DUKE POWER COMPANY
POWER BUILDING
422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28242

50-369
50-370

WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

November 2, 1978

TELEPHONE: AREA 704
373-4083

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. Robert L. Baer, Chief
Light Water Reactors Branch No. 2

Dear Mr. Denton:

Please find attached Duke Power Company's response to the NRC positions on fire protection which were transmitted by the staff's letter of September 6, 1978. These responses reflect the agreements reached with the staff in our meeting on September 27-28, 1978. In this meeting a commitment to submit this information on November 1, 1978 was made, however, due to administrative delays it is being submitted one day late.

Very truly yours,

William O. Parker Jr.

William O. Parker, Jr. lywAH

GAC:scs
Attachment

B002
3/1

The following responses are presented to docket the final positions on fire protection transmitted to Duke in the NRC's September 6, 1978 letter and resolved in the September 27-28 meeting between Duke and the NRC.

The fire protection systems and modifications will be completed and in service by Unit 1 fuel loading with the following exceptions which will be implemented prior to commercial operation of Unit 1:

1. Extention of the RHR pump room sprinkler systems to protect the corridor connecting pump rooms. (Position 10)

2. Automatic sprinklers installed to protect the cable tray stacks at the east and west ends of the battery room from an exposure fire. (Position 14)

3. Fire doors and dampers installed in penetrations in rooms 807 and 820 on elevations 750 of the Axuiliary Building which are adjacent to safety related equipment areas. (Position 25)

4. Fire doors, dampers and the 1½-hour rated ceilings for the peripheral rooms within the control complex. (Position 26b)

* A draft copy of the test report for the penetraions through fire barriers is attached for review. The final report will be forwarded when complete. There are no significant changes anticipated in the final report. (Position 23)

→ 1 cy Rec'd. NOT REPRODUCIBLE. ADVANCED DIRECTLY TO P. MATTHEWS (NRC)

4. Your response does not outline the interim procedure to achieve cold shutdown in the event of a damaging fire in the cable spreading room or the control room prior to installation of the standby shutdown system. We will require this information to complete our evaluation.

RESPONSE

In addition to those measures outlined in the Duke response of August 1, 1978, instructions will be provided for operator guidance in placing the plant in hot standby with possible loss of offsite power and proceeding to cold shutdown with offsite power re-established. These instructions will address alternative methods for establishing the following supporting features necessary for the various phases of shutdown:

Reactor Trip
Emergency Power
Seal Injection Flow
Feedwater Flow
Heat Sink
Charging Flow
Boration
Letdown
Component Cooling Water
Service Water
Instrumentation

Alternative methods of operation may include the normal method of operation, various manual methods of operation, and damage control measures. These instructions will be completed and made available to the operator prior to fuel loading of Unit 1. These instructions or a summary description of them will be submitted to the NRC staff for review prior to fuel loading.

5. Since an exposure fire can damage both redundant power cables for the RHR pumps, it is our position that the redundant cable trains be enclosed in a ½-hr fire rated barrier. Also, the same situation exists for the nuclear service water pumps and the component cooling water pumps; therefore, the redundant cable trains of these pumps should be enclosed in a ½-hr fire

rated barrie·. In addition, verify that there is ample accessibility for manual operation of the residual heat removal letdown valves.

RESPONSE

An analysis of the spatial separation and physical barriers between the redundant trains of power cable for the residual heat removal pumps, the nuclear service water pumps, and the component cooling water pumps was presented to the NRC staff on September 27, 1978. As a result of this presentation, the NRC staff concluded that the existing spatial separation and physical barriers are adequate to protect redundant pump power cables and that ½-hr rated barriers are not required.

Capability for manual operation of the residual heat removal letdown valves is provided; however, accessibility to the containment is limited for personnel protection in certain circumstances. Spare cable will be provided at the site in order to supply an alternate source of power for remotely operating these valves.

7. Your proposed emergency lighting system is unacceptable since you have not demonstrated that a fire in one area will not also result in loss of lighting in other plant areas. It is our position that fixed self-contained lighting systems consisting of fluorescent or seal beam units with an individual 8-hr minimum battery power supply be provided in areas that must be manned for safe cold shutdown and for access and egress routes to all these areas. Confirm that you will meet this position.

RESPONSE

Fixed self-contained dc seal beam units with individual 8-hr minimum battery power supply will be provided in areas that must be manned for safe cold shutdown.

These areas will include:

Control Room
Auxiliary Shutdown Panels
Access Stairs from Control Room to the Auxiliary Shutdown Panels
Areas required to be manned for safe cold shutdown

9. Your response is incomplete. You have not provided sufficient information to demonstrate that the 1 inch bypass line of the deluge valve would be sufficient to supply the required water flow to the auxiliary reactor building fire suppression system. Further, you have not provided assurance that a fire at the batteries will not affect the fire protection system water supply. We will need this information to complete our review.

RESPONSE

The two deluge valves which control the fire protection water supply for the Auxiliary Building may be manually tripped open at the valve upon loss of electrical power. In addition, a normally open 1 inch bypass line is provided around each deluge valve. As shown in Figure 9.1, these lines have adequate capacity to supply two hose stations at the battery rooms. This figure shows the head loss curve for the piping system through the 1 inch bypass lines and out through the hose nozzles. Also shown are curves depicting fire protection jockey pump performance. As can be seen, with only one jockey pump in operation, the total flow to the two hose racks will be 188 gpm or 94 gpm each with a nozzle pressure of 195 feet. Figure 9.2 shows the effective reach of a wide fog stream versus nozzle pressure for these nozzles. From this figure, it can be seen that the effective reach with 195 feet of nozzle pressure is approximately 39 feet.

These two features provide assurance that a fire at the batteries will not adversely affect the fire protection system water supply.

10. There are no fire doors on the stated 3-hr fire barriers of each RHR pump room. As stated in the original question, access is very limited by two

MCGUIRE NUCLEAR STATION
BATTERY ROOM HOSE
STATION PERFORMANCE

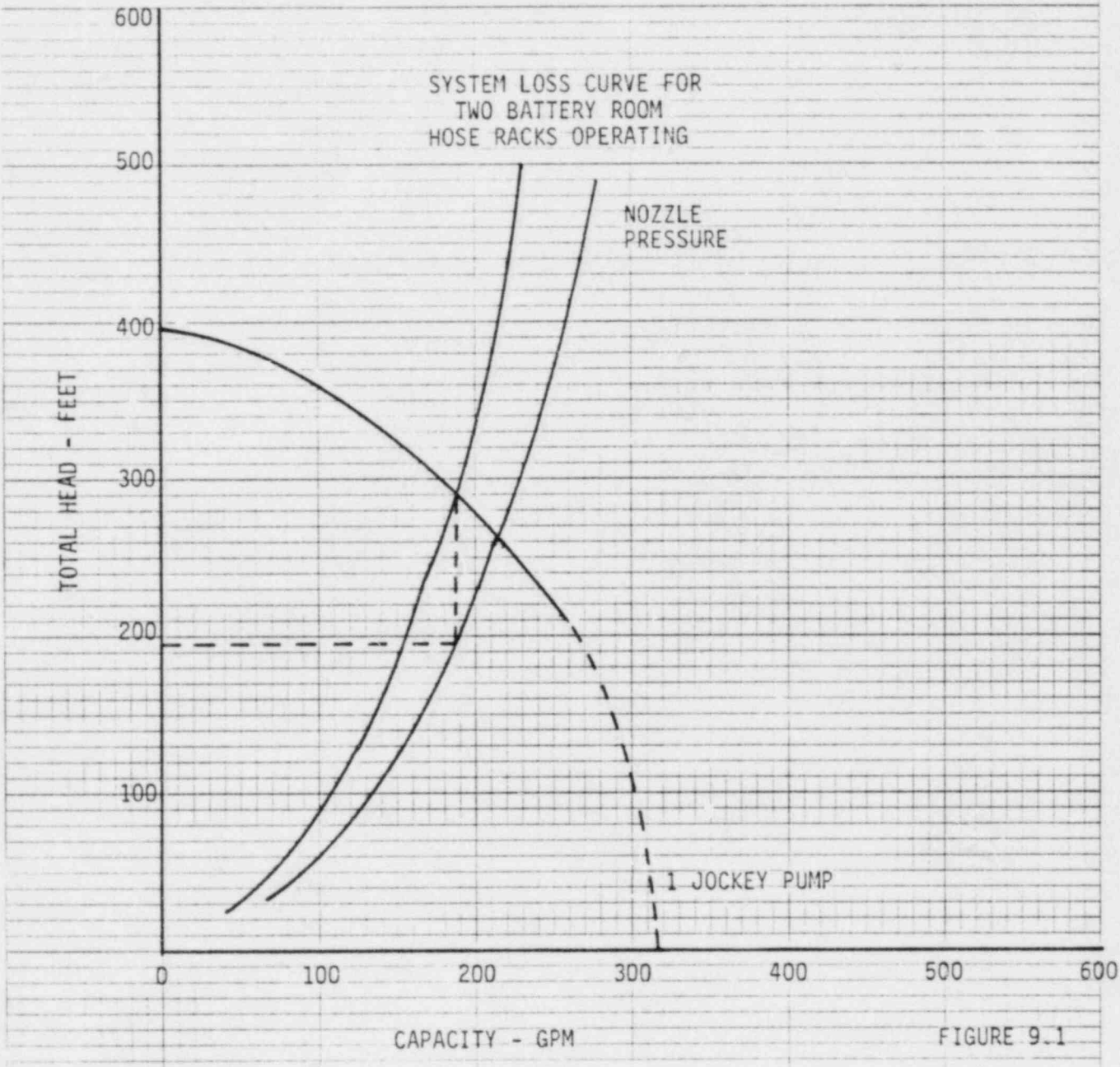


FIGURE 9.1

NOTES:

1 THE ABOVE SYSTEM LOSS CURVE ASSUMES THAT THE SUPPLY TO THE TWO HOSE RACKS IS PROVIDED THROUGH THE TWO AUXILIARY BUILDING DELUGE VALVES ONE (1) INCH BYPASS LINES.

