

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of)	
	\	Dockets Nos. 50-277
THE PHILADELPHIA ELECTRIC COMPANY, ET AL	\	and 50-278
	\	
(Peach Bottom Atomic Power Station,	\	
Units 2 and 3))	

EXEMPTION

I.

The Philadelphia Electric Company (the licensee) and three other co-owners are the holders of Facility Operating Licenses Nos. DPR-44 and DPR-56 which authorize the operation of the Peach Bottom Atomic Power Station, Units 2 and 3 (the Facilities), at steady-state power levels not in excess of 3293 megawatts thermal for each unit. These facilities are boiling water reactors located at the licensee's site in York County, Pennsylvania. These licenses are subject to all rules, regulations, and orders of the Nuclear Regulatory Commission (the Commission) now or hereafter in effect.

II.

On November 19, 1980, the Commission published in the Federal Register (45 FR 76602) revised Section 10 CFR 50.48 and a new Appendix R to 10 CFR 50 regarding fire protection features of nuclear power plants. The revised regulation and new appendix became effective on February 17, 1981. Section III of Appendix R identifies specific fire protection requirements in fifteen subsections, lettered A through O. This exemption relates to certain aspects of Sections III.F and III.G, as follows, from which the licensee has requested relief:

- a) A requirement of Section III.F of Appendix R to provide the installation of automatic fire detection systems in all areas of the plant that contain or present an exposure fire hazard to safe shutdown or safety-related systems or components;
- b) A requirement of Subsection III.G.2 to provide the installation of 3-hour fire rated barriers to separate redundant trains;
- c) A requirement of Subsection III.G.2 to provide the installation of automatic suppression systems in specific fire areas, and,
- d) A requirement of Section III.G.3 to provide for the installation of a fixed suppression system in specific fire areas.

III.

By letters dated May 27, 1983, September 16, 1983, and December 2, 1983, the licensee requested exemptions from Sections III.F and III.G of Appendix R. By letters dated January 16, 1984, and February 10, 1984, the licensee provided additional information. The specific requests and the acceptability of the exemption are addressed herein.

a) Exemptions from Section III.F

Section III.F of Appendix R to 10 CFR Part 50 requires the installation of automatic fire detection systems in all areas of the plant that contain or present an exposure fire hazard to safe shutdown or safety-related systems or components.

At Peach Bottom Atomic Power Station, the main steam isolation valve (MSIV) rooms, chemical waste tank room, offgas line tunnel, and diesel generator building supply enclosures contain one division of safe shutdown or safety-related systems. Fire protection for each area consists of manual hose stations and portable fire extinguishers. The in situ fuel load in each area is negligible. Each area has limited personnel access.

The technical requirements of Section III.F of Appendix R are not met in these areas because automatic fire detection systems have not been installed.

The fire load in these areas is low. Combustible material in each area is negligible. Consequently; we do not expect a fire of any significant magnitude or duration to occur. If a fire were to occur in these areas, it would be detected by fire detectors in adjoining locations or by plant operators who would summon the fire brigade. The safety-related and safe shutdown equipment in these areas would not be prone to fire damage. Therefore, pending arrival of the brigade and eventual extinguishing of the fire, no loss of safety function would result.

Based on the above evaluation, we conclude that the existing fire protection for the MSIV rooms, chemical waste tank room, offgas line tunnel and the diesel generator building supply enclosures provides a level of fire protection equivalent to the technical requirements of Section III.F, and therefore, the licensee's request for exemption from Section III.F of Appendix R should be granted.

b) Exemptions from Section III.G

Subsection 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 the 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.

The licensee requested an exemption from Subsection III.G.2 of Appendix R to the extent that it requires the installation of 3-hour fire rated barriers to separate redundant trains.

Thirty-two heating and ventilating penetrations through safe shutdown barriers have been identified which contain fire dampers rated at less than 3 hours. The installed dampers are UL rated for 1 1/2-hour fire resistance and were installed during plant construction.

