

# PHILADELPHIA ELECTRIC COMPANY

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AUG 08 1984

JOHN S. KEMPER  
VICE-PRESIDENT  
ENGINEERING AND RESEARCH

Mr. A. Schwencer, Chief  
Licensing Branch No. 2  
Division of Licensing  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Docket Nos.: 50-352  
50-353

SUBJECT: Limerick Generating Station, Unit 1 and 2  
Fire Protection Evaluation Report, Revision 6  
Licensing Document Change Notice - FP-37

Reference: 1) Telecon between NRC Staff and PECO  
on August 8, 1984  
2) Site Audit - April 9-12, 1984

File: GOVT 1-1 (NRC)

Attachment: 1) LCDN-FP-37

Dear Mr. Schwencer:

Pursuant to our Reference 1) telecon, the attachment provides our written resolution of the item questioned during the Reference 2) site audit of fire protection systems and documentation.

The information concerning the 4 KV Bus Duct penetrations was expected to be part of the FPER, revision 6 submittal, but missed the printer date. The printed information in Attachment 1) will be formally incorporated into the next FPER revision.

Should any additional information be required, please do not hesitate to contact us.

Sincerely,

*JW Ballyhoo*  
*for*  
*JS Kemper*

GJR/mlb/08088401

Copy to: See Attached Service List

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PDR ADOCK 05000352  
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cc: Judge Lawrence Brenner	(w/enclosure)
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Atomic Safety & Licensing Board Panel	(w/enclosure)
Docket & Service Section	(w/enclosure - 3 copies))
James Wiggins	(w/enclosure)
Timothy R. S. Campbell	(w/enclosure)

## (e) Effect of fire on safe shutdown:

A fire in this area will have no effect on the ability to achieve a safe shutdown on Unit 1. Since no equipment or cabling associated with shutdown methods A, B, C, or D is located in this fire area, all of these methods will remain available to safely shut Unit 1 down.

With regard to Unit 2, since no equipment or cabling associated with shutdown methods B or D is located in this fire area, both of these methods will remain available to safely shut Unit 1 down.

### 5.3.12 Fire Area 12: Unit 1 4-kV Switchgear Compartment (El. 239'-0")

(a) Structural and architectural design features of fire area  
(see Figure B-7):

	<u>Construction</u>	<u>Rating</u>
Walls:	N - Reinforced concrete	3 hr <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">6</span>
	E - Concrete masonry unit	3 hr <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">6</span>
	S - Concrete masonry unit	3 hr <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">6</span>
	W - Concrete masonry unit	3 hr
Floor:	Reinforced concrete	3 hr*
Ceiling:	Reinforced concrete	3 hr
Access:	Door connecting to area 13	3 hr
	Steamtight door connecting to area 113	3 hr

## (b) Major safety-related components in fire area:

Insert (A) here.

- (1) Class IE 4-kV switchgear 10A117 (Div. 3)
- (2) Class IE dc distribution panels 1CD102 and 1CD162 (Div. 3)
- (3) Class IE instrument ac distribution panel 10Y103 (Div. 3)

## (c) Postulated fire in area:

Ignition of electrical cabling in cable tray. (As discussed in Table A-3, the ignition of electrical cabling is extremely unlikely in the absence of a fire source external to the cabling.)

## (d) Consequences of fire with active fire suppression:

The smoke generated by a fire in this area will activate the smoke detectors, which will cause an audible-visual annunciation to register on the fire protection panels in the control room. Once the alarm has been received in the control room, the plant fire brigade will be dispatched to extinguish the fire.

## (e) Effect of fire on safe shutdown:

A fire in this area will have no effect on the ability to achieve a safe shutdown on Unit 2. Since no equipment or cabling associated with shutdown methods A, B, C, or D is located in this fire area, all of these methods will remain available to safely shut Unit 2 down.

With regard to Unit 1, since no equipment or cabling associated with shutdown methods B or D is located in this fire area, both of these methods will remain available to safely shut Unit 1 down.

Insert (B) here.