RGK:10-20-78

MCGUIRE NUCLEAR STATION
TWO BATTERY ROOM HOSE STATIONS
NOZZLE PRESSURE VS. EFFECTIVE REACH OF WIDE FOG STREAM

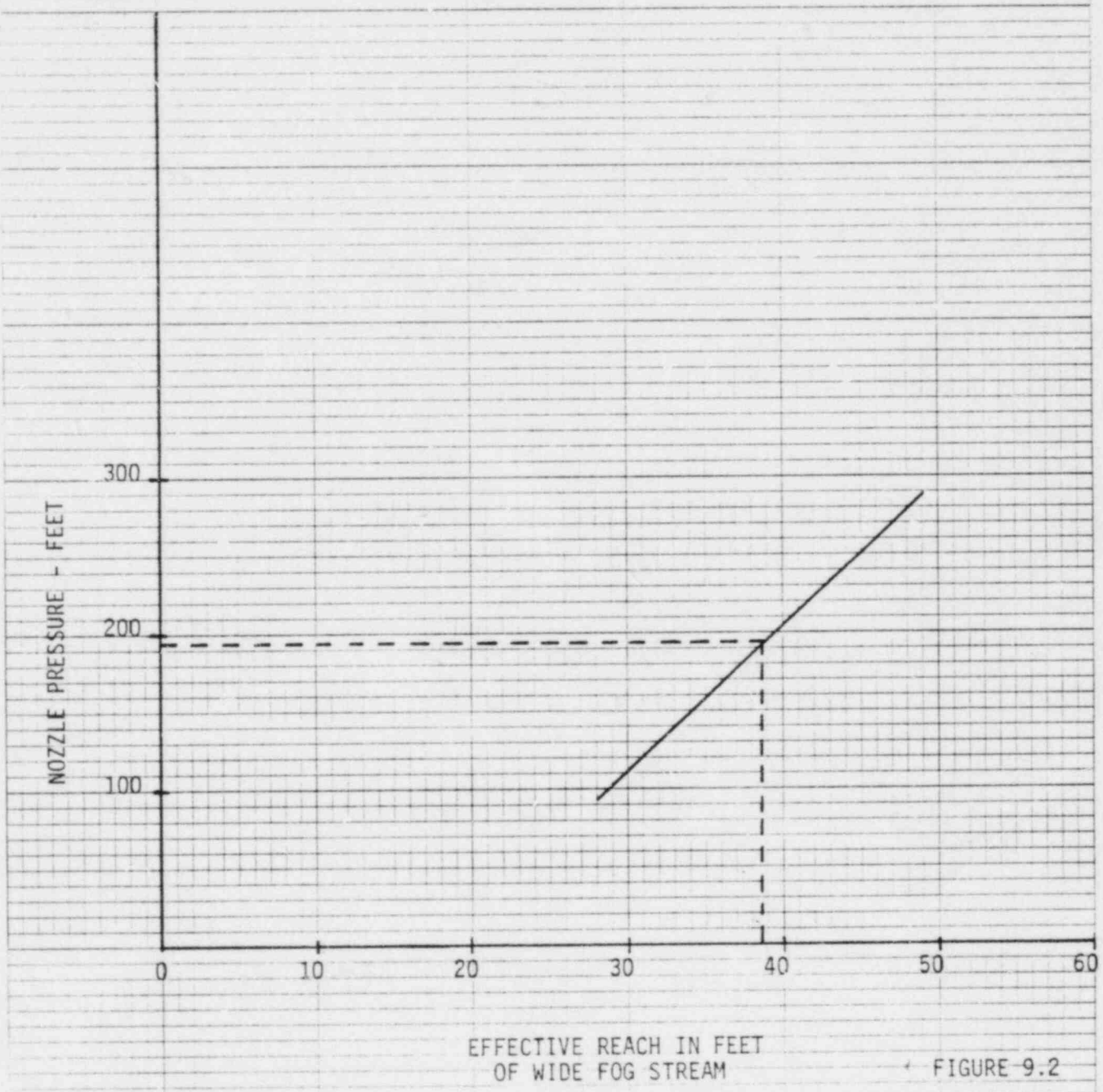


FIGURE 9.2

RGK:10-20-78

open spiral stairways from the level above. The fire postulated for this area is an exposure fire in the corridor. Automatic detection, although provided, is of limited value if the fire brigade cannot reach the area. It is our position that area sprinkler systems be provided in the corridor area. Confirm that you will meet this position.

RESPONSE

As agreed during the September 27-28 meeting between Duke and the NRC staff, the sprinklers protecting the RHR pump rooms will be extended to provide protection to the connecting corridor between redundant RHR pump rooms.

11. It is our position that you provide a fire barrier of at least ½-hr fire rating to protect the instrumentation and control cables for the turbine-driven auxiliary feedwater pump, which are located in the motor-driven auxiliary feedwater pump (MDAFP) room. Or, alternately relocate these cables to another area such that they will not be affected in the event an exposure fire occurs in the MDAFP area.

RESPONSE

Kaowool blankets will be installed to provide a ½-hr rated barrier to provide additional protection for the instrumentation and control cables for the turbine-driven auxiliary feedwater pump which are located in the motor-driven auxiliary feedwater pump (MDAFP) room.

12. Your response to our question about use of detectors for the turbine-driven auxiliary feed pump area only considered ionization smoke detectors. No consideration was given to photoelectric smoke detectors. It is our position that smoke detectors be provided for this area to provide early detection.

RESPONSE

Photoelectric smoke detectors will be provided in the turbine-driven

auxiliary feedwater pump room for early fire detection.

13. Verify that fire damage to the auxiliary shutdown panel will not compromise the cold shutdown capability of the control room.

RESPONSE

As agreed in the September 27-28 meeting with the NRC staff, a ½-hr rated barrier such as kaowool or marinite board will be attached to the ASP to provide additional protection from an exposure fire. Redundant cable trains in the MDAFP room related to the ASP will be protected with a ½-hr rated barrier of Kaowool.

14. Provide drawings to show the detail arrangement and cross-sections of the barrier to be provided for the cable tray stacks at the east and west end of the battery room, fire area 13, auxiliary building, elevation 733 ft. The information should include the barrier material, method of supporting the barrier, and how the supports are protected. Since this plant area is critical to both Units 1 and 2, it is, therefore, our position that the existing 1½-hr dampers be upgraded to 3-hr rating.

RESPONSE

As agreed in the September 27-28 meeting with the NRC staff, automatic sprinklers will be added to protect the cable tray stacks at the east and west end of the battery room from an exposure fire.

Existing 1½-hr rated dampers in the battery room will be upgraded to 3-hr rated dampers.

16. Describe the type of barrier or provide a sketch of the barrier used to separate the component cooling pumps from each other. In addition, demonstrate that the proposed barrier can preclude an exposure fire from damaging redundant component cooling pumps. (See item 5 for our position

of redundant trains of CCW pump cables.)

RESPONSE

The barriers separating the component cooling water pumps will be 1½-hr rated gypsum construction or concrete block. The wall will extend from floor to ceiling and extend three feet beyond the pumps. Redundant component cooling water pumps are located on a different e evation of the auxiliary building separated by a 3-hr rated fire barrier.

17. Provide the basis to justify that an exposure fire in rooms 722 or 724 will not affect the ability to achieve cold shutdown.

RESPONSE

An exposure fire in rooms 722 or 724 will not affect the ability to achieve cold shutdown. These two rooms contain Train B safety-related motor control centers. The redundant Train A motor control centers are located on a different elevation and are, therefore, in a separate fire zone.