The maximum fixed fire resistance required in any of the areas as listed above is the cable spreading room 1 hour, 14 minutes. The cable spreading room is protected by area smoke detection and an automatic carbon dioxide suppression system. The next largest fixed combustible loading equates to a 27-minute fire resistance requirement.

Twenty-eight of the dampers in question are installed two dampers in series, though only one damper is required in the wall for a 1 1/2-hour rating.

Four locations, three dampers in the cable spreading room and one in the switchgear room, have only one damper installed in the wall.

Fire protection for each of the above areas consists of early warning fire detection, manual hose stations and portable fire extinguishers.

In lieu of providing 3-hour fire rated dampers in 3-hour fire rated barriers, the licensee has installed two 1 1/2-hour dampers in series in the barriers or one damper in the cable spreading room and switchgear rooms as indicated above. In every area where 1 1/2-hour dampers are installed, early warning fire detection has been provided. The early warning fire detectors will provide reasonable assurance that a fire will be discovered in its incipient stage and be extinguished by the fire brigade within a short time span. Although a time delay is anticipated between the receipt of the initial fire alarm and the arrival of the fire brigade, the low fuel load in all areas except the cable spreading room and the automatic carbon dioxide extinguishing system in the cable spreading room provides reasonable assurance that the 1 1/2-hour rated dampers will provide adequate protection in the above barriers.

Based on our evaluation, we find that the existing 1 1/2-hour fire rated dampers provide a level of fire protection equivalent to the technical requirements of Subsection III.G.2 of Appendix R, and therefore, the exemption should be granted.

The licensee also requested an exemption from Subsection III.G.2 of Appendix R to the extent that it requires the installation of automatic suppression systems throughout Fire Areas 05 and 12.

Fire Areas 05 and 12 are located at the 91 foot 6 inch and 116 foot elevations of the Unit 2 and Unit 3 Reactor Buildings, respectively.

Fire Areas 05 and 12 are 19,278 ft² in area and have clear floor-to-ceiling heights of approximately 42 feet and volumes of approximately 800,000 ft³. With the exception of the two steel grates for each fire area in the ceiling to the 135-foot elevation of the Reactor Buildings which are provided for personnel access to the torus area, water drainage and pressure relief purposes in design basis accidents, all boundary fire barrier penetrations are sealed and dampered to provide a fire rating commensurate with the hazard. The west wall corridor grates have automatic water spray systems directly over them.

The fixed combustible loadings for Fire Areas 05 and 12, when distributed evenly throughout the fire area, are 1038 and 949 Btu/ft², respectively, with resultant equivalent fire severities of under 1 minute. Except for the vacuum breaker areas of the 116-foot elevation, radiological

conditions in these fire areas are such that access is controlled by Health Physics. This minimizes the presence and use of transient combustible material within these fire areas. Fire protection in the areas consists of early warning fire detectors, manual hose stations, and portable fire extinguishers.

Fire Areas 05 and 12 contain redundant components for the residual heat removal (RHR) system and suppression pool temperature monitoring instruments and cables of the respective units.

There are a total of eight RHR motor-operated valves in the redundant loop of each unit in the respective area, all of which are located in the torus compartment. The valves are located approximately 140 feet apart; however, the separation between power cables is less than 20 feet. Two factors mitigate the potential effects of any postulated fire damaging the control cables to both RHR valves for manual operation. First, handwheels are provided on both valves for manual operation. Second, there is a significant time lag of approximately 3 hours before the RHR systems would be required for safe shutdown. The redundant suppression and temperature elements are separated by approximately 140 feet and the corresponding temperature transmitters for each unit are located in separate fire areas. The horizontal separation between the power cables is approximately 90 feet.

These areas do not comply with Subsection III.G.2 of Appendix R because automatic suppression systems are not installed throughout the areas.

Redundant cables and equipment associated with the suppression pool temperature sensors are separated by approximately 90 feet. The early warning fire detectors will provide reasonable assurance that a fire will be discovered in its incipient stage before significant damage results. Because of the low in situ fuel load, available manual firefighting equipment and fire brigade training, it is our conclusion that any postulated fire in the areas would not be beyond the capabilities of the fire brigade to extinguish within a short time span. Although a time delay is anticipated between the receipt of the initial fire alarm and the arrival of the fire brigade, the separation of the redundant trains will provide sufficient passive fire protection until the fire is extinguished.

