JUN 19 1978

Docket No.: 50-346

MEMORANDUM FOR: J. F. Stolz, Chief, Light Water Reactors Branch No. 1, Division of Project Management

FROM: V. Benaroya, Chief, Auxiliary Systems Branch, Division of Systems Safety

SUBJECT: FIRE PROTECTION QUESTIONS FOR ~~ZIMMER~~ Davis-Besse

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| Plant Name: | Davis-Besse, Unit No. 1 |
| Licensing Stage: | OL |
| Docket Number: | 50-346 |
| Milestone Number: | N/A |
| Responsible Branch: | LWR No. 1 |
| Project Manager: | L. Engle |
| Requested Completion Date: | June 15, 1978 |
| Review Status: | Awaiting Information |

The Toledo Edison Company has submitted for our review the Davis-Besse, Unit No. 1 Fire Protection Evaluation Report. This report contains both their fire hazards analysis and their response to Appendix A to Branch Technical Position 9.5-1 (BTP 9.5-1).

We have reviewed the above documents using the guidelines of Appendix A to BTP 9.5-1. In addition, the DSS Fire Protection Review Team visited the Davis-Besse Plant on May 23-25, 1978.

Davis-Besse has not submitted sufficient information for us to complete our review. Enclosed is a request for additional information and statements of our positions pertaining to plant fire protection.

The licensee should notify us as soon as possible on those positions that he plans to implement. Where the licensee provides a commitment for modifications, a description of the modifications required to implement the positions, and a schedule for implementations should be provided.

DISTRIBUTION:
DOCKET FILE 50-346
NRR READING
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VBENAROYA
Enclosure:
As stated

for P.R. Matthews Thomas
Victor Benaroya, Chief
Auxiliary Systems Branch
Division of Systems Safety

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FIRE P[illegible]TECTION QUESTIONS
AUXIL[illegible]RY SYSTEMS BRANCH
DAVIS BESSE NUCLEAR POWER STATION, UNIT NO. 1

1. Table 4-1, Item C4[illegible], General Guidlines

The Auxiliary Transformers and buss tie transformers are located within 50 ft. of the north wall of the auxiliary building. A total of five openings in the wall adjacent to the transformers were noted during our site visit. These openings are in direct communication with the switchgear room and the battery room, which are needed for safe shutdown of the plant. It is our position that 3 hr. fire door dampers be provided for these openings.

2. Table 4-1, Item C4a(10), General Guidelines

For the following listed items substantiate their fire resistance capabilities as they pertain to safety-related areas or high hazard areas by verifying that their construction will be in accordance with a particular fire tested design. Identify the design, test method, and acceptance criteria.

a. Rated wall assemblies. Provide any test results as well as fire tested assemblies that were used in the design of rated barriers. Also include the results of the spray or fire proofing used to provide fire resistance on the structural members throughout the plant.

b. Fire dampers and fire doors, including the installation of the same in ventilating ducts penetrating fire barriers of safety related areas, fire door dampers are required in all 3 hr. rated penetrations. Verify that the installation of all fire door dampers conforms to UL555, especially ventilation grills that terminate on one side of fire barriers.

c. Fire barrier penetration seals around ducts, pipes, cables, cable trays, and conduit or any other penetrations. Demonstrate that in case of horizontal trays support failure, the resultant unsupported load and torque on the penetration seal will not affect the integrity of the seal, otherwise provide 3 hr. fire resistance coating for these supports.

3. It is our position that the 18 in. x 12 in. supply grill at elevation 623, Room 501 to Room 603 electrical penetration room, elevation 603 be supplied with a 3 hr. horizontal type fire door.

4. Verify the type of protection to be provided for the blowout panels between rooms 235 and 124 at elevation 565 ft., auxiliary building.