22. You state that the construction of the wall separating the cable room along column line 56 will be tested to verify the 3-hr rating. It is our position that the test results be made available for the staff review prior to initial fuel loading.

RESPONSE

The construction of the wall separating the cable room along column line 56 will be tested to verify the 3-hr rating. Results of the test will be available for staff review prior to fuel loading.

23. Provide the results of the fire tests of the cable room floor opening and confirm that the size of the opening tested is similar to the actual installation.

RESPONSE

Results of the fire test for cable penetrations will be available November 1, 1978.

The actual installation of fire stops are similar in sizes to those tested.

25. It is our position that you provide a minimum of 1½-hr fire rating for the walls, including penetrations, for rooms 807 and 820 on elevation 750 of the auxiliary building or provide water sprinkler systems in these rooms and the corridor to protect safety related equipment in adjacent areas.

RESPONSE

The walls, including penetrations, for rooms 807 and 820 on elevation 750 of the auxiliary building will have a minimum 1½-hr fire rating.

26b. Our position remains that the peripheral room within the control room complex should be extended to the ceiling, and Class C doors should replace the existing doors.

RESPONSE

As agreed in the September 27-28 meeting, the ceiling of the peripheral rooms within the control room complex will be rated 1½-hr and the doors will be Class C. Smoke detectors will be located in each room.

27. It is our position that the control valve for the reactor cooling pump sprinkler system should be automatic or remote manual operated from the control room. Also state the criteria and procedure to be followed by an operator to open the control valve to supply water to the sprinklers and hose stations inside containment.

RESPONSE

The control valve for the reactor coolant pump sprinkler system will be a remotely operated valve with manual actuation from the control room. This valve and the auxiliary building deluge valves will be actuated to open by an operator after receipt of an alarm indicating fire in the containment, and, if possible, visual confirmation of the fire.

31. Your response does not address item (b) of our question number 31. Provide the requested information. Also provide the test results for the wall assemblies. We will require this information to complete our review.

RESPONSE

(a) The following analysis demonstrates the fire rating of concrete masonry walls used as fire barriers:

T_e = Equivalent Thickness

V_n = Net Volume

Ref: Note KK page A-91 Appendix K, "Fire Resistance Ratings," North Carolina State Building Code - Volume 1, or Note (b), Table 1, Appendix B, Southern Building Code.

$$T_e = \frac{V_n}{L \times H}$$

Volume Block = 1385 in^3

Area Face = 119 in^2

Per manufacturer: Masonry unit is 66 percent void and 34 percent block material; therefore V_n = .34 (1385 in^3) = 371 in^3.

$$T_e = \frac{471\ in^3}{119\ in^2} = 3.96\ in$$

1. The N C State Building Code, P72 of Appendix K

   - 8" or 12" units with expanded clay, shale or slate, rotary

kiln process:

3.95" T_e = 2-hr rating

4.50" T_e = 3-hr rating

2. NCMA-TEK Bulletin No 46 (copy attached)

States: "an 8 inch fully grouted wall, for instance, would have an equivalent thickness of 7.6" which is the same as if the wall is 100 percent sold units."

Appendix K indicated T_e of 5.35 = 4-hr rating.

Therefore, the concrete masonry walls indicated at McGuire are rated at least 3-hrs.

(b) In compliance with NFPA-90A requirements, a UL labeled fire damper has been installed in the duct penetration through fire barriers.

There are two types of fire dampers used at McGuire, nuclear safety related and non-safety related. The two types of dampers are furnished by two different manufacturers.

Due to the special duct construction methods required for the safety related duct, it was necessary to deviate from the manufacturer's installation instructions for fire dampers. The different fire damper installations used at McGuire are shown on the attached details. An explanation of each installation and the deviations from the manufacturer's instructions is also attached. Fire dampers at McGuire are installed within the confines of the fire rated barrier. The intent of the fire damper installation in all cases, is to prevent a fire from spreading from one area to another through the HVAC penetration.

CASE I

Case I consists of nuclear safety related fire dampers manufactured by American Warming and Ventilating. The dampers are installed in nuclear

safety related ducts which pass from the equipment room and in duct shafts serving safety related areas.

The safety related duct work in the equipment room and in the duct shafts is constructed from 11 gauge metal, continuously welded (joints and seams) and supported by safety related seismic duct hangers. The criteria for using continuously welded 11 gauge metal for the duct construction is to provide a system to insure uninterrupted air flow from the air handling equipment to the safety related areas during a seismic event. The HVAC system must maintain acceptable limits within these safety related areas for operation of unit controls and for uninterrupted safe occupancy of the rooms during post accident shut-down. The all-welded air conduit was selected to satisfy this criteria.

The 11 gauge duct continues through the wall into the safety related area where the construction material changes to 18 gauge metal. Eighteen gauge metal is used from this point since distribution in the room is not as critical. The 18 gauge duct is supported on both sides of the wall. The 18 gauge duct is connected to the 11 gauge duct by companion angle flanges. The fire damper is welded inside the 11 gauge duct within the boundaries of the wall. The 11 gauge duct within which the fire damper is installed is heavier than the sleeve required by paragraph 12.2 of UL-555.

In locations where this particular installation is required, an air-tight seal is also required for pressurization. For this reason, the space between the duct and the wall is filled with a fire rated RTV silicon foam. To assure the integrity of the fire barrier, a minimum of 10 inches of foam is used with 1 inch cerafiber board on each side

of the wall providing a 12 inch barrier. A flashing angle, constructed of 11 gauge metal is attached to the 11 gauge duct and extends over the cerafiber board and up the wall. The angle is not attached to the wall.

The manufacturer's instructions, AW&V drawing DAF-D-5177 (attached), were followed with the following exceptions:

1. All 11 gauge flashing angle is used in lieu of the 1½" x 1½" x 1/8" angle.
2. The clearances around the duct vary from 0-12 inches and are filled with foam in accordance with paragraph 3-3.8.1, NFPA 90A. Airtight seals are provided to maintain positive pressure requirements outlined in paragraph 6.4.1 of the FSAR. These seals are accomplished with a fire rated, compressible RTV silicon foam which will allow for duct expansion.
3. The fire dampers are installed in 11 gauge duct in lieu of the 10 gauge sleeve specified by the manufacturer. The 11 gauge metal is in compliance with UL-555, paragraph 13.2.
4. Pop rivets, spaced a maximum of 3½" on center, or 1 inch welds 8 inches on center are used to attach retainer and flashing angles to the duct.

CASE 2

Case 2 consists of nuclear safety related fire dampers manufactured by American Warming and Ventilating. The dampers are installed in nuclear safety related ducts which pass from one safety related area to another safety related area.

The ducts in the safety related areas are constructed from 18 gauge metal, according to SMACNA high pressure duct construction standards

and supported by nuclear safety related seismic duct hangers. When it is necessary for one of these ducts to penetrate a fire barrier, fire dampers are installed as described herein. The fire damper is welded inside an 11 gauge sleeve with minimum 1 inch welds 8 inches on center. The sleeve extends a maximum of 1'-0" either side of the wall and a seismic hanger supports the sleeve on both sides of the wall. The 11 gauge sleeve attaches to the 18 gauge duct with companion angle flanges.

The space between the sleeve and the wall varies from 0 to 12 inches. This space is filled with a minimum of 10 inches RTV silicon foam backed with two, 1 inch thick sections of cerafiber board, one on each side of the wall. This is done to insure the fire resistance integrity of the partition and at the same time provide an airtight seal between the two areas as explained in Case 1.

A flashing angle constructed of 11 gauge metal is secured to the 11 gauge sleeve and extends around the fiberboard and overlaps the wall. The angle is on both sides of the wall and is not attached to the wall.

The flashing angle and the 11 gauge sleeve are both heavier metal than required by UL-555, paragraph 13.2.

The manufacturer's instructions, AWSV drawing DAF-D-5177 (attached), were followed with following exceptions:

1. An 11 gauge flashing angle is used in lieu of the $1\frac{1}{2}$" x $1\frac{1}{2}$" x 1/8" angle.
2. The clearances around the duct vary from 0-12 inches and are filled with foam in accordance with paragraph 3-3.8.1, NEFPA 90A. Airtight seals are provided to maintain positive pressure requirements outlined in paragraph 6.4.1 of the FSAR. These seals are

accomplished with a fire rated, compressible RTV silicon foam which will allow for duct expansion.

3. The fire dampers are installed in an 11 gauge sleeve, in lieu of the 10 gauge sleeve specified by the manufacturer. The 11 gauge metal is in compliance with UL-555, paragraph 13.2.
4. Pop rivets, spaced a maximum of 3½" on center, or 1 inch welds 8 inches on center are used to attach retainer and flashing angles to the duct.

