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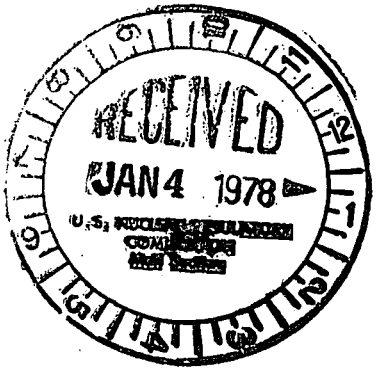
December 29, 1977



Mr. Roby Bevan, Project Manager
Operating Reactors - Branch 2
Division of Operating Reactors
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Dresden Station Units 2 and 3
Fire Protection
NRC Docket Nos. 50-237 and 50-249

Dear Mr. Bevan:

Attached are responses to Staff question Nos. 4, 7, 12, and 25 for Dresden Station Units 2 and 3, in addition to a clarification to PF 15 which was previously submitted.

Three copies of this letter are provided for your review.

Very truly yours,

M. S. Turbak

M. S. Turbak
Nuclear Licensing Administrator
Boiling Water Reactors

Attachments

QUESTION 4

Provide an analysis which shows that failure or rupture of a fire protection system will not subsequently cause damage or failure of safe-related equipment required for safe-shutdown.

Special consideration should be given to the fire water main which traverses the Unit 2 turbine building in the vicinity of the auxiliary electrical equipment room.

ANSWER:

Per the discussion on May 25, 1977, with the NRC staff, the scope of this question was limited to providing an analysis which shows that operation of a fire protection system will not subsequently cause damage to, or failure of safety-related equipment required for safe shutdown.

Equipment that could be affected by fixed fire protection system water sprays that is either safety related or needed for shutdown are:

1. MCC's 28-2, 28-3, 38-2, 38-3, 39-2
2. Standby Gas Treatment Systems
3. Condensate Transfer Pumps (Non Safety Related)
4. CRD Pumps (Non Safety Related)
5. LPCI/Containment Cooling Services Water Pumps

MCC's 28-2 and 28-3 could be exposed to spray from the deluge system protection for the Unit 2 hydrogen seal oil unit.

MCC's 38-2 and 38-3 could be exposed to spray from the deluge system protection for the Unit 3 hydrogen seal oil unit.

MCC 39-2 could be exposed to spray from the area sprinkler system located in the area with the SBGT systems.

MCC 28-2 supplies auxiliaries for SBGT system Train A. It also is the power source for condensate transfer pump 2A.

MCC 28-3 supplies Diesel Generator 2/3 cooling water pump and auxiliaries for SBGT system Train A.

MCC 38-2 supplies power for condensate transfer pump 3A.

MCC 38-3 supplies Diesel Generator 2/3 cooling water pump.

MCC 39-2 supplies Diesel Generator 3 cooling water pump, auxiliaries for SBGT system Train B, condensate transfer pump 3B.

Motor Control Centers

Equipment pedestals and adequate drainage systems are provided for all MCC's.

The power supply for SBGT system Train A is MCC's 28-2 and 28-3. The power supply for SBGT system Train B is MCC 39-2. MCC's 28-2 and 28-3 are separated from MCC 39-2 such that a water spray can not affect both power supplies. Therefore, only one train of the SBGT system could be affected by false operation of a sprinkler system.

The power supplies for the Diesel Generator Cooling Water Pumps are:

MCC 28-3 - Unit 2 feed to DG 2/3 cooling water pump.

MCC 38-3 - Unit 3 feed to DG 2/3 cooling water pump.

MCC 39-2 - Feed to DG 3 cooling water pump.

The three MCC supplying power to the DG cooling water pumps are all separated from each other so that a false operation of a sprinkler system would affect only one DG cooling water pumps power supply. The loss of a single DG cooling water pump is acceptable

since a second DG in each case would be available as an emergency onsite source of power.

Standby Gas Treatment System

The SBGT systems are not needed for normal shutdown. The SBGT systems are exposed to spray from the area sprinkler system in the turbine building mezzanine floor. The filters in these units are fully enclosed in sheetmetal housings which would provide protection against water impingement. Each unit is mounted on a 1 foot 6 inch equipment pedestal.

Condensate Transfer Pumps

The condensate transfer pumps are non safety related but they are used to provide makeup water to the isolation condenser. Water damage to MCC 28-2 could affect the power supply to condensate transfer pump 2A. Water damage to MCC 39-2 could affect the power supply to condensate transfer pump 3B. The service water pumps, the diesel fire pump and the clean demineralized water pumps, however, provide redundant and diverse methods of providing makeup water to the isolation condenser so the loss of a condensate transfer pumps will not prevent operation of the isolation condenser.