Although the redundant RHR valves in the areas are located approximately 140 feet apart, the separation between redundant power cables is less than 20 feet. The licensee justifies this configuration based on the following:

- a. Handwheels are provided on the valves for manual operation;
- b. the RHR system is not required until approximately 3 hours into the safe shutdown process.

Because of the low in situ fuel load in these areas, it is our assessment that any postulated fire in the areas would be extinguished in a short time span and allow operators to enter the areas and allow manual operation of the valves before the RHR system would be required in the safe shutdown process.

Based on our evaluation, we conclude that the existing fire protection provides a level of fire protection in Fire Areas 05 and 12 equivalent to the technical requirements of Subsection III.G.2, and therefore, the exemption should be granted.

The licensee also requested an exemption from Subsection III.G.2 of Appendix R to the extent that it requires the installation of automatic suppression systems throughout Fire Areas 06 and 13.

Fire Areas 06 and 13 are located at the 135-foot elevations of the Unit 2 and Unit 3 Reactor Buildings, respectively. Each fire area is made up of the drywell access areas (Zone 022 for Unit 2 and Zone 028 for Unit 3), the isolation valve compartments (Zones 23 and 19 for Unit 2 and Zones 027 and 031 for Unit 3), and the neutron monitoring rooms (Zone 020 for Unit 2 and Zone 030 for Unit 3).

Fire Areas 06 and 13 are 10,482 and 9802 ft² in area, respectively, and have clear floor-to-ceiling heights of approximately 28 feet. This results in volumes of 290,000 and 270,000 ft³, respectively. Due to the extension of the steam pipe tunnel out of the eastern-most wall to both fire areas, a corridor is formed that is approximately 12 feet wide by 12 feet high by 45 feet long. On either end of this corridor, the ceiling height rises from approximately 12 feet to 23 feet. With the exceptions of the two steel grates in the floor to the torus compartment and the large open hatch in the ceiling to the 165 foot elevation of each Reactor Building, all boundary fire barriers are sealed and dampered to provide a fire rating equal to that required of the barriers.

The fixed combustible loading for Fire Areas 06 and 13, when distributed evenly throughout the fire areas, are 32,109 and 33,403 Btu/ft² with resultant equivalent fire severities of 24 and 25 minutes, respectively. Fire protection in the areas consists of early warning fire detectors, manual hose stations, and portable fire extinguishers. In addition, automatic suppression is provided in the form of water curtains at the closest junction of the west wall to each fire area and the reactor drywell. The water curtains are arranged in two branches 13 feet apart with application rates of 0.3 gpm/ft³. The water curtains are provided to eliminate the hazard of intervening combustibles in the form of horizontal cable trays installed between redundant trains.

Fire areas 06 and 13 located at the 135-foot elevation of the Reactor Building contain components/cables of the following safe shutdown systems for the respective unit: *

- (1) RHR System (all trains);
- (2) Core Spray (CS) System (all trains);
- (3) High Pressure Coolant Injection (HPCI) System;
- (4) Reactor Core Isolation Cooling (RCIC) System;
- (5) Nuclear System Pressure Relief System (NSPRS);
- (6) AC Emergency Power System;
- (7) DC Emergency Power System (only power to HPCI MCC); and
- (8) Monitoring Instrumentation.

Two redundant methods of safe shutdown can be identified for these areas in the Reactor Building, one based on the north side of the Reactor Building and the other on the south side:

(1) North Side Safe Shutdown Method

(for fires in the south side)

Based on the Main Control Room control of HPCI, NSPRS, RHR (B or D), AC Emergency Power System (B or D), DC Emergency Power System B/D, and instrumentation based on the 165-foot elevation of the Reactor Building.