CASE 3

Case 3 consists of nuclear safety related fire dampers manufactured by American Warming and Ventilating. The dampers are installed in nuclear safety related round ducts which pass through a fire rated partition. The round duct provides outside air required for make-up air and pressurization of the control room. The duct is constructed from continuously welded 16 gauge metal. As in Case 1, the primary objective is to assure an uninterrupted path for air for pressurization of the control room to prevent possible contaminated infiltration. The duct is supported with seismic hangers.

The fire damper used is square and factory mounted in a 10 gauge factory supplied sleeve. The sleeve has 18 inch round connecting flanges for connection of the round duct. To maintain the integrity of the duct, the round duct was continuously welded to the sleeve on both sides of the wall. To maintain an airtight seal and the integrity of the fire barrier between the damper and sides of the wall, the space is filled with RTV silicon foam. A minimum of 10 inches of foam is used, backed with 1 inch thick cerafiber board on both sides of the wall. A flashing angle, constructed of 11 gauge metal, is attached

to the sleeve and extends over the cerafiber board and the wall. The flashing angle is not attached to the wall.

The manufacturer's instructions, AW&V drawings 11792 and DAA-D-5177 (attached), were followed with the following exceptions:

1. The flashing angle was modified for the 12 inch thick fire barrier constructed around the sleeve. The 11 gauge metal flashing was welded to the sleeve and extends over the cerafiber board and the wall.
2. The clearances around the duct vary from 0 to 12 inches and are filled with foam in accordance with paragraph 3-3.8.1, NFPA 90A. Airtight seals are provided to maintain positive pressure requirements outlined in paragraph 6.4.1 of the FSAR. The seals are accomplished with a fire rated, compressible RTV silicon foam which will allow for duct expansion.

CASE 4

Case 4 consists of standard fire dampers, manufactured by Tuttle and Bailey, installed in non-safety related duct work which passes through a fire rated barrier.

The duct work in the areas where Case 4 is applied is constructed in accordance with SMACNA high velocity duct construction standards.

The space between the sleeve and the wall varies from 0-12 inches. This space is filled with a minimum of 10 inches RTV silicon foam, backed with 1 inch thick cerafiber board on both sides of the wall. The use of the foam and fiber board is to maintain the integrity of the fire barrier. A metal flashing angle, minimum 16 gauge, is attached to the sleeve and extends over the fiber board and overlaps the wall. The angle is not attached to the wall.

The manufacturer's instructions, Tuttle and Bailey drawing F2 (attached), were followed with the following exceptions:

1. In some instances, the fire dampers are welded inside the sleeve, using minimum 1" long x 8" maximum on center welds.
2. The flashing angles, in some instances, are pop-riveted to the sleeve with 3/16" x 5/8" pop rivets, maximum 3½" on center.
3. In order to maintain heavy duct construction standards, companion angle flanges are used to connect the duct to the sleeves.
4. The clearances around the duct vary from 0 to 12 inches and are filled with foam in accordance with paragraph 3-3.8.1, NFPA 90A. The RTV silicon foam and cerafiber board are an approved fire barrier. The foam is compressible and will allow for duct expansion.

   The flashing angles are constructed from 16 gauge metal when the clearance between the sleeve and wall does not exceed 4 inches. Where the clearance between the sleeve and wall exceeds 4 inches, 11 gauge metal is used.

CASE 5

Case 5 consists of standard fire dampers, manufactured by Tuttle and Bailey, installed in non-safety related ducts which pass through a fire rated barrier with the top of the opening flush with the ceiling. The duct work in Case 5 areas is constructed in accordance with SMACNA high velocity duct construction standards.

The fire dampers are installed in a metal sleeve within the confines of the wall in accordance with the manufacturer's instructions. The minimum gauge metal sleeve is 16 gauge. The fire damper is welded or bolted inside the sleeve. The sleeve extends from both sides of the wall from 2 inches to 24 inches. The ducts on both sides of the wall

are connected to the sleeve by companion angle flanges.

The manufacturer's instructions, Tuttle and Bailey drawing F2 (attached), were followed with the following exceptions:

1. In some instances, the fire dampers are welded inside the sleeve, using 1 inch welds, 8 inches on center.
2. The flashing angles, in some instances, are pop-riveted to the sleeve with pop rivets, spaced a maximum 3½" on center.
3. In order to maintain heavy duct construction standards, companion angle flanges are used to connect the duct to the sleeve.
4. The clearances between the sleeve and the wall and ceiling vary from 0-12 inches. To maintain the integrity of the fire barrier a minimum of 10 inches of RTV silicon foam, backed with 1 inch thick cerafiber board in both sides of the wall, is used to seal the opening in accordance with paragraph 3-3.81., NFPA 90A. The foam is compressible; therefore, the duct can expand.
5. The flashing angles are constructed from 16 gauge metal when the clearance between the sleeve and wall does not exceed 4 inches. Where the clearance between the sleeve and wall exceeds 4 inches, 11 gauge metal is used.

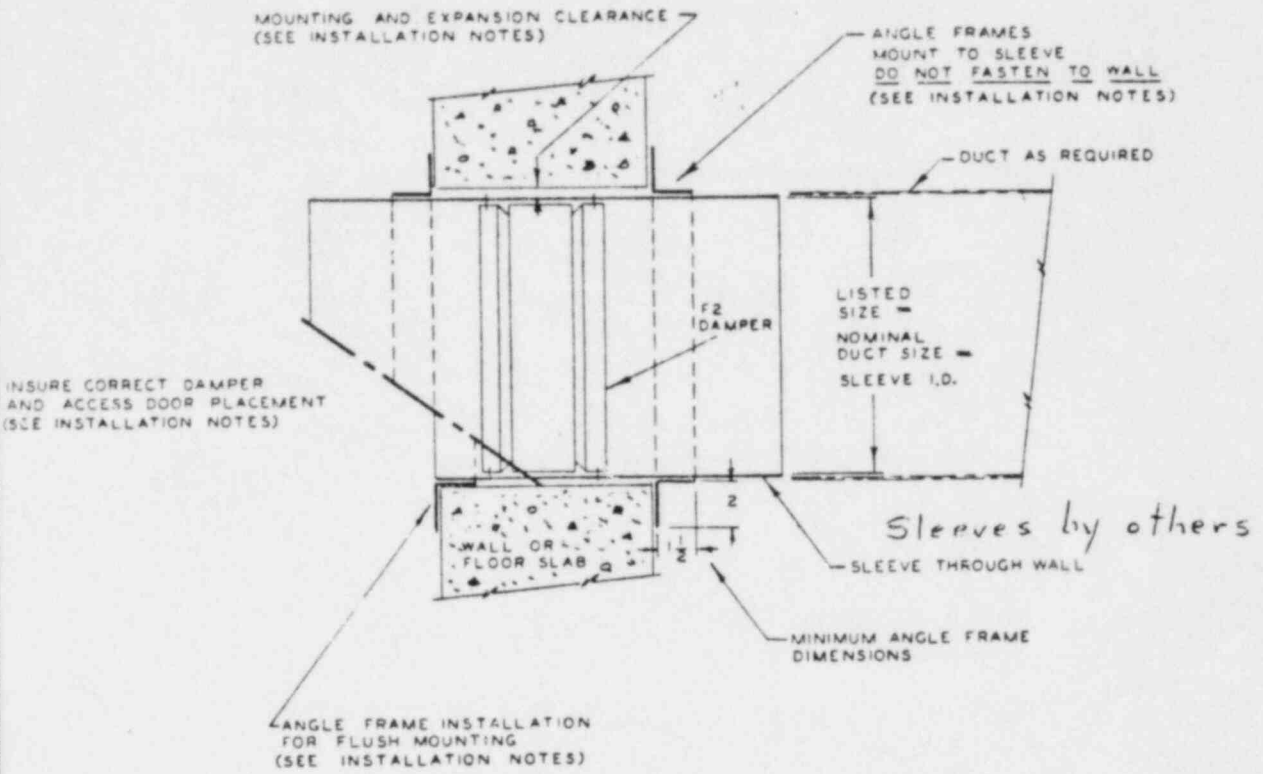
32. Outline the action to be taken by the control room operator upon indication of loss of battery room supply or exhaust ventilation.

RESPONSE

Station procedures will require the operator to check the HVAC control panel to assure battery room supply and exhaust ventilation.

If operator has loss of HVAC, he will switch to redundant HVAC train to restore ventilation.

