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Harold W. Keiser
Vice President-Nuclear Operations
215/770-7502

APR 18 1986

Director of Nuclear Reactor Regulation
Attention: Ms. E. Adensam, Project Director
BWR Project Directorate No. 3
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION
APPENDIX R-REVISED DEVIATION
REQUESTS 11 AND 12 Docket Nos. 50-387
PLA-2627 FILES S013,P5-1,R41-2 50-388

Dear Ms. Adensam:

As a result of discussions with your staff, attached are revised Deviation Requests No. 11 and 12.

Deviation Request No. 11 contains a generic description and justification, Legend Drawing A-205790, sheet 1, and individual case-by-case descriptions and supporting drawings C-205789, sheets 1 through 14.

Deviation Request No. 12 contains a generic description and justification, Legend Drawing A-205790, sheet 1, and individual case-by-case descriptions and supporting drawing C-205791, sheets 1 through 9.

Should you have any questions, please call.

Very truly yours,

H. W. Keiser
Vice President-Nuclear Operations

Attachment

cc: M. J. Campagnone USNRC
R. H. Jacobs USNRC

A006 1/1

Aperture Card
Dist
original w/Drawings
To: Reg File

APPENDIX R DEVIATION REQUEST

HVAC PENETRATIONS REACTOR BUILDING FIRE WALLS

DEVIATION REQUEST:

We request approval of the following:

Fire rated walls between fire areas which have a combustible load (in-situ and transient) on both sides of the wall of one hour or less are acceptable as Fire Area Boundaries without fire dampers installed in the horizontal ventilation ducts that penetrate the walls. Fire dampers are not required to be installed in the following ventilation duct penetrations in fire rated wall assemblies between Fire Area R-1A and R-1B or R-2A and R-2B:

Penetration	Fire Zone/Fire Zone
X-25-3-37	1-3A/1-3B-N
X-25-5-23	1-5B/1-4G
X-27-4-16	1-4A-S/1-4G
X-27-4-17	1-4A-S/1-4G
X-27-5-29	1-5B/1-5A-S
X-27-5-30	1-5B/1-5A-S
X-28-5-44	1-5A-W/1-5E
X-29-5-25	1-5A-W/1-5E
X-30-5-4	2-5B/2-5A-N
X-30-5-5	2-5B/2-5A-N
X-30-5-32	2-5B/2-4G
X-30-5-50	2-5B/2-5A-N
X-32-5-41	2-5B/2-5A-S
X-33-5-26	2-5A-W/2-5E
X-33-5-27	2-5A-W/2-5E

FIRE AREAS AFFECTED:

This deviation request concerns Fire Areas R-1A, R-1B, R-2A, R-2B, and R-2D.

REASON FOR DEVIATION REQUEST:

NRC guidance to 10 CFR 50, Appendix R, Section III.G.2 requires that fire areas shall have three hour barriers, and such barriers shall have fire rated dampers installed at duct penetrations. Various fire walls within the Unit 1 and Unit 2 Reactor Building have ventilation system (HVAC) duct penetrations without fire dampers thus rendering the rating of the barrier less than three hours.

EXISTING ARRANGEMENT:

The following is a description of the wall assemblies penetrated by ventilation ducts:

Fire Zone/Fire Zone	Penetration	Duct Size	Zone Sprinklered	Zone Without Duct Opening	Drawing C-205789 Reference
R-1A to R-1B					
1-3A/1-3B-N	X-25-3-37	8" x 6"	1-3A	Neither	Shts. 1&1A
1-5B/1-4G	X-25-5-23	24" x 18"	Neither	Neither	Shts. 2&2A
1-4A-S/1-4G	X-27-4-16	30" x 18"	1-4A-S	1-4A-S	Shts. 3&3A
1-4A-S/1-4G	X-27-4-17	12" x 12"	1-4A-S	Neither	Shts. 4&4A
1-5B/1-5A-S	X-27-5-29	18" x 18"	1-5A-S	Neither	Sht. 5
1-5B/1-5A-S	X-27-5-30	30" x 26"	1-5A-S	Both	Sht. 6
1-5A-W/1-5E	X-28-5-44	18" x 12"	Neither	1-5A-W	Shts. 7&7A
1-5A-W/1-5E	X-29-5-25	12" x 8"	Neither	Neither	Shts. 8&7A
R-2A to R-2B					
2-5B/2-5A-N	X-30-5-4	18" x 18"	2-5A-N	2-5A-N	Sht. 9
2-5B/2-5A-N	X-30-5-5	22" x 22"	2-5A-N	Both	Sht. 10
2-5B/2-4G	X-30-5-32	24" x 18"	Neither	2-5B	Sht. 10
2-5B/2-5A-N	X-30-5-50	30" x 26"	2-5A-N	Both	Sht.11&11A
2-5B/2-5A-S	X-32-5-41	30" x 26"	Neither	Both	Sht.12&12A
2-5A-W/2-5E	X-33-5-26	12" x 8"	2-5A-W	Neither	Sht.13&14A
2-5A-W/2-5E	X-33-5-27	18" x 12"	2-5A-W	2-5A-W	Sht.14&14A

The maximum combustible loading within either Reactor Building is 45 minutes (In-Situ and transient).

See attached sheets of drawing C-205789 for details.

JUSTIFICATION:

The National Fire Protection Association's "Fire Protection Handbook" (14th edition, page 7-69) states:

"In the gauges commonly used, some sheet metal ducts may protect an opening in a building construction assembly for up to 1-hour, if properly hung and adequately fire stopped. Therefore, ducts passing through fire barriers having a rating of up to 1-hour fire resistance can be assumed to present no extraordinary hazard. If the wall, partition, ceiling, or floor is required to have a fire resistance rating of more than 1-hour, a fire damper is required...."

The minimum 18-gauge (0.048 in. thick) sheet metal ducts used at Susquehanna (Ref: Dwg. C-1126) are heavier than the commonly used gauges referred to by the NFPA Statement. The ducts are seismically hung (Ref: Dwg C-1129 thru C-1136) and adequately fire stopped (Ref: Respective penetration drawing for each listed duct penetration on Drawing C-205789, all sheets).

In addition, NFPA 90A, Section 3-3.2.1.1 states that "Approved fire dampers shall be provided where ducts or air grills penetrate partitions required to have a fire resistance rating of 2 hours or more". Based on our calculated combustible loadings and actual combustible configurations, 1-hour fire rated walls are sufficient in the reactor buildings and therefore, the subject duct assemblies do not require fire dampers per Section 3-3.2.1.1 of NFPA 90A.

A 1-hour fire test of horizontal steel ducts without a fire damper at the fire wall penetrations was conducted by Underwriters Laboratories using ASTM E-119 criteria (See Attachment Number 1). In the test, an uninsulated galvanized steel duct assembly, 0.022 in. thick, was exposed to flames of controlled extent and severity in accordance with the Standard Time-Temperature Curve. Tests results showed no degradation of the duct assembly and no loss of integrity of the 1-hour fire barrier wall. This test confirms the validity of the NFPA statement and further assures us that our thicker gauge duct bounds the results of the test.

As outlined on the attached drawings, cables in cable tray are the primary source of combustible materials contributing to the postulated fire in each fire zone. Transient and in-situ combustibles were also examined in each affected fire zone but were determined not to be of concern. Since all of the subject duct assemblies are well above their respective floor elevations, any heat generated from transient combustibles would not be significant enough to affect the duct assemblies. The only in-situ combustibles affecting the subject duct assemblies are 26 lbs. of lube oil and 20 lbs. of grease near the containment access area in Fire Zones 1-4A and 2-4A and a total of 30 gallons of lube oil in both Fire Zones 1-5A and 2-5A. All four of the above mentioned fire zones have an automatic suppression system which would mitigate the heat generated as a result of a fire in these fire zones.

Therefore, it is our position that these ducts adequately mitigate the effects of a fire and provide at least an equivalent 1-hour fire resistance. The following descriptions and drawings (C-205789, all sheets) provide the basis for our position and address each horizontal ventilation duct penetration on an individual case by case basis. Through this case by case approach, each duct penetration is shown in its actual combustible configuration in the plant. Parameters such as nearby combustibles, direction of duct air flow, location of duct openings, sprinkler protection, HVAC system and general duct and fire zone configuration have been examined to clarify and specifically document the rationale used for this deviation request.

fm/b064i:dek

P&L FORM 3508A (1/84)

(X-XX-X) FIRE ZONE

(XX) BUILDING COLUMN LINE

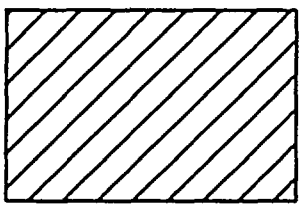
[XX] COMBUSTIBLE LOAD (MINUTES)

FPD 3 3 HOUR FIRE DAMPER

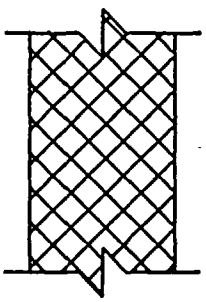
X-XX-X / XX PENETRATION NO.