5.3.13 Fire Area 13: Unit 1 4-kV Switchgear Compartment  
(El. 239'-0")

(a) Structural and architectural design features of fire area  
(see Figure B-7):

	<u>Construction</u>	<u>Rating</u>
Walls:	N - Concrete masonry unit	3 hr <sup>§</sup>
	E - Concrete masonry unit	3 hr <sup>§</sup>
	S - Concrete masonry unit	3 hr
	W - Concrete masonry unit	3 hr
Floor:	Reinforced concrete	3 hr*
Ceiling:	Reinforced concrete	3 hr
Access:	Doors connecting to areas 7 and 12	3 hr

Insert (C) here.

## (b) Major safety-related components in fire area:

- (1) Class IE 4-kV switchgear 10A115 (Div. 1)
- (2) Class IE dc distribution panels 1AD102 and 1AD162 (Div. 1)
- (3) Class IE instrument ac distribution panel 10Y101 (Div. 1)

## (c) Postulated fire in area:

Ignition of electrical cabling in cable tray. (As discussed in Table A-3, the ignition of electrical cabling is extremely unlikely in the absence of a fire source external to the cabling.)

## (d) Consequences of fire with active fire suppression:

The smoke generated by a fire in this area will activate the smoke detectors, which will cause an audible-visual annunciation to register on the fire protection panels in the control room. Once the alarm has been received in the control room, the plant fire brigade will be dispatched to extinguish the fire.

## (e) Effect of fire on safe shutdown:

A fire in this area will have no effect on the ability to achieve a safe shutdown on Unit 2. Since no equipment or cabling associated with shutdown methods A, B, C, and D is located in this fire area, all of these methods will remain available to safely shut Unit 2 down.

With regard to Unit 1, since no equipment or cabling associated with shutdown methods B or D is located in this fire area, both of these methods will remain available to safely shut Unit 2 down.

Insert (D) here.

5.3.14 Fire Area 14: Unit 1 4-kV Switchgear Compartment  
(El. 239'-0")

(a) Structural and architectural design features of fire area  
(see Figure B-7):



	<u>Construction</u>	<u>Rating</u>
Walls:	N - Reinforced concrete	3 hr
	E - Concrete masonry unit	3 hr <sup>4</sup>
	S - Concrete masonry unit	3 hr
	W - Concrete masonry unit	3 hr <sup>4</sup>
Floor:	Reinforced concrete	3 hr*
Ceiling:	Reinforced concrete	3 hr
Access:	Door connecting to area 15	3 hr
	Steamtight door connecting to area 113	3 hr

## (b) Major safety-related components in fire area:

Insert (E) here.

- (1) Class IE 4-kV switchgear 10A118 (Div. 4)
- (2) Class IE instrument ac distribution panel 10Y104 (Div. 4)

## (c) Postulated fire in area:

Ignition of electrical cabling in cable tray. (As discussed in Table A-3, the ignition of electrical cabling is extremely unlikely in the absence of a fire source external to the cabling.)

## (d) Consequences of fire with active fire suppression:

The smoke generated by a fire in this area will activate the smoke detectors, which will cause an audible-visual annunciation to register on the fire protection panels in the control room. Once the alarm has been received in the control room, the plant fire brigade will be dispatched to extinguish the fire.

## (e) Effect of fire on safe shutdown:

A fire in this area will have no effect on the ability to achieve a safe shutdown on Unit 2. Since no equipment or cabling associated with shutdown methods A, B, C, or D is located in this fire area, all of these methods will remain available to safely shut Unit 2 down.

With regard to Unit 1, since no equipment or cabling associated with shutdown methods A or C is located in this fire area, both of these methods will remain available to safely shut Unit 1 down.

Insert (F) here.

