

January, 1987

Docket No. 50-286

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Power Authority of the State  
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Dear Mr. Brons:

By letters dated August 16, 1984, March 15, June 14 and September 19, 1985, and September 10, and October 31, 1986, you requested a total of seven exemptions from the technical requirements of Sections III.G. and III.J. of Appendix R to 10 CFR 50 based on a reanalysis of your fire protection program.

The enclosed Exemption grants your request and concludes that an exemption is not necessary for the Turbine Building. Our Safety Evaluation is enclosed with the Exemption.

Sincerely,

Steven A. Varga, Director  
Project Directorate #3  
Division of PWR Licensing-A

Enclosures:  
As stated

cc: See next page

\* SEE PREVIOUS CONCURRENCE

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*see concurrence on exemption 12/15/86*

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Indian Point 3

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requirements for a particular aspect of fire protection features at a nuclear power plant. Two of the fifteen subsections, III.G and III.J, are the subjects of this exemption request.

By letter dated August 16, 1984, as supplemented September 10, 1986, the licensee submitted the results of a re-evaluation of Indian Point 3 to the technical requirements of Section III.G, and III.L. Four new exemptions to Section III.G were requested. By letter dated June 14, 1985, the licensee also requested an exemption from the requirements of Section III.J. Additional information was provided by letters dated March 15 and September 19, 1985. In the September 19, 1985 letter, the licensee requested approval for 2 additional exemptions to Section III.G. Exemptions for the following areas were requested.

1. Primary Auxiliary Building
2. Cable Tunnel
3. Auxiliary Feedwater Pump Room
4. 8-hour battery powered emergency lighting in the yard area
5. Yard Area-Service Water Pumps
6. Turbine Building

The exemption requested for the Turbine Building was determined by the staff to be not necessary. Therefore, only exemptions for the first five areas are summarized herein. Details of these exemptions are discussed in the Safety Evaluation enclosed with this Exemption.

1. Primary Auxiliary Building (Fire Area PAR-2)

The exemption was requested from Section III.G.2(b) of Appendix R to 10 CFR 50 to the extent that redundant shutdown systems be separated by 20 feet, free of intervening combustibles, and protected by an automatic sprinkler

system. An exemption was also requested from the requirements of Section III.G.3 to the extent that it requires a fixed fire protection system in an area for which an alternate shutdown capability has been provided.

2. Electric Cable Tunnels (Fire Area ETN-4)

The exemption was requested from Section III.G.2 of Appendix R to 10 CFR 50 to the extent that it requires that redundant shutdown systems be separated by more than 20 feet, free of intervening combustibles or fire hazards and to the extent that it requires that redundant systems be separated by a 1-hour fire barrier in an area which is protected by automatic fire detection and suppression systems.

3. Auxiliary Boiler Feedwater Pump Room (Fire Area AFW-6)

The exemption was requested from Section III.G.2.(b) of Appendix R to 10 CFR 50 to the extent that it requires that redundant shutdown systems be separated by more than 20 feet, free of intervening combustible materials.

4. Emergency Lighting

An exemption was requested from Section III.J of Appendix R to 10 CFR 50 to the extent that it requires that all areas needed for operation of safe shutdown equipment and in access and egress routes thereto be provided with 8-hour battery powered emergency lighting units.

5. Yard Area - Service Water Pumps

The exemption was requested from Section III.G.2.b of Appendix R to the extent it requires that redundant shutdown systems be protected by automatic fire detection and suppression systems.

Based on our evaluation, we conclude that the level of fire safety in the areas listed is equivalent to that achieved by compliance with the technical requirements of Appendix R and, therefore, the licensee's request for exemption in these areas should be granted.

By letter dated October 31, 1986, the licensee provided information relevant to the "special circumstances" finding required by revised 10 CFR 50.12(a) (see 50 FR 50764). The licensee stated that existing and proposed fire protection features at Indian Point 3 accomplish the underlying purpose of the rule. Implementing additional modifications to provide additional suppression systems, detection systems, and fire barriers would require the expenditure of engineering and construction resources as well as the associated capital costs which would represent an unwarranted burden on the licensee. The licensee stated that the costs to be incurred would be as follows:

1. Engineering and installation of fire barriers to:
  - Isolate the common stairway enclosure between the Upper and Lower Electrical Cable Tunnels,
  - Wrap exposed cable insulation considered intervening combustibles between Auxiliary Feedwater Pumps (AFW),
  - Separate redundant Residual Heat Removal Pumps (RHR) and Charging Pumps in lieu of the existing configuration consisting of full or partial height and width concrete barriers in the Primary Auxiliary Building, and
  - Separate redundant Component Cooling (CCW) Pumps with a fully rated barrier in lieu of the installed radiant energy shield.
2. Engineering and installation of additional piping, sprinkler heads, and supporting structures to provide:
  - Full area automatic suppression on the 15 ft, 41 ft and 55 ft elevations of the Primary Auxiliary Building,