SUPPLY AIR REGISTER

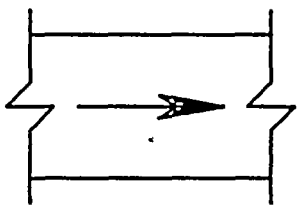
EXHAUST AIR REGISTER



FIRE RATED FLOOR



FIRE RATED WALL



AIR FLOW DIRECTION

T.O.G. = TOP OF GRATING
B.O.D. = BOTTOM OF DUCT
B.O.R. = BOTTOM OF REGISTER
B.O.T. = BOTTOM OF TRAY

XX
SECTION SHOWN ON SHEET XX

EXAMPLES:

B.O.D. EL. 772'-9" (16"X24") — DUCT SIZE

B.O.R. EL. 772'-9" (18"X26") — REGISTER SIZE

B.O.T. EL. 772'-9" 2MKA (24"X6")

CABLE TRAY IDENTIFIER — TRAY SIZE

NOTE: SIZE OF DUCTS, REGISTERS & CABLE TRAYS ARE SHOWN IN PLAN AS WIDTH X HEIGHT. EX.: (24"X6"). SHOWN IN ELEVATION VIEW AS HEIGHT X WIDTH. EX.: (6"X24").

SUSQUEHANNA S.E.S.
UNIT 1 & 2
APPENDIX "R"
DEVIATION REQUEST & LEGEND

NO. 11 - SEE DRAWING C-205789
NO. 12 - SEE DRAWING C-205791

NON-QUALITY RELATED

AREA NA	ELEV. NA	SCALE NA

PENNSYLVANIA POWER & LIGHT COMPANY
ALLENTOWN PA.

PP&L DRAWING NO.	SHEET NO.	REV.NO.
A-205790	1	0

AE DRAWING NO.
C-1695 SH. 1

REV | DESCRIPTION | DR | CH | APPROVED | DATE
0 | INITIAL ISSUE | DR | CH | APPROVED | 4-3-86

FRACTIONAL 0 1 2 2 1 0 DECIMAL CV0036

APPENDIX R
DEVIATION REQUEST NO. 11

PENETRATION: X-25-3-37
ADJACENT FIRE ZONES: 1-3A/1-3B-N
RESPECTIVE COMBUSTIBLE LOADINGS: 25/20
DUCT SIZE AT PENETRATION: 8" X 6"
VENTILATION SYSTEM: REACTOR BUILDING ZONE I SUPPLY

PENETRATION: X-25-3-37

FIRE ZONE/FIRE ZONE: 1-3A/1-3B-N

DUCT SIZE: 8" x 6"

COMBUSTIBLE LOADINGS: 25 / 20

DISCUSSION:

As shown on Shts 1 and 1A of Drawing C-205789, the duct assembly penetrates the fire barrier wall at elevation 704'-0". This penetration joins Fire Zone 1-3A with Fire Zone 1-3B-N. A supply air register is located on the face of the fire barrier wall in Fire Zone 1-3A. Fire Zone 1-3A is fully sprinklered in the area of concern.

JUSTIFICATION:

a) Fire initiated in Fire Zone 1-3A with potential to spread to Fire Zone 1-3B-N

For a fire to spread into Fire Zone 1-3B-N, it would have to enter the relatively small 8" x 6" duct counter to the direction of the air flow and travel through that duct for a distance of about 20' until the next duct opening. All of the combustibles in the fire zone are cables. Since the majority of the cable tray in the vicinity of the duct opening are above the elevation of the duct opening, any fire of a significant enough magnitude to be able to move as described above would actuate the automatic suppression system in Fire Zone 1-3A. The automatic suppression system would mitigate the heat generated by a fire in the zone. Therefore, a fire in Fire Zone 1-3A would not spread into Fire Zone 1-3B-N.

b) Fire initiated in Fire Zone 1-3B-N with potential to spread to Fire Zone 1-3A.

For a fire to spread into Fire Zone 1-3A, it would have to enter the supply air register at elevation 700'-0" in Fire Zone 1-3B-N counter to the direction of air flow and then travel through a 8" x 6" duct for a distance of about 20' to Fire Zone 1-3A. All of the combustibles in the fire zone are cables. Since the majority of the cable tray in the vicinity of the duct opening are above the elevation of the duct opening, any fire of a significant enough magnitude to be able to move as described above would actuate the automatic suppression system in Fire Zone 1-3A. The automatic suppression system would mitigate the transfer of heat into Fire Zone 1-3A. Therefore, a fire in a Fire Zone 1-3B-N would not spread into Fire Zone 1-3A.

CONCLUSION

Based on the above discussion, the physical layout of the adjacent fire zones and the combustible configuration within the fire zones, a fire damper is not required in penetration X-25-3-37.

fxm/b299i:mg

APPENDIX R
DEVIATION REQUEST NO. 11

PENETRATION: X-25-5-23
ADJACENT FIRE ZONES: 1-5B/1-4G
RESPECTIVE COMBUSTIBLE LOADINGS: 3 / 4
DUCT SIZE AT PENETRATION: 24" x 18"
VENTILATION SYSTEM: REACTOR BUILDING ZONE I EQUIPMENT COMPARTMENT (FILTERED) EXHAUST

PENETRATION: X-25-5-23

FIRE ZONE/FIRE ZONE: 1-5B/1-4G

DUCT SIZE: 24" X 18"

COMBUSTIBLE LOADINGS: 3 / 4

DISCUSSION:

As shown on Shts. 2 and 2A of Drawing C-205789, this duct assembly penetrates the P-line wall at el. 770'-1". This penetration joins Fire Zone 1-4G with Fire Zone 1-5B. An exhaust air register is located flush with the wall in Fire Zone 1-4G and another exhaust air register is located in Fire Zone 1-5B, approximately 18' away from the subject penetration.

JUSTIFICATION:

a) Fire initiated in Fire Zone 1-4G with potential to spread to Fire Zone 1-5B.

   Fire Zone 1-4G has a combustible loading of 4 minutes which is relatively low and the closest combustible is more than 10' away from the register in that room. Considering the low combustible loading of Fire Zone 1-4G and the distance from the combustible load to the exhaust air register, a fire in Fire Zone 1-4G could not spread the fire into Fire Zone 1-5B.

b) Fire initiated in Fire Zone 1-5B with potential to spread into Fire Zone 1-4G.

   Fire Zone 1-5B has a combustible loading of 3 minutes. As noted on the referenced sketch, a 12" X 4" cable tray is situated directly under the exhaust air register in Fire Zone 1-5B. To spread the fire into Fire Zone 1-4G, the fire would have to enter the register directly over the cable tray and travel counter to the direction of the air flow a distance of 18' and escape through the register in Fire Zone 1-4G. Considering the distance the fire would have to travel counter to the air flow and the low combustible loading of Fire Zone 1-4G, a fire initiated in Fire Zone 1-5B will not spread into Fire Zone 1-4G.

CONCLUSION

Based on the above discussion, the physical layout of the adjacent fire zones, and the combustible configuration within these fire zones, a fire damper is not required in penetration X-25-5-23.

fm/b092i:mg

APPENDIX R
DEVIATION REQUEST NO. 11

PENETRATION: X-27-4-16
ADJACENT FIRE ZONES: 1-4A-S/1-4G
RESPECTIVE COMBUSTIBLE LOADINGS: 15 / 4
DUCT SIZE AT PENETRATION: 30" X 18"
VENTILATION SYSTEM: REACTOR BUILDING ZONE I SUPPLY

PENETRATION: X-27-4-16

FIRE ZONE/FIRE ZONE: 1-4A-S/1-4G

DUCT SIZE: 30" x 18"

COMBUSTIBLE LOADINGS: 15 / 4

DISCUSSION:

As shown on Shts. 3 and 3A of Drawing C-205789, the duct assembly penetrates the fire barrier at elevation 743'-3". This penetration joins Fire Zone 1-4A-S with Fire Zone 1-4G. A supply air register is located in Fire Zone 1-4G near the face of the fire barrier wall. Fire Zone 1-4A-S is a fully sprinklered area.

JUSTIFICATION:

a) Fire initiated in Fire Zone 1-4G with potential to spread to Fire Zone 1-4A-S.

Fire Zone 1-4G has a combustible loading of 4 minutes with the nearest combustible (cable tray F1KY) is approximately 5' beneath the supply air register. Furthermore, after cable tray F1KY enters Zone 1-4G, it drops to a distance of approximately 7'6" beneath the supply air register. Cable tray F1KY is fire wrapped in Fire Zone 1-4A-S. Based on the low combustible loading of Fire Zone 1-4G, the distance between the supply air register and the cable tray and the fact that the duct opening is discharging air into Fire Zone 1-4G, a fire in Fire Zone 1-4G would not spread into Fire Zone 1-4A-S.

b) Fire initiated in Fire Zone 1-4A-S with potential to spread to Fire Zone 1-4G

Fire Zone 1-4A-S has a combustible loading of 15 minutes, however, the nearest opening in the HVAC duct which penetrates the fire barrier is located at El. 731'-9", approximately 25' from penetration X-27-4-16. This opening is a supply air register to the enclosed equipment airlock room in which there are no combustibles. Cable tray F1KY is fire wrapped in Fire Zone 1-4A-S. In addition, Fire Zone 1-4A-S is fully sprinklered. Actuation of the sprinkler system will mitigate the consequences of a fire in this zone. Based on the long distance between openings in the duct on this system, sprinkler protection in Fire Zone 1-4A-S, and the absence of a combustible load in Fire Zone 1-4G, a fire initiated in Fire Zone 1-4A-S would not spread into Fire Zone 1-4G.