5.3.15 Fire Area 15: Unit 1 4-kV Switchgear Compartment  
(El. 239'-0")

- (a) Structural and architectural design features of fire area
- 
- (see Figure B-7):

	<u>Construction</u>	<u>Rating</u>
Walls:	N - Concrete masonry unit	3 hr
	E - Concrete masonry unit	3 hr <sup>4</sup>
	S - Concrete masonry unit	3 hr
	W - Concrete masonry unit	3 hr <sup>4</sup>
Floor:	Reinforced concrete	3 hr*
Ceiling:	Reinforced concrete	3 hr
Access:	Doors connecting to areas 7 and 14	3 hr

- (b) Major safety-related components in fire area:

Insert (G) here.

- (1) Class IE 4-kV switchgear 10A116 (Div. 2)
- (2) Class IE instrument ac distribution panel 10Y102 (Div. 2)

- (c) Postulated fire in area:

Ignition of electrical cabling in cable tray. (As discussed in Table A-3, the ignition of electrical cabling is extremely unlikely in the absence of a fire source external to the cabling.)

- (d) Consequences of fire with active fire suppression:

The smoke generated by a fire in this area will activate the smoke detectors, which will cause an audible-visual annunciation to register on the fire protection panels in the control room. Once the alarm has been received in the control room, the plant fire brigade will be dispatched to extinguish the fire.

- (e) Effect of fire on safe shutdown:

A fire in this area will have no effect on the ability to achieve a safe shutdown on Unit 2. Since no equipment or cabling associated with shutdown methods A, B, C, or D is located in this fire area, all of these methods will remain available to safely shut Unit 2 down.

With regard to Unit 1, since no equipment or cabling associated with shutdown methods A or C is located in this

fire area, both of these methods will remain available to safely shut Unit 1 down.

Insert (H) here.

5.3.16 Fire Area 16: Unit 2 4-kV Switchgear Compartment  
(El. 239'-0")

(a) Structural and architectural design features of fire area  
(see Figure B-7):

	<u>Construction</u>	<u>Rating</u>
Walls:	N - Reinforced concrete	3 hr
	E - Concrete masonry unit	3 hr <sup>6</sup>
	S - Concrete masonry unit	3 hr
	W - Concrete masonry unit	3 hr <sup>6</sup>
Floor:	Reinforced concrete	3 hr*
Ceiling:	Reinforced concrete	3 hr
Access:	Door connecting to area 17	3 hr
	Steamtight door connecting to area 113	3 hr

(b) Major safety-related components in fire area:

Insert (J) here.

- (1) Class IE 4-kV switchgear 20A118 (Div. 4)
- (2) Class IE instrument ac distribution panel 20Y104 (Div. 4)

(c) Postulated fire in area:

Ignition of electrical cabling in cable tray. (As discussed in Table A-3, the ignition of electrical cabling is extremely unlikely in the absence of a fire source external to the cabling.)

(d) Consequences of fire with active fire suppression:

The smoke generated by a fire in this area will activate the smoke detectors, which will cause an audible-visual annunciation to register on the fire protection panels in the control room. Once the alarm has been received in the control room, the plant fire brigade will be dispatched to extinguish the fire.

(e) Effect of fire on safe shutdown:

A fire in this area will have no effect on the ability to achieve a safe shutdown on Unit 1. Since no equipment or cabling associated with shutdown methods A, B, C, or D is



located in this fire area, all of these methods will remain available to safely shut Unit 1 down.

With regard to Unit 2, since no equipment or cabling associated with shutdown methods A or C is located in this fire area, both of these methods will remain available to safely shut Unit 2 down.

Insert (K) here.

5.3.17 Fire Area 17: Unit 2 4-kV Switchgear Compartment  
(El. 239'-0")

- (a) Structural and architectural design features of fire area  
(see Figure B-7):

	<u>Construction</u>	<u>Rating</u>
Walls:	N - Concrete masonry unit	3 hr
	E - Concrete masonry unit	3 hr
	S - Concrete masonry unit	3 hr
	W - Concrete masonry unit	3 hr
Floor:	Reinforced concrete	3 hr*
Ceiling:	Reinforced concrete	3 hr
Access:	Doors connecting to areas 7 and 16	3 hr

- (b) Major safety-related components in fire area:

Insert (L) here.