5. It is our understanding that modifications to the existing fire alarm system are being made. Describe in detail the modifications being

made, including a description of the detector system circuitry (from the detectors to the main control room fire alarm panel). Include in the description a single line drawing from the detection circuits, waterflow alarms, through the sub-panels and into the control room. The drawing should show how primary and secondary power is maintained on the system. Verify that all equipment connected to the fire alarm system is electrically supervised.

6. During the site visit to Davis-Besse 1, we were informed that only seal wire would be used for all non-electrically supervised sectional, divisional, and control valves, rather than locking the valves open with strict key control. This is not acceptable; therefore, revise your design to meet the guidelines of Appendix A to BTP 9.5-1.

7. Table 4-1, Item 4e(1), Lighting and Communication

You state that the emergency lightup has a 2-hour battery supply which is through a conduit instead of individual battery supply. This is unacceptable. It is our position that fixed selfcontained lighting consisting of flourescent or sealed-beam units with individual 8-hour-minimum battery power supplies should be provided in areas that must be manned for safe shutdown and for access and egress routes to and from all fire areas. Safe shutdown areas include those required to be manned if the ocntrol room must be evacuated. Confirm that you will comply with this position.

8. Table 4-1, Item 5c, Water Sprinkler and Hose Standpipe System

You indicate that the sprinkler system for both the emergency diesel generator rooms are connected to a common header. Provide information

to demonstrate that a through-wall leakage crack in the 10" common header will not affect the sprinkler system for both diesel generator rooms. ; Also provide additional hose stations in the area to properly protect all areas in the vicinity of each emergency diesel generator including its associated day tank.

9. Table 4-1, Item 6a, Primary and Secondary Containment

During our site visit, we observed that the reactor coolant pump oil collection system was inadequate to contain the pressurized oil. Revise your system design and provide drawings to indicate that the pressurized oil can be contained completely.

10. Table 4-1, Item 6a, Primary and Secondary Containment

It is our position that adequate self-contained breathing apparatus be provided near the containment entrances for firefighting and damage control personnel. These units should be independent of any breathing apparatus provided for general plant activities.

11. Table 4-1, Item 6b, Control Room Complex

a. It is our position that you provide portable extinguishers for protection against a Class A deep-seated fire for the control room complex. Extinguishers should be spaced and installed according to NFPA 10.

b. Verify that the suspended control room ceiling has been tested in accordance with Standards Method of Fire Tests of Building Construction and Materials (NFPA No. 251) and which has obtained a fire resistance rating of not less than 1 hr., since the present ceiling is being used as a return air plenum from the control room.

12. Table 4-1, Item 6c, Cable Spreading Room

The present arrangement of the conduit and cable trays in the cable spreading room make manual fire fighting difficult as entrance cannot be gained into the major area of the room. Both divisions are contained within the room and there is presently no fire suppression system installed. Hose stations and protable fire extinguishers are located near the entrances to this room.

Taking these factors into account and providing a defense-in-depth protection for this room, it is our position that an automatic spray fog system be provided at the ceiling level. Provide preliminary drawings of such a system showing piping and spray head locations.

In addition, we will require the licensee to establish emergency remote shutdown capability and procedures for Davis-Besse, Unit No. 1, to achieve cold shutdown in the event of a cable spreading room fire or a control room cabinet fire, which disables redundant cable division of systems necessary for safe shutdown, assuming a turbine generator trip. Use of non-safety related systems may be considered for this purpose. Confirm that you will meet the above positions.

13. Throughout your fire hazards analysis you take credit for alternative means of achieving cold shutdown if both redundant pieces of safety related equipment are lost due to a fire. Verify that where such credit is taken that written procedures have been established for immediate use by appropriate individuals and that cold shutdown can be achieved

within 72 hours.

14. Table 4-1, Item 6i, Diesel Generator Areas

Provide sufficient information to demonstrate that an oil spillage in the diesel fuel oil day tank room will not spread to either diesel generator rooms or any other safety related areas by means such as interconnecting drains.