CONCLUSION

Based on the above discussion, the physical layout of the adjacent fire zones and the combustible configuration within these fire zones, a fire damper is not required in penetration X-27-4-16.

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APPENDIX R
DEVIATION REQUEST NO. 11

PENETRATION: X-27-4-17
ADJACENT FIRE ZONES: 1-4A-S/1-4G
RESPECTIVE COMBUSTIBLE LOADINGS: 15 / 4
DUCT SIZE AT PENETRATION: 12" x 12"
VENTILATION SYSTEM: TRANSFER DUCT

PENETRATION: X-27-4-17

FIRE ZONE/FIRE ZONE: 1-4A-S/1-4G

DUCT SIZE: 12" x 12"

COMBUSTIBLE LOADINGS: 15 / 4

DISCUSSION:

As shown on Shts. 4 and 4A of Drawing C-205789, the duct assembly penetrates the fire barrier at elevation 743'0". This penetration joins fire zone 1-4A-S with fire zone 1-4G. A supply air register is located in fire zone 1-4G near the face of the fire barrier wall. This duct system is a transfer duct which supplies air from Fire Zone 1-4A-S to Fire Zone 1-4G at a rate of 500 CFM. Fire Zone 1-4A-S is a fully sprinklered area.

JUSTIFICATION:

a) Fire initiated in Fire Zone 1-4G with potential to spread to Fire Zone 1-4A-S.

   Fire Zone 1-4G has a combustible loading of 4 minutes with the nearest combustible (cable tray F1KY) located approximately 5'-2" beneath the duct supply air register. Cable tray F1KY is fire wrapped in Fire Zone 1-4A-S. After cable tray F1KY enters Fire Zone 1-4G it drops to a distance of approximately 7'3" beneath the duct supply air register. Based on the low combustible loading of Fire Zone 1-4G and the distance between the supply air register and the nearest cable tray, a fire in Fire Zone 1-4G will not spread into Fire Zone 1-4A-S.

b) Fire initiated in Fire Zone 1-4A-S with potential to spread to Fire Zone 1-4G

   Fire Zone 1-4A-S has a combustible loading of 15, however, only 1 cable tray (F1KY) is near to the duct opening. In addition, cable tray F1KY is fire wrapped in Fire Zone 1-4A-S and Fire Zone 1-4A-S has full sprinkler protection. Therefore, since there are no combustibles in the vicinity of the subject duct opening and since Fire Zone 1-4A-S is fully sprinklered, a fire initiated in Fire Zone 1-4A-S will not spread into Fire Zone 1-4G via the subject duct penetration.

CONCLUSION

Based on the above discussion, the physical layout of the adjacent fire zones and the combustible configuration within these fire zones, a fire damper is not required in penetration X-27-4-17.

fxm/b227i:mg

APPENDIX R
DEVIATION REQUEST NO. 11

PENETRATION: X-27-5-29
ADJACENT FIRE ZONES: 1-5B/1-5A-S
RESPECTIVE COMBUSTIBLE LOADINGS: 3 / 19
DUCT SIZE AT PENETRATION: 18" X 18"
VENTILATION SYSTEM: REACTOR BUILDING ZONE I SUPPLY

PENETRATION: X-27-5-29 FIRE ZONE/FIRE ZONE: 1-5A-S/1-5B

DUCT SIZE: 18" x 18" COMBUSTIBLE LOADINGS: 19 / 3

DISCUSSION:

As shown on Sht. 5 of Drawing C-205789, this duct assembly penetrates the fire barrier wall at Elevation 771'-6". This penetration joins Fire Zone 1-5A-S with Fire Zone 1-5B. A supply air register is located against the face of the fire barrier wall in Fire Zone 1-5B. Fire Zone 1-5A-S is a fully sprinklered area.

JUSTIFICATION:

a) Fire initiated in Fire Zone 1-5A-S with potential to spread to Fire Zone 1-5B.

In Fire Zone 1-5A-S, all the cable trays near the duct assembly are located above the top of the duct. Also, Fire Zone 1-5A-S is a fully sprinklered area which would mitigate the heat generated by a fire. The one opening in the duct located near the fire barrier wall is a supply air register, venting air into Fire Zone 1-5A-S. Therefore, with the cable trays being located above the duct assembly and a sprinkler system present in this area, a fire initiated in Fire Zone 1-5A-S would not spread into Fire Zone 1-5B.

b) Fire initiated in Fire Zone 1-5B with potential to spread to Fire Zone 1-5A-S.

Fire Zone 1-5B has minimal combustibles and the only combustible near the duct opening is located above the top of the duct. Also, for a fire to spread into Fire Zone 1-5A-S, it would have to travel counter to the air flow in the duct assembly. Therefore, a fire initiated in Fire Zone 1-5B would not spread into Fire Zone 1-5A-S.

CONCLUSION:

Based on the above discussion, the physical layout of the adjacent fire zones and the combustible configuration within these fire zones, a fire damper is not required in penetration X-27-5-29.

fxm/c160i:mg

APPENDIX R
DEVIATION REQUEST NO. 11

PENETRATION: X-27-5-30
ADJACENT FIRE ZONES: 1-5B/1-5A-S
RESPECTIVE COMBUSTIBLE LOADINGS: 3 / 19
DUCT SIZE AT PENETRATION: 30" x 26"
VENTILATION SYSTEM: UNIT 1 PRIMARY CONTAINMENT
DRYWELL PURGE EXHAUST TO
STANDBY GAS TREATMENT

PENETRATION: X-27-5-30 FIRE ZONE/FIRE ZONE: 1-5A-S/1-5B

DUCT SIZE: 30" x 26" COMBUSTIBLE LOADINGS: 19 / 3

DISCUSSION:

As shown on Sht. 6 of Drawing C-205789, the duct assembly penetrates the fire barrier wall at Elevation 772'-7". This penetration joins Fire Zone 1-5A-S with Fire Zone 1-5B. Fire Zone 1-5A-S is a fully sprinklered area.

JUSTIFICATION:

a) Fire initiated in Fire Zone 1-5A-S with potential to spread to Fire Zone 1-5B.

In Fire Zone 1-5A-S, there are no openings in the duct assembly. Also, Fire Zone 1-5A-S is a fully sprinklered area which would mitigate the heat generated by a fire. Consequently, a fire initiated in Fire Zone 1-5A-S would not spread to Fire Zone 1-5B.

b) Fire initiated in Fire Zone 1-5B with potential to spread to Fire Zone 1-5A-S.

Fire Zone 1-5B has 3 minutes of combustibles and the only cable tray near the duct assembly is located within the top 2" of the duct. However, with no duct openings located in Fire Zone 1-5B and no openings in the duct in sprinklered Fire Zone 1-5A-S, a fire initiated in Fire Zone 1-5B would not generate enough heat to spread into Fire Zone 1-5A-S.

CONCLUSION:

Based on the above discussion, the physical layout of the adjacent fire zones and the combustible configuration within the fire zones, a fire damper is not required in penetration X-27-5-30.

fxm/c161i:mg

APPENDIX R
DEVIATION REQUEST NO. 11

PENETRATION: X-28-5-44
ADJACENT FIRE ZONES: 1-5A-W/1-5E
RESPECTIVE COMBUSTIBLE LOADINGS: 19 / 10
DUCT SIZE AT PENETRATION: 18" X 12"
VENTILATION SYSTEM: REACTOR BUILDING ZONE I
EQUIPMENT COMPARTMENT (FILTERED)
EXHAUST

PENETRATION: X-28-5-44

FIRE ZONE/FIRE ZONE: 1-5E/1-5A-W

DUCT SIZE: 18" x 12"

COMBUSTIBLE LOADINGS: 10 / 19

DISCUSSION:

As shown on Shts. 7 and 7A of Drawing C-205789, the duct assembly penetrates the fire barrier wall at Elevation 771'-3". This penetration joins Fire Zone 1-5E with Fire Zone 1-5A-W. An exhaust air register is located against the face of the wall in Fire Zone 1-5E.

JUSTIFICATION:

a) Fire initiated in Fire Zone 1-5E with potential to spread to Fire Zone 1-5A-W.

   In Fire Zone 1-5E, there are no combustibles located within 10' of penetration X-28-5-44. Also, there are no duct openings located within 50' of the penetration in Fire Zone 1-5A-W. Therefore, a fire generated in Fire Zone 1-5E would not spread into Fire Zone 1-5A-W.

b) Fire initiated in Fire Zone 1-5A-W with potential to spread to Fire Zone 1-5E.

   As stated above, there are no openings in the duct assembly located within 50' of penetration X-28-5-44. Also, for a fire to spread through the duct into Fire Zone 1-5E, the fire would have to travel counter to the direction of air flow. Therefore, a fire in Fire Zone 1-5A-W would not spread into Fire Zone 1-5E.