- (1) Class IE 4-kV switchgear 20A116 (Div. 2)
- (2) Class IE instrument ac distribution panel 20Y102 (Div. 2)

- (c) Postulated fire in area:

Ignition of electrical cabling in cable tray. (As discussed in Table A-3, the ignition of electrical cabling is extremely unlikely in the absence of a fire source external to the cabling.)

- (d) Consequences of fire with active fire suppression:

The smoke generated by a fire in this area will activate the smoke detectors, which will cause an audible-visual annunciation to register on the fire protection panels in the control room. Once the alarm has been received in the control room, the plant fire brigade will be dispatched to extinguish the fire.

- (e) Effect of fire on safe shutdown:

A fire in this area will have no effect on the ability to achieve a safe shutdown on Unit 1. Since no equipment or cabling associated with shutdown methods A, B, C, or D is located in this fire area, all of these methods will remain available to safely shut Unit 1 down.

With regard to Unit 2, since no equipment or cabling associated with shutdown methods A or C is located in this fire area, both of these methods will remain available to safely shut Unit 2 down.

Insert (M) here.

5.3.18 Fire Area 18: Unit 2 4-kV Switchgear Compartment  
(El. 239'-0")

(a) Structural and architectural design features of fire area  
(see Figure B-7):

	<u>Construction</u>	<u>Rating</u>
Walls:	N - Reinforced concrete	3 hr (6)
	E - Concrete masonry unit	3 hr
	S - Concrete masonry unit	3 hr (6)
	W - Concrete masonry unit	3 hr (6)
Floor:	Reinforced concrete	3 hr*
Ceiling:	Reinforced concrete	3 hr
Access:	Door connecting to area 19	3 hr
	Steamtight door connecting to area 113	3 hr

(b) Major safety-related components in fire area:

Insert (N) here.

- (1) Class IE 4-kV switchgear 20A117 (Div. 3)
- (2) Class IE dc distribution panel 2CD102 (Div. 3)
- (3) Class IE instrument ac distribution panel 20Y103 (Div. 3)

(c) Postulated fire in area:

Ignition of electrical cabling in cable tray. (As discussed in Table A-3, the ignition of electrical cabling is extremely unlikely in the absence of a fire source external to the cabling.)

(d) Consequences of fire with active fire suppression:

The smoke generated by a fire in this area will activate the smoke detectors, which will cause an audible-visual annunciation to register on the fire protection panels in the control room. Once the alarm has been received in the

control room, the plant fire brigade will be dispatched to extinguish the fire.

(e) Effect of fire on safe shutdown:

A fire in this area will have no effect on the ability to achieve a safe shutdown on Unit 1. Since no equipment or cabling associated with shutdown methods A, B, C, or D is located in this fire area, all of these methods will remain available to safely shut Unit 1 down.

With regard to Unit 2, since no equipment or cabling associated with shutdown methods B or D is located in this fire area, both of these methods will remain available to safely shut Unit 2 down.

Insert (P) here.

5.3.19 Fire Area 19: Unit 2 4-kV Switchgear Compartment  
(El. 239'-0")

(a) Structural and architectural design features of fire area  
(see Figure B-7):

	<u>Construction</u>	<u>Rating</u>
Walls:	N - Concrete masonry unit	3 hr <sup>(6)</sup>
	E - Concrete masonry unit	3 hr
	S - Concrete masonry unit	3 hr
	W - Concrete masonry unit	3 hr <sup>(6)</sup>
Floor:	Reinforced concrete	3 hr*
Ceiling:	Reinforced concrete	3 hr
Access:	Doors connecting to areas 7 and 18	3 hr

(b) Major safety-related components in fire area:

Insert (Q) here.

- (1) Class IE 4-kV switchgear 20A115 (Div. 1)
- (2) Class IE dc distribution panel 2AD102 (Div. 1)
- (3) Class IE instrument ac distribution panel 20Y101 (Div. 1)

(c) Postulated fire in area:

Ignition of electrical cabling in cable tray. (As discussed in Table A-3, the ignition of electrical cabling is extremely unlikely in the absence of a fire source external to the cabling.)