15. Table 4-1, Item 6n, Related Safety Pumps

All three servive water pumps and two cooling tower makeup pumps are located in one room of the intake structure. It is our position that a noncombustible 1/2-hour rated barrier separate each service water pump and motor from its redundant train (two barriers required). The barriers should be extended from floor to ceiling. Also provide a preaction sprinkler system to cover the entire room, except the MCC, with alarm and annunciation in the control room. Any redundant cabling or conduit from one train within the barrier of the other should be totally enclosed in Kaowool or other suitable material to give at least a half hour fire rating.

All openings in the wall separating this room from the diesel fire pump room should be sealed with a material to achieve a 3 hr. fire rating. Also provide a curb around the entrance to the SW pump area on the fire pump side to prohibit a liquid from running under the door separating the two rooms.

It is also our position that you provide a 1-1/2 in. hose station in the immediate area of the SW pump room within the intake structure to cover all portions of any area containing safety related equipment.

16. Item 5.A.3.2, Fire Zone A-13, ECCS Pump Room 115, Auxiliary Building

It is our position that an approved 3 hr rated rolling type fire door which can be actuated by fire alarms from either sides of the room, be provided at the south west corner of ECCS pump room 115, fire area A-13, elevation 545 to prevent direct communication with its redundant train.

17. Item 5.A.3.5, Fire Zone A-3, Clean Waste Receiver Tank Room 124, Auxiliary Building

At present, both cable trains in fire area A-3, clean waste receiver tank room 124, elevation 545, are separated from each other by 30 ft. and are approximately 31 ft. above the floor of this room. One of the redundant trains contains cables for the component cooling water pumps, diesel generator, and 4.16 KV feeder breakers of the substation. It is our position that the trays of each train be protected from an exposure fire on the floor by a 1/2 hour fire rated barrier. In addition, provide automatic sprinkler system to cover the area between the cable divisions.

18. It is our position that you provide 1-1/2 in. fire hose (each station should be equipped with a maximum of 100 ft. of rubber lined hose and suitable nozzle) stations at the following locations:

a. Entrances to the annulus in No. 2 mechanical penetration room 236 and No. 1 mechanical penetration room 208 on elevation 565'.

b. No. 4 mechanical penetration room 314 and No. 3 mechanical penetration room 303, elevation 585 ft.

c. Fire zone 0-24, No. 2 main steam line area, Room 602 and Fire Zone 0-25, No. 1 main steam line area, Room 601.

19. Item 4.0.4, Fire Propagation Control

Verify that the structural steel in the mechanical and electrical penetration rooms on all elevations of the auxiliary building will be protected with a 3 hr. fire rated sprayed-on-type fire proofing as stated in your fire hazards analysis.

20. Item 5.0.4, Fire Propagation Control

Throughout your analysis credit is taken for the proposed water curtain instead of a blank 3 hr. fire wall. Provide a description of such a water curtain including preliminary drawings and activation, as well as the criteria used in the design.

21. Item 5.0.5, Fire Detection

It is our position that due to the communication of the various electrical and mechanical penetration rooms on the various elevations that smoke detectors be installed on a maximum of 250 $ft.^2$ of ceiling

area per detector. Verify that such spacing per detector is being met.

22. Item 5.0.3.11 Fire Zone D-17, No. 3 Mechanical Penetration Room 303, Auxiliary Building

Power and control cabling trays for the four seal isolation valves are contained in the No. 3 mechanical penetration room 303, elevation 585 ft. It is our position that these valves should be protected against an exposure fire for at least 1/2 hour to prevent damage to the RCP seals for lacking of sealing water.

23. Verify the type of automatic suppression system proposed to be installed for fire zone D-16.—Mechanical Penetration Room No. 4 room 314, elevation 585 ft. of the auxiliary building.