CONCLUSION:

Based on the above discussion, the physical layout of the adjacent fire zones and the combustible configuration within these fire zones, a fire damper is not required in penetration X-28-5-44.

fxm/c162i:mg

APPENDIX R
DEVIATION REQUEST NO. 11

PENETRATION: X-29-5-25
ADJACENT FIRE ZONES: 1-5A-W/1-5E
RESPECTIVE COMBUSTIBLE LOADINGS: 19 / 10
DUCT SIZE AT PENETRATION: 12" x 8"
VENTILATION SYSTEM: REACTOR BUILDING ZONE I SUPPLY

PENETRATION: X-29-5-25

FIRE ZONE/FIRE ZONE: 1-5E/1-5A-W

DUCT SIZE: 12" x 8"

COMBUSTIBLE LOADINGS: 10 / 19

DISCUSSION:

As shown on Shts. 8 and 7A of Drawing C-205789, this duct assembly penetrates the fire barrier wall at elevation 766'9". This penetration joins Fire Zone 1-5E with Fire Zone 1-5A-W. A supply air register is located against the face of the fire barrier wall in Fire Zone 1-5E.

JUSTIFICATION:

a) Fire initiated in Fire Zone 1-5E with potential to spread to Fire Zone 1-5A-W.

   Fire Zone 1-5E, the nearest combustible is approximately 8' from the supply air register. For a fire to spread into Fire Zone 1-5A-W it would have to enter the register and advance in a direction counter to the air flow. Therefore, a fire initiated in Zone 1-5E does not have the capability to spread into Zone 1-5A-W.

b) Fire initiated in Fire Zone 1-5A-W with potential to spread to Fire Zone 1-5E.

   Fire Zone 1-5A-W is a fully sprinklered area and there are no openings in the duct assembly in this zone. There are minimal combustibles in the vicinity of the duct. In addition, the direction of air flow in the duct is from Fire Zone 2-5B into Fire Zone 2-5A-N. Therefore, a path is not available for the heat generated by a fire in Fire Zone 1-5A-W to spread into Fire Zone 1-5E.

CONCLUSION

Based on the above discussion, the physical layout of the adjacent fire zones and the combustible configuration within these fire zones, a fire damper is not required in penetration X-29-5-25.

fxm/c163i:mg

APPENDIX R
DEVIATION REQUEST NO. 11

PENETRATION: X-30-5-4
ADJACENT FIRE ZONES: 2-5B/2-5A-N
RESPECTIVE COMBUSTIBLE LOADINGS: 3 / 18
DUCT SIZE AT PENETRATION: 18" x 18"
VENTILATION SYSTEM: REACTOR BUILDING ZONE II SUPPLY

PENETRATION: X-30-5-4

FIRE ZONE/FIRE ZONE: 2-5B/2-5A-N

DUCT SIZE: 18" x 18"

COMBUSTIBLE LOADINGS: 3 / 18

DISCUSSION:

As shown on Sht. 9 of Drawing C-205789, the duct assembly penetrates the fire barrier at elevation 770'9". This penetration joins Fire Zone 2-5B with Fire Zone 2-5A-N. A supply air register is located in Fire Zone 2-5B at the face of the fire barrier wall. Fire Zone 2-5A-N is a fully sprinklered area.

JUSTIFICATION:

a) Fire initiated in Zone 2-5B with potential to spread to Zone 2-5A-N.

Fire Zone 2-5B has a combustible loading of 3 minutes and the nearest combustible to the duct supply air register is cable tray E2KK which is located above the top of the duct and is also offset horizontally from the duct by approximately 6'. Based on the elevation of the tray being above that of the duct and the duct consisting of a supply air register, a fire initiated in Fire Zone 2-5B would not have a path to spread fire to Fire Zone 2-5A-N.

b) Fire initiated in Zone 2-5A-N with potential to spread to Zone 2-5B

In Fire Zone 2-5A-N, the distance from the first duct register opening in Fire Zone 2-5A-N to the subject penetration is greater than 35'. Also, the supply air register into Fire Zone 2-5B is not in the immediate vicinity of any combustibles. In addition, Fire Zone 2-5A-N is a fully sprinklered area which would minimize the heat buildup in this area. Therefore, a fire initiated in Fire Zone 2-5A-N would not spread into Fire Zone 2-5B.

CONCLUSION

Based on the above discussion, the physical layout of the adjacent fire zones and the combustible configuration within these fire zones, a fire damper is not required in penetration X-30-5-4.

fxm/b274i:mg

APPENDIX R
DEVIATION REQUEST NO. 11

PENETRATION:	X-30-5-5	X-30-5-32
ADJACENT FIRE ZONES:	2-5B/2-5A-N	2-5B/2-4G
RESPECTIVE COMBUSTIBLE LOADINGS:	3 / 18	3 / 4
DUCT SIZE AT PENETRATION:	22" x 22"	24" x 18"
VENTILATION SYSTEM:	REACTOR BUILDING ZONE II EQUIPMENT COMPARTMENT (FILTERED) EXHAUST	REACTOR BUILDING ZONE II EQUIPMENT COMPARTMENT (FILTERED) EXHAUST

PENETRATION: X-30-5-5 FIRE ZONE/FIRE ZONE: 2-5B/2-5A-N

DUCT SIZE: 22" x 22" COMBUSTIBLE LOADINGS: 3 / 18

DISCUSSION:

As shown on Sht. 10 of attached drawing C-205789, the duct assembly penetrates the fire barrier wall at elevation 773'-3". This penetration joins Fire Zone 2-5B with Fire Zone 2-5A-N. Fire Zone 2-5A-N is a fully sprinklered area.

JUSTIFICATION:

a) Fire initiated in Fire Zone 2-5B with potential to spread to Fire Zone 2-5A-N.

Fire Zone 2-5B has a low combustible loading of 3 minutes and the combustibles located near the duct assembly are cable trays E2KK and 2MKB. Although these trays are located directly under the duct, there are no openings in the duct assembly in Fire Zone 2-5B and the combustible configuration of these trays would not cause sufficient heat build up to burn through the duct assembly in Fire Zone 2-5B and spread to Fire Zone 2-5A-N.

b) Fire initiated in Fire Zone 2-5A-N with potential to spread into Fire Zone 2-5B.

There are no openings in the duct assembly in Fire Zone 2-5A-N for at least 25' from penetration X-30-5-5. In addition, Fire Zone 2-5A-N is a fully sprinklered area. Therefore, there would not be sufficient heat for a fire to spread from Fire Zone 2-5A-N in a direction counter to the air flow into Fire Zone 2-5B.

As this duct assembly continues, it enters Fire Zone 2-4G, which also must be separated from Fire Zone 2-5A-N. However, using the same reasoning as in the above paragraph, a fire in Fire Zone 2-5A-N would not have a path capable of spreading fire to Fire Zone 2-4G.

CONCLUSION

Based on the above discussion, the physical layout of the adjacent fire zones and the combustible configuration within these fire zones, a fire damper is not required in penetration X-30-5-5.

fxm/b341i:mg

PENETRATION: X-30-5-32

FIRE ZONE/FIRE ZONE: 2-5B/2-4G

DUCT SIZE: 24" x 18"

COMBUSTIBLE LOADINGS: 3 / 4

DISCUSSION:

As shown on Sht. 10 of Drawing C-205789, the duct assembly penetrates the fire barrier at elevation 773'3". This penetration joins Fire Zone 2-5B with Fire Zone 2-4G. An exhaust air register is located within zone 2-4G.

JUSTIFICATION:

a) Fire initiated in Fire Zone 2-4G with potential to spread to Fire Zone 2-5B

Fire Zones 2-4G and 2-5B have combustible loadings of 4 minutes and 3 minutes respectively and there are no combustible loads within 5' of the duct assembly in Fire Zone 2-4G. There are also no openings in the duct in Fire Zone 2-5B. Therefore, a fire in Fire Zone 2-4G does not have the capability to spread into Fire Zone 2-5B.

As this duct continues, it enters Fire Zone 2-5A-N, which also must be separated from Fire Zone 2-4G. The duct opening in Fire Zone 2-5A-N is greater than 40' away from the exhaust air register in Fire Zone 2-4G. Fire Zone 2-5A-N is also a fully sprinklered area. Based on the absence of combustibles near the inlet register in Fire Zone 2-4G, the long distance between the exhaust air register in Fire Zone 2-4G and the duct opening in Fire Zone 2-5A-N and the fact that Fire Zone 2-5A-N is sprinklered, a fire developed in Fire Zone 2-4G will not spread into Fire Zone 2-5A-N.

b) Fire initiated in Fire Zone 2-5B with potential to spread into Fire Zone 2-4G.

As stated previously, both affected Fire Zones have low combustible loadings and there are no openings in the duct in Fire Zone 2-5B. In addition, the direction of the air flow in the duct is away from the exhaust air register in Fire Zone 2-4G. Therefore, a fire developed in Fire Zone 2-5B will not spread into Fire Zone 2-4G.