- Fixed automatic suppression where alternate shutdown capability has been provided for motor control centers for Charging Pumps, CCW and Diesel Ventilation systems,
  - Detection and automatic suppression for Atmospheric Steam Dump Valves in the Turbine Building, and
  - Detection and automatic suppression for Service Water Pumps and Backup Service Water Pumps in the Yard Area.
3. Installation and maintenance of eight hour battery powered lighting for the access route through the yard to the Appendix R diesel which is currently provided by yard security lighting.
  4. Significant rerouting of power, control and instrumentation cabling along with associated conduits, ducts and supports for:
    - Atmospheric Relief Valves, Charging Pumps, CCW, AFW and RHR Pumps in Electrical Cable Tunnels, and
    - RHR, Charging and CCW Pumps in the Primary Auxiliary Building.
  5. Increased surveillance on new or extended fire suppression and fire detection systems.
  6. Evaluation of and possible need to provide additional fire main capacity if the fire main system is modified.
  7. Consideration of the increased congestion that will result from additional modifications in numerous plant locations which will complicate future plant modifications/operations.

The licensee stated that these costs are significantly in excess of those required to meet the underlying purpose of the rule. The staff concludes that "special circumstances" exist for the licensee's requested exemptions in that



application of the regulation in these particular circumstances is not necessary to achieve the underlying purposes of Appendix R to 10 CFR Part 50. See 10 CFR 50.12(a)(2)(ii).

III.

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12(a), (1) these exemptions as described in Section II are authorized by law and will not present an undue risk to the public health and safety, and are consistent with the common defense and security and (2) special circumstances are present for the exemptions in that application of the regulation in these particular circumstances is not necessary to achieve the underlying purposes of Appendix R to 10 CFR Part 50. Therefore, the Commission hereby grants exemptions from the requirements of Section III.G and III.J of Appendix R to 10 CFR Part 50.

A copy of the Safety Evaluation dated January 7, 1987, related to this action is available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, DC 20555, and at the Local Public Document Room, White Plains Public Library, 100 Martine Avenue, White Plains, New York 10610.

Pursuant to 10 CFR 51.32, the Commission has determined that the issuance of the Exemption will have no significant impact on the environment (51 FR 45824).

This exemption is effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION  
Original signed by:  
Thomas M. Novak, Acting Director  
Division of PWR Licensing-A  
Office of Nuclear Reactor Regulation

Dated at Bethesda, Maryland  
this 7th day of January, 1987.

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EX-47

SAFETY EVALUATION OF INDIAN POINT UNIT 3  
EXEMPTION REQUESTS

1.0 Introduction

By letters dated July 1 and November 22, 1982, the licensee submitted an evaluation of Indian Point 3 to the technical requirements of Section III.G of Appendix R. Along with this evaluation, 26 exemptions from these requirements were requested. We recommended that 8 exemptions be granted, 16 be denied and concluded that two exemptions were not necessary.

By letter dated August 16, 1984 as supplemented September 10, 1986, the licensee submitted the results of a re-evaluation of the plant to the technical requirements of Sections III.G and III.L. Four new exemptions were requested. By letter dated June 14, 1985, the licensee requested an exemption from Section III.J. Additional information in support of these exemptions was provided by letters dated March 15 and September 19, 1985.

Section III.G.2 of Appendix R requires that one train of cables and equipment necessary to achieve and maintain safe shutdown be maintained free of fire damage by one of the following means:

- (1) 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;
- (2) 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 combustibles or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area; or

- (3) 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.

If these conditions are not met, Section III.G.3 requires an alternative shutdown capability independent of the fire area of concern. It also requires a fixed fire suppression system to be installed in the fire area of concern if it contains a large concentration of cables or other combustibles. These alternative requirements are not deemed to be equivalent; however, they provide equivalent protection for those configurations in which they are accepted.

Because it is not possible to predict the specific conditions under which fires may occur and propagate, the design basis protective features are specified in the rule rather than the design basis fire. Plant specific features may require protection different than the measures specified in Section III.G. In such a case, the licensee must demonstrate, by means of a detailed fire hazards analysis, that existing protection in conjunction with proposed modifications will provide a level of safety equivalent to the technical requirements of Section III.G of Appendix R.