24. Item 4.E.3.1, Fire Zone E-1, Auxiliary Feed Pump Room 237, Auxiliary Building

It is our position that the opening in the ceiling of the auxiliary feed pump unit room 237, fire zone E-1, elevation 565 ft. be sealed with a suitable material. It is also our position that fire door dampers be provided for the ventilation openings of the auxiliary feed pump room 237 at the ceiling which communicates with the heater bay above. Also provide fire doors to the stairwell air intake between room 238 of the auxiliary feed pump room and the heater bay area.

25. Item 5.G.3.5, Fire Zone G-11, Passage 227, Auxiliary Building

It is our position that a suitable fire resistant barrier be provided between the proposed automatic sprinklers and the lowest conduit-cable trays for fire zone G-11, passage room 227, elevation 565 of the auxiliary building. Verify that sprinkler protection will be provided for area in front of, but not including, the MCC panels in this passageway.

26. Item 5.H.3.1, Fire Zone H-1, Makeup Pump Room 225, Auxiliary Building

It is our position that automatic sprinkler protection be provided for fire zone H-1, make-up pump room 225, auxiliary building, elevation 565 ft. for protection against an exposure fire involving both make-up pumps. Activation of the system should be alarmed and annunciated in the control room.

27. Item 5.H.3.2, Fire Zone H-2, Corridor 209, Auxiliary Building

a. It is our position that additional fire detectors be installed in Corridor 209, fire zone H-2, Auxiliary building, elevation 565' to enable early detection of a fire. At present there is only one detector for the entire length of the corridor.

b. It is our position that a 1/2 hour rated fire barrier (kaowool or equivalent be provided around the conduit for the decay heat system and the high-pressure injection system in corridor 209, fire zone H-2, elevation 565 ft. of the auxiliary building for protection against an exposure fire involving its redundant division in MCC EIIA.

27. Item 5.J.3.1, Fire Zone J-1, Diesel Generator Room 319, Auxiliary Building

It is our position that an additional hose station be provided (adjacent to diesel generator room 319 fire zone J-1, elevation 585 ft.) to enable sufficient coverage to be provided. At present the only hose available is in the charge room 321.).

28. Item 5.P.3.1, Fire Zone P-1, Passage 322, Auxiliary Building

It is our position that drainage be provided for fire zone P-1, passage room 322, elevation 585 ft. so that water will not run into adjacent safety related electrical rooms in the immediate area which also have no drainage. Credit is now taken for drainage into the heater bay area of the turbine building; however, an 8 in. curb separates this area from the passage.

It is also a position that a 1/2 hour fire rated barrier be provided around one of the cable trains (to protect the CCW valves conduit/ cable tray) to ensure both trains are not exposed to a single fire in the preceding area.

29. Item 5.T.3-1, Fire Zone T-1, Component Cooling Water Heat Exchanger and Pump Room 328, Auxiliary Building

It is our position that automatic sprinklers be provided in the area of the three component cooling water exchanger and pump room 328, fire zone T-1, elevation 585 ft. of the auxiliary building for

protection against an exposure fire. Also provide a noncombustible barrier of at least 1/2-hour rated from the floor to the ceiling to separte each pump from the other. Activation of the sprinkler system should alarm and annunciate in the control room.

It is also our position that the hydrogen line passing through this area be relocated to another location not containing safety related equipment. Varify that no piped hydrogen lines are located through or exposes any other safety related equipment or conduit cable. For any areas where such condition exists, these lines should be relocated to a safe distance away, or demonstrate that the hydrogen can be safely vented.

30. Item 5.U.3.I, Fire Zone U-I, Passage and Hatch Area 310 and 313, Auxiliary Building

Fire Zone U-I passage room 310, auxiliary building, elevation 587 contains power and instrument cables/conduit from both divisions. It is our position in addition to the proposed automatic sprinkler system for this area that safety related conduit/cable of both divisions be provided with a suitable fire rated barrier of at least a half hour. It is also our position that all storage in the area be relocated to another location.

It is also our position that due to the hydrazine tank storage being located adjacent to the above that the proposed automatic sprinkler system for passage 310 be extended to cover hatch area room 313 at the same elevation.