CONCLUSION

Based on the above discussion, the physical layout of the adjacent fire zones and the combustible configuration within these fire zones, a fire damper is not required in penetration X-30-5-32.

fxm/b226i:mg

APPENDIX R
DEVIATION REQUEST NO. 11

PENETRATION: X-30-5-50
ADJACENT FIRE ZONES: 2-5B/2-5A-N
RESPECTIVE COMBUSTIBLE LOADINGS: 3 / 4
DUCT SIZE AT PENETRATION: 30" x 26"
VENTILATION SYSTEM: UNIT 2 PRIMARY CONTAINMENT
DRYWELL PURGE EXHAUST TO
STANDBY GAS TREATMENT

PENETRATION: X-30-5-50

FIRE ZONE/FIRE ZONE: 2-5B/2-5A-N

DUCT SIZE: 30" x 26"

COMBUSTIBLE LOADINGS: 3 / 4

DISCUSSION:

As shown on Shts. 11 and 11A of Drawing C-205789, this duct assembly penetrates the fire barrier wall at elevation 770'9". This penetration joins Fire Zone 2-5B with Fire Zone 2-5A-N. There are no duct openings in either fire zone. Fire Zone 2-5A-N is a fully sprinklered area.

JUSTIFICATION:

a) Fire initiated in Fire Zone 2-5B with potential to spread to Fire Zone 2-5A-N.

   Fire Zone 2-5B has a low combustible loading of 3 minutes with the nearest combustible being approximately 5' from the duct assembly. Also, there are no openings in the duct assembly in this zone. Therefore, a fire initiated in Zone 2-5B would not spread into Fire Zone 2-5A-N.

b) Fire initiated in Fire Zone 2-5A-N with potential to spread to Fire Zone 2-5B

   Fire Zone 2-5A-N is a fully sprinklered area and there are no openings in the duct assembly in this zone. There are minimal combustibles in the vicinity of the duct. In addition, the direction of air flow in the duct is from Fire Zone 2-5B into Fire Zone 2-5A-N. Therefore, a fire initiated in Fire Zone 2-5A-N would not spread into Fire Zone 2-5B.

CONCLUSION

Based on the above discussion, the physical layout of the adjacent fire zones and the combustible configuration within these fire zones, a fire damper is not required in penetration X-30-5-50.

fxm/b298i:mg

APPENDIX R
DEVIATION REQUEST NO. 11

PENETRATION: X-32-5-41
ADJACENT FIRE ZONES: 2-5A-S/2-5B
RESPECTIVE COMBUSTIBLE LOADINGS: 18 / 3
DUCT SIZE AT PENETRATION: 30" x 26"
VENTILATION SYSTEM: UNIT 2 PRIMARY CONTAINMENT
DRYWELL PURGE EXHAUST TO
STANDBY GAS TREATMENT

PENETRATION: X-32-5-41

FIRE ZONE/FIRE ZONE: 2-5A-S/2-5B

DUCT SIZE: 30" x 26"

COMBUSTIBLE LOADINGS: 18 / 3

DISCUSSION:

As shown on Shts. 12 and 12A of Drawing C-205789, the duct assembly penetrates the fire barrier at Elevation 769'-9". This penetration joins Fire Zone 2-5A-S with Fire Zone 2-5B. There are no duct openings in either Fire Zone.

JUSTIFICATION:

a) Fire initiated in Fire Zone 2-5A-S with potential to spread to Fire Zone 2-5B.

   There are no openings in the duct assembly in Fire Zone 2-5A-S and the only combustibles near the duct assembly are on the side and above the duct. Therefore, sufficient concentrated combustibles do not exist to spread a fire into Fire Zone 2-5B.

b) Fire initiated in Fire Zone 2-5B with potential to spread to Fire Zone 2-5A-S.

   The duct assembly in Fire Zone 2-5B has no openings. The combustible loading in this zone is 3 minutes and there are no combustibles within 5' of the duct. Therefore, a fire initiated in Fire Zone 2-5B would not spread into Fire Zone 2-5A-S.

CONCLUSION:

Based on the above discussion, the physical layout of the adjacent Fire Zones and the combustible configuration within the fire zones, a fire damper is not required in penetration X-32-5-41.

fxm/b313i:dek

APPENDIX R
DEVIATION REQUEST NO. 11

PENETRATION: X-33-5-26
ADJACENT FIRE ZONES: 2-5A-W/2-5E
RESPECTIVE COMBUSTIBLE LOADINGS: 18 / 9
DUCT SIZE AT PENETRATION: 12" x 8"
VENTILATION SYSTEM: REACTOR BUILDING ZONE II SUPPLY

PENETRATION: X-33-5-26

FIRE ZONE/FIRE ZONE: 2-5A-W/2-5E

DUCT SIZE: 12" X 8"

COMBUSTIBLE LOADINGS: 18 / 9

DISCUSSION:

As shown on Shts. 13 & 14A of Drawing C-205789, this duct assembly penetrates the fire barrier wall at elevation 767'1". This penetration joins Fire Zone 2-5A-W with Fire Zone 2-5E. A supply air register is located in Fire Zone 2-5E near the face of the fire barrier wall. Fire Zone 2-5A-W is a fully sprinklered area.

JUSTIFICATION:

a) Fire initiated in Fire Zone 2-5E with potential to spread to Fire Zone 2-5A-W.

   All combustibles in Fire Zone 2-5E are cables. There are no combustibles located within 5' of the supply air register and since the duct opening is discharging air into Fire Zone 2-5E, a fire in Fire Zone 2-5E would not spread into Fire Zone 2-5A-W.

b) Fire initiated in Fire Zone 2-5A-W with potential to spread into Fire Zone 2-5E.

   All combustibles in Fire Zone 2-5A-W are cables. As shown on the elevation view of this duct (Sht. 14A, Drawing C-205789 for penetration X-33-5-27), three cable trays are located under the subject duct assembly. These trays are located near the supply air register at elevation 762'10". With the supply air register being located below the bottom of the cable tray, a fire would not spread from the cable tray, through the supply air register and then into Fire Zone 2-5E to combustibles 5 feet away from the supply air register. In addition, the sprinkler protection in Fire Zone 2-5A-W would mitigate the spread of fire into Fire Zone 2-5E.

CONCLUSION

Based on the above discussion, the physical layout of the adjacent fire zones and the combustible configuration within the fire zones, a fire damper is not required in penetration X-33-5-26.

fxm/b250i:mg

APPENDIX R
DEVIATION REQUEST NO. 11

PENETRATION: X-33-5-27
ADJACENT FIRE ZONES: 2-5A-W/2-5E
RESPECTIVE COMBUSTIBLE LOADINGS: 18 / 9
DUCT SIZE AT PENETRATION: 18" x 12"
VENTILATION SYSTEM: REACTOR BUILDING ZONE II
EQUIPMENT COMPARTMENT (FILTERED)
EXHAUST

PENETRATION: X-33-5-27

FIRE ZONE/FIRE ZONE: 2-5A-W/2-5E

DUCT SIZE: 18" x 12"

COMBUSTIBLE LOADINGS: 18 / 9

DISCUSSION:

As shown on Shts. 14 and 14A of Drawing C-205789, the duct assembly penetrates the fire barrier wall at elevation 769'0". This penetration joins Fire Zone 2-5A-W with Fire Zone 2-5E. An exhaust air register is located at the face of the wall in Fire Zone 2-5E. Fire Zone 2-5A-W is a fully sprinklered area.

JUSTIFICATION:

a) Fire initiated in Fire Zone 2-5E with potential to spread to Fire Zone 2-5A-W

All combustibles in Fire Zone 2-5E are cables. Two cable trays are located relatively close to the exhaust air register in Fire Zone 2-5E. If a fire were to persist in Fire Zone 2-5E, the fire could begin to enter the exhaust register in Fire Zone 2-5E. However, since there are no openings in this duct assembly in the direction of air flow in Fire Zone 2-5A-W and since Fire Zone 2-5A-W is protected by sprinklers, a path does not exist to spread the fire into Fire Zone 2-5A-W.

b) Fire initiated in Fire Zone 2-5A-W with potential to spread to Fire Zone 2-5E.

All combustibles in the Fire Zone 2-5A-W are cables. There are three cable trays in the vicinity of this duct. One is approximately six feet from the subject penetration. The other two are shielded from the penetration by other ducts. There are no openings in the subject duct assembly in Fire Zone 2-5A-W and since Fire Zone 2-5A-W is protected by sprinklers, there would be no path to spread a fire into Fire Zone 2-5E through penetration X-33-5-27.

CONCLUSION

Based on the above discussion, the physical layout of the adjacent fire zones and the combustible configuration within these fire zones, a fire damper is not required in penetration X-33-5-27.

fxm/b256i:mg

APPENDIX R DEVIATION REQUEST

FIRE BARRIER WITHOUT FIRE DAMPERS IN VERTICAL VENTILATION DUCT PENETRATIONS

DEVIATION REQUEST:

We request approval of the following:

Fire dampers are not required to be installed in the following ventilation duct penetrations in fire rated floor/ceiling assemblies between Fire Area R-1A and R-1B or R-2A and R-2B:

Penetration	Fire Zone/Fire Zone
X-27-6-17	1-5A-S/1-6A
X-27-6-18	1-5A-S/1-6A
X-27-6-50	1-5A-S/1-6A
X-27-6-51	1-5A-S/1-6A
X-27-6-83	1-5A-S/1-6A
X-28-5-66	1-4A-W/1-5A-W
X-29-5-34	1-4A-W/1-5A-S
X-29-5-54	1-4A-W/1-5A-S
X-34-5-4	2-4A-S/2-5A-W

FIRE AREAS AFFECTED:

This deviation request concerns Fire Areas R-1A, R-1B, R-2A, and R-2B.