(d) Consequences of fire with active fire suppression:

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The smoke generated by a fire in this area will activate the smoke detectors, which will cause an audible-visual annunciation to register on the fire protection panels in the control room. Once the alarm has been received in the control room, the plant fire brigade will be dispatched to extinguish the fire.

(e) Effect of fire on safe shutdown:

A fire in this area will have no effect on the ability to achieve a safe shutdown on Unit 1. Since no equipment or cabling associated with shutdown methods A, B, C, or D is located in this fire area, all of these methods will remain available to safely shut Unit 1 down.

With regard to Unit 2, since no equipment or cabling associated with shutdown methods B or D is located in this fire area, both of these methods will remain available to safely shut Unit 2 down.

Insert ® here.

5.3.20 Fire Area 20: Unit 1 Static Inverter Compartment  
(El. 254'-0")

(a) Structural and architectural design features of fire area  
(see Figure B-7):

	<u>Construction</u>	<u>Rating</u>
Walls:	N - Reinforced concrete	2 hr
	E - Concrete masonry unit	3 hr
	S - Reinforced concrete	3 hr
	W - Reinforced concrete	3 hr
Floor:	Reinforced concrete	3 hr
Ceiling:	Reinforced concrete	3 hr
Access:	Two doors connecting to area 22	3 hr

(b) Major safety-related components in fire area:

- (1) 125V dc power distribution panels 1BD102 (Div. 2) and 1DD102 (Div. 4)

(c) Postulated fire in area:

Ignition of electrical cabling in cable tray. (As discussed in Table A-3, the ignition of electrical cabling is extremely unlikely in the absence of a fire source external to the cabling.)

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isolation valves are in series with the high/low pressure interface valves on the RHR heat exchanger steam supply lines, the HPCI valves provide a backup isolation capability to the valves in the RHR heat exchanger steam supply lines.

The steam supply line to each RHR heat exchanger is provided with four valves to control the steam flow; the two upstream valves are mounted in parallel with each other and the two downstream valves are mounted in parallel with each other. All four of these valves are considered to be high/low pressure interface valves. The following discussion uses valve numbers that apply to RHR heat exchanger A, but is typical for RHR heat exchanger B. The RHR heat exchanger and its connected piping is protected from overpressurization by a relief valve (PSV-51-1F055A) that discharges to the suppression chamber. This relief valve has sufficient flow capacity to prevent overpressurization unless both of the downstream interface valves are open simultaneously with the larger of the upstream interface valves (HV-51-1F052A). Therefore, at least one of the downstream interface valves must be prevented from opening simultaneously with valve HV-51-1F052A. To accomplish this, the power cabling to downstream interface valve HV-C51-154A is disconnected so that fire-caused damage to the cabling cannot result in inadvertent opening of the valve.



Insert ⑤ here.



Insert (A)

Walls denoted above by the "s" symbol are capable of being rated as 3-hour fire barriers, except for unrated wall penetration assemblies associated with the 4-kV nonsegregated phase bus ducts. These penetration assemblies are described in Section 6.3. A maximum of two penetration assemblies are located in each of the walls indicated above. These walls separate fire area 12 from fire areas 13, 14, and 113.

Insert (B)

The calculations discussed in Section 6.3 indicate that the most severe fire postulated to occur in fire area 12 will not breach the bus duct penetration assemblies. In the highly unlikely event that a breach should occur, fire would not propagate through the penetration assemblies, although smoke and hot gases might do so. If the spread of smoke and hot gases into fire areas 13 and 14 causes the safe shutdown components in those areas to become inoperable, cold shutdown could still be achieved. For Unit 1, this would be accomplished by utilizing equipment powered from the Division 2 4-kV switchgear, which would remain unaffected by the fire.

Insert (C)

Walls denoted above by the "s" symbol are capable of being rated as 3-hour fire barriers, except for unrated wall penetration assemblies associated with the 4-kV nonsegregated phase bus ducts. These penetration assemblies are described in Section 6.3. A maximum of two penetration assemblies are located in each of the walls indicated above. These walls separate fire area 13 from fire areas 12 and 15.