In summary, Section III.G is related to fire protection features for ensuring that systems and associated circuits used to achieve and maintain safe shutdown are free of fire damage. Fire protection configurations must either meet the specific requirements of Section III.G or an alternative fire protection configuration must be justified by a fire hazard analysis.

Our general criteria for accepting an alternative fire protection configuration are the following:

- ° The alternative assures that one train of equipment necessary to achieve hot shutdown from either the control room or emergency control stations is free of fire damage.

- ° The alternative assures that fire damage to at least one train of equipment necessary to achieve cold shutdown is limited such that it can be repaired within a reasonable time (minor repairs with components stored on-site).
- ° Modifications required to meet Section III.G would not enhance fire protection safety above that provided by either existing or proposed alternatives.
- ° Modifications required to meet Section III.G would be detrimental to overall facility safety.

## 2.0 Primary Auxiliary Building (Fire Area PAB-2)

### 2.1 Exemption Requested

The licensee requested an exemption from Section III.G.2(b) of Appendix R to 10 CFR 50 to the extent that it requires that redundant shutdown systems be separated by 20 feet, free of intervening combustibles, and protected by an automatic sprinkler system. The licensee also requested an exemption from the requirements of Section III.G.3 to the extent that it requires a fixed fire protection system in an area for which an alternate shutdown capability has been provided.

### 2.2 Discussion

This fire area encompasses the Primary Auxiliary Building, the Fan House and the Radioactive Machine Shop. It is bounded by walls, floors and ceilings having a 1 to 3-hour fire resistance rating as delineated in Table 2-2 of the licensee's August 16, 1984 Appendix R Report. This area adjoins other plant locations which the licensee has designated as separate fire areas. Within the PAB, the licensee has identified three locations (Elevations 15 ft., 41 ft., and 55 ft.) where deviations from the technical requirements of Section III.G exist. In the remaining locations either no shutdown related systems are present or they are separated/protected per the requirements of Section III.G.

15 ft. Elevation - RHR Rooms

The 15 ft. elevation of the Primary Auxiliary Building is the lowest floor and is compartmentalized by full height barriers. The RHR pumps are located in two cubicles in the remote corner of the floor. The cubicles are partially enclosed by concrete barriers that extend from the floor to the ceiling and shield one RHR pump from the other.

The barriers have piping penetrations slightly above floor level. The horizontal separation between RHR pumps 31 and 32 is 15 ft. The power cable for RHR pump 32 is routed in conduit that runs west past the RHR pump 31 cubicle approximately 13 ft. 6 in. off the floor into a cable tray located outside the cubicles, into the common corridor, and then toward the upper electrical tunnel. The power cable for RHR pump 31 is in an open ladder tray that extends to where it penetrates the ceiling in embedded conduit toward the lower electrical tunnel. The closest separation points between redundant power cables is approximately 6 inches.

The fire load in this location is about 5,000 BTU/ft<sup>2</sup> with a corresponding fire severity of about 4 minutes.

Existing fire protection includes a fire detection system, manual hose stations and portable fire extinguishers.

The licensee justifies the exemption in this location on the ability to make repairs on any fire-damaged RHR-related cables within 72 hours. Also, the low fire loading, existing fire protection and the separation between the two RHR pumps is sufficient to provide reasonable assurance that at least one pump would remain free of fire damage.

41 ft. Elevation - CCW Pump Area

The north section of the elevation contains the three CCW pumps. The CCW pumps are each separated by 11 ft. centerline to centerline. Each of the two pumps is on a base that is 16 in. off the floor and has a normal power feed that

runs directly up and is embedded into the ceiling assembly. CCW pumps 31 and 33 have the normal power cables running into the upper electrical tunnel and CCW pump 32 normal power cable runs to the lower electrical tunnel. The alternative power feed for CCW pump 32 runs west outside the area and towards the lower electrical tunnel.

The fire load in this location is about 1,300 BTU/ft<sup>2</sup> with a corresponding fire severity of about 1 minute.

Existing fire protection includes a fire detection system; manual hose stations and portable extinguishers; a partial-height noncombustible barrier designed to protect CCW pump 33 against radiant heat from a fire; and a 1-hour fire-rated cable wrap around the normal power feed to CCW pump 33.

The licensee justifies the exemption in this location on the low fire loading and existing fire protection and physical separation between shutdown systems.

#### 55 ft. Elevation - Charging Pump Rooms

The three charging pumps are located in separate cubicles in this elevation. The boundaries of each cubicle are constructed of at least 2 ft. of reinforced concrete. These walls do not fully enclose the cubicles but have indirect open doorways between charging pumps 31 and 32 and open grating above the door of the cubicle for charging pump 33, for ventilation purposes. There are some piping, unrated dampers and electrical penetrations unsealed between the cubicles. The separation between the pump centerlines is 16 ft. 6 in. for pumps 31 and 32 and 12 ft. 6 in. for pumps 32 and 33.