31. Item 5.V.3.I, Fire Zone V-I, Fuel Handling Area 300, Auxiliary Building

It is our position that a fire detection system which alarms and annunciates

in the control room be installed in the northwest corner area of fire zone V-1, fuel handling area room 300, elevation 585 ft. of the auxiliary building due to the storage of combustible material prior to it being sealed in 55 gal. drums and placed in the drumming area.

32. Item 5.V.3.2, Fire Zone V-6, Corridor 304, Auxiliary Building

It is our position that a suitable fire barrier such as Kaowool and good for 1/2-hour fire rating be provided for those conduits of both trains necessary to achieve cold shutdown in fire zone V-6, corridor room 304, auxiliary building, elevation 585 ft.

33. It is our position that the combustible storage located in both battery room A and B, rooms 428A, 429B, elevation 603 ft., auxiliary building be removed to another location not exposing safety related equipment.

34. It was noted that 2 conduits from the opposite train were routed in room 429, fire zone V-1, low voltage switchgear room E Bus, elevation 603 ft. of the auxiliary building. Identify the functions of these conduits and verify the ability of the plant to achieve cold shutdown should a fire in the room damage both cable trains.

35. It is our position that all peripheral rooms within the control room complex be separated from the control room by at least 1 hr. fire resistant construction. Some of the doors to these rooms where

hollow metal steel type construction with no fire rating.

36. It is our position that the numerous curtain type fire doors that are bolted together to protect the opening in the 3 hr. fire wall separating the turbine area from the supply air and exhaust equipment room 516 fire zone EE-1, elevation 623 ft. are not an acceptable arrangement. Describe what additional measures will be taken to provide acceptable protection to properly protect the openings.

37. It is our position that the four horizontal cable trays penetrating the 3 hr. fire wall on elevation 602 ft. at column line 9-F be supported as in the fire test. As an alternate modify the supports to provide 3 hour protection as the present trays are supported only by two bare steel rods.

38. State whether the collapse of the turbine building roof due to a fire would effect the integrity of safe shutdown or associated equipment in the area or adjacent to the turbine building. Demonstrate that safe shutdown can be accomplished in the event of the turbine building roof collapse.

39. Throughout your fire hazards analysis reference is made to the fact that a horizontal curtain type fire door is installed in vertical duct penetrations. Supply information such as the model number, manufacturer, fire rating, and testing laboratory of such a fire door/damper to verify that they are approved for such installation and meets 3 hour fire rating.

40. During our site visit we were informed that Davis-Besse Unit 1 would only provide a 3 man fire brigade rather than a 5 man brigade. We have reviewed the information contained in your letter dated April 11, 1978, and concluded that the minimum size of the fire brigade shift should be five persons unless a specific site evaluation has been completed and some other number justified. See Enclosure 1 for discussion of staff manpower requirement.

41. General Design Criterion 19 requires that control room be provided to control operation of the reactor during normal conditions and to maintain it in a safe condition under accident conditions. The criterion also requires remote capability (outside of the control room) for prompt hot shutdown and the potential capability for subsequent cold shutdown of the reactor.

From our site visit it was not clear how the Davis Besse design satisfies GDC 19 in the event of fire. Therefore, we require that complete descriptions for safely shutting down the reactor be provided as follows:

A. 1. Safely shutting down the reactor from the main control room when fire disables any safe shutdown equipment controlled from remote locations.

2. Safely shutting down the reactor from remote locations when the main control room is uninhabitable and when fire disables safe shutdown equipment controlled from the main control room or the cable spreading room.

B. These descriptions should include:

1. A list of all instrumentation and controls required by and will be available to the operator safely shutdown the plant from the main control room.

2. A list of all instrumentation, controls and communications equipment required by and available to the operators to safely shutdown the plant from locations that are remote from the control room. Also identify the location of each instrument, each control components and the communications equipment available to the operators for remote safe shutdown of the plant.