Insert (D)

The calculations discussed in Section 6.3 indicate that the most severe fire postulated to occur in fire area 13 will not breach the bus duct penetration assemblies. In the highly unlikely event that a breach should occur, fire would not propagate through the penetration assemblies, although smoke and hot gases might do so. If the spread of smoke and hot gases into fire areas 12 and 15 causes the safe shutdown components in those areas to become inoperable, cold shutdown could still be achieved. For Unit 1, this would be accomplished by utilizing equipment powered from the Division 4 4-kV switchgear, which would remain unaffected by the fire.

Insert (E)

Walls denoted above by the "s" symbol are capable of being rated as 3-hour fire barriers, except for unrated wall penetration assemblies associated with the 4-kV nonsegregated phase bus ducts. These penetration assemblies are described in Section 6.3. A maximum of two penetration assemblies are located in each of the walls indicated above. These walls separate fire area 14 from fire areas 12 and 16.



Insert (F)

The calculations discussed in Section 6.3 indicate that the most severe fire postulated to occur in fire area 14 will not breach the bus duct penetration assemblies. In the highly unlikely event that a breach should occur, fire would not propagate through the penetration assemblies, although smoke and hot gases might do so. If the spread of smoke and hot gases into fire areas 12 and 16 causes the safe shutdown components in those areas to become inoperable, cold shutdown could still be achieved. For Unit 1, this would be accomplished by utilizing equipment powered from the Division 1 4-kV switchgear, which would remain unaffected by the fire. For Unit 2, this would be accomplished by utilizing equipment powered from the Division 1, 2, and 3 4-kV switchgear, which would remain unaffected by the fire.

Insert ⑥

Walls denoted above by the "s" symbol are capable of being rated as 3-hour fire barriers, except for unrated wall penetration assemblies associated with the 4-kV nonsegregated phase bus ducts. These penetration assemblies are described in Section 6.3. A maximum of two penetration assemblies are located in each of the walls indicated above. These walls separate fire area 15 from fire areas 13 and 17.

Insert (H)

The calculations discussed in Section 6.3 indicate that the most severe fire postulated to occur in fire area 15 will not breach the bus duct penetration assemblies. In the highly unlikely event that a breach should occur, fire would not propagate through the penetration assemblies, although smoke and hot gases might do so. If the spread of smoke and hot gases into fire areas 13 and 17 causes the safe shutdown components in those areas to become inoperable, cold shutdown could still be achieved. For Unit 1, this would be accomplished by utilizing equipment powered from the Division 3 4-kV switchgear, which would remain unaffected by the fire. For Unit 2, this would be accomplished by utilizing equipment powered from the Division 1, 3, and 4 4-kV switchgear, which would remain unaffected by the fire.

Insert (J)

Walls denoted above by the "s" symbol are capable of being rated as 3-hour fire barriers, except for unrated wall penetration assemblies associated with the 4-kV nonsegregated phase bus ducts. These penetration assemblies are described in Section 6.3. A maximum of two penetration assemblies are located in each of the walls indicated above. These walls separate fire area 16 from fire areas 14 and 18.

Insert (K)

The calculations discussed in Section 6.3 indicate that the most severe fire postulated to occur in fire area 16 will not breach the bus duct penetration assemblies. In the highly unlikely event that a breach should occur, fire would not propagate through the penetration assemblies, although smoke and hot gases might do so. If the spread of smoke and hot gases into fire areas 14 and 18 causes the safe shutdown components in those areas to become inoperable, cold shutdown could still be achieved. For Unit 2, this would be accomplished by utilizing equipment powered from the Division 1 4-kV switchgear, which would remain unaffected by the fire. For Unit 1, this would be accomplished by utilizing equipment powered from the Division 1, 2, and 3 4-kV switchgear, which would remain unaffected by the fire.