The fire load in this location is about 25,000 BTU/ft<sup>2</sup> with an equivalent fire severity of about 19 minutes.

Existing fire protection consists of a fire detection systems as described in the September 19, 1985 letter, manual hose stations and portable fire extinguishers.

The licensee justifies this exemption on the low fire loading and the existing fire protection and physical separation between shutdown systems.

### 55 ft. Elevation - MCC Area

Three motor control centers are located on the northwest section of Fire Zone 17A at the 55 ft. elevation. These motor control centers allow for remote operation of motor-operated valves and support ventilation for the emergency diesel generator cells.

In the event of a fire and loss of these functions, the alternative diesel that is physically isolated from the PAB and Control Building can be utilized for safe shutdown. Manual operation of motor-operated valves may be necessary. Alternative power feeds to the charging and CCW pumps are physically separated from the MCC area.

The fire load in this location is about 12,700 BTU/ft<sup>2</sup> with a fire severity of 9 minutes.

Existing fire protection includes a fire detection system, manual hose stations and portable fire extinguishers.

The licensee justifies this exemption on the low fire loading, the existing fire protection and the ability to achieve safe shutdown if a fire damaged the shutdown-related systems in this location.

### 2.3 Evaluation

The technical requirements of Section III.G.2 are not met on elevations 15 feet and 41 feet of the PAB because an automatic suppression system has not been provided and redundant shutdown systems are not separated by more than 20 feet free of intervening combustibles. The requirements of Section III.G.2

are not met on elevation 55 feet because an automatic fire suppression system has not been provided to protect the charging pumps. The requirements of Section III.G.3 are not met on elevation 55 feet because a fixed fire suppression system has not been provided to protect the MCC area and some cables associated with the alternate shutdown capability are not independent of this fire area.

Our principal concern with the level of fire protection in these locations was that because of the absence of an automatic fixed fire suppression system, a fire of significant magnitude could develop and damage redundant shutdown related systems. However, the fire load in these locations is low. If a fire were to occur, we expect that it would develop slowly, with initially low heat release and slow room temperature rise. Because of the presence of the fire detection systems, the fire would be detected in its formative stages. The alarm from these detectors are annunciated in the control room. The fire brigade would then be dispatched and would extinguish the fire manually using hose lines or portable extinguishers.

The physical configuration of these locations is such that the smoke and hot gases from a fire would be channeled away from the vulnerable shutdown systems by the existing reinforced concrete walls and openings in floor/ceilings. The partial walls between components such as the RHR, CCW and charging pumps would also act as an effective shield against radiant heat from a fire.

With regard to the MCC area, an alternate shutdown capability exists, with components located in separate fire areas or at lower elevations of the PAB.

Because the effects of a postulated fire on elevation 55 feet would be directed horizontally and vertically, we do not expect any systems located below the 55 feet elevation to be damaged. Also, any operator actions that may be necessary to safely shut down the plant are also independent of this elevation or are not necessary until at least one hour after the fire occurred; by which time we expect the fire to have been extinguished.



Therefore, we have reasonable assurance that if a fire occurs in this location, safe shutdown could still be achieved and maintained.

#### 2.4 Conclusion

Based on our evaluation, we conclude that the licensee's alternate fire protection configuration will achieve an acceptable level of fire protection equivalent to that provided by Sections III.G.2 and III.G.3. Therefore, the licensee's request for exemption in the Primary Auxiliary Building as described in the August 16, 1984 and September 19, 1985 letters should be granted.

#### 3.0 Electric Cable Tunnels (Fire Area ETN-4)

##### 3.1 Exemption Requested

The licensee requested an exemption from Section III.G.2 of Appendix R to 10 CFR 50 to the extent that it requires that redundant shutdown systems be separated by more than 20 feet, free of intervening combustibles or fire hazards and to the extent that it requires that redundant systems be separated by a 1-hour fire barrier in an area which is protected by automatic fire detection and suppression systems.

##### 3.2 Discussion

This fire area consists of the electrical cable tunnels, the associated electrical penetration areas and the entranceway to the cable spreading room. It is enclosed by continuous walls, floors and ceilings having a 1 to 3-hour fire resistance rating as stipulated in Table 2-2 of the August 16, 1984 Appendix R Report. This area adjoins other plant locations which the licensee has designated as separate fire areas.