3. The design provisions made to preclude a fire at any location from preventing safe shutdown of the plant.

4. Procedures to achieve hot shutdown and also to achieve cold shutdown for each case of item A above.

ENCLOSURE 1

# MANPOWER REQUIREMENTS FOR OPERATING REACTORS

The NRC has established requirements for personnel at operating reactors for purposes of plant operation, industrial security, and fire fighting. The following discussion considers the extent to which plant personnel assigned to either plant operation or security may also be temporarily allowed to man a fire brigade in the event of a fire for a single unit facility and sets forth an acceptable sharing scheme for operating reactors.

## Summary of Manpower Requirements

1. Fire Brigade: The staff has concluded that the minimum size of the fire brigade shift should be five persons unless a specific site evaluation has been completed and some other number justified. The five-man team would consist of one leader and four fire fighters and would be expected to provide defense against the fire for an initial 30-minute period. See Attachment A for the basis for the need for a five-man fire brigade.

2. Plant Operation: Standard Review Plan Section 13.1.2 requires that for a station having one licensed unit, each shift crew should have at least three persons at all times, plus two additional persons when the unit is operating.

3. Plant Security: The requirements for a guard force are outlined in 10 CFR Part 73.55. In the course of the staff's review of proposed security plans, a required minimum security response force will be established for each specific site. In addition to the response team, two additional members of the security force will be required to continuously man the Central Alarm Station (CAS) and Secondary Alarm Station (SAS). It is expected that many facilities will have a security organization with greater numbers of personnel than the minimum number assumed for purposes of discussion in this paper.

The NRC staff has given consideration to the appropriateness of permitting a limited degree of sharing to satisfy the requirements of plant operation, security and fire protection and has concluded that, (1) subject to certain site and plant specific conditions, the fire brigade staffing could generally be provided through operations and security personnel, and (2) the requirements for operators and the security force should remain uncompromised. Until a site specific review is completed, the following indicates the interim distribution and justification for these dual assignments, and therefore our interim minimum requirements for a typical presently operating commercial single unit facility. The staff believes that manpower for the fire brigade for multi-unit facilities is not now a problem because of the larger numbers of people generally present at the sites. Situations which do pose problems will be reviewed on a case-by-case basis.

1. Plant Operation: The staff has concluded that for most events at a single unit nuclear facility, a minimum of three operators should be available to place the reactor in a safe condition. The two additional operators required to be available at the nuclear facility are generally required to be present to perform routine jobs which can be interrupted to accomodate unusual situations that may arise. That is, there is the potential for the remaining two members of the operating crew to assume other short-term duties such as fire fighting. In light of the original rationale for providing extra plant operators to cope with off-normal conditions, it appears justified to rely on these personnel for this function. The staff recommends that one of the two operators assigned to the fire brigade should be designated as leader of the fire brigade in view of his background in plant operations and overall familiarity with the plant. In this regard, the shift supervisor should not be the fire brigade leader because his presence is necessary elsewhere if fires occur in certain critical areas of the plant.

2. Plant Security: In the event of a fire, a contingency plan and procedures will be used in deploying the security organization to assure that an appropriate level of physical protection is maintained during the event. The staff has determined that it is possible in the planning for site response to a fire, to assign a maximum of three members of the security organization to serve on the fire brigade and still provide an acceptable level of physical protection. While certain security posts must be manned continuously (e.g., CAS, SAS), the personnel in other assignments, including the response force, could be temporarily (i.e., 30 minutes) assigned to the fire brigade. In judging the merits of this allowance the underlying question is whether the minimum security force strength must be maintained continuously in the event of a plant emergency such as a fire. Further examination of this issue leads to two potential rationales for reaching an affirmative decision. First, could there be a causal connection between a fire and the security threat? Second, are there compelling policy reasons to postulate a simultaneous threat and fire?

