute.

We interpret this question as being related to NRC I&E circular 77-03 dated February 28, 1977 with respect to a fire caused by a misalignment of bus stabs in a safety-related ITE Imperial seri.s 5600 Motor Control Center at the Three Mile Island Unit 2 facility. Per letter from Mr. R. M. Combes of Gould/ITE to Mr. Carl Seyfrit, Chief of U.S. Nuclear Regulatory Commission, Reactor Technical Assistance Branch, the non-metallic vertical and horizontal bus barriers used as mechanical barriers for personnel protection and not as supports for live parts or arc barriers do meet U.L. and industry requirements for insulating material. Furthermore, we also have insured that all bus stabs have been thoroughly checked and inspected using procedures and equipment provided by ITE. Due to the above reasons, we are confident that the same fire incident would not likely occur at Arkansas Nuclear One - Unit 2.