(2) South Side Safe Shutdown Method

(for fires in the north side)

Based on the Main Control Room control of NSPRS, RCIC, RHR (A or C), AC Emergency Power System (A or C), and DC Emergency Power System A/C, as well as 165-foot elevation instrumentation.

The above areas do not comply with Subsection III.G.2 of Appendix R because automatic suppression systems have not been installed throughout the areas. Redundant methods of safe shutdown in each area are separated by greater than 100 feet. The early warning fire detectors will provide reasonable assurance that a fire will be discovered in its incipient stage before significant damage results. Because of the low in situ fuel load, available manual fire fighting equipment, and fire brigade training, it is our assessment that any postulated fire in the area would not be beyond the capabilities of the fire brigade to extinguish within a short time span. Although a time delay is anticipated between receipt of the initial fire alarm and the arrival of the brigade, the separation of redundant safe

shutdown methods will provide sufficient passive fire protection until the fire is extinguished. In addition, the water curtains will eliminate the spread of fire via any intervening combustibles in the area. Based on our evaluation, we conclude that the existing fire protection in Fire Areas 06 and 13 provides a level of fire protection equivalent to the technical requirements of Subsection III.G.2, and therefore, the exemption should be granted.

In addition, the licensee requested an exemption from Subsection III.G.3 of Appendix R to the extent that it requires the installation of a fixed suppression system in the control room.

The control room is a continuously occupied space that houses controls and instruments necessary to remotely operate valves, pumps, motors, etc. required for plant operation. Most of these controls and instruments are mounted on centrally located panels. Redundant safe shutdown-related cables are routed in the area to various control panels. Ionization type fire detectors are located throughout the control room. No automatic fire suppression capability is provided. However, portable fire extinguishers and standpipe and hose stations are available for use throughout the control room. The licensee will also install an alternative shutdown capability independent of the control room.

Plant Technical Specifications require that the control room be continuously manned by the operations personnel. Most of these personnel are trained members of the fire brigade. Therefore, these personnel constitute a

continuous fire watch. The fuel load in the area is low. Manual suppression, if a fire occurred, would be prompt and effective; thus, a fixed suppression system would not enhance the fire protection in this area.

Based on the above evaluation, we conclude that the existing and proposed fire protection for the control room, Fire Area 29, provides a level of fire protection equivalent to the technical requirements of Section III.G, and therefore, the exemption should be granted.

The licensee also requested an exemption from Subsection III.G.3 of Appendix R to the extent that it requires the installation of a fixed suppression system in Fire Areas 47 and 48.

Fire Areas 47 and 48 are located at the 112-foot elevation of the cooling water pump structure. The fire areas are similar, each containing high pressure service water (HPSW) pumps, and an emergency service water (ESW) pump. In Fire Area 49, the diesel fire pump room is adjacent to the east wall and is fully enclosed in 3-hour rated barriers. The access door to the diesel fire pump room has a 15-inch door sill to prevent spreading of spilled fuel.

Excluding the common wall between the fire areas, the boundaries are reinforced concrete or masonry construction. The common wall is fabricated of 1/4 inch and 3/8 inch steel plate set on wide flange columns which, although not tested for specified fire rating, provides a level of protection in excess of the hazard in the areas. The barrier is water-tight. All access doors are water-tight construction necessary for plant safeguards system flood protection. The common wall between the fire areas has been reviewed and accepted as an adequate fire boundary in our fire protection SER dated May 23, 1979.

The in situ combustible loading in the areas results in fire severity of less than 2 minutes. Cables in these areas are in conduit and lubricating oil is present in enclosed pump motor coolers. The lubricating oil is not pressurized and is considered combustible only if it is sprayed upon a hot surface which raises its temperature to above its flash point (approximately 450°F). Such surfaces do not exist within these fire areas. Ignition of a contained floor spill by an external ignition source is also precluded by the presence of water floor drains. Fire protection in the areas consists of early warning fire detection, manual hose stations and portable fire extinguishers.