INSTALLATION INSTRUCTIONS

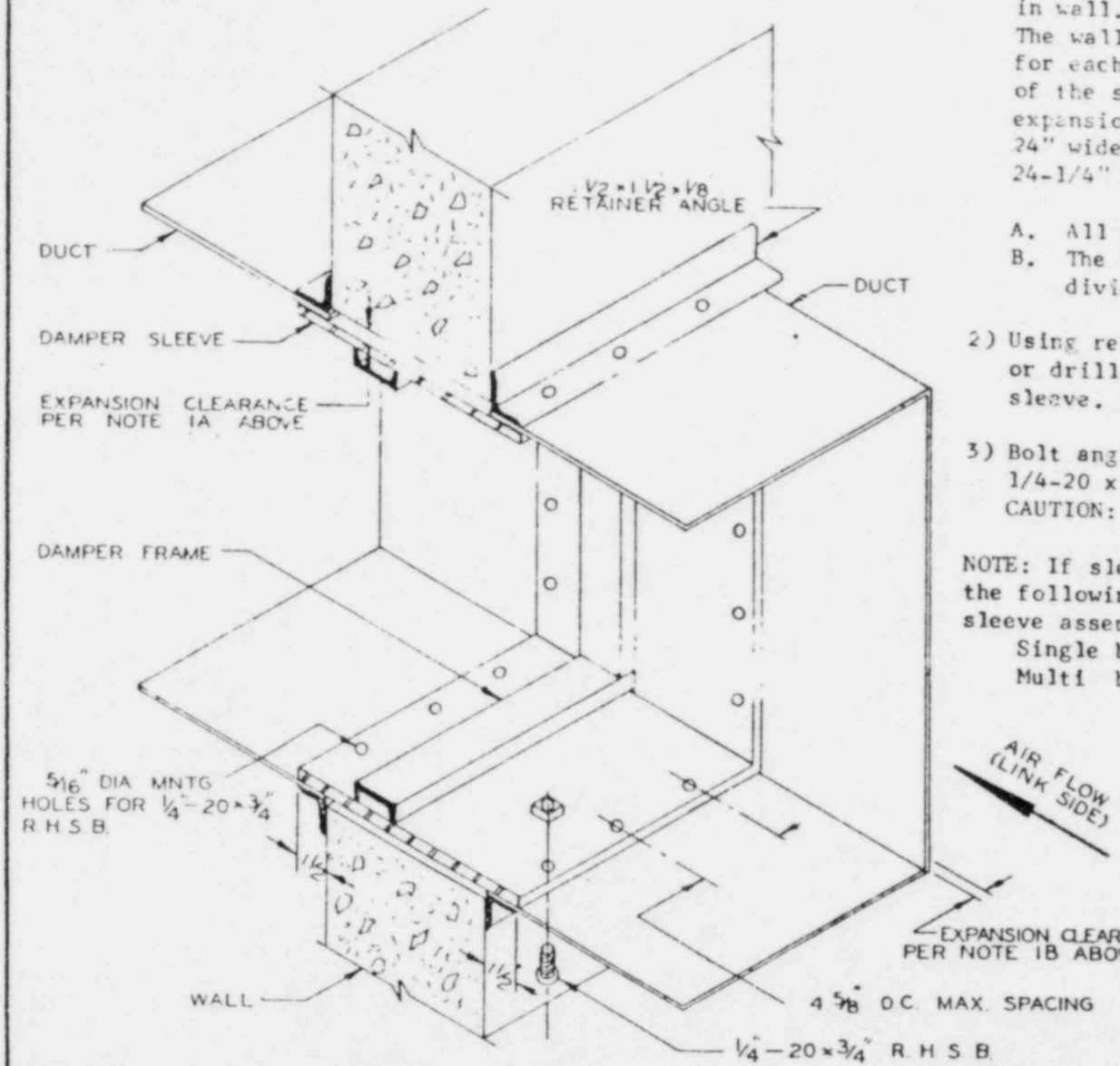


INSTALLATION NOTES:

- Damper must be installed within fire wall or floor slab. Damper should be mounted in a sleeve, factory supplied or field fabricated with inside dimensions equal to nominal duct dimensions.
- Sleeve must not be less than 16 gauge steel for sizes 36W or 24H and under, and must not be less than 14 gauge steel for sizes over 36W or 24H.
- Damper must be installed in sleeve with #10x1/2 S.M. screws or 1/4x1/2 bolts with nuts or clips. These fasteners must be no more than 9 inches on center, and 2-3/4 inches from corners.
- Mounting and expansion clearance: When sizing masonry opening, two additions have to be made to listed dimensions. Allow 3/4 inch over both listed width and listed height for sleeve metal thickness and damper fastener clearance. Provide an additional 1/8 inch for each 12 inches of both listed width and listed height for thermal expansion. For vertical installation, all vertical clearance should be above top of sleeve. All horizontal clearance should be divided equally on both sides of sleeve. For horizontal installation, all clearances are divided equally on all sides.
- Sleeve must not be attached to wall or slab, but retained on each side by a 16 gauge angle frame attached to sleeve by welds, #10x1/2 S.M. screws or 1/4x1/2 bolts - not over 12 inches on center. This angle frame also closes all clearance between sleeve and wall or slab.
- A suitable, tightly covered access to the damper must be provided to allow inspection and maintenance.
- Sleeve and damper must be installed so damper blade locks are uppermost in horizontal installations and toward access door in all cases.
- For installation requiring flush mounting, angle frame may be notched to allow it to be mounted facing into the wall (or slab).
- Alternate sleeve construction may employ light gauge steel - same thickness as ducting, provided: Light gauge sleeve is mounted in wall and holds damper as above. Ducting not attached to sleeve with other than free slip joint so ducting can collapse and fall free leaving sleeve and damper intact in wall. (See U.L. Std. 555)

TUTTLE & BAILEY DIVISION OF ALLIED THERMAL CORPORATION NEW BRITAIN, CONNECTICUT — MIAMI, FLORIDA PORT ERIE, ONTARIO, CANADA — LOUISVILLE, KENTUCKY	INSTALLATION INSTRUCTIONS FOR SQUARE F2 FIRE DAMPER SEE OTHER SIDE FOR DAMPER DETAILS	DRAWN BY JH DATE 11-1-74	PLATE NO. F 2 SHEET 2

PRINTED IN U. S. A.



INSTALLATION PROCEDURE

1) Position damper and sleeve assembly in wall.
The wall opening should be larger by 1/8" for each linear foot in height or width of the sleeve to allow for anticipated expansion. Example: Sleeve dimensions--24" wide x 12" high--wall opening 24-1/4" wide x 12-1/8" high.

   A. All vertical clearance is at the top.
   B. The horizontal clearance is to be divided equally at the sides.

2) Using retaining angles as a template, punch or drill 5/16" diameter holes in duct and sleeve.

3) Bolt angles through 10 ga. sleeve & duct with 1/4-20 x 3/4" R.H.S.B.
CAUTION: DO NOT FASTEN ANGLES TO THE WALL.

NOTE: If sleeves are not factory supplied, see the following drawings for details of damper to sleeve assembly:
Single blade model - DAF-D-5170
Multi blade model - DAF-D-5171

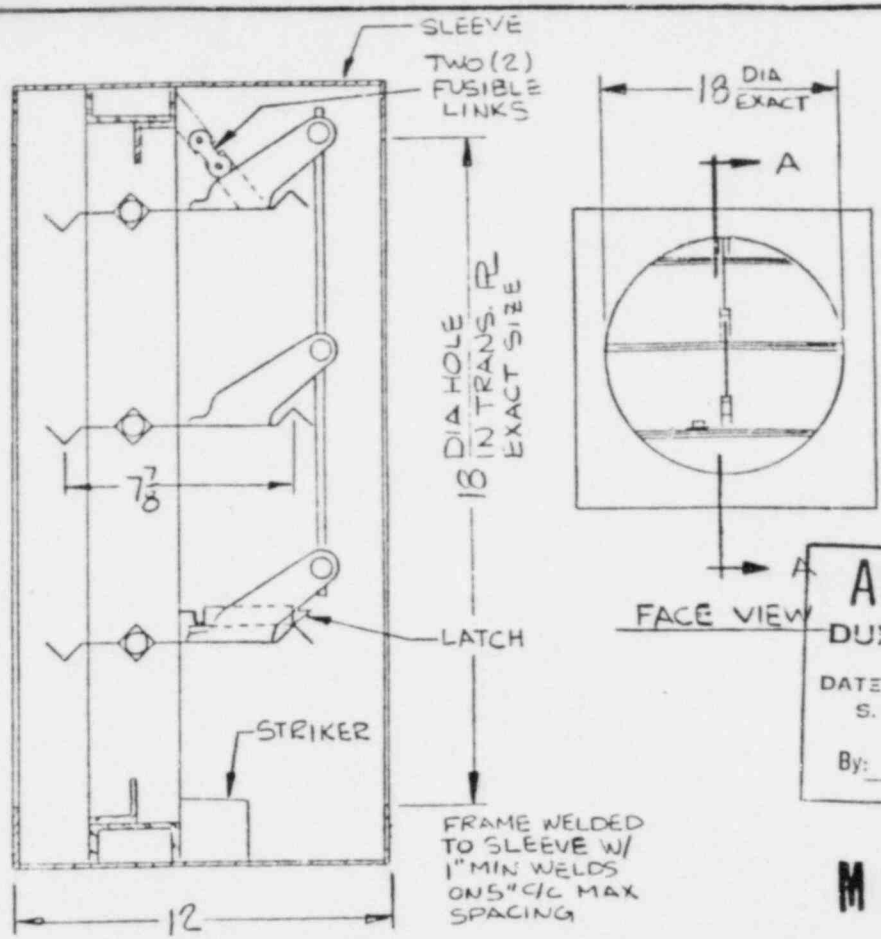
	REVISION	DATE	BY
A	NEW LOGO & TITLE	11-18-71	LAT