The first potential rationale would only be credible if, (1) the insider (posed as part of the threat definition) was an active participant in an assault and started a fire coincident with the attack on the plant or, (2) a diversionary fire was started by an attack force somewhere external to the plant itself where no equipment required for safe shutdown is located. The role of the insider will be discussed first. While 73.55 assigns an active status to the insider, the rule also requires that measures be implemented to contain his activities and thereby reduce his

effectiveness. At present, these measures include background checks on plant employees, limited access to vital plant areas, badging systems and the two-man rule. Here, limited access means that only designated employees are allowed in vital areas and that their entry is controlled by either conventional locks or card-key systems. Also, if separate trains of safety equipment are involved, then either compartmentalization or the two-man rule is required. These measures to contain the insider are presently being implemented and will provide assurance that people of questionable reliability would not be able to gain employee status at a nuclear plant and should they become an employee with unescorted access, significant restraints would be interposed on the ability of such a person to carry out extensive damage to plant vital areas. Recognizing that additional safeguards may still be appropriate, the staff has recommended to the Commission that plant personnel also be required to obtain an NRC security clearance. The staff believes that the attendant background investigation associated with a clearance, in conjunction with the other 73.55 measures, will provide a high degree of assurance that plant personnel will not attempt to take an active sabotage role. If the clearance rule is adopted the staff believes some of the measures, such as the two-man rule, designed to contain the insider can be relaxed. Thus, there does not now appear to be a reasonably credible causative relationship between a fire intentionally set by an insider and the postulated external security threat. For the case of diversionary fires set external to the plant itself, adequate security forces can still be maintained by allowing only part of the fire brigade to respond while both fire fighters and security force armed responders maintain a high degree of alertness for a possible real attack somewhere else on the plant. Thus, the effective number of armed responders required by 73.55 can be maintained for external diversionary fires.

The second potential rationale concerns whether a serious, spontaneous fire should be postulated coincident with an external security threat as a design basis. In evaluating such a requirement it is useful to consider the likelihood of occurrence of this combination of events. While it is difficult to quantify the probability of the 73.55 threat, it is generally accepted that it is small, comparable probably to other design basis type events. The probability of a fire which is spontaneous and located in or in close proximity to a vital area of the plant and is serious enough to pose a significant safety concern is also small. It would appear, therefore, that the random coincidence of these two unlikely events would be sufficiently small to not

require protection against their simultaneous occurrence. In addition, it should be noted that the short time period (30 minutes) for which several members of the security force would be dedicated to the fire brigade would further reduce the likelihood of coincident

As neither of the two potential rationales appear to preclude the use of members of the security force in the event of a fire, the staff has concluded that the short assignment of security personnel from the armed response force or other available security personnel to the fire brigade under these conditions would be acceptable.

To ensure a timely and effective response to a fire, while still preserving a flexible security response, the staff believes that the fire brigade should operate in the following manner. In the event of an internal fire, all five members of the fire brigade should be dispatched to the scene of the fire to assess the nature and seriousness of the fire. Simultaneously, the plant security force should be actively evaluating the possibility of any security threat to the plant and taking any actions which are necessary to counter that threat. For external fires, a lesser number than the five-man brigade should respond for assessment and fire fighting. As the overall plant situation becomes apparent it would be expected that the most effective distribution of manpower between plant operations, security and fire protection would be made, allowing a balanced utilization of manpower resources until offsite assistance becomes available. The manpower pool provided by the plant operating personnel and security force are adequate to respond to the occurrence of a design basis fire or a security threat equivalent to the 73.55 performance requirements. It is also recognized that other, more likely combinations of postulated fires and security threats of a lesser magnitude than the design basis, could be considered. While the probabilities of these higher likelihood events may be sufficient to warrant protecting against them in combination, the manpower requirements required to cope with each event would be similarly reduced thereby allowing adequate coverage by plant personnel.