Normal power and control cables to most of the safe shutdown components as well as instrumentation-related cables are routed through this area.

Electrical channel separation in the tunnel is maintained by placing all Channel 1 trays on the opposite side of the upper tunnel from the Channel 2 trays. Channel 3 and 4 trays are located on opposite sides of the lower tunnel. The normal power cables for essential safe shutdown pumps (CCW, charging, RHR) have at least one redundant pump power cable in the opposite tunnel. Two redundant safe shutdown instrumentation channels have their cables routed in opposite tunnels after leaving the upper penetration area.

Alternative power cables are provided for CCW pump 32 and charging pumps 31 and 32. These alternative feeds enter the tunnel at the penetration area and are routed through the tunnel to the PAB midway through the tunnel. Alternative power for essential instrumentation is also provided by the instrument isolation cabinets at the penetration area.

Availability of at least one charging pump, one CCW pump and sufficient instrumentation to achieve safe shutdown is ensured in the cable tunnel by supplying power from either the emergency diesels, alternative diesel or off-site power.

In the event of loss of power cables to both RHR pumps, a post-fire repair will be performed to ensure the availability of one RHR pump to achieve cold shutdown.

The combined in-situ and transient fire load for this area is about 80,000 BTU/ft<sup>2</sup>, which represents a fire severity of about 1-hour as determined by the ASTM E-119 time temperature curve.

Existing fire protection includes: automatic fire detection systems, which provide area-wide coverage; a pre-action-type automatic sprinkler system which covers all of the cables in trays throughout the area; manual hose stations and portable fire extinguishers. In the Appendix R Report the

licensee also committed to seal all unrated penetrations in the fire area boundary construction with material equivalent to the required rating of the barrier and to replace two unrated security doors with listed 3-hour fire-rated door assemblies. The licensee also committed to protect one train of instrumentation in the upper penetration area and at the electrical tunnel entranceway from the Cable Spreading Room with a 1-hour fire-rated barrier.

The licensee justified the exemption on the bases of the existing fire protection, the proposed modifications and the availability of an alternate shutdown capability for certain shutdown-related systems in this fire area.

### 3.3 Evaluation

The technical requirements of Section III.G.3 are not met in this area because cables associated with the alternate shutdown capability for this location are not independent of the fire area. The requirements of Section III.G.2 are not met because certain shutdown-related systems are not separated by more than 20 feet free of intervening combustibile materials or are not protected by a 1-hour fire barrier.

By letter dated February 2, 1984, we granted the licensee's exemption requests associated with the degree of separation between power and control cables and the independence of the alternate shutdown capability in the cable tunnel and upper penetration area. Based on our evaluation of the licensee's August 16, 1984 and September 19, 1985 submittals, this exemption should still be considered valid. The August 16, 1984 letter identified redundant instrumentation cabling that does not conform with Section III.G and was not considered in our February 2, 1984 safety evaluation. However, the licensee committed in the September 19, 1985 letter to protect certain safe shutdown related instrumentation cables at the electrical tunnel entranceway from the Cable Spreading Room.

We originally had several concerns with the level of fire protection in this area depending on where one postulated a fire would originate.

If a fire occurred at the end of the electrical tunnel near the Cable Spreading Room or in either the Upper or Lower Electrical Tunnels, we concluded in our February 2, 1984 safety evaluation that the existing fire protection, the proposed modifications, and the degree of physical separation between redundant shutdown systems and the alternate shutdown capability was sufficient to provide us with reasonable assurance that safe shutdown could be achieved and maintained.

In the Upper and Lower Penetration Areas shutdown-related instrumentation cabling is vulnerable to fire damage. However, because one channel of instrumentation in the upper penetration area is protected by a 1-hour barrier until it enters the lower cable tunnel and because of the automatic suppression and detection systems we have reasonable assurance that a fire originating in the upper penetration area will not prevent the plant from safely shutting down.

Because of the existing fire protection and the tendency of smoke and hot gases to rise, we have reasonable assurance that a fire in the upper penetration area will not spread downward into the lower penetration area.

If a fire were to originate in the Lower Penetration Area, the licensee will rely upon redundant instrumentation cabling in the Upper Penetration Area to maintain safe shutdown conditions. Because of the open stairway between the two areas, we expect hot gases from the fire to spread into the Upper Penetration Area. However, the automatic sprinkler system in that area would actuate to reduce room temperatures and to protect the instrumentation cables that are relied upon for shutdown pending arrival of the plant fire brigade and eventual fire extinguishment.