Insert (L)

Walls denoted above by the "s" symbol are capable of being rated as 3-hour fire barriers, except for unrated wall penetration assemblies associated with the 4-kV nonsegregated phase bus ducts. These penetration assemblies are described in Section 6.3. A maximum of two penetration assemblies are located in each of the walls indicated above. These walls separate fire area 17 from fire areas 15 and 19.

Insert (M)

The calculations discussed in Section 6.3 indicate that the most severe fire postulated to occur in fire area 17 will not breach the bus duct penetration assemblies. In the highly unlikely event that a breach should occur, fire would not propagate through the penetration assemblies, although smoke and hot gases might do so. If the spread of smoke and hot gases into fire areas 15 and 19 causes the safe shutdown components in those areas to become inoperable, cold shutdown could still be achieved. For Unit 2, this would be accomplished by utilizing equipment powered from the Division 3 4-kV switchgear, which would remain unaffected by the fire. For Unit 1, this would be accomplished by utilizing equipment powered from the Division 1, 3, and 4 4-kV switchgear, which would remain unaffected by the fire.

Insert (N)

Walls denoted above by the "s" symbol are capable of being rated as 3-hour fire barriers, except for unrated wall penetration assemblies associated with the 4-kV nonsegregated phase bus ducts. These penetration assemblies are described in Section 6.3. A maximum of two penetration assemblies are located in each of the walls indicated above. These walls separate fire area 18 from fire areas 16, 19, and 113.

Insert ①

The calculations discussed in Section 6.3 indicate that the most severe fire postulated to occur in fire area 18 will not breach the bus duct penetration assemblies. In the highly unlikely event that a breach should occur, fire would not propagate through the penetration assemblies, although smoke and hot gases might do so. If the spread of smoke and hot gases into fire areas 16 and 19 causes the safe shutdown components in those areas to become inoperable, cold shutdown could still be achieved. For Unit 2, this would be accomplished by utilizing equipment powered from the Division 2 4-kV switchgear, which would remain unaffected by the fire.

Insert (Q)

Walls denoted above by the "s" symbol are capable of being rated as 3-hour fire barriers, except for unrated wall penetration assemblies associated with the 4-kV nonsegregated phase bus ducts. These penetration assemblies are described in Section 6.3. A maximum of two penetration assemblies are located in each of the walls indicated above. These walls separate fire area 19 from fire areas 17 and 18.



Insert ②

The calculations discussed in Section 6.3 indicate that the most severe fire postulated to occur in fire area 19 will not breach the bus duct penetration assemblies. In the highly unlikely event that a breach should occur, fire would not propagate through the penetration assemblies, although smoke and hot gases might do so. If the spread of smoke and hot gases into fire areas 17 and 18 causes the safe shutdown components in those areas to become inoperable, cold shutdown could still be achieved. For Unit 2, this would be accomplished by utilizing equipment powered from the Division 4 4-kV switchgear, which would remain unaffected by the fire.

### 6.3 FIRE BARRIER PENETRATION ASSEMBLIES FOR 4-KV BUS DUCTS

At elev. 239 feet in the control structure, 4-kV nonsegregated phase bus ducts penetrate some of the walls that separate the 4-kV switchgear compartments (fire areas 12 through 19) from each other and from adjacent compartments. The bus ducts are either 15.4 by 36 inches or 19.4 by 36 inches in size, and are constructed of steel plate having a thickness of 0.119 inch. Inside these steel ducts, copper bus bars are supported by porcelain insulators. At each wall penetration, a smoke and hot gas barrier is provided internal to the duct. This barrier consists of a polyester resin sheet reinforced with glass fiber. Porcelain insulators are mounted in the sheet to support the bus bars that penetrate the sheet. Although it is not fire rated, the polyester and glass fiber sheet material has been tested in accordance with ASTM Standard D-229 (Method II) and shown to be flame retardant. The combination of the steel bus duct and its internal smoke and hot gas barrier constitutes a penetration assembly, equivalent to that required of the barrier. The areas of concern have a maximum equivalent fire severity of 5 minutes.