REASON FOR DEVIATION REQUEST:

The requirements of 10 CFR 50, Appendix R, Section III.G. requires fire rated barriers between fire areas. The guidance documents provided by the NRC indicate these barriers shall be rated for 3-hours fire resistance and ventilation ducts that penetrate such barriers shall have fire dampers installed. The floor/ceiling assemblies identified to be upgraded in PP&L's September 4, 1985 response (PLA-2529) contain ventilation duct penetrations which do not contain fire dampers.

EXISTING ARRANGEMENT:

The following is a description of the floor/ceiling assemblies penetrated by ventilation ducts:

Fire Zone/Fire Zone	Penetration	Duct Size	Zone Sprinklered	Zone Without Duct Opening	Drawing C-205791 Reference
R-1A to R-1B					
1-5A-S/1-6A	X-27-6-17	26" Dia.	1-5A-S	1-6A	Shts.1,1A&1B
1-5A-S/1-6A	X-27-6-18	32" Dia.	1-5A-S	Both	Shts.2,2A&2B
1-5A-S/1-6A	X-27-6-50	30" x 20"	1-5A-S	1-5A-S	Shts.3,3A&3B
1-5A-S/1-6A	X-27-6-51	30" x 20"	1-5A-S	1-5A-S	Shts.4,4A&4B
1-5A-S/1-6A	X-27-6-83	20" x 8"	1-5A-S	1-6A	Shts.5,5A&5B
1-4A-W/1-5A-W	X-28-5-66	22" x 22"	1-4A-W	Both	Shts.6,6A&6B
1-4A-W/1-5A-S	X-29-5-34	36" Dia.	Both	Both	Shts.7,7A,7B&7C
1-4A-W/1-5A-S	X-29-5-54	22" x 22"	Both	Both	Shts.8,8A&8B
R-2A to R-2B					
2-4A-S/2-5A-W	X-34-5-4	40" x 28"	Both	Both	Shts.9,9A&9B

The maximum combustible loading within either Reactor Building is 45 minutes (In-Situ and transient).

See attached sketches for details.

JUSTIFICATION:

The National Fire Protection Association's "Fire Protection Handbook" (14th edition, page 7-69) states:

"In the gauges commonly used, some sheet metal ducts may protect an opening in a building construction assembly for up to 1-hour, if properly hung and adequately fire stopped. Therefore, ducts passing through fire barriers having a rating of up to 1-hour fire resistance can be assumed to present no extraordinary hazard. If the wall, partition, ceiling, or floor is required to have a fire resistance rating of more than 1-hour, a fire damper is required...."

The minimum 18 gauge (0.048 in. thick) sheet metal ducts used at Susquehanna (Ref: Dwg. C-1126) are heavier than the commonly used gauges referred to by the NFPA statement. The ducts are seismically hung (Ref: Dwg. C-1129 thru C-1136) and adequately fire stopped (Ref: Respective penetration drawing for each listed duct penetration on Drawing C-205791, all sheets).

It is our position that these ducts adequately mitigate fire spread and provide at least an equivalent 1-hour fire resistance. The following descriptions and drawings (C-205791, all sheets) provide the basis for our position and address each ventilation duct penetration on an individual case by case basis. Through this case by case approach, each duct penetration is shown in its actual combustible configuration in the plant. Parameters such as nearby combustibles, direction of duct air flow, location of duct openings, sprinkler protection, HVAC system and general duct and fire zone configuration have been examined to clarify and document the reasoning used for this deviation request.

fm/b080i:dek

P&L FORM 3500A (1/84)

X-XX-X FIRE ZONE

XX BUILDING COLUMN LINE

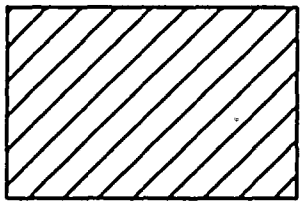
XX COMBUSTIBLE LOAD (MINUTES)

FPD 3 3 HOUR FIRE DAMPER

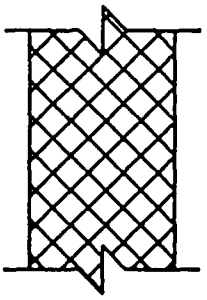
X-XX-X / XX PENETRATION NO.

SUPPLY AIR REGISTER

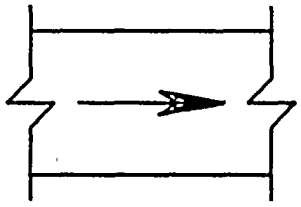
EXHAUST AIR REGISTER



FIRE RATED FLOOR



FIRE RATED WALL



AIR FLOW DIRECTION

T.O.G. = TOP OF GRATING
B.O.D. = BOTTOM OF DUCT
B.O.R. = BOTTOM OF REGISTER
B.O.T. = BOTTOM OF TRAY

XX
SECTION SHOWN ON SHEET XX

EXAMPLES:

B.O.D. EL. 772'-9" (16"X24") — DUCT SIZE

B.O.R. EL. 772'-9" (18"X26") — REGISTER SIZE

B.O.T. EL. 772'-9" 2MKA (24"X6")

CABLE TRAY IDENTIFIER — TRAY SIZE

NOTE: SIZE OF DUCTS, REGISTERS & CABLE TRAYS ARE SHOWN IN PLAN AS WIDTH X HEIGHT. EX.: (24"X6"). SHOWN IN ELEVATION VIEW AS HEIGHT X WIDTH. EX.: (6"X24").

SUSQUEHANNA S.E.S.
UNIT 1 & 2
APPENDIX "R"
DEVIATION REQUEST & LEGEND
NO. 11 - SEE DRAWING C-205789
NO. 12 - SEE DRAWING C-205791

NON-QUALITY RELATED

AREA NA	ELEV. NA	SCALE NA

PENNSYLVANIA POWER & LIGHT COMPANY
ALLENTOWN PA.

PP&L DRAWING NO.	SHEET NO.	REV.NO.
A-205790	1	0

AE DRAWING NO.
C-1695 SH. 1

REV | DESCRIPTION | DR | CH | APPROVED | DATE
0 | INITIAL ISSUE | BAD | TAG | TAG | 4-3-86

FRACTIONAL 0 1 2 2 1 0 DECIMAL CV0038

APPENDIX R
DEVIATION REQUEST NO. 12

PENETRATION: X-27-6-17
ADJACENT FIRE ZONES: 1-5A-S/1-6A
RESPECTIVE COMBUSTIBLE LOADINGS: 19 / 6
DUCT SIZE AT PENETRATION: 26" DIAMETER
VENTILATION SYSTEM: REACTOR BUILDING STANDBY GAS TREATMENT SYSTEM SUCTION FROM RECIRCULATION SYSTEM

PENETRATION: X-27-6-17 FIRE ZONE/FIRE ZONE: 1-5A-S/1-6A

DUCT SIZE: 26" Diameter COMBUSTIBLE LOADINGS: 19/ 6

DISCUSSION:

As shown on Shts. 1, 1A and 1B of Drawing C-205791, the duct assembly penetrates the fire barrier floor at elevation 779'1". This penetration joins Fire Zone 1-5A-S with Fire Zone 1-6A. Fire Zone 1-5A-S is a fully sprinklered area.

JUSTIFICATION:

a) Fire initiated in Fire Zone 1-5A-S with potential to spread to Fire Zone 1-6A.

All of the combustibles in the vicinity of the duct assembly are cables. There are no duct openings in either Fire Zone 1-5A-S or Fire Zone 1-6A. A fire initiated in Fire Zone 1-5A-S would be mitigated by the automatic suppression system in that fire zone. Therefore, a fire initiated in Fire Zone 1-5A-S would not spread into Fire Zone 1-6A.

b) Fire initiated in Fire Zone 1-6A with potential to spread to Fire Zone 1-5A-S.

All of the combustibles in the vicinity of the duct assembly are cables. There are no openings in the duct in either Fire Zone 1-6A or Fire Zone 1-5A-S. For a fire to spread from Fire Zone 1-6A to Fire Zone 1-5A-S, it would have to burn downwards and against the direction of air flow in the duct assembly. Also, heat generated by the fire that would spread into Fire Zone 1-5A-S would be mitigated by the automatic sprinkler system in Fire Zone 1-5A-S. Therefore, a fire initiated in Fire Zone 1-6A would not spread into Fire Zone 1-5A-S.