american warming and ventilating inc
1017 SUMMIT ST. TOLEDO, OHIO

INSTALLATION INSTRUCTIONS FOR UL CLASSIFIED FIRE DAMPERS NOS DAF-P-5170 & DAF-P-5171

CKD. BY WF	APPD. BY GFH	
DRN. BY NC	DWG. NO. DAF-D-5177	REV. A
DATE 5-19-66		

CAT. SECTION 4
DAMPERS - FIRE CONTROL



SPECIFICATIONS

FRAME:	2 X 1 X 3/16 ST'L CHAN. AISI-[illegible] WITH ZRC FINISH.
SLEEVE & TRANSITION PLATE:	10 GA. [illegible]
BLADES:	12 GA. GALV. ST'L. ASTM-A-[illegible]
AXLES:	1/2 DIA. AISI-1008/1020 COMM. GALV.
BEARINGS:	OIL IMPREGNATED BRONZE
FUSIBLE LINK:	U.L. APPROVED, 160°F STANDARD
STOPS:	[illegible] X 1 X 10 GA. GALV. ST'L. ANGLE [illegible]
[illegible]	[illegible]
FINISH:	GALVANIZED WITH ZRC TOUCH-UP PAINT
LABELS:	[illegible] ASSEMBLY TO BEAR A U.L. LABEL
MOUNTING:	VERTICAL [illegible] WITH HORIZONTAL AIR FLOW.

APPROVED
DUKE POWER CO.
DATE: 2-10-76
S. K. [illegible]LEY, JR.
CHIEF ENGINEER
By: MECHANICAL DIVISION

ENVIRONMENTAL PRODUCTS SALES
BAHNSON SERVICE
P.O. #293-DPC
DUKE POWER
MCGUIRE NUCLEAR STATION
BAHNSON #A-0001-[illegible]
AMV QUOTE 3987-1
AMV JOB # 90035

RECEIVED
FEB 9 1976
DUKE POWER COMP
DESIGN ENGINEERI

MCM1211.00-552

FOR APPROVAL

JAN 2[illegible]

A W & V

NOTES

(1) ALL MOUNTING ANGLES & HARDWARE BY OTHERS.
(2) NO. REQUIRED: FOUR (4) DAMPERS AS SHOWN.
(3) TAG DAMPERS: MA-1-FD1 ADVISE
MA-2-FD1 ADVISE
(4) DESIGN CRITERIA: DIFF. PRESS. = 2" H_2O
MAX. VELOCITY = 2000 FPM
(5) SEE DWG. DAA-D-5177 FOR INSTALLATION INSTRUCTIONS.
(6) CERTIFICATION WILL BE FURNISHED FOR COMPLIANCE WITH SPECIFICATIONS AND PURCHASE ORDER.
(7) SEISMIC CALCULATIONS WILL BE FURNISHED FOR DAMPERS ONLY.

NUCLEAR SAFETY [illegible]LATED

	REVISION	DATE	BY
C	QTY. CHNG'D. TO FOUR(4)	1-21-76 / 1-21-76	RDV / [illegible]
B	REDRAWN - CHG'D TO RD. 5171 W/U.L. LABEL	1-3-76 / 1-8-76	RDV / [illegible]

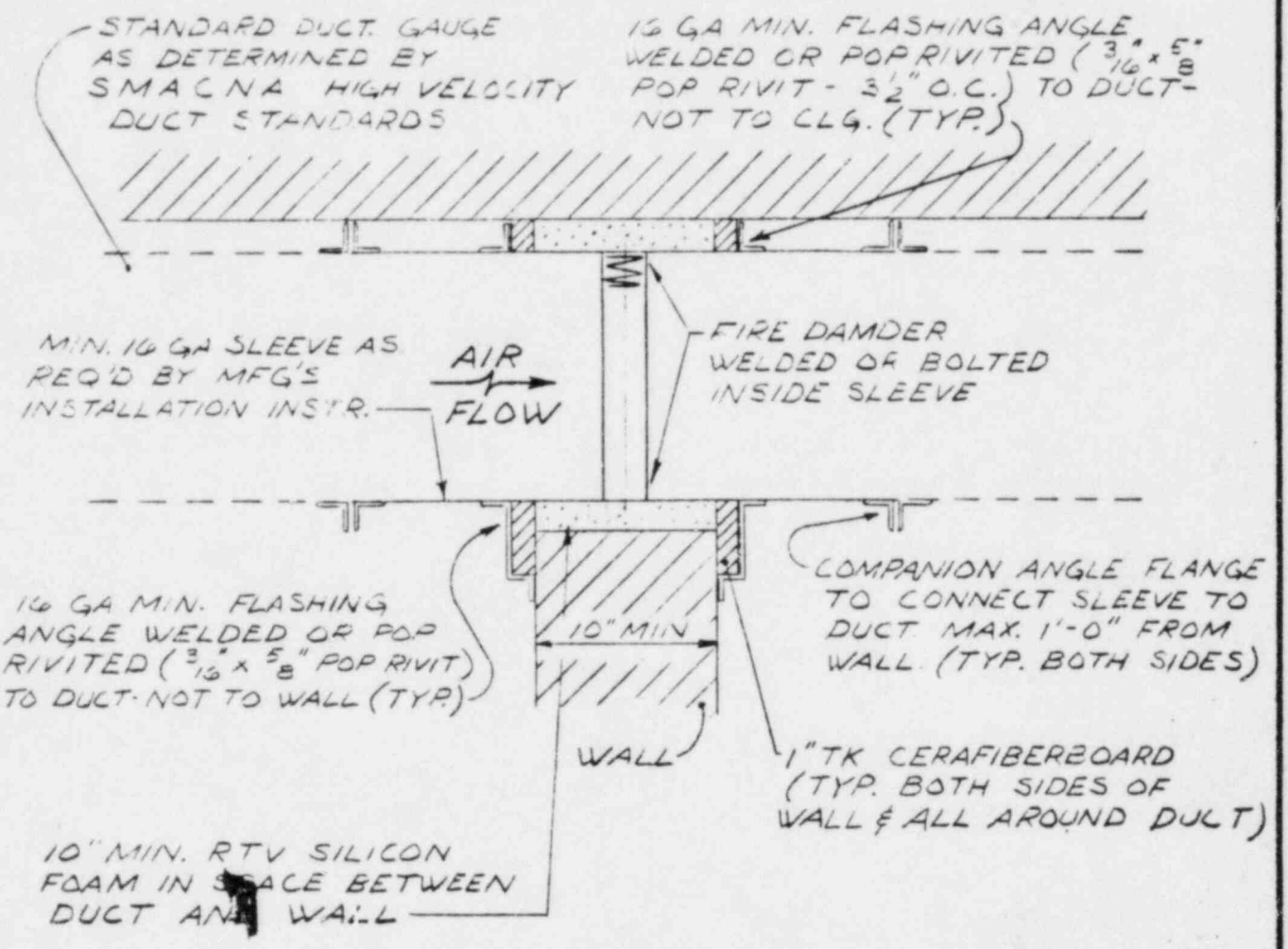
american warming and ventilating inc
1017 SUMMIT ST. TOLEDO, OHIO

DAF-P-5171 ROUND FIRE DAMPER

CKD. BY TMD	APPD. BY	
DRN. BY RDV	DWG. NO. 11792	REV. C
DATE 1-8-76		

N76688-A

CASE 5



DESCRIPTION OF USE: THE ABOVE INSTALLATION IS USED IN NON-SAFETY RELATED DUCT WHICH PASS THROUGH A FIRE RATED PARTITION, WHERE THE TOP OF THE OPENING IS FLUSH WITH THE CEILING.