CRD and LPCI/CCSW Pumps

Water from the sprinkler system in the Low Pressure Heater Area on the ground floor could run down openings at locations D36 and D52 onto the floor at elevation 495 feet 0 inches. The non-safety related CRD pumps and the LPCI/Containment Cooling Service Water Pumps which are located in this area could be affected by this water.

There are, however, numerous other safe shutdown methods available including the normal steam and feedwater systems, HPCI and the isolation condenser.

REFERENCES:

Information Relevant to Fire Protection Systems and Programs Part 3, Dresden Nuclear Power Stations Units 2 and 3, Commonwealth Edison Company, April, 1977, Tables 2.1-1 through 2.1-5 pages 2.1-6 through 2.1-38.

QUESTION NO. 7

The source of dc control power for Division 1 in each unit is that unit's battery. The source of dc control power for Division 2 in each unit is the other unit's battery. In areas where Division 1 or 2 cables are not separated on a unit basis, cables could coexist which derive dc control power from both batteries. Provide an analysis that demonstrates that redundant safe shutdown systems could not be lost due to fire-related damage in either Division 1 or where dc control cables are not separated on a unit basis. For this analysis credit should not be taken for an isolation device actuated only by fault current and it should be assumed that fire-related damage to cables for control circuits could result in the advertent operation, close or trip, of any associated circuit breaker.

ANSWER:

The interconnecting cable between units which connect Unit 2 Main DC Bus 2 (Unit 2 cable separation Division 1) to the Unit 3 Reserve DC Bus 3 (Unit 3 cable separation Division 2) is routed in Unit 2 Division 1 trays to the wall separating Unit 2 and Unit 3. On the Unit 3 side of this wall the cables are routed in Unit 3 Division 2 trays from the wall to the Unit 3 Reserve Bus 3. See Figure 2.1-10 attached.

Inspection has proven that routing of the cable connecting Unit 3 Main DC Bus 3 (Unit 3 cable separation Division 1) to Unit 2 Reserve DC Bus 2 (Unit 2 cable separation Division 2) is not correct. The cable routing from Unit 3 Main Bus 3 is in Unit 3 Division 2 trays up to the wall between Units 2 and 3. The portion of cable from the wall to the Unit 2 Reserve Bus 2 is routed in Unit 2 Division 1 trays. This cable will be rerouted so that the cable from Unit 3 Main DC Bus 3 to the wall between Units 2 and 3 is in Unit 3 Division 1 trays. The routing from the Units 2 and 3 wall to the Unit 2 Reserve DC Bus 2 will be rerouted in Unit 2 Division 2 trays. See Figure 2.1-10. When this cable is rerouted, the interconnecting cables will be separated properly on a divisional basis.

The cable which connects Battery Charger 2/3, which is located in the Unit 2 battery room, to the Unit 3 battery is routed incorrectly from a separation standpoint. This cable will be disconnected and battery charger 2/3 will become a spare charger dedicated to Unit 2. A spare charger will be purchased for use in charging the Unit 3 battery. See Figure 2.1-10.