We were also concerned that it might be necessary for plant operators to enter the fire area to achieve safe shutdown. However, the licensee has confirmed in the September 19, 1985 letter that the modifications previously described for this area preclude the need for plant operators to enter the area for shutdown related purposes. We find this acceptable.

### 3.4 Conclusion

Based on our evaluation, we conclude that the licensee's alternate fire protection configuration with the proposed modifications, will achieve an acceptable level of fire protection equivalent to that provided by Section III.G.2 and III.G.3. Therefore, the licensee's request for exemption in the Electric Cable Tunnels Fire Area ETN-4 as described in the August 16, 1984 and September 19, 1985 letters should be granted.

### 4.0 Turbine Building (Fire Area TBL-5)

#### 4.1 Exemption Requested

The licensee requested an exemption from Section III.G.2.(b) of Appendix R to 10 CFR 50 to the extent that it requires that automatic fire detection and fire suppression systems be provided in a fire area, where redundant shutdown systems are separated by more than 20 feet free of intervening combustibles.

#### 4.2 Discussion

The four atmospheric steam dump valves are located in this fire area. These valves function to remove decay heat from the primary steam system by dumping main steam to the atmosphere. These valves fail closed when a loss of instrument signal or loss of instrument air occurs. One of the four valves

is necessary to achieve safe shutdown. Furthermore, these valves are not required to achieve hot safe shutdown since the main steam code safety valves can accomplish the initial decay heat removal after a scram. The atmospheric steam dump valves are used for a controlled cooldown from the Control Room or local operator control of main steam release to the atmosphere until RHR cut-in temperature and pressure conditions are reached.

The licensee's request for exemption was based on the assumption that a fire would result in damage to the steel valves themselves. This was confirmed in a telephone conference with the licensee's representatives on July 9, 1985. However, it is our position that steel valves that can be manually operated, tanks and piping will not be adversely affected by fire. Therefore, Section III.G.1 of Appendix R does not apply in this instance.

#### 4.3 Conclusion

The licensee's request for exemption from Section III.G.2 related to the need for automatic fire detection and suppression to protect the atmospheric steam dump valves is not necessary.

### 5.0 Auxiliary Boiler Feedwater Pump Room (Fire Area AFW-6)

#### 5.1 Exemption Requested

The licensee requested an exemption from Section III.G.2.(b) of Appendix R to 10 CFR 50 to the extent that it requires that redundant shutdown systems be separated by more than 20 feet, free of intervening combustible materials.

#### 5.2 Discussion

The area is enclosed by continuous walls, floor and ceiling having a 1 to 3-hour fire resistance rating as stipulated in Table 2-2 of the licensee's August 16, 1984 Appendix R Report. This area adjoins other plant locations which the licensee has designated as separate fire areas.

Safe shutdown systems in this area consist of equipment and cables related to the Auxiliary Feedwater System and process monitoring instrumentation. The cables are specifically identified in Table 3-1 of the Appendix R Report.

The south section of the fire area contains turbine-driven auxiliary feedwater Pump 32, the associated feedwater control valves, the alternate city water supply valve, and the local control and monitoring station. This local station will contain controls and cables common to all the AFW pumps, pressure gauges for all steam generators, instruments for steam generator wide range level, pressurizer level and RCS pressure, and hot and cold leg temperature indicators for loop 31. The local station for AFW pumps (PT2) is not essential for safe shutdown for a fire in this area, because monitoring capability for the safe shutdown instrumentation will still be available at the Control Room.

The north section of the fire area contains AFW motor-driven Pump 33, its associated recirculation control valve and feedwater control valves to steam generators 33 and 34. The north side has control and instrumentation cables crossing into the south side of the room. Only the power cable to AFW Pump 33 is essential for this AFW train operation. This power cable is in the remote north side of the room and is routed through the ceiling assembly in rigid conduit.

AFW Pumps 33 and 32 are separated by 20 ft. This space contains a negligible amount of intervening combustibles in the form of cable insulation in open cable trays.

The lube oil for the AFW pumps is enclosed within the pump casing. The common local control station for all AFW pumps is located on the south side of the room. Cable and conduit routes from the north side of the room cross the separation zone to the common panel. A fire in the north side of the room affecting AFW Pump 33 would not affect the redundant turbine-driven AFW Pump 32 at the common control station or in the Control Room. A fire in the south section of the room would affect the control of all the AFW pumps from the Control Room. However, local operator action at the emergency switchgear in the Control Building can compensate for loss of function in the Control Room.

The exposed fixed combustible loading for Fire Area AFW-6 is approximately 6800 BTU/ft<sup>2</sup>, with an equivalent fire severity of 5 minutes as determined by the ASTM E-119 time temperature curve.