Conclusion

The staff believes that it would be reasonable to allow a limited amount of sharing of plant personnel in satisfying the requirements of plant operation, security, and fire protection. An acceptable sharing scheme would entail reliance on two plant operators and three members of the security organization to constitute the fire brigade. Since availability of the full fire brigade would only

be required for fires with potential for serious damage, actual distribution of plant personnel during a plant emergency would be governed by the exigencies of the situation. Of course, all personn assigned to the fire brigade would have to fulfill all applicable training requirements. It should also be recognized that the diversion of personnel to the fire brigade would be of short duratio and that substantial additional offsite assistance would be forthcom in accordance with the emergency and contingency plan developed for each facility. In evaluating licensee proposals for manpower sharing due consideration will also have to be made of unique facility characteristics, such as terrain and plant lay-out, as well as the overall strengths of the licensee's fire and security plans. Minimum protection levels in either area could preclude the sharing of manpower.

ATTACHMENT A

## Staff Position

## Minimum Fire Brigade Shift Size

### INTRODUCTION

Nuclear power plants depend on the response of an onsite fire brigade for defense against the effects of fire on plant safe shutdown capabilities. In some areas, actions by the fire brigade are the only means of fire suppression. In other areas, that are protected by correctly designed automatic detection and suppression systems, manual fire fighting efforts are used to extinguish: (1) fires too small to actuate the automatic system; (2) well developed fires if the automatic system fails to function; and (3) fires that are not completely controlled by the automatic system. Thus, an adequate fire brigade is essential to fulfill the defense in depth requirements which protect safe shutdown systems from the effects of fires and their related combustion by-products.

### DISCUSSION

There are a number of factors that should be considered in establishing the minimum fire brigade shift size. They include:

1) plant geometry and size;
2) quantity and quality of detection and suppression systems;
3) fire fighting strategies for postulated fires;
4) fire brigade training;
5) fire brigade equipment; and
6) fire brigade supplements by plant personnel and local fire department(s).

In all plants, the majority of postulated fires are in enclosed window-less structures. In such areas, the working environment of the brigade created by the heat and smoke buildup within the enclosure, will require the use of self-contained breathing apparatus, smoke ventilation equipment, and a personnel replacement capability.

Certain functions must be performed for all fires, i.e., command brigade actions, inform plant management, fire suppression, ventilation control, provide extra equipment, and account for possible injuries. Until a site specific review can be completed, an interim minimum fire brigade size of five persons has been established. This brigade size should provide a minimum working number of personnel to deal with those postulated fires in a typical presently operating commercial nuclear power station.

If the brigade is composed of a smaller number of personnel, the fire attack may be stopped whenever new equipment is needed or a person is injured or fatigued. We note that in the career fire service, the minimum engine company manning considered to be effective for an initial attack on a fire is also five, including one officer and four team members.

It is assumed for the purposes of this position that brigade training and equipment is adequate and that a backup capability of trained individuals exist whether through plant personnel call back or from the local fire department.

POSITION

1. The minimum fire brigade shift size should be justified by an analysis of the plant specific factors stated above for the plant, after modifications are complete.

2. In the interim, the minimum fire brigade shift size shall be five persons. These persons shall be fully qualified to perform their assigned responsibility, and shall include:

   One Supervisor - This individual must have fire tactics training. He will assume all command responsibilities for fighting the fire. During plant emergencies, the brigade supervisor should not have other responsibilities that would detract from his full attention being devoted to the fire. This supervisor should not be actively engaged in the fighting of the fire. His total function should be to survey the fire area, command the brigade, and keep the upper levels of plant management informed.

   Two Hose Men - A 1.5 inch fire hose being handled within a smoke-less enclosure would require two trained individuals. The two team members are required to physically handle the active hose line and to protect each other while in the adverse environment of the fire.

   Two Additional Team Members - One of these individuals would be required to supply filled air cylinders to the fire fighting members of the brigade and the second to establish smoke ventilation and aid in filling the air cylinder. These two individuals would also act as the first backup to the engaged team.