CONCLUSION

Based on the above conclusion, the physical layout of the adjacent fire zones, and the combustible configuration within the fire zones, a fire damper is not required in penetration X-27-6-17.

fxm/b298i:mg

APPENDIX R .
DEVIATION REQUEST NO. 12

PENETRATION: X-27-6-18
ADJACENT FIRE ZONES: 1-5A-S/1-6A
RESPECTIVE COMBUSTIBLE LOADINGS: 19 / 6
DUCT SIZE AT PENETRATION: 32" DIAMETER
VENTILATION SYSTEM: UNIT 1 PRIMARY CONTAINMENT
DRYWELL AND SUPPRESSION POOL
PURGE EXHAUST TO STANDBY
GAS TREATMENT

PENETRATION: X-27-6-18 FIRE ZONE/FIRE ZONE: 1-5A-S/1-6A

DUCT SIZE: 32" Diameter COMBUSTIBLE LOADINGS: 19/6

DISCUSSION:

As shown on sheets 2, 2A and 2B of drawing C-205791, the duct assembly penetrates the fire barrier floor/ceiling it elevation 779'-1". This penetration joins Fire Zone 1-5A-S with Fire Zone 1-6A. There are no openings in the duct assembly in Fire Zone 1-5A-S or Fire Zone 1-6A. Fire Zone 1-5A-S is fully protected by an automatic suppression system.

JUSTIFICATION:

a) Fire initiated in Fire Zone 1-5A-S with potential to spread to Fire Zone 1-6A.

All of the combustibles in the vicinity of the duct assembly are cables. There are no openings in the duct assembly in Fire Zone 1-5A-S and heat generated as a result of a fire in Fire Zone 1-5A-S would be suppressed by the automatic sprinkler system. Therefore, a fire initiated in Fire Zone 1-5A-S would not spread into Fire Zone 1-6A.

b) Fire initiated in Fire Zone 1-6A with potential to spread to Fire Zone 1-5A-S.

There are no openings in the duct assembly in Fire Zone 1-6A and there are no combustibles located near the duct penetration of the 779'-1" floor slab in Fire Zone 1-6A. For a fire to spread into Fire Zone 1-5A-S, it would have to travel counter to the direction of air flow in the duct and the automatic suppression system in Fire Zone 1-5A-S would mitigate heat transmitted to in Fire Zone 1-5A-S as a result of a fire in Fire Zone 1-6A. Therefore, a Fire in Fire Zone 1-6A would not spread into Fire Zone 1-5A-S.

CONCLUSION:

Based on the above discussion the physical layout of the adjacent Fire Zones and the combustible configuration within the Fire Zones, a fire damper is not required in penetration X-27-6-18.

fmc/c134i:ncr

APPENDIX R
DEVIATION REQUEST NO. 12

PENETRATION: X-27-6-50
ADJACENT FIRE ZONES: 1-5A-S/1-6A
RESPECTIVE COMBUSTIBLE LOADINGS: 19 / 6
DUCT SIZE AT PENETRATION: 30" x 20"
VENTILATION SYSTEM: REACTOR BUILDING ZONE III
UNFILTERED EXHAUST

PENETRATION: X-27-6-50 FIRE ZONE/FIRE ZONE: 1-5A-S/1-6A

DUCT SIZE: 30" x 20" COMBUSTIBLE LOADINGS: 19 / 6

DISCUSSION:

As shown on Shts. 3, 3A & 3B of Drawing C-205791, the duct assembly penetrates the fire barrier floor/ceiling at elevation 779'-1". This penetration joins Fire Zone 1-5A-S with Fire Zone 1-6A. Fire Zone 1-5A-S has full sprinkler protection.

JUSTIFICATION:

a) Fire initiated in Fire Zone 1-5A-S with potential to spread to Fire Zone 1-6A.

There are no combustibles located near the duct assembly in Fire Zone 1-5A-S and there are no openings in the duct assembly in Fire Zone 1-5A-S. In addition, any fire initiated in Fire Zone 1-5A-S would be suppressed by the automatic sprinkler system in that zone. Therefore, a fire initiated in Fire Zone 1-5A-S would not spread into Fire Zone 1-6A.

b) Fire initiated in Fire Zone 1-6A with potential to spread to Fire Zone 1-5A-S.

Fire Zone 1-6A has a relatively low combustible loading of 6 minutes and there are no combustibles in the immediate area of the duct assembly. There are no openings in the duct in Fire Zone 1-6A, however, there is an exhaust air register in adjacent Fire Zone 1-6I. There are no combustibles located near this exhaust air register. In any event, heat transmitted to Fire Zone 1-5A-S as a result of a fire in Fire Zone 1-6A would be mitigated by the automatic suppression system in Fire Zone 1-5A-S. Therefore, a fire initiated in Fire Zone 1-6A would not spread into Fire Zone 1-5A-S.

CONCLUSION:

Based on the above discussion, the physical layout of the adjacent fire zones, and the combustible configuration within these zones, a fire damper is not required in penetration X-27-6-50.

fxm/c177i:mg

APPENDIX R
DEVIATION REQUEST NO. 12

PENETRATION: X-27-6-51
ADJACENT FIRE ZONES: 1-5A-S/1-6A
RESPECTIVE COMBUSTIBLE LOADINGS: 19 / 6
DUCT SIZE AT PENETRATION: 30" x 20"
VENTILATION SYSTEM: REACTOR BUILDING ZONE III SUPPLY

PENETRATION: X-27-6-51 FIRE ZONE/FIRE ZONE: 1-5A-S/1-6A

DUCT SIZE: 30" x 20" COMBUSTIBLE LOADINGS: 19 / 6

DISCUSSION:

As shown on Shts. 4, 4A and 4B of Drawing C-205791, the duct assembly penetrates the fire barrier floor/ceiling at elevation 779'1". This penetration joins Fire Zone 1-5A-S with Fire Zone 1-6A. Fire Zone 1-5A-S has full sprinkler protection.

JUSTIFICATION:

a) Fire initiated in Fire Zone 1-5A-S with potential to spread to Fire Zone 1-6A.

There are no openings in the duct assembly in Fire Zone 1-5A-S and there are no combustibles in the vicinity of duct assembly in this fire zone. Furthermore, any fire initiated in Fire Zone 1-5A-S would be suppressed by the automatic sprinkler system. Therefore, a fire initiated in Fire Zone 1-5A-S would not spread into Fire Zone 1-6A.

b) Fire initiated in Fire Zone 1-6A with potential to spread to Fire Zone 1-5A-S.

Fire Zone 1-6A has a relatively low combustible loading of 6 minutes. The two openings in the duct assembly near penetration X-27-6-5 are both supply air registers. Any heat or flame generated as a result of a fire in Fire Zone 1-6A would have to travel through the duct counter to the direction of air flow and burn through the duct in order to enter Fire Zone 1-5A-S. The automatic suppression system would mitigate heat transmitted to Fire Zone 1-5A-S. Therefore, a fire initiated in Fire Zone 1-6A would not spread into Fire Zone 1-5A-S.

CONCLUSION:

Based on the above discussion, the physical layout of the adjacent fire zones, and the combustible configuration within these fire zones, a fire damper is not required in penetration X-27-6-51.

fxm/c178i:mg

PENETRATION: X-27-6-83
ADJACENT FIRE ZONES: 1-5A-S/1-6A
RESPECTIVE COMBUSTIBLE LOADINGS: 19 / 6
DUCT SIZE AT PENETRATION: 20" x 8 "
VENTILATION SYSTEM: REACTOR BUILDING HVAC
ZONE I EQUIPMENT
COMPARTMENT (FILTERED)
EXHAUST SYSTEM

Note: THIS DUCT SECTION HAS
BEEN BLANKED OFF AND
ABANDONED IN PLACE.

PENETRATION: X-27-6-83 FIRE ZONE/FIRE ZONE: 1-5A-S/1-6A

DUCT SIZE: 20" x 8" COMBUSTIBLE LOADINGS: 19 / 6

DISCUSSION:

As shown on Shts. 5, 5A & 5B of Drawing C-205791, the duct assembly penetrates the fire barrier floor/ceiling at elevation 779'-1". This penetration joins Fire Zone 1-5A-S with Fire Zone 1-6A. Fire Zone 1-5A-S has full sprinkler protection. It should be noted that this duct section has been blanked off at elevation 780'-1" and has been abandoned in place.

JUSTIFICATION:

a) Fire initiated in Fire Zone 1-5A-S with potential to spread to Fire Zone 1-6A.

There are no openings in the duct assembly in Fire Zone 1-5A-S and significant heat generated by a fire in Fire Zone 1-5A-S would be mitigated by the automatic suppression system in Fire Zone 1-5A-S. Therefore, a fire initiated in Fire Zone 1-5A-S would not spread into Fire Zone 1-6A.

b) Fire initiated in Fire Zone 1-6A with potential to spread to Fire Zone 1-5A-S.

The duct assembly is capped 1 foot above its floor penetration in Fire Zone 1-5A and there are no combustibles in the vicinity of this 1 foot length of duct. Therefore, a fire initiated in Fire Zone 1-6A would not spread into Fire Zone 1-5A-S.