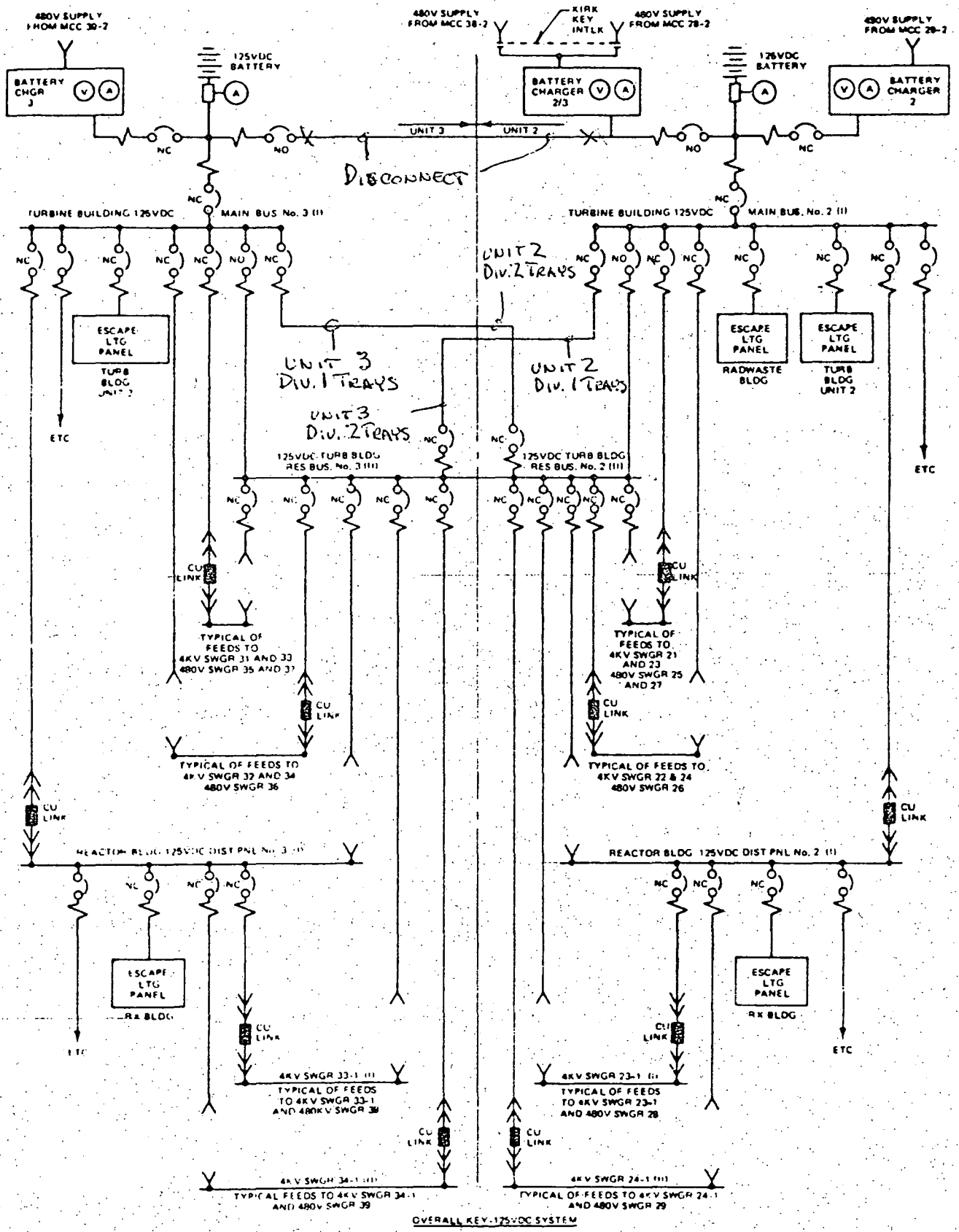
Investigation of the remaining DC system cabling has identified the following areas where fire and/or fire related damage could affect the Reserve (cable Division2) and the Main feed (cable Division 1) for the following equipment:

1. Reactor building for distribution panel #2 (Unit 2)
2. Distribution Panel #1 at 345 KV relay house
3. 4 KV switchgear 23-1 (Unit 2)
4. 4 KV switchgear 24-1 (Unit 2)
5. 4 KV switchgear 24 (Unit 2)
6. 4 KV switchgear 23 (Unit 2)
7. 480 V switchgear 28 (Unit 2)
8. 480 V switchgear 29 (Unit 2)
9. 4 KV switchgear 33-1 (Unit 3)
10. 4 KV switchgear 34-1 (Unit 3)
11. 4 KV switchgear 34 (Unit 3)
12. 4 KV switchgear 33 (Unit 3)
13. 480 V switchgear 38 (Unit 3)
14. 480 V switchgear 39 (Unit 3)

The result of a fire and/or fire related damage in tray sections common to both the reserve and the main feeds of the services listed above could be loss of both 125 volt systems (Unit 2 and 3) and therefore loss of both Division I and Division II dc systems. See Figure 2.1-10.

Steps are in progress to correct this condition by leaving the CU Links out at the various loads as shown in the Figure 2.1-10. In addition the source circuit breakers at the Main or Reserve Busses will be opened. This will deenergize the cables between the sources and the loads such that a fire at one of the loads would not affect both DC division since the cable from the second division at any load location is not connected to the a source. Administrative control will prevent closing of either the circuit breaker or the links unless the other supply is disconnected both at the circuit breaker (source) and the link (load).

When these corrections have been completed it is our opinion that the DC control power for each unit is correctly separated and that separation between units is done correctly to provide the maximum security.



OVERALL KEY-125VDC SYSTEM

DRESDEN 2&3

FIGURE 2.1-1

Dresden 2 & 3

Revision 1
December, 1977

QUESTION 12:

"Provide an analysis which shows that the capacity of the building drains are sufficient to remove the water released from sprinklers and fire hoses or that the standing water does not damage safety-related equipment necessary for safe shutdown of the plant. For diesel generator rooms, the analysis should include fire fighting water and day tank contents".