Existing fire protection includes automatic fire detection and suppression systems, which provide area-wide coverage; manual hose stations and portable fire extinguishers.

The licensee justifies the exemption on the basis of the low fire hazard, the existing fire protection, the availability of an alternate shutdown capability for certain shutdown systems that may be lost during a fire in this area; and the spatial separation between the remaining redundant shutdown systems.

### 5.3 Evaluation

The technical requirements of Section III.G.2 are not met in this location because redundant shutdown-related systems are not separated by 20 feet, free of intervening combustibles or fire hazards.

We were concerned that if a fire of significant magnitude occurred, redundant shutdown systems would be damaged. However, the fire hazard within this area is low. If all the combustibles were totally consumed, it would result in a fire of about 5 minute severity.

Because of the presence of a fire detection systems, we expect a fire to be discovered in its incipient stages, before significant propagation or room temperature rise occurred. The fire brigade would then be dispatched and would extinguish the fire manually. If rapid fire spread occurred before the arrival of the brigade, the automatic sprinkler system would actuate to control the fire, to reduce room temperature and to protect the shutdown cables and components. Until the fire was put out the 20 feet of spatial separation between the redundant shutdown-related systems would provide sufficient passive protection to provide us with reasonable assurance that one shutdown division would



remain free of damage. Where 20 feet of separation does not exist and where redundant system might be damaged, the licensee has identified an alternate shutdown capability that is physically and electrically independent of this fire area.

Because the cables have been fire tested and accepted as meeting Section III.D.3 of our fire protection guidelines as evaluated in our Safety Evaluation Report (SER) and because the sprinkler system will discharge water onto the cables in the event of a significant fire, the presence of cables as an intervening combustible has no appreciable safety significance.

#### 5.4 Conclusion

Based on our evaluation, we conclude that the licensee's alternate fire protection configuration, will achieve an acceptable level of fire protection equivalent to that provided by Section III.G.2. Therefore, the licensee's request for exemption for the presence of intervening combustibles in the Auxiliary Boiler Feedwater Pump Room should be granted.

#### 6.0 Emergency Lighting

##### 6.1 Exemption Requested

The licensee requested an exemption from Section III.J of Appendix R to 10 CFR 50 to the extent that it requires that all areas needed for operation of safe shutdown equipment and in access and egress routes thereto be provided with 8-hour battery powered emergency lighting units.

##### 6.2 Discussion

To effect and maintain safe shutdown under certain fire scenarios, the licensee has indicated that operators would need to start the alternate diesel generator locally as well as locally manipulate certain circuit breakers which provide the proper electrical bus alignment.

These tasks would be performed at the diesel generator and outdoor switchgear enclosures. Access to these enclosures is through the yard area between the Containment and Turbine Building. Emergency light units will be provided in the equipment enclosures as required by Section III.J of Appendix R. Lighting coverage of the yard area along the access route to the alternate diesel generator and switchgear is provided. This lighting, however, does not comply with the requirement of Section III.J of Appendix R specifying an eight-hour battery supply.

The yard area lighting for the access and egress route to the alternate diesel and outdoor switchgear is part of the security lighting system. The security lighting is powered by a dedicated propane powered generator which operates in the event of a loss of the normal power supply to the security system. The security generator is located in the security building which is physically separate from the main plant and from the Control Building. The alternate diesel generator is proposed to mitigate the consequences of a Control Building fire which damages both the onsite and offsite power supplies or distribution system. As such, a Control Building fire necessitating access to the alternate diesel generator will not impact the security generator. In addition, the distribution system for the yard lighting from the security generator is independent of the Control Building.

The security generator has sufficient capacity and fuel supply to power the yard lighting for the eight-hour time period specified in Section III.J of Appendix R. Furthermore, the operator actions requiring yard access and egress will be one of the initial actions prescribed by the safe shutdown procedure in the event both onsite and offsite power is lost due to a fire.

In all other locations, the licensee meets Section III.J by providing individual 8-hour battery powered lighting units.

### 6.3 Evaluation

We had several concerns with the licensee's proposed lighting configuration. The first was that hand held lights would be relied upon as the sole means of illumination. The licensee has confirmed that, while the operators will be carrying flashlights, they will only be relied upon to supplement the security lighting. And, if the flashlights become inoperable or could not be used while performing the safe shutdown function, the security lighting itself would supply sufficient illumination.

Our second concern was that the same fire which resulted in the need to go to the areas covered by the security or banked-battery lighting would cause the loss of this capability. The security lighting is supplied power from the security diesel and is, therefore, not vulnerable to fire loss under the postulated fire scenario.