NO.	REVISION	CHKD	APPR	DATE

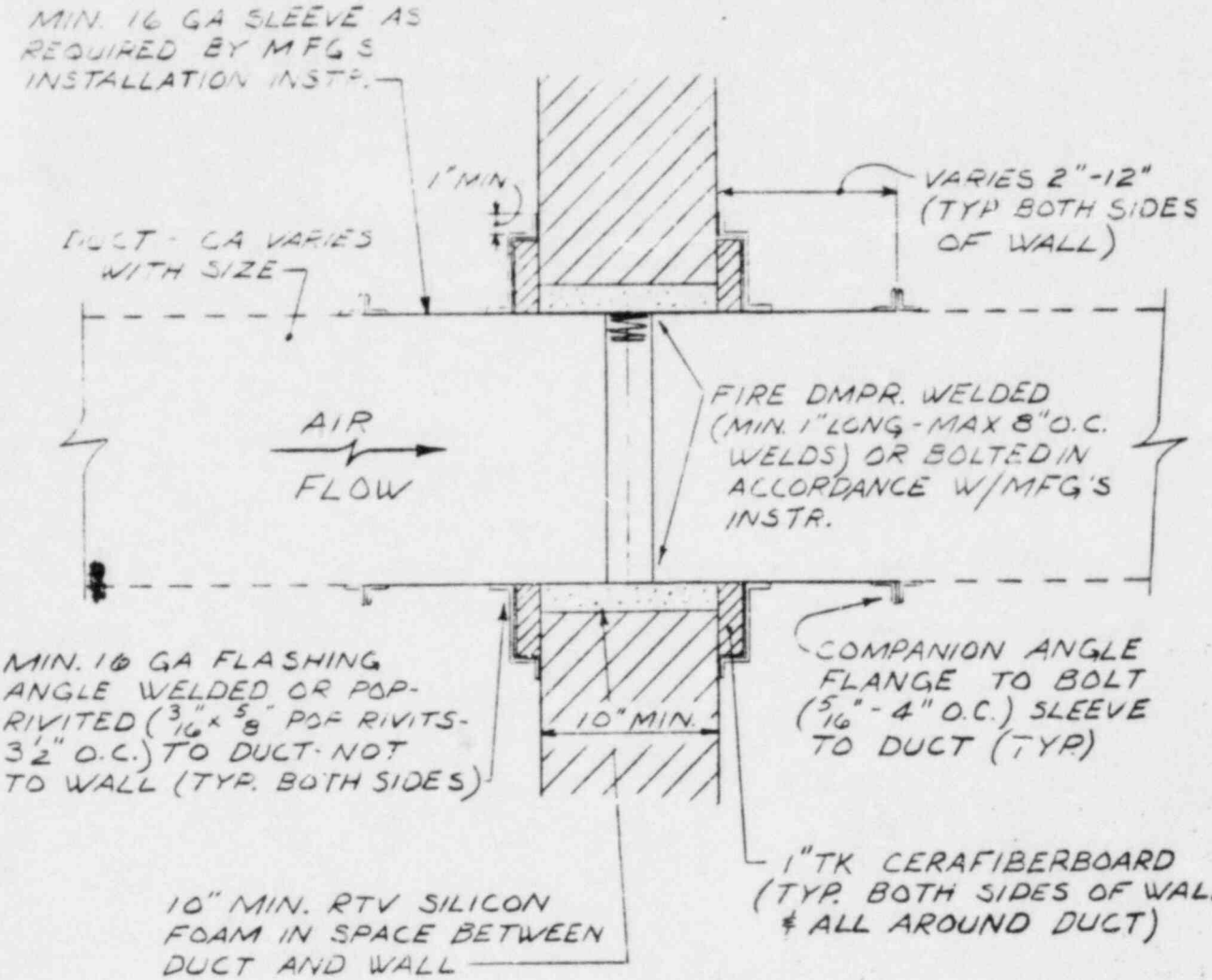
DUKE POWER CO.

McGUIRE NUCLEAR STATION UNITS 1 & 2
DUCT PENETRATIONS
FIRE STOP DETAILS

DRN.	RWE	7-1-,	CHKD.		
INSP.			APPR.		

SCALE NONE NO.

CASE 4



DESCRIPTION OF USE: THE ABOVE INSTALLATION IS USED IN NON-SAFETY DUCTS WHICH PASS THROUGH A FIRE RATED PARTITION OR WALL.

NO.	REVISION	CHKD	APPR	DATE

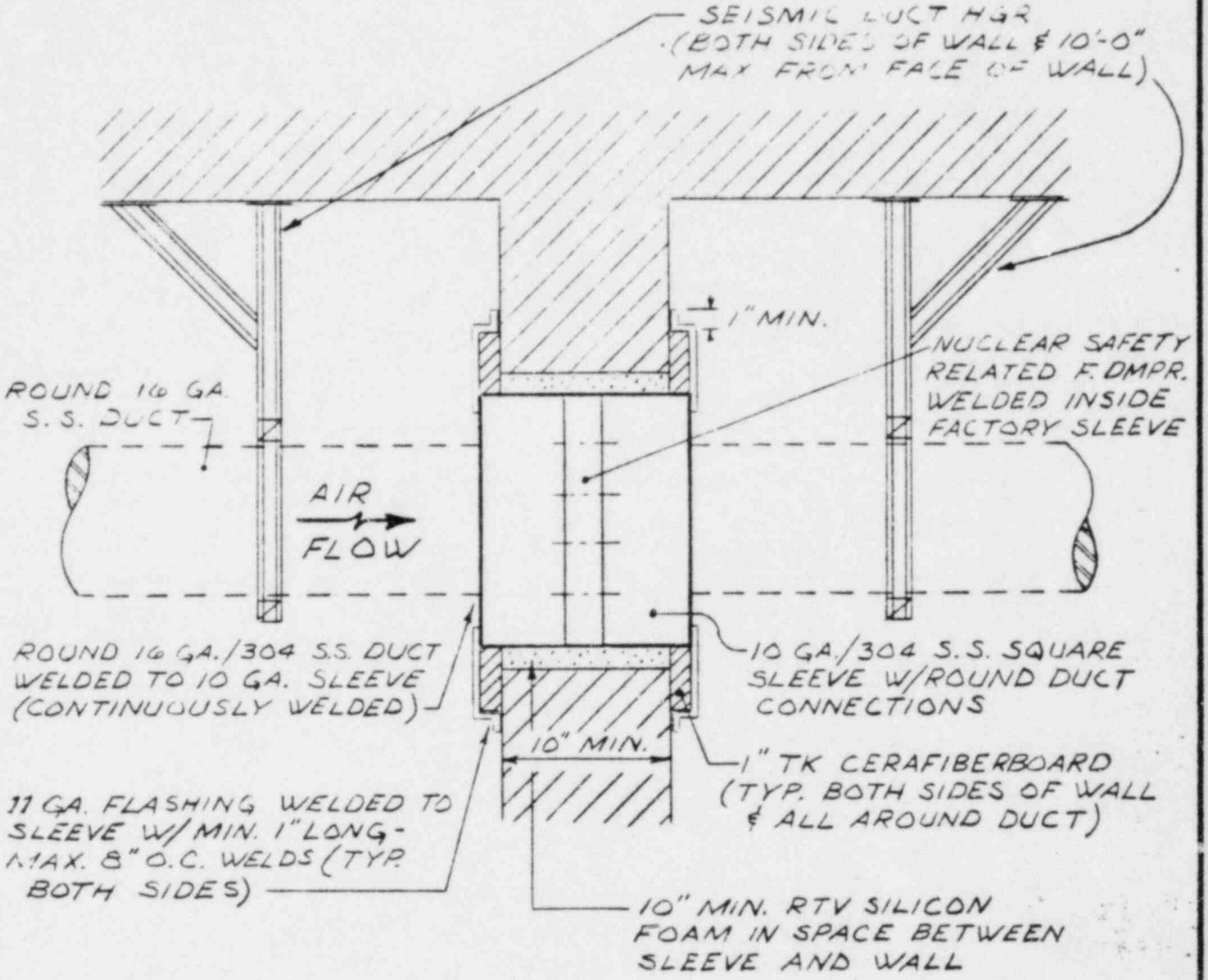
DUKE POWER CO.

McGUIRE NUCLEAR STATION UNIT 1 & 2
DUCT PENETRATIONS
FIRE STOP DETAILS

DRN.	RWE	11/14/72	CHKD.		
INSP.			APPR.		

SCALE NONE NO.

CASE-3



DESCRIPTION OF USE: THE ABOVE INSTALLATION IS USED IN NUCLEAR SAFETY RELATED ROUND OUTSIDE PRESSURIZING AIR INTAKE DUCTS. THE DAMPER AND SLEEVE WERE PURCHASED AS A UNIT FROM THE DAMPER MFG.