ANSWER:

An evaluation of the effects of water released from sprinklers and fire hoses on safety-related equipment necessary for safe shutdown was presented in the Dresden 2 and 3 Fire Protection Report, Part 3, April 1977, Section 3.4 paragraph D1 (i). The curbs in the diesel generator 2 and 3 day tank rooms are adequate to contain only the day tank contents and not the fire fighting water. Drains will be provided in the Unit 2 and Unit 3 day tank rooms.

Dresden 2 & 3

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QUESTION 25 (submittal of March 29, 1977)

Is the use of water to extinquish cable fires permitted in areas where equipment subject to damage from water is not protected from water from hose streams? If not describe primary and back up suppression available in each specific area so affected. If permitted provide the justification for each area that such is acceptable.

ANSWER:

Water hose reels with combination spray/straight stream nozzles are provided throughout the station. Fire brigade personnel receive training annually in the use of these nozzles around electrical equipment.

In the control room (CR), auxiliary electric equipment room (AEER), and diesel generator rooms water is not considered the primary suppression agent. In the CR automatic fire detectors are provided and the primary fire suppression would be with portable extinquishers. A low flow water hose and nozzle will be available as back up fire protection.

In the AEER, cables will be coated with a fire retardant coating. The primary fire suppression is provided by a Halon system with back up by a manually initiated CO_2 system. A low flow water hose reel and nozzle provides additional protection. Safety related panels will be protected against water to the extent possible.

A CO_2 system is provided in the diesel generator rooms. Back up is provided by water hose reels and portable extinquishers.

The majority of motors installed at Dresden 2 and 3 have open drip-proof enclosures. Falling water would have no adverse affect on the operation of the motors.

The safety related motor control centers (MCC's) at Dresden 2 and 3 are separated by electrical division and by distance such that if one MCC were damaged by a fire or by fire suppression water, at a minimum, the equipment in the other division would still be in service. These MCC's are mounted on pedestals and adequate drainage is provided. See the response to Dresden 2 and 3 fire protection questions 4 and 12.

Unit 3 4KV switchgear 33-1 and 34-1 on the Unit 3 reactor building mezzanine floor are protected from water run off on the floor by 4 inch curbs and from water falling from cable trays above by a water shield. Similar protection is provided for Unit 2 4KV switchgear 23-1 and 24-1 on the Unit 2 reactor building mezzanine floor.

Unit 3 switchgear 38 and 39, 250V DC MCC's 3A and 3B, and reactor building 125V DC distribution panel located on reactor building main floor, are provided with pedestals and adequate drains. Unit 2 switchgear 28 and 29, 250V DC MCC's 2A and 2B, and reactor building 125V DC distribution panel are similarly protected. Safe shutdown can be achieved independent of this equipment by the normal steam and feedwater system, LPCI system with ADS, or the Isolation condenser.

Neither drains or equipment pedestals are provided for turbine building 4KV switchgear 23, 24, 33 and 34. However safe shutdown can be achieved independent of these switchgear because the emergency diesel generators are available as an alternate feed to switchgear 33-1, 34-1, 23-1 and 24-1. A low flow hose and nozzle will be available in the area of switchgear 23 and 24,because of the high concentration of cables in this area.

The battery chargers, 250V MCC, a 125V DC distribution panel, and 48/24V DC switchgear 3A and 3B in the safety related panel area (fire area 6.1) are mounter on equipment pedestals. A plate is provided above the battery chargers which would protect the chargers from water impingement from above.

Water Damage From Manual Hoses

There are several locations in the plant where manual fire fighting may be required and where water used to fight a fire in one safety division may cuase damage in a second safety division equipment because of the physical proximity of one division to the others. In order to minimize the possibility of water damage as described above. The openings in the tops of the following switchgear and MCC will be plugged.

1. Reactor Building

MCC's	28	38
	28-7	39-7
	29	39

REFERENCES:

Information Relevant to Fire Protection Systems and Programs Part 3, Dresden Nuclear Power Station Units 2 and 3, Commonwealth Edison Company, April 1977.

Clarification of Position P.F. 15

In our answer to position P.F. 15 Section 2 Item C we wish to clarify the sprinkler system planned for the area bounded by Columns D-E and 33-36 (Elev. 517). The sprinkler system planned for this area will cover the service air compreesor only and will not cover any cable trays in this area. This sprinkler system is being provided to protect against the air compressor which is the external hazard.