Our third concern was that the level of illumination would be sufficient to provide us with reasonable assurance that the safe shutdown function could be achieved. At our request, the licensee conducted a walkdown of the yard areas where the alternate lighting configuration was provided. This walkdown confirmed that an adequate level of illumination had been provided.

We were also concerned that the security lighting would not be maintained. However, this lighting is inspected and maintained as part of the plant security requirements. We find this acceptable.

### 6.4 Conclusions

Based on our review, we conclude that the use of the proposed emergency lighting systems and the field verification of the adequacy of the lighting provide an acceptable margin of safety equivalent to that provided by the technical requirements of Section III.J. Therefore, the licensee's request for an exemption should be granted.

## 7.0 Yard Area-Service Water Pumps

### 7.1 Exemption Requested

The licensee requested an exemption from Section III.G.2.b of Appendix R to the extent it requires that redundant shutdown systems be protected by automatic fire detection and suppression systems.

### 7.2 Discussion

The Yard Area contains the normal Service Water Pumps (SWP's) as well as the redundant, Backup Service Water Pumps (BSWP's). The normal SWP's are separated from the BSWP's by a distance in excess of 100 feet. There are negligible fixed intervening combustibles between the two groups of pumps. The SWP's are designated as safe shutdown equipment since they provide cooling to the emergency diesel generators and Component Cooling Water (CCW) System. The immediate operation of the service water system is not required for the shutdown of the plant since the alternate diesel generator can be utilized in lieu of the emergency diesels. The alternate diesel does not require Service Water cooling. Four fire hydrants and three hose houses are located in the vicinity of the pumps to facilitate manual fire suppression activities.

Periodic surveillance of the yard area is performed by the security force. The licensee justified the exemption on the basis of the physical configuration of the redundant SWP groups, the lack of any appreciable quantities of combustibles between the pumps, the manual suppression capability in the area, and the large distance between pump groups.

### 7.3. Evaluation

The technical requirements of Section III.G.2.b are not met in this area because of the lack of automatic fire detection and suppression systems.

Our principal concern was that because of the absence of automatic detection and suppression a fire of significant magnitude could develop and damage both pump groups. However, there are no significant accumulations of combustibles or fire hazards between the pump groups. Because of the traffic patterns, area layout, administrative controls and arrangement of the pump groups, the potential for the accumulation or presence of unanticipated combustible materials that would represent a threat to both pump groups is inconsequential.

If a fire would occur, it would be detected by plant operators or the security force. The fire brigade would then respond and would extinguish the fire using manual fire fighting equipment. Because this is an outside area, any smoke or hot gases would be dissipated up and away from the pumps. And because of the large spatial separation between the pump groups, radiant heat, which would normally be of concern with close-spaced components, would not be a significant factor. We, therefore, have reasonable assurance that at least one pump group would remain free of fire damage until the brigade put out the fire.

#### 7.4 Conclusion

Based on our evaluation, we conclude that the existing configuration of the Service Water Pumps in the Yard Area provides an acceptable level of safety equivalent to that provided by Section III.G.2.b. Therefore, the licensee's request for exemption from the requirements for automatic fire detection and suppression should be granted.

#### 8.0 Fire Area Boundaries

In our safety evaluation of February 2, 1984, we expressed concern about the adequacy of the construction of fire area boundaries. In the August 14, 1984 Appendix R re-evaluation report, the licensee re-defined the fire areas in the plant. However, the description of the new fire area boundary construction remained unclear. By letter dated September 19, 1985, the licensee provided

additional information. On the basis of this new information, we conclude that except for three plant features, the new fire areas are defined by continuous barriers having a fire resistance rating as delineated in Table 2-2 of the above letter, with all openings protected by penetration seals, dampers or doors that have a fire rating equivalent to the rating of the wall or floor/ceiling assembly. Fire rating is defined by the fire test method of ASTM E-119. The three plant features which represent an exemption to the above statement have been analyzed by the licensee in accordance with the guidance provided in the Regional Fire Protection Workshops and in Generic Letter 85-01. These analyses will be made available for review during subsequent Regional fire protection inspections. We find this acceptable.

#### 9.0 Summary

Based on our evaluation, the licensee's request for exemption for the following areas should be granted:

1. Primary Auxiliary Building
2. Cable Tunnels (Two exemptions requested)
3. Auxiliary Feedwater Pump Room
4. 8-hour battery powered emergency lighting in the yard area
5. Yard Area - Service Water Pumps

The licensee's request for exemption in the Turbine Building is not necessary.

Dated: January 7, 1987

PRINCIPAL CONTRIBUTOR:

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