Fire Areas 47 and 48 contain components of the ESW and HPSW systems for both units. Fire Area 47 contains one ESW pump and four HPSW pumps of Unit 3, in addition to the cross-tie gate valve (516B) between the two HPSW systems. Fire Area 48 contains one ESW pump and four HPSW pumps, in addition to one cross-tie gate valve (516A) for Unit 2. The ESW system is a common system for both units. Two HPSW pumps and one ESW pump are needed for safe shutdown. The ESW power cable will be encapsulated in Fire Area 47. The cross-tie valve between HPSW systems must be manually operated for safe shutdown. A minimum of 3 hours exists after the initiation of safe shutdown operations before these valves must be operated.

These areas do not comply with Subsection III.G.3 of Appendix R because fixed suppression systems are not installed throughout the areas. In these areas, the combustible loading is low, and fire detection and manual fire suppression equipment are available. There is alternate shutdown capability, independent of each area. We have reasonable assurances that a fire in these areas would be promptly detected and extinguished. The low combustible

loading in these areas ensures that safety-related equipment in adjacent areas will not be threatened. The installation of a fixed fire suppression system will not significantly increase the level of fire protection in these areas. In addition, because of the low fuel load in these areas, it is our opinion that any postulated fire would be extinguished in a short time span and allow operators to enter the area to allow manual operation of the cross-tie valve before the HPSW system is required in the safe shutdown process.

Based on our evaluation, we conclude that the existing fire protection in conjunction with the alternate shutdown capability for Fire Areas 47 and 48 provides a level of fire protection equivalent to the technical requirements of a Section III.G, and therefore, the exemption should be granted.

Finally, the licensee requested an exemption from Subsection III.G.3 of Appendix R to the extent that it requires the installation of a fixed suppression system in Fire Area 25.

Fire Area 25 is located at Elevation 165' of the Radwaste Building. The room contains the remote shutdown panels for both units as well as the control structure for mechanical ventilation equipment and associated control panel.

The boundary fire barriers of Fire Area 25 are of heavy reinforced concrete construction having fire ratings in excess of 3 hours. The in situ fuel in the area is 32,640 Btu/sq.ft., with an equivalent fire severity of approximately 25 minutes in the ASTM E-119 Standard Time Temperature Curve. Fire protection features in the area consist of early warning fire detectors, hose stations and portable fire extinguishers.

This area contains the remote shutdown panels for Units 2 and 3. Safe shutdown and process monitoring instrumentation control cables and some of the AC power cables leading to and from the emergency load centers are routed in this area. Also, ESW, HPCI, and RCIC cables, as well as AC off-site power and feeds to load center breakers, are routed in this area.

Alternative shutdown capability is provided independent of this area to operate the safe shutdown systems by using a combination of the Control Room and the HPCI alternative control panel.

The technical requirements of Section III.G are not met in the area because a fixed fire suppression system has not been installed. In this area, the combustible loading is moderate, fire detection and manual fire suppression equipment are available. There is alternate shutdown capability independent of this area. There is reasonable assurance that a fire in this area would be promptly detected and extinguished. The moderate combustible loading in the area ensures that safety-related equipment in adjacent areas will not be threatened. The installation of a fixed fire suppression system will not significantly increase the level of fire protection in this area.

Based on our evaluation, we find that the existing fire protection features in conjunction with alternate shutdown capability for Fire Area 2E provide a level of fire protection equivalent to the technical requirements of Subsection III.G.3 of Appendix R, and therefore, the exemption should be granted.

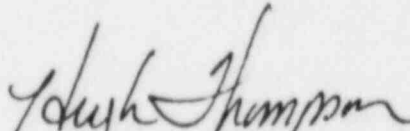
IV.

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12, the exemptions requested by the licensee's letters as referenced and discussed in II. and III. above are authorized by law, will not endanger life or property or the common defense and security, are otherwise in the public interest, and are hereby granted.

Pursuant to 10 CFR 51.32, the Commission has determined that the issuance of the exemption will have no significant impact on the environment (50-FR-9735).

This Exemption is effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Hugh Thompson, Director
Division of Licensing
Office of Nuclear Reactor Regulation

Dated at Bethesda, Maryland,
this 13th day of March 1985