NO.	REVISION	CHKD	APPR	DATE

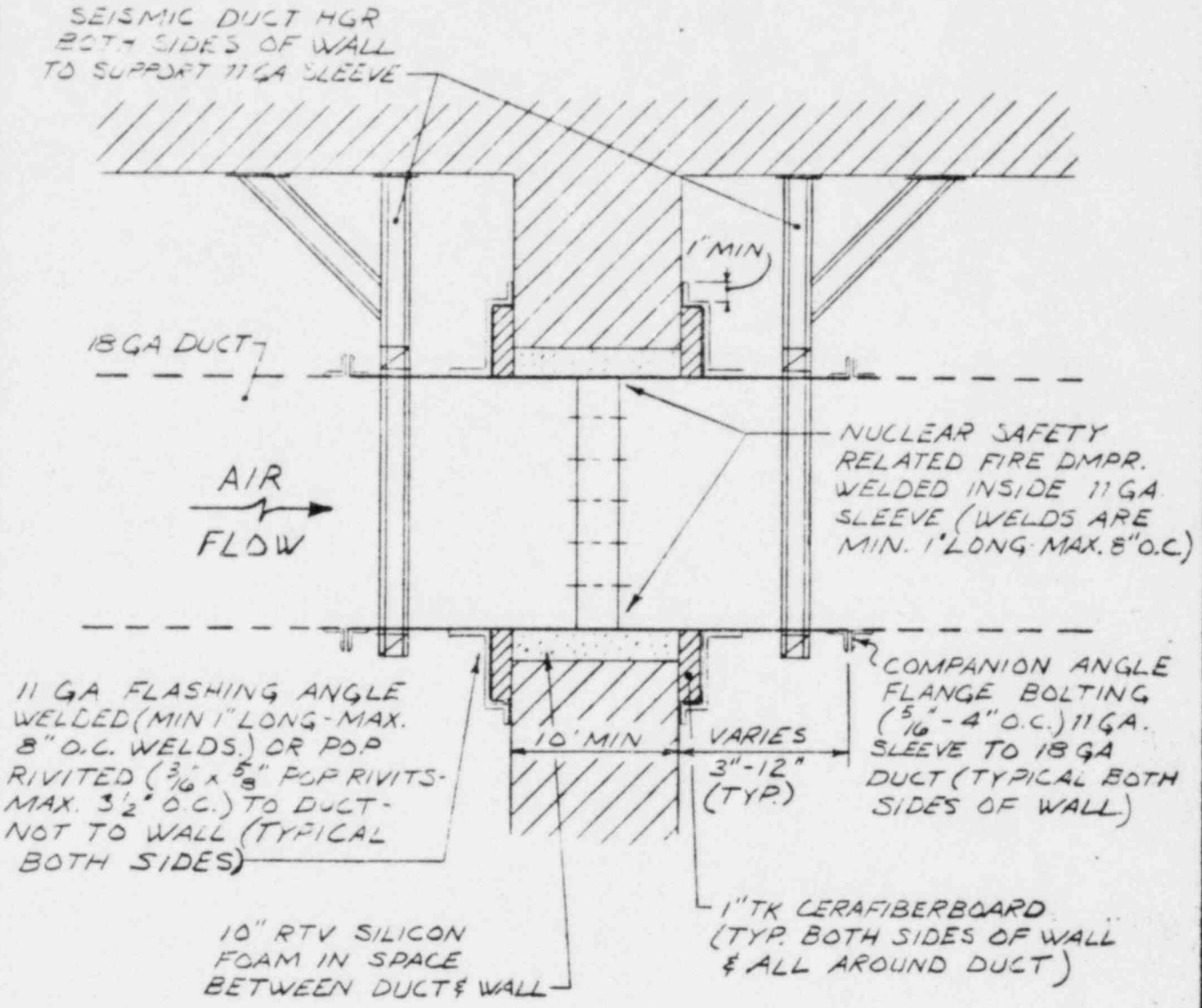
DUKE POWER CO.

McGUIRE NUCLEAR STATION UNITS 1&2
DUCT PENETRATIONS
FIRE STOP DETAILS

DRN.	RWE	10/14/78	CHKD.		
INSP.			APPR.		

SCALE NONE NO.

CASE - 2



DESCRIPTION OF USE: THE ABOVE INSTALLATION IS USED IN NUCLEAR SAFETY RELATED DUCTS WHICH PASS FROM ONE SAFETY RELATED AREA THROUGH A FIRE RATED PARTITION TO ANOTHER SAFETY RELATED AREA.

NO.	REVISION	CHKD	APPR	DATE

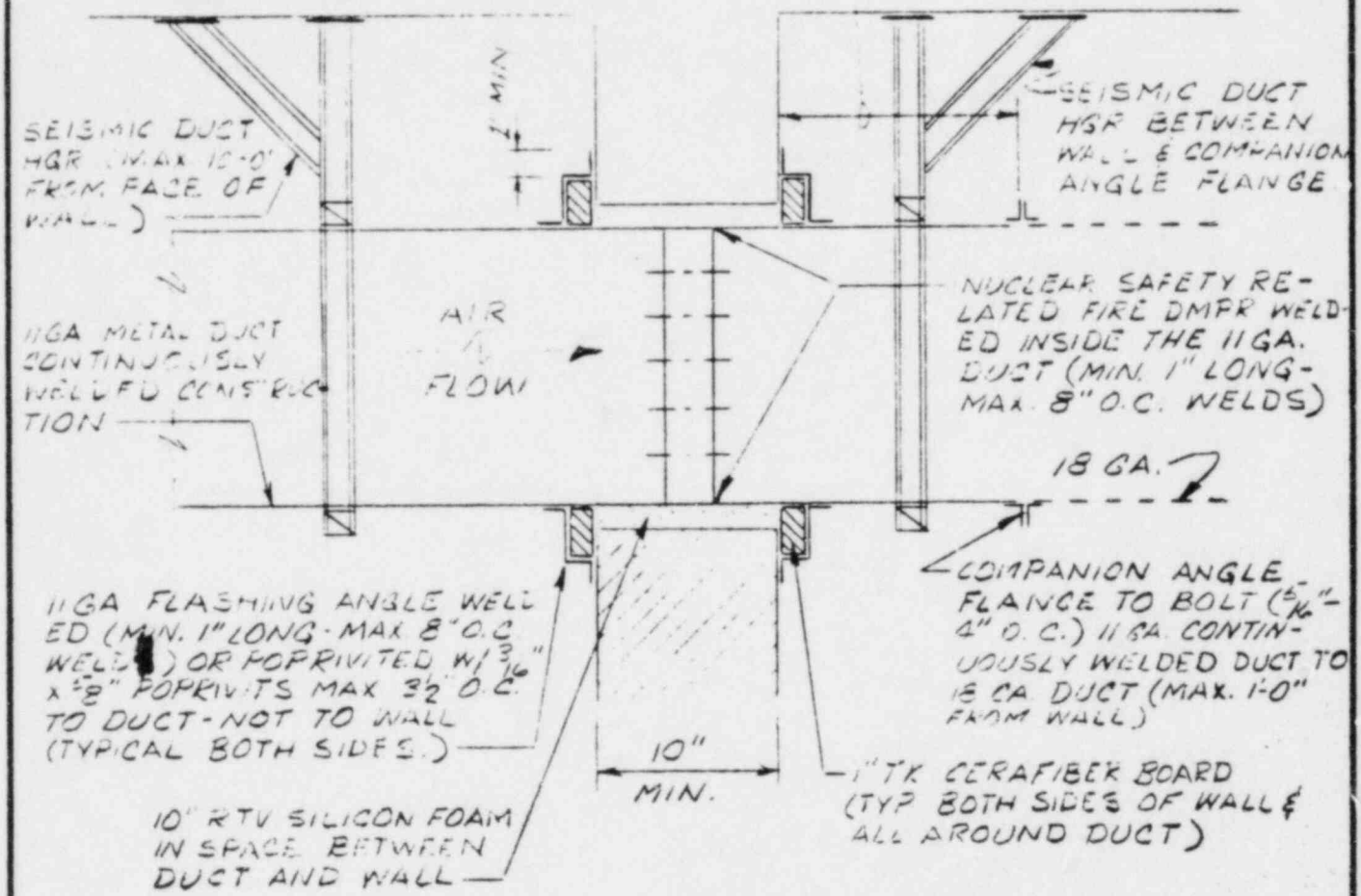
DUKE POWER CO.

McGUIRE NUCLEAR STATION UNITS 1&2
DUCT PENETRATIONS
FIRE STOP DETAILS

DRN.	RWE	5/16/79	CHKD.		
INSP.			APPR.		

SCALE NONE No.

CASE - 1



DESCRIPTION OF USE: THE ABOVE INSTALLATION IS USED IN NUCLEAR SAFETY RELATED DUCTS FROM THE HVAC EQUIPMENT AREAS OR DUCT SHAFTS WHICH SERVE SAFETY RELATED AREAS.

NO.	REVISION	CHKD	APPR	DATE

DUKE POWER CO.

McGUIRE NUCLEAR STATION UNITS 1 & 2
DUCT PENETRATIONS
FIRE STOP DETAILS

DRN.	TRT	10/16/78	CHKD.		
INSP.			APPR.		

SCALE NONE NO.

The previously filed responses to positions 28, 29, 30 and 34 were satisfactory.

To determine whether or not a fire in an individual battery room which caused failure of the overhead steel beams in the room would affect adjacent battery room, the structural stability of the individual battery rooms was reviewed. The conclusion is that the seismic design criteria for the walls provides a greater horizontal load on this wall than would be applied if the overhead steel failed and sagged; therefore, a fire would not affect adjacent battery rooms.