CONCLUSION:

Based on the above discussion, the physical layout of the adjacent fire zones and the combustible configuration within these zones, a fire damper is not required in penetration X-27-6-83.

fxm/c198i:mg

APPENDIX R
DEVIATION REQUEST NO. 12

PENETRATION: X-28-5-66
ADJACENT FIRE ZONES: 1-4A-W/1-5A-W
RESPECTIVE COMBUSTIBLE LOADINGS: 15 / 19
DUCT SIZE AT PENETRATION: 22" x 22"
VENTILATION SYSTEM: REACTOR BUILDING EMERGENCY SWITCHGEAR ROOMS COOLING UNITS SUPPLY

PENETRATION: X-28-5-66

FIRE ZONE/FIRE ZONE: 1-4A-W/1-5A-W

DUCT SIZE: 22" x 22"

COMBUSTIBLE LOADINGS: 15 / 19

DISCUSSION:

As shown on Shts. 6, 6A and 6B of drawing C-205791, the duct assembly penetrates the fire barrier floor at elevation 749'1". This penetration joins Fire Zone 1-4A-W with Fire Zone 1-5A-W. Fire Zone 1-4A-W has full sprinkler protection.

JUSTIFICATION:

a) Fire initiated in Fire Zone 1-4A-W with potential to spread to Fire Zone 1-5A-W.

All of the combustibles in the vicinity of the subject duct assembly are cables. There are no openings in the duct in either Fire Zone 1-4A-W or Fire Zone 1-5A-W. If a fire was initiated in Fire Zone 1-4A-W, the automatic suppression system would mitigate the heat generated by the fire. Therefore, a fire initiated in Fire Zone 1-4A-W would not spread into Fire Zone 1-5A-W.

b) Fire initiated in Fire Zone 1-5A-W with potential to spread to Fire Zone 1-4A-W.

All of the combustibles in the vicinity of the duct assembly are cables. There are no openings in the duct assembly in either Fire Zone 1-5A-W or Fire Zone 1-4A-W. Since Fire Zone 1-5A-W is located above Fire Zone 1-4A-W, a fire in Fire Zone 1-5A-W would not spread downward towards Fire Zone 1-4A-W. As a further precaution, heat generated in Fire Zone 1-4A-W would be mitigated by the automatic sprinkler system. Therefore, a fire initiated in Fire Zone 1-5A-W would not spread into Fire Zone 1-4A-W.

CONCLUSION

Based on the above discussion, the physical layout of the adjacent fire zones and the combustible configuration within the fire zones, a fire damper is not required in penetration X-28-5-66.

fxm/c107i:mg

APPENDIX R
DEVIATION REQUEST NO. 12

PENETRATION: X-29-5-34
ADJACENT FIRE ZONES: 1-4A-W/1-5A-S
RESPECTIVE COMBUSTIBLE LOADINGS: 15 / 19
DUCT SIZE AT PENETRATION: 36" DIAMETER
VENTILATION SYSTEM: REACTOR BUILDING ZONE I SUPPLY TO UNIT 1 PRIMARY CONTAINMENT DRYWELL AND SUPPRESSION POOL PURGE SUPPLY

PENETRATION: X-29-5-34

FIRE ZONE/FIRE ZONE: 1-4A-W/1-5A-S

DUCT SIZE: 36" Diameter

COMBUSTIBLE LOADINGS: 15 / 19

DISCUSSION:

As shown on Shts. 7, 7A, 7B and 7C of Drawing C-205791, the duct assembly penetrates the fire barrier floor at elevation 749'1". this penetration joins Fire Zone 1-4A-W with Fire Zone 1-5A-S. Both Fire Zones 1-4A-W and Fire Zone 1-5A-S have full sprinkler protection. Additionally, there are no openings in this duct run with both ends having normally closed dampers.

JUSTIFICATION:

a) Fire initiated in Fire Zone 1-4A-W with potential to spread to Fire Zone 1-5A-S.

   All of the combustibles in the vicinity of the subject duct assembly in Fire Zone 1-4A-W are cables. There are no openings in the ducts assembly in either fire zone and heat generated by a fire in Fire Zone 1-4A-W would be mitigated by the automatic suppression system. Therefore, a fire initiated in Fire Zone 1-4A-W would not spread into Fire Zone 1-5A-S.

b) Fire initiated in Fire Zone 1-5A-S with potential to spread to Fire Zone 1-4A-W.

   All of the combustibles in the vicinity of the subject duct assembly in Fire Zone 1-5A-S are cables. There are no openings in the duct assembly in Fire Zone 1-5A-S and heat generated by a fire in Fire Zone 1-5A-S would be mitigated by the automatic suppression system. Therefore, a fire initiated in Fire Zone 1-5A-S would not spread into Fire Zone 1-4A-W.

CONCLUSION

Based on the above discussion, the physical layout of the adjacent fire zones and the combustible configuration within the fire zones, a fire damper is not required in penetration X-29-5-34.

fxm/c106i:mg

APPENDIX R
DEVIATION REQUEST NO. 12

PENETRATION: X-29-5-54
ADJACENT FIRE ZONES: 1-4A-W/1-5A-S
RESPECTIVE COMBUSTIBLE LOADINGS: 15 / 19
DUCT SIZE AT PENETRATION: 22" x 22"
VENTILATION SYSTEM: REACTOR BUILDING EMERGENCY SWITCHGEAR ROOMS COOLING UNIT SUPPLY

PENETRATION: X-29-5-54

FIRE ZONE/FIRE ZONE: 1-4A-W/1-5A-S

DUCT SIZE: 22" x 22"

COMBUSTIBLE LOADINGS: 15 / 19

DISCUSSION:

As shown on Shts. 8, 8A and 8B of Drawing C-205791, the duct assembly penetrates the fire barrier floor at elevation 749'1". This penetration joins Fire Zone 1-4A-W with Fire Zone 1-5A-S. Both Fire Zone 1-4A-W and Fire Zone 1-5A-S have full sprinkler protection.

JUSTIFICATION:

a) Fire initiated in Fire Zone 1-4A-W with potential to spread to Fire Zone 1-5A-S.

   All of the combustibles located in the vicinity of this duct assembly are cables. There are no openings in the duct assembly in either Fire Zone 1-4A-W or Fire Zone 1-5A-S. A fire in Fire Zone 1-4A-W would be mitigated by the automatic suppression system and therefore, a fire initiated in Fire Zone 1-4A-W would not spread into Fire Zone 1-5A-S.

b) Fire initiated in Fire Zone 1-5A-S with potential to spread to Fire Zone 1-4A-W

   All of the combustibles located near the duct assembly are cables. There are no openings in the duct assembly in either Fire Zone 1-5A-S or Fire Zone 1-4A-W. A fire in Fire Zone 1-5A-S would be mitigated by the automatic suppression system and therefore, a fire initiated in Fire Zone 1-5A-S would not spread into Fire Zone 1-4A-W.

CONCLUSION

Based on the above discussion, the physical layout of the adjacent fire zones and the combustible configuration within the fire zones, a fire damper is not required in penetration X-29-5-54.

fxm/c109i:mg

APPENDIX R
DEVIATION REQUEST NO. 12

PENETRATION: X-34-5-4
ADJACENT FIRE ZONES: 2-4A-S/2-5A-W
RESPECTIVE COMBUSTIBLE LOADINGS: 15 / 18
DUCT SIZE AT PENETRATION: 40" x 28"
VENTILATION SYSTEM: REACTOR BUILDING HVAC ZONE II
SUPPLY TO UNIT II PRIMARY
CONTAINMENT DRYWELL AND SUPPRESSION
POOL PURGE SUPPLY

PENETRATION:	X-34-5-4	FIRE ZONE/FIRE ZONE:	2-4A-S/2-5A-W
DUCT SIZE:	40" x 28"	COMBUSTIBLE LOADINGS:	15/18

DISCUSSION:

As shown on sheets 9, 9A and 9B of drawing C-205791, the duct assembly penetrates the fire barrier floor/ceiling it elevation 749'-1". This penetration joins Fire Zone 2-4A-S with Fire Zone 2-5W. Both Fire Zone 2-4A-S and Fire Zone 2-5A-W have automatic suppression system protection in the vicinity of the subject penetration. Additionally, there are no openings in this duct run with both ends having normally closed dampers.

JUSTIFICATION:

a) Fire initiated in Fire Zone 2-4A-S with potential to spread to Fire Zone 2-5A-W.

The combustibles located near the duct assembly in Fire Zone 2-4A-S are two cable trays. A fire in the fire zone would be mitigated by the automatic suppression system. Therefore, enough heat would not be generated to spread a fire from Fire Zone 1-4A-S to Fire Zone 2-5A-W.

b) Fire initiated in Fire Zone 2-5A with potential to spread to Fire Zone 2-4A-S.

The combustibles located near the duct assembly in Fire Zone 2-5A-W are two cable trays which drop into the Load Center as they approach the duct. There are no openings in the duct near the penetration or near the cable trays. A fire in Fire Zone 2-5A-W would be mitigated by the automatic suppression system in that zone. Therefore, a fire initiated in Fire Zone 2-5A-W would not spread into Fire Zone 2-4A-S.

CONCLUSION:

Based on the above discussion the physical layout of the attached Fire Zones, and the combustible configuration within these Fire Zones, a fire damper is not required in penetration X-34-5-4.

fmc/